

## Volume 2

HIGH PERFORMANCE TOOLING SOLUTIONS





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**MEGA Micro Chuck**

Ultra slim design eliminates any interference.



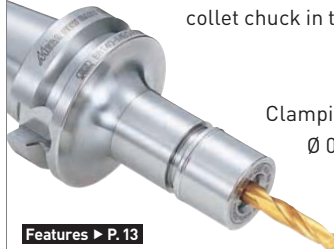
Clamping range:  
Ø 0.45 - 8.05

Features ▶ P. 12

BBT Shank	46
BDV Shank	96
HSK Shank	128/163/170
Cylindrical Shank	208
BIG CAPTO Shank	178
For N/C Lathe	242

**MEGA New Baby Chuck**

Most reliable high precision collet chuck in the world.



Clamping range:  
Ø 0.25 - 25.4

Features ▶ P. 13

BBT Shank	48
BDV Shank	97
HSK Shank	130/165/171
BIG CAPTO Shank	179

**MEGA E Chuck**

Original and exclusive design for small endmilling.



Clamping range:  
Ø 3 - 12

Features ▶ P. 14

BBT Shank	52
BDV Shank	99
HSK Shank	134/172
BIG CAPTO Shank	182

**MEGA Double Power Chuck**

Specialist for heavy-duty cutting.



Clamping range:  
Ø 3 - 42

Features ▶ P. 15

BBT Shank	53
BDV Shank	100
HSK Shank	135/173
BIG CAPTO Shank	183

**New Baby Chuck**

High precision collet chuck for various applications.



Clamping range:  
Ø 0.25 - 20

Features ▶ P. 16

BT Shank	56
DV Shank	102
HSK Shank	138
Cylindrical Shank	209
For N/C Lathe	238

**New Hi-Power Milling Chuck**

Reliable milling chuck with slim design.



Clamping range:  
Ø 3 - 42

Features ▶ P. 17

BBT Shank	58
BDV Shank	104
HSK Shank	139
Cylindrical Shank	211
BIG CAPTO Shank	185
CK Shank	201

**MEGA Perfect Grip**

Unique design anti pulling out cutter milling chuck.



Clamping range:  
Ø 16 - 32

Features ▶ P. 18

BBT Shank	55
DV Shank	101
HSK Shank	137

**Hydraulic Chuck**

Various design with outstanding repeatability.



Clamping range:  
Ø 3 - 32

Features ▶ P. 19

BBT Shank	60
BDV Shank	106
HSK Shank	141/167
Cylindrical Shank	210
BIG CAPTO Shank	186

**MEGA Synchro Tapping Holder**

Improves thread quality and tool life.



Tapping range:  
M1 - M36

Features ▶ P. 20/21

BBT Shank	66
BDV Shank	108
HSK Shank	146
Cylindrical Shank	215
BIG CAPTO Shank	187
CK Shank	203
For N/C Lathe	242

**Shrink Chucks**

Shrink fit solution with BIG-PLUS interface.



Clamping range:  
Ø 4 - 25

BBT Shank	64
BDV Shank	107
HSK Shank	144
Cylindrical Shank	212

**Face Mill Arbors**

Eliminates chatter for smoother finish.



BBT Shank	72
BDV Shank	111
HSK Shank	148
BIG CAPTO Shank	190

**Smart Damper for Milling**

Unique modular damping face mill arbor.



Features ▶ P. 22

BBT Shank	73
BDV Shank	112
HSK Shank	149

**Side Lock Holders**



Clamping range:  
Ø 6 - 50

BBT Shank	68
BDV Shank	109
BIG CAPTO Shank	188

**CK Shanks**

Various CK shanks for boring systems.



Features ▶ P. 27

BBT Shank	74
BDV Shank	113
HSK Shank	150/168
Cylindrical Shank	214
BIG CAPTO Shank	192
Reductions, Extensions	196

**Dyna Test**

Precision measuring tools of the highest quality for machine tool maintenance.



Features ▶ P. 42

BBT Shank	93
BDV Shank	126
HSK Shank	174
BIG CAPTO Shank	193

**Millturn Tooling HSK-T**

Unique modular turning system.



Modular Turning Tools	218
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**Millturn Tooling BIG CAPTO**

Modular turning tools and high precision rotary tool holders.



Modular Turning Tools	228
Rotary Tool Holders	178

**N/C Lathe Tooling**

For improved efficiency and reliability of production on NC lathe.



For N/C Lathe	237
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**Tool Assembly Stations**



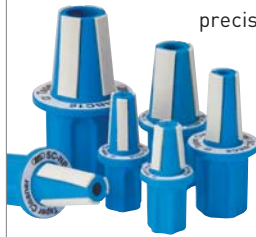
**Torque Fit**  
With integrated torque measuring system.

**Kombi Grip**  
For HSK and BIG CAPTO.

Features ▶ P.42

Torque Fit	284
Tooling Mate	283
Kombi Grip	283

**Cleaners**



Maintain accuracy of high precision collet chucks.

$\alpha$ Taper Cleaners	286
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$\alpha$ Wiper Cleaners	286
$\alpha$ Tooling Cleaners	287
Spindle Cleaners	287

**Pull Stud Bolts / Coolant Pipes**



**Pull Stud Bolt**

**Coolant Pipe**  
For HSK form A and E.

Coolant Pipes	175
Pullstud Bolts	288
Pullstud Wrenches	289

**Angle Heads**

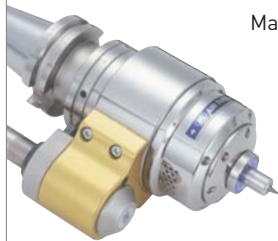


Eliminates multiple set up.

Features ▶ P.24

BBT Shank	78
BDV Shank	116
HSK Shank	152
Stop Block	290

**Air Turbine Spindles**



Max. 120 000 min<sup>-1</sup>

Features ▶ P.25

BBT Shank	88
BDV Shank	121
HSK Shank	160/169

**High Spindles**



4, 5, 6 times speed increaser.

Features ▶ P.26

BBT Shank	92
BDV Shank	125

**Rough Boring Heads**



SW: Perfect roughing.

Features ▶ P.35

SW, Ø 20 - 203	297
TW, Ø 20 - 203	306
MW, Ø 16 - 21	296

**Digital Fine Boring Heads EWE**



EWE: Wireless communication to the BIG KAISER app.

Features ▶ P.30

EWE, Ø 2 - 152	312/332
EWE, Ø 41 - 203	349

**Fine Boring Heads EWN/EWB**



EWN 04-7: The smallest boring head in the world.

Features ▶ P.31

EWN, Ø 0.4 - 152	313/333/344
EWN, Ø 20 - 203	351
EWB, Ø 2 - 50	314/334
EWB, Ø 32 - 105	358
EWB-AL, Ø 100 - 203	358
EWB-UP, Ø 25 - 100	360

**Smart Damper Boring Heads**

Anti-vibration boring bars.



Features ▶ P.23

SW Smart Damper	299
EWD/EWN Smart Damper	350
BBT Smart Damper Shanks	75
BDV Smart Damper Shanks	114
HSK Smart Damper Shanks	151
Smart Damper Extensions	197

**Large Diameter Boring Tools**

Lightweight tools  
Ø 200 - 3 000 mm.



Features ▶ P.36

Series 318, Ø 200 - 620	367
Series 318, Ø 620 - 3 000	374
Series 317, Ø 200 - 620	379

**Indexable Inserts**

Specially selected inserts  
for boring operations.



Features ▶ P.37

Indexable Inserts	386
CBN/PCD Inserts	407
Boring Cutters	414

**Fullcut Mill**

**FCM and FCR type**

Super smooth cutting  
with low cutting force.



Features ▶ P.38

FCM Integral Type	444
FCM Cylindrical Type	450
FCM Arbor Type	451
FCR Integral Type	455
FCR Cylindrical Type	458
Contact Grip	462

**Speed Finisher**

High speed cutter for  
incredibly smooth  
surface finish.



Features ▶ P.40

Speed Finisher	468
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**Surface Mill**

Unique design  
face mill cutter.



Surface Mill	467
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**C-Cutter Mini**

Ultra high feed  
chamfer mill.



Features ▶ P.41

Multi Insert Type	476
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CKB Type	479

**C-Cutter**

Extensive chamfering range.



Standard Type	482
Universal Type	482
CKB Type	483

**R-Cutter**

Automated R-chamfering.



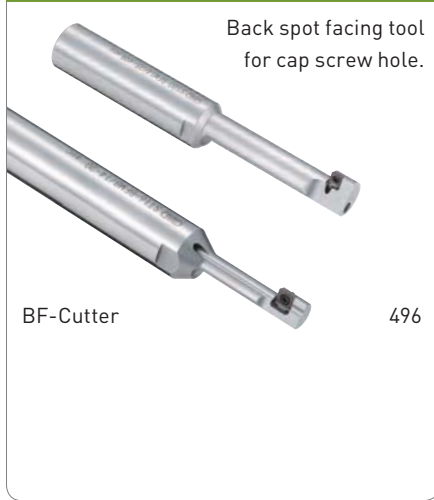
Front and Back Chamfering	488
Front Chamfering	489
CKB Type	490

**Slot Milling Cutters**



Cylindrical Type 494  
 CK Type 494  
 Arbor Type 494

**BF-Cutter**



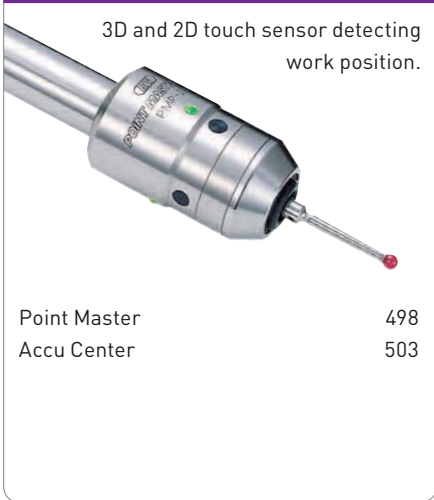
Back spot facing tool for cap screw hole. 496

**Center Boy**



Center and chamfer in one. 487  
 Center Boy 492

**Edge Detector**



3D and 2D touch sensor detecting work position. 498  
 Point Master 503  
 Accu Center 503

**Tool Offset Sensor**



Magnetic tool offset sensor. 501  
 Base Master 503  
 Tool Master 503

**Alignment Tool for ATC Arm**



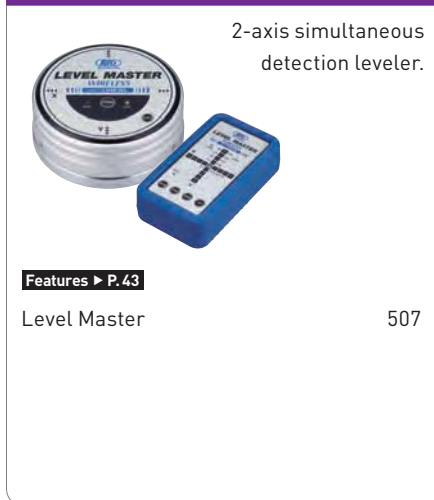
For maintenance of machine tool spindle. 504  
 ATC Alignment Tool 504

**Dyna Contact**



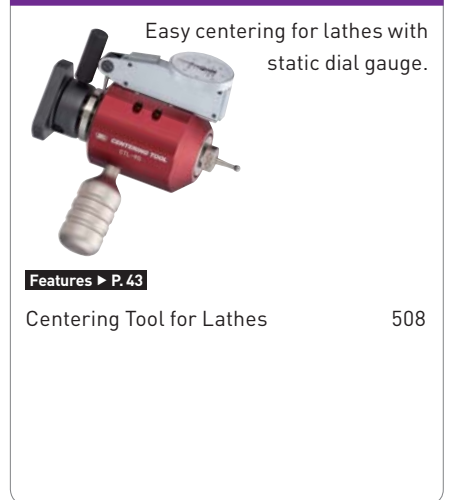
A ceramic taper gauge for machine taper inspection. 506  
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**Level Master**



2-axis simultaneous detection leveler. 507  
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 Level Master 507

**Centering Tool for Lathes**



Easy centering for lathes with static dial gauge. 508  
 Features ▶ P.43  
 Centering Tool for Lathes 508



# The Original Simultaneous Taper and Flange Fit Spindle System for Steep Taper



The BIG-PLUS spindle system exceeds all other interface concepts thanks to simultaneous taper and face contact between machine spindle and tool holder. Furthermore the system offers full interchangeability with existing machines and tool holders.

In a first step a taper contact is resulting during entering the tool into the machine spindle. Due to the pull-in force the tool taper expands the spindle in the elastic range. The tool is pulled further into the spindle until the tool flange reaches the surface of the spindle nose.

**Advantages**

- Improved surface finish & dimensional accuracy
- Extended tool life
- Prevention of fretting corrosion caused by heavy cutting
- Improvement of ATC repeatability
- Elimination of Z-axial movement at high speeds
- Improved roundness of boring operation

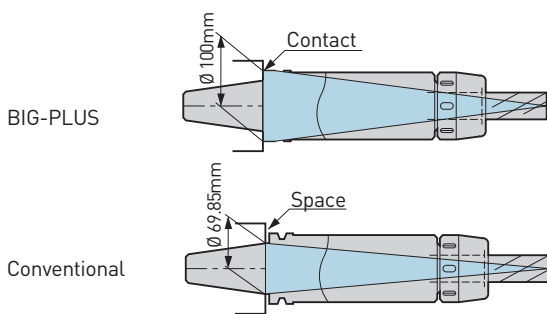
**Basic concept**

The BIG-PLUS Spindle System is based on the most current available standards in JIS B6339 and DIN 69871.

A conventional steep taper tool holder is supported on a reference diameter called the gauge face. On the contrary, a BIG-PLUS tool holder is supported on the flange face, which brings remarkable improvement to rigidity.

	Conventional	BIG-PLUS
BT50	Ø 69.85	Ø 100
BT40	Ø 44.45	Ø 63
BT30	Ø 31.75	Ø 46

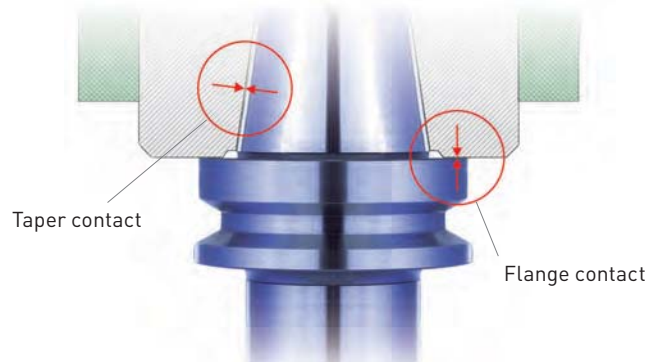
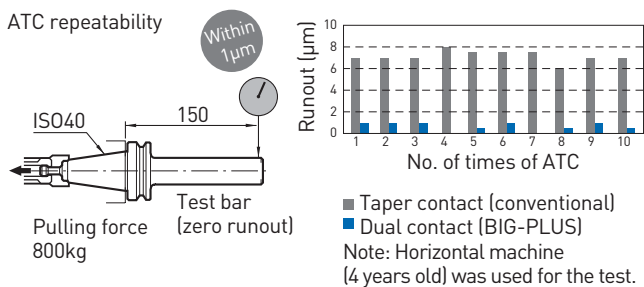
**Increased contact diameter (example of BT50)**



**Improvement of ATC repeatability**

The BIG-PLUS spindle System assures the highest precision location of the tool holder in the spindle when using the ATC for loading tools, as a result of the dual contact which precisely positions the tool holder within 1 micron.

ATC repeatability

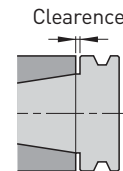
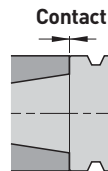


**Perfect interchangeability**

BIG-PLUS tool holders can be used on existing standard machine spindles. Existing standard tool holders can also be used on BIG-PLUS spindles. In this case, simultaneous contact cannot be attained.

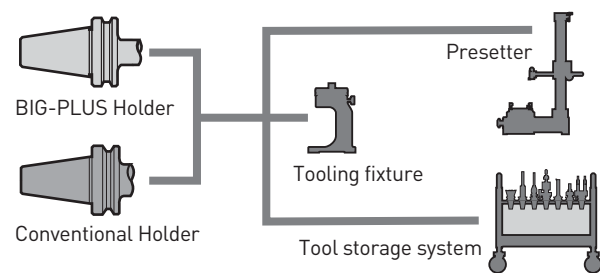
BIG-PLUS Spindle + BIG-PLUS Holder

Conventional Spindle + BIG-PLUS Holder



Although other simultaneous contact systems require exclusive new accessories, the BIG-PLUS spindle uses existing accessories such as a presetter and tool holder fixture as it is based on a conventional steep taper shank. Further, it is not necessary to modify tool magazines and ATC devices of existing machines.

**Existing accessories utilized**



**Note:**

BIG-PLUS tools are available as BBT or BDV in page 45 - 94 and 95 - 126.

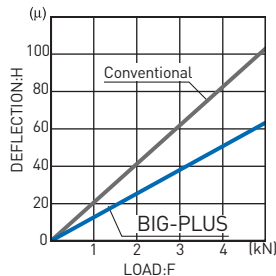
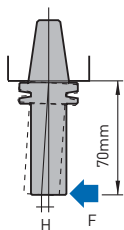


**Minimized deflection for maximum machining, accuracy and superior finish**

With BIG-PLUS simultaneous contact, machining rigidity is greatly enhanced due to the larger contact diameter of the tool holder flange face. This larger face contact combined with the taper contact works together to resist deflection. With less deflection, greater machining accuracy and superior finish can be achieved.

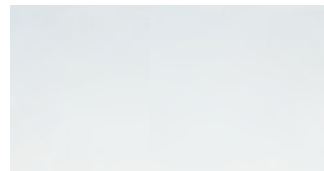
Comparison of deflection

**BT40**



Deflection of machine spindle is included. Vertical machine was used for the test.

**Face milling application**



BIG-PLUS



Standard

Machine tool: #40 (horizontal machining center)  
 Cutter: Face milling Ø 125 (6 cutting edges)  
 Work material: A2017 Duralumin  
 Cutting depth: 2.4 mm

**Caution: The Original Simultaneous Taper and Flange fit Spindle System for Steep Taper**

**More than 85% of not original dual contact BIG-PLUS® are not in tolerance**

There are many manufacturers who claim to have dual contact tooling system: But only a few have an official license of BIG-PLUS®. Without a license, these manufacturers haven't the master gauges nor the measuring devices or the tolerances for defining the critical dimension of the distance between the taper gauge line and the tool flange. However, according to our inspection\*, 85% of the tested tool holders are out of the official BIG-PLUS® tolerance. Only original BIG-PLUS® tool holders enable the benefits and strengths of a BIG-PLUS® spindle system. BIG KAISER controls 100% of its BIG-PLUS® tool holders and therefore guarantees that all products are in the tight BIG-PLUS® tolerance.



BIG-PLUS is the trademark guarantee to maximize your machine capability.

\* Inspection results or samples of non-licensed dual contact tooling measured according to the BIG-PLUS® standard.

## HSK Tooling Systems

Selected materials and strict control of dimensional accuracy for the optimum quality. Wide range of standard holders to meet all production requirements.

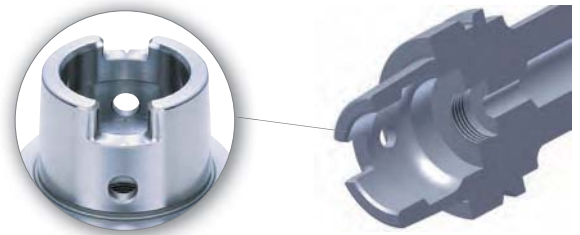
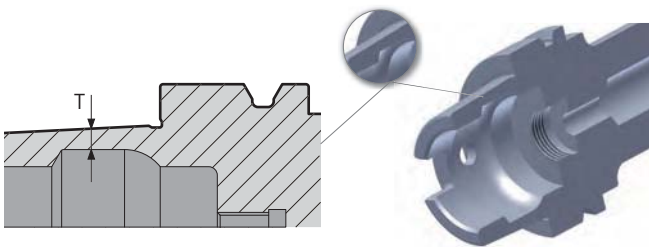


### Premium material selection

Since HSK is a hollow taper shank, the material has a critical role for optimum performance. BIG KAISER uses carefully selected high grade alloy steels. Particularly, BIG KAISER uses die steel materials for HSK 40 and smaller where the cross section of shank taper is very thin.

### Drive key form

HSK shanks according to form A are designed to carry out torque transmission by the round shaped key-way at the end of the taper. Because of the importance of this round shaped geometry, BIG KAISER provides finishing of this feature after heat treatment.



HSK Size	25	32	40	50	63	100
T	1.09	1.25	1.92	2.60	3.47	5.17

### HSK turning tools

HSK-T63 / T100 (ISO 12164-3)

Unique modular type of turning system offer various solution for turning applications.

### Great variety of HSK

Following HSK types are standardized to offer the best possible solution. Other types are also available upon request.

HSK-A32/A40/A50/A63/A100/A125

HSK-E25/E32/E40/E50

HSK-F63/F80M

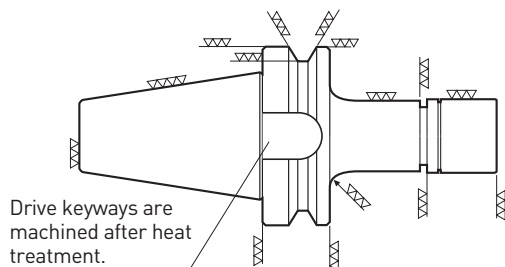






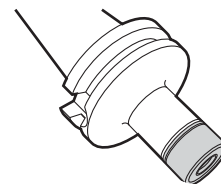
**Precision ground and balanced for high speed machining**

MEGA Chucks are micro mirror ground finished on all surfaces to assure perfect concentricity for high speed machining. The drive keyway is machined after heat treatment.



**Notch-free design MEGA NUT prevents vibration and reduces noise**

Vibration at high speeds is eliminated with the use of notch free designed nuts, which offer superior balance and concentricity.



**Perfect quality control**



All tools are marked with serial no. as a proof of a high quality and good traceability. 100% tools are inspected its quality to guarantee high performance.

**Easy and firm clamping by the MEGA Wrench**

The unique MEGA Wrench has a one way clutch system with roller bearings and a ratchet function which is capable of safely and evenly applying force to the entire nut periphery.



**Tool identification service available**



As an experienced partner for tool management solutions, BIG KAISER is ready to provide its tooling with various solutions for tool identification such as data matrix codes or ID sensors.

**4 chuck types for different high speed machining requirements**

**MEGA Micro Chuck**

For micro drills and end mills  
Clamping range:  
Ø 0.45 - 8.05 mm



**MEGA New Baby Chuck**

For carbide drills, reamers and end mills  
Clamping range:  
Ø 0.25 - 25 mm



**MEGA E Chuck**

For end mills and reamers  
Clamping range:  
Ø 3 - 12 mm



**MEGA Double Power Chuck**

For end mills  
Clamping range:  
Ø 3 - 42 mm



## MEGA MICRO CHUCK®



- max. 50 000 min<sup>-1</sup>
- Clamping range: Ø 0.45 - 8.05
- 0.1 mm increments for higher precision



### Nut diameter 10, 12, 14 & 18mm, extremely slim design

Slim design avoids interference. Ideal for small mold making combining high speed and high precision capability.



Ø 10 mm  
3S type

### High concentricity

100% concentricity inspection. Within 1 µm at nose is guaranteed.



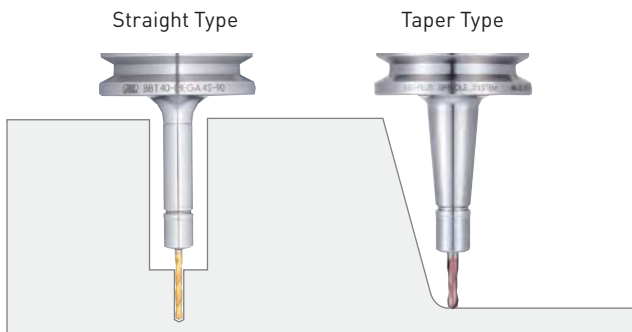
High precision Micro Collet

### Three versions are available

Straight Type: where access is restricted

Taper Type: for increased rigidity

Cylindrical Shank Type: for increased versatility



### Collet concentricity

	Collet class	Max. runout	
		At nose	At end of test bar
	AA	Within 1 µm	Within 3 µm

### Efficient coolant supply



Sealing nut for MEGA6S and MEGA8S brings various solution for micro machining such as high pressure coolant supply and dust proof.

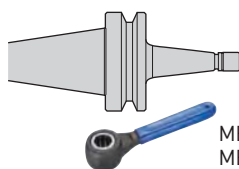


### Cylindrical Shank Type

Flexible tool layout, for tighter and deeper area

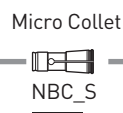


### MEGA Micro Chuck



MEGA Wrench  
MEGA Torque Wrench

▶ 271  
▶ 271

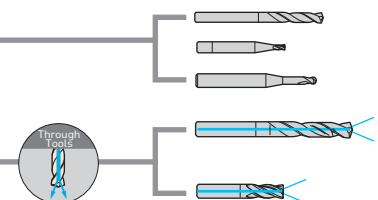


NBC\_S

▶ 247

Micro Seal Nut

▶ 249



## MEGA NEW BABY CHUCK®

High speed design, offered in six different size collet series, utilizes ultra precision New Baby Collets which guarantee a runout at the collet nose of less than 1 micron.

- max. 40 000 min<sup>-1</sup>
- Clamping range: Ø 0.25 - 25.4



### High precision collet, close to submicron

100% inspection to guarantee accuracy. Material, production, heat treatment, everything is selected for precision.



High precision NBC Collet

Collet concentricity

Collet Class	Max. Runout	
	At Nose	At End of Test Bar
AA	Within 1 µm	Within 3 µm

### 2 way coolant supply

Sealed collet nut MEGA Perfect Seal

- Standard NBC Collet is used
- High dust resistance
- Max. coolant pressure 7 MPa



Through Tools  
Tools with holes



Jet Through  
Tools without holes

### Various collet and nut selection

Various type of collet and nut can bring the best solution for your demand.

NBC Standard  
For general



NBC-E collet  
For end mill



FONBC collet  
For coolant-through tools



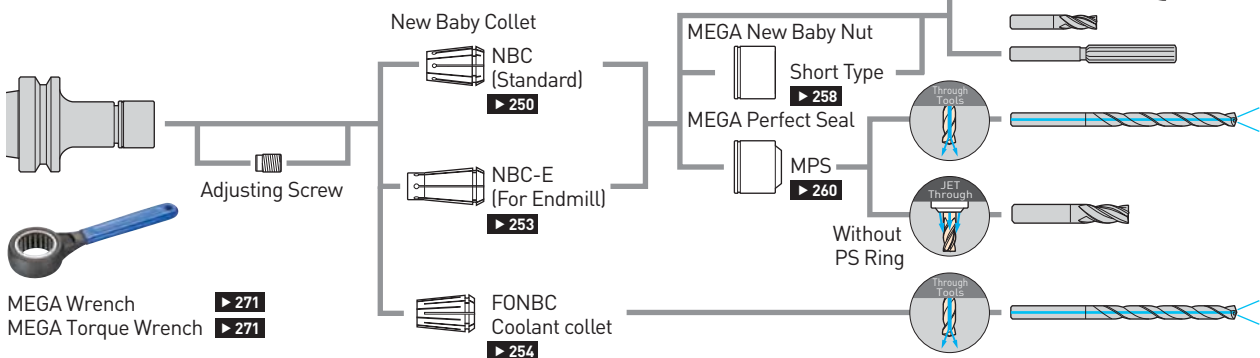
MGN nut  
For high speed



MPS nut  
For efficient coolant supply



### MEGA New Baby Chuck



## MEGA E CHUCK®

Collet chuck designed exclusively for endmilling up to Ø 12 mm with high concentricity and rigidity.



- max. 40 000 min<sup>-1</sup>
- Clamping range: Ø 3 - 12



### High concentricity

100% inspection to guarantee accuracy within 1µm runout at collet nose.

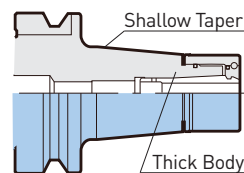


High precision MEGA E Collet

Collet concentricity

Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 µm	Within 3 µm

### Substantial and tapered body design



Thick body eliminates chatter and deflection. Tapered extension provides the rigidity to prevent vibration.

### Slit-through coolant

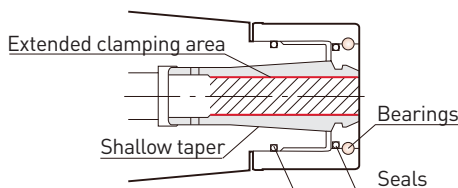
Coolant is reliably directed to cutting surface through slits in the collet. Tool life is extended together with improved surface finish as a result of smooth chip evacuation.

- Max. coolant pressure 7 MPa



### High grip collet

Gripping force is an important element for endmilling with a collet chuck. The long gripping length of the collet in the MEGA E series provides a powerful gripping force. The shallower taper of the collet improves concentricity in order to achieve better surface finishes and longer cutting tool life.



For coolant-through tools

Sealed collet nut to supply coolant reliably through cutting tool.

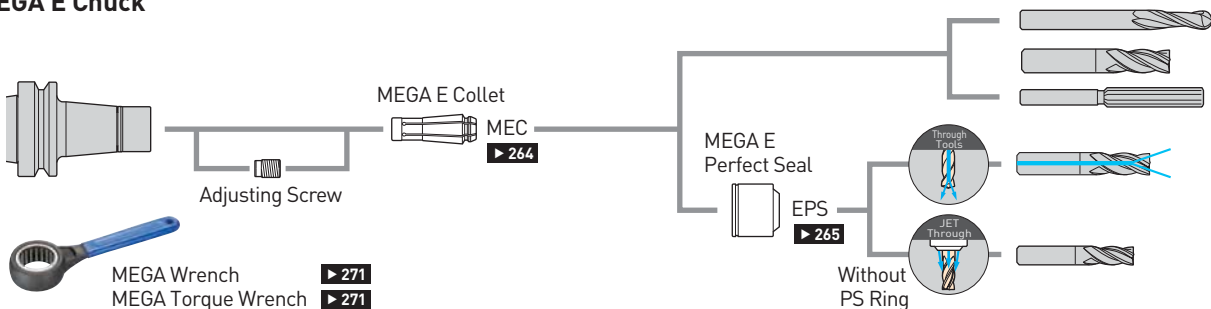


MEGA E Perfect Seal



Ideal for burnishing drills and reamers due to extended gripping length.

### MEGA E Chuck



## MEGA DOUBLE POWER CHUCK®

Flange contacting nut and simultaneous taper & flange contact assure highest rigidity.



- max. 30 000 min<sup>-1</sup>
- Clamping range: Ø 3 - 42
- Ideal for solid machines



### Stabilizing contact between flange and nut provides exceptional rigidity

The expanded contact diameter of the nut of the MEGA Double Power Chuck to the flange provides the highest rigidity as if the chuck and nut were one solid piece. This superior rigidity assures heavier duty machining without chatter.



### Secure coolant supply

Two types are designed for the most effective coolant supply.

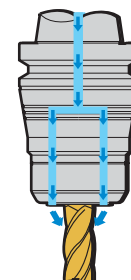
- Improved surface finish
- Extended tool life
- Smoother chip evacuation
- Cooling & lubrication of tools



Type D through tools



Type DS jet through



### Cutting conditions

Coated carbide endmill Ø32, 4-flutes Workpiece: SS400 (JIS) V282 m/min S2,800min <sup>-1</sup> F1 120 mm/min	BBT50-MEGA32D-105	Other manufacturer (L = 90)
	Radial d = 14 mm Power 15.2KW	Radial d = 9.5mm Power 9.2 KW

Various type of straight collets are available.

For jet through  
PJC collet



For through tools  
PSC collet

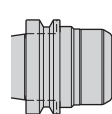


For through tools  
OCA collet



### MEGA Double Power Chuck

#### Type D



Adjusting Screw



MEGA Wrench  
▶ 275

C Collet ▶ 274

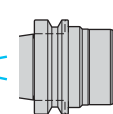
PSC Collet ▶ 273

OCA Collet ▶ 273

PJC Collet ▶ 272



#### Type DS



Adjusting Screw



MEGA Wrench  
▶ 275

C Collet ▶ 274

PJC Collet ▶ 272

PSC Collet ▶ 273





## New Baby Chuck

New Baby Chuck is capable of achieving high spindle speeds as required for drilling and end milling with smaller diameter cutting tools.

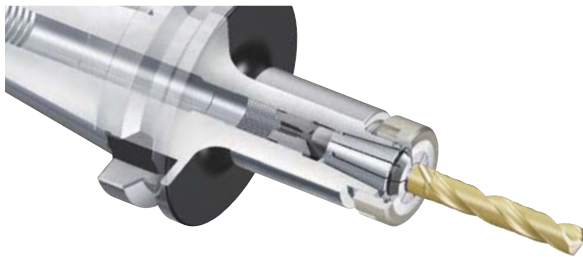


- Clamping range:  $\varnothing$  0.25 - 20



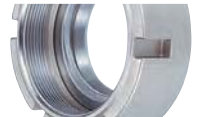
### Ideal combination of taper angle and collet projection length

New Baby Chuck satisfies all requirements for accuracy, clamping force and clamping range, by utilizing the ideal 12° taper angle.



### The nut is a key to achieve the highest precision of a collet

- Since the threads greatly influences accuracy, they are finished after heat treatment. Therefore, bad influence from clamping action is eliminated, which enhance clamping performance.
- A nut incorporates a thrust bearing with steel balls that prevents stress to a collet and allows a smooth clamping force to a collet.



### High concentricity



Each collet is inspected and double checked to meet maximum runout tolerance permitted.

Collet concentricity

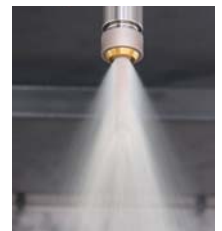
Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 $\mu$ m	Within 3 $\mu$ m

### For high pressure coolant supply

- Standard NBC Collet is used.
- High dust resistance
- Max. coolant pressure 7 MPa

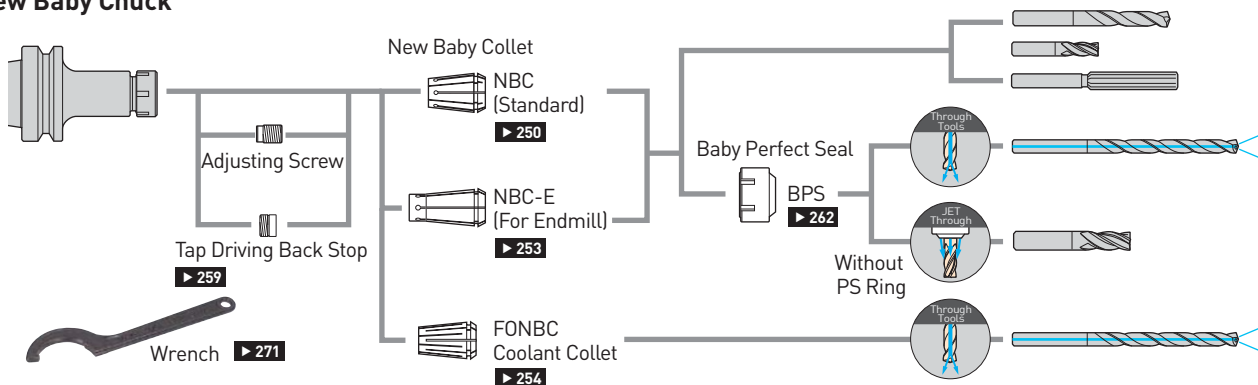


Through Tools  
Tools with holes



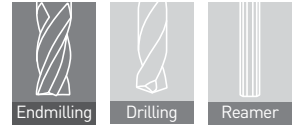
Jet Through  
Tools without holes

### New Baby Chuck



## New Hi-Power Milling Chuck

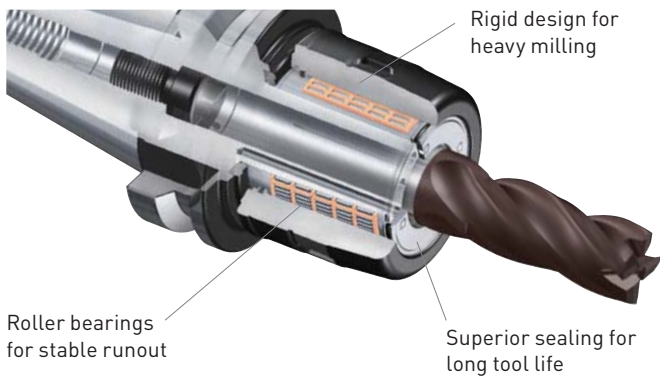
New Hi-Power Milling Chuck combines the high accuracy with high torque capability and rigidity.



- Clamping range:  $\varnothing$  3 - 42



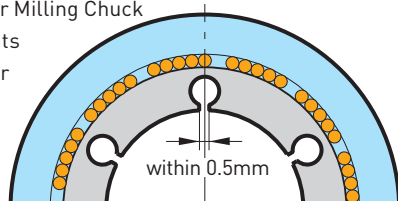
### High rigidity design for heavy cutting



### Secure and reliable slit design

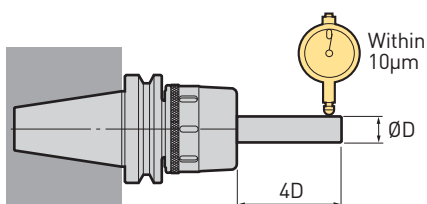
The annular section needs to be substantial in order to provide rigidity but retain the ability to collapse in order to provide sufficient grip.

The section of the Hi-Power Milling Chuck has combined holes and slits at regular intervals in order to combine both requirements.



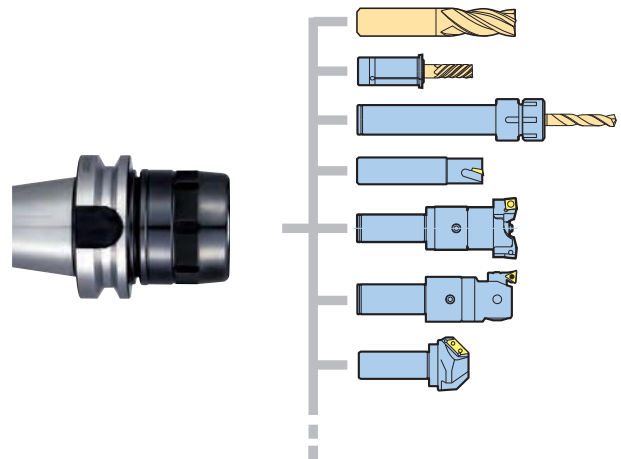
### Precise concentricity

Concentricity is assured by the integral design and clamping by mechanical compression of the annular section by the rolling bearing system. All models are inspected and double checked to meet maximum runout tolerance permitted. (within  $10\mu\text{m}$  at  $4D$ ).



### Basic tool for various applications

New Hi-Power Milling Chuck is a good basic tool. Not only for milling tool, but also for boring tools, chamfering tools and various applications.

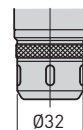


### HMC12J type

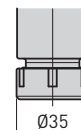
Super slim design milling chuck with peripheral coolant supply function is also available.



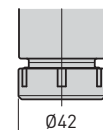
HMC12J



NBS13



NBS16



## MEGA Perfect GRIP®

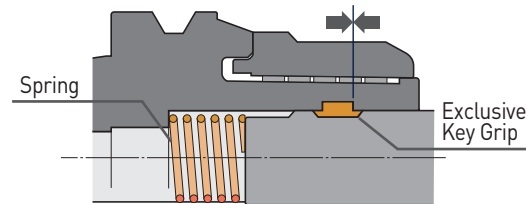
Features 100% security against pulling out the cutting tool under any torque load.

- Accepts industry standard Weldon flat milling cutters
- No special grinding of milling cutter required
- Flood jet-through coolant
- Available with BBT40/50/DV50 and HSK-A63/100/125



### Non-Pullout mechanism

The Key Grip engages in the groove of the chuck body to ensure no tool pullout.

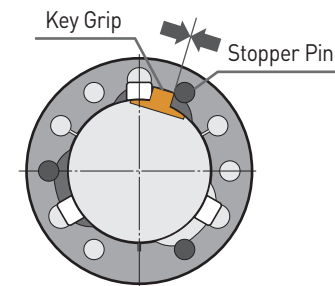


### Simple, easy handling with secure clamping

1. Place the exclusive key grip into the Weldon flat of the end mill shank.
2. Insert the end mill with the key grip in alignment with one of the three key grip grooves inside the milling chuck.
3. Rotate the end mill approximately 20° clockwise until the key grip stops securely against the stopper pin.
4. Finish clamping the tool until the clamping nut contacts the positive stop of the chuck body.

### Non-Slip mechanism

The Key Grip maintains contact with the stopper pin to prevent any slip under high torque.



### Flood jet-through coolant

The key grip grooves provide channels for high volume coolant to the cutter. Effective end milling of HRSA's requires a high volume of coolant to the cutting edge to dissipate heat and aid in the removal of chips.



### Perfect contact between flange and nut

The expanded contact diameter of the nut of the MEGA Perfect Grip to the flange provides the highest rigidity.



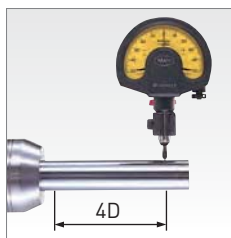


## HYDRAULIC CHUCK

Ultra precision hydraulic clamping chuck holder with various additional features.



### Runout accuracy less than 3 μm



High precision runout accuracy less than 3 μm at 4d improves the workpiece surface finish and extends tool life.

### Various selection of Hydraulic Chuck

The Hydraulic Chucks come in a variety of design and function to cover specific demands within high precision application.

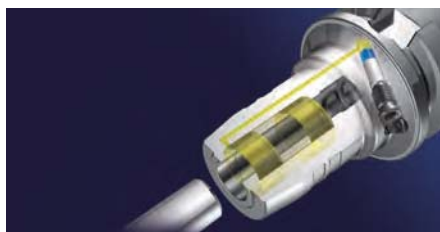
- Slim and high speed
- Slim design available from Ø 3 mm
- Jet-through coolant supply



Super Slim Type

### Integral sleeve construction

Compared with the traditional two-part construction sealed with O-rings, BIG KAISER Hydraulic Chucks are long lasting and maintenance free. Also the rigidity is greatly improved by the short projection length and dual pressure points.



Super compact and high speed  
(max. 60 000 min<sup>-1</sup>)



Cylindrical shank  
with coolant-through



### Easy clamping with 1 wrench



The cutting tool can be clamped or unclamped easily and securely with just 1 wrench. Extremely good repeatability and runout accuracy are guaranteed.

Jet-through coolant supply (max. 30 000 min<sup>-1</sup>)



Coolant to cutting  
tool periphery

## MEGA SYNCHRO<sup>®</sup> Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



- Tapping range: M1 - M36



### 39 body models and 188 tap holder models are available

New large tap series achieves the max. M36. An extensive variety of bodies suitable for many spindle types. Short, middle & long tap holders are standardized to cover between M2 and M36.

The slim design avoids interference.



### Secure drive system

Body and tap holder are fixed with a drive key in the rotation direction as well as the square of the tap.



Drive Key



**Tool periphery**  
Coolant is supplied through slits of the tap holder.



**Through tool**  
Coolant is supplied through both the tool and the slits of tap holder.

### Coolant through center capability for all models

Coolant is supplied both through the tool and to the tool periphery simultaneously.



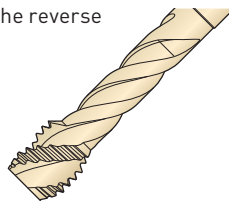
**MEGA Synchro Tapping Holder compensates for synchronization errors with any type of tap**

Minimized thrust load to both the tap and workpiece improves thread quality and tap life.

**Load to tap – spiral tap**

Spiral grooves on spiral tap cause loading in the reverse direction, similar to an end mill.

- M6 P1
- V: 20 m/min (1060 min<sup>-1</sup>)
- Measured by Kistler dynamometer

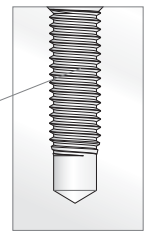


**Comparison of surface finish**

Tapping of exotic materials tends to cause a compressed burr on the thread surface. BIG KAISER MEGA Synchro compensates for synchronization errors and minimizes cutting load.

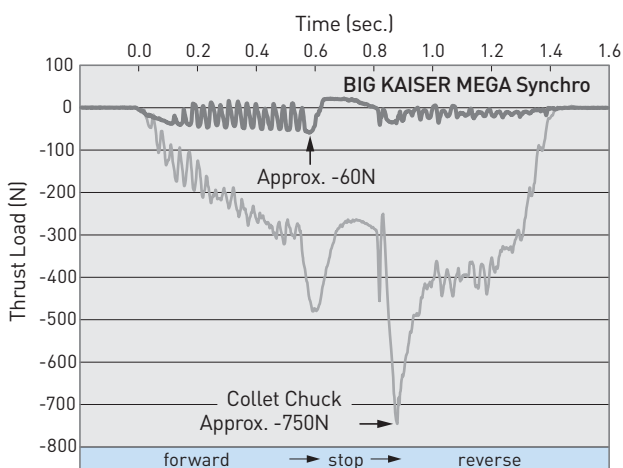
Spiral tap

M5 P0.8 Material : SNCM420(41CrNiMo2)



Collet chuck

MEGA Synchro

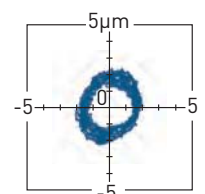


**Result**

MEGA Synchro reduces load to approx. 60N. This is less than 1/10th of the load compared to a collet chuck. Approx. 750N of reversal load is applied to a tap held with a collet chuck.

**For small tap MGT3 (M1 - M3)**

Eliminated synchronization errors and minimized dynamic runout. Plotted position of a test bar (at 16 mm distance on 4 mm diameter).



**For large tap MGT36 (M22 - M36)**

Smooth tapping for large tapping.



## Smart Damper Series

Unique dynamic damping system eliminates vibration for higher productivity.



- Unique damping system for milling and boring
- Center through coolant supply

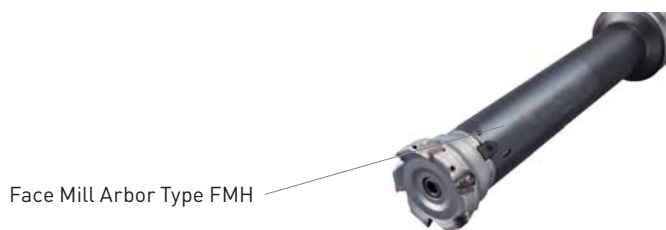
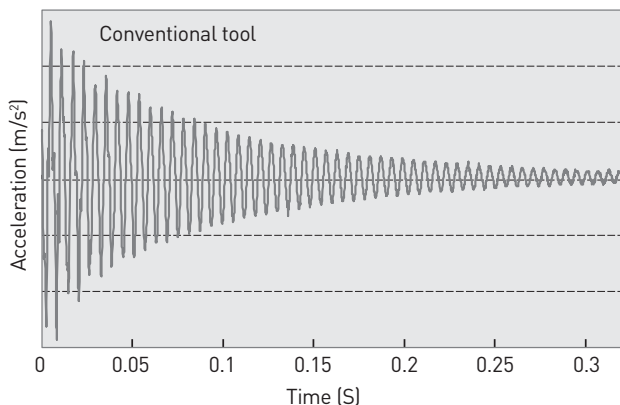
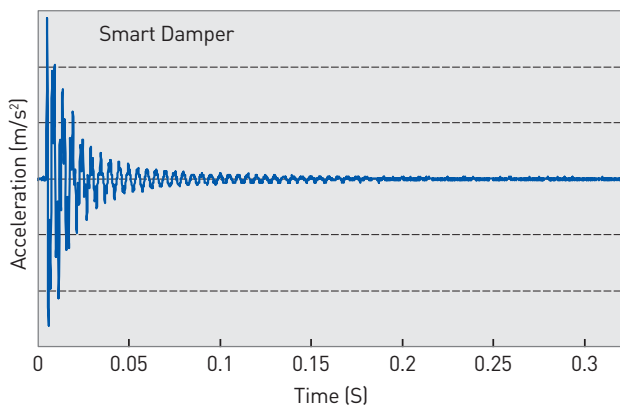


### Damping mechanism

Smart Damper incorporates unique damping mechanism functioning both counter and friction dampers. Patent-pending counter weight maximizes effect of the friction damper. Vibration is absorbed effectively and higher machining accuracy is achieved.

### Comparison of oscillatory waveforms

Smart Damper incorporates a unique counter force damping mechanism by friction dampers. Vibration is absorbed effectively and higher machining accuracy is achieved.



Face milling of C55 with high feed cutter

Holder	Radial depth of cut (mm)				Condition
	5	10	20	30	
Standard Holder	○	X	X		 V=90m/min Fz=1.0/tooth Ap=2.0mm Overhang=347mm
Smart Damper	○	○	○		

Smart Damper achieves 6x deeper depth of cut.

Super finish surface with tough condition

Fine boring of ductile cast iron (FCD500) with horizontal MC BIG-PLUS BBT50

Holder	Cutting speed (m/min)				Condition
	25	50	100	150	
Holder without damper	○	X	X		 Dia=Ø68mm Depth=408mm (L/D=6) Insert radius=R0.4 Feed=0.2mm/rev Depth of cut=m0.3mm/Ø
Built-in Damper Smart Damper BBT50-CK-6DP-451	○	○	○		

X = Chattering ○ = Good ◎ = Excellent surface finish

6 times greater productivity. Superior surface finish and better tool life due to increased cutting speed.



**Smart Damper CK Boring Tools**

Wide variety, such as extension type, integral type, fine boring, rough boring are available depending on your application.



**EWD/EWN Fine Boring Type**  
Damping function integrated in the head achieves the best surface finish.

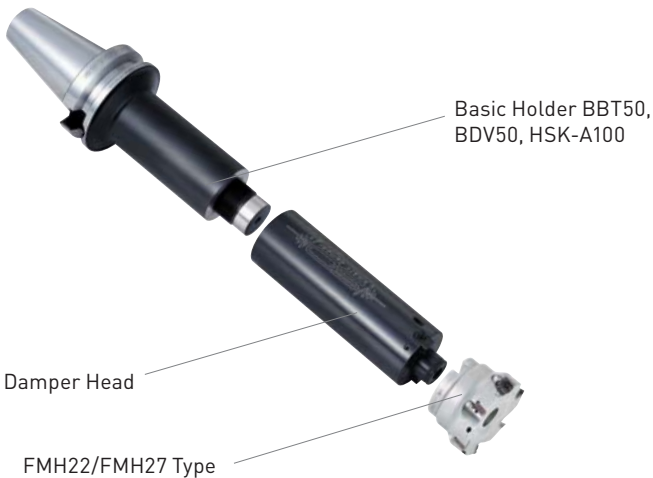
**SW Rough Boring Type**  
Damping function integrated in the head maximizes cutting performance.

**CK Shank Integral Type**  
Damping function integrated in CK shank offers more flexibility in selecting the boring head.

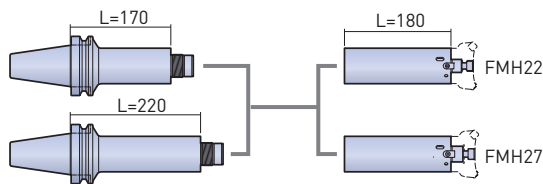
**CK Extension Type**  
Easy update of the existing CK boring to a damping boring tool.

**Smart Damper Face Mill Arbor**

Replaceable damper head enables use on various basic holders.

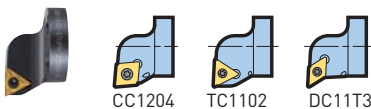


Combination examples BBT50



**Smart Damper Turning**

Newly developed for boring applications on turning machines. It performs perfectly in both roughing and finishing. Several cartridges are available for ISO insert, depending on the application.



## Angle Head

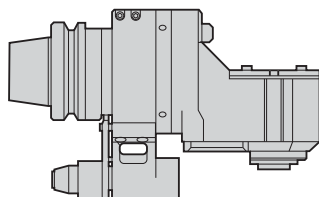
Angle Heads eliminate multiple set-ups, combine vertical, horizontal and angular operations on one machine. One original set-up saves time, speeds production and guarantees accuracy.

- Max. 6 000 min<sup>-1</sup>
- Coolant-through from the locating pin

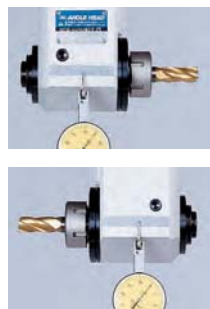


### Compact design assures rigidity

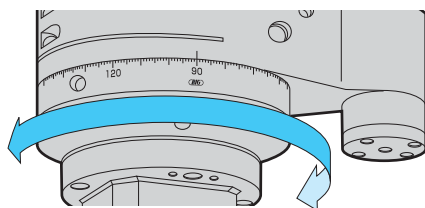
Overhang is minimized for added rigidity and strength. As a result, the projection length with cutting tool is shorter, which reduces the overall load on the Angle Head and thus improves the unit's cutting capability. The minimized overhang helps to eliminate interference with the ATC and adjacent storage pockets in the tool magazine. High Rigidity S-type, which has a steel housing and a stronger locating pin assembly, is also available.



### Cutter head adjustable 360°



Reference faces are provided on both sides of all heads for easier setting of a cutter direction.



### Unique coolant jacket



Jacket allows coolant coming through the stop block to be efficiently directed to the tool cutting edge while simultaneously cooling the Angle Head.

### Innovative sealing method



The advanced non-contact sealing method prevents coolant and particle contamination better than any other sealing method.

### Superior quality components



For smooth and powerful operation and to minimize noise and vibration, all Angle Heads are equipped with hardened and ground chrome-nickel steel spiral bevel gears, super precision hardened and ground spindles, and high precision angular contact ball bearing.

### Various executions of Angle Head

More types are available to offer the best solution for your demand.

AG90 NBS type



AG90 Build-Up type



AGU type



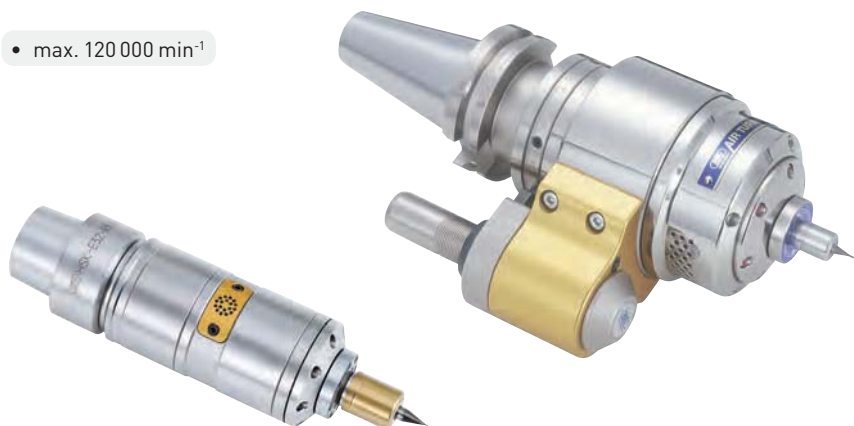
Small bore type



# AIR TURBINE SPINDLE

High-speed micro-machining can be done on a normal machining center, eliminating the need of an expensive high-speed machine.

- max. 120 000 min<sup>-1</sup>

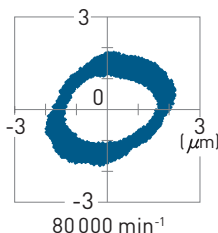


### Dynamic runout accuracy

Most problems associated with micro-machining are caused by poor dynamic runout of a machine spindle. We have established a runout measuring system that can detect spindle movement during rotation at high speed and achieved the best dynamic runout accuracy.

- Improved machining accuracy
- Superior surface finish
- Extended tool life

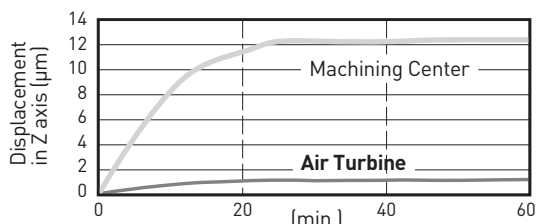
Plotted position of a test bar at the max. spindle speed (see image on the right).



### Minimal thermal displacement

Air turbine drive prevents thermal expansion of the spindle, which is essential for high accuracy micro-machining.

Axial displacement compared to operating time

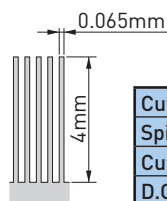


### Application examples

#### RBX7

#### Aluminum A2017

Outstanding runout accuracy permits perfect thin wall cutting.

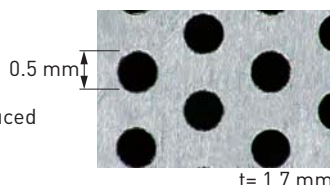


Cutter	Ø 0.5 mm rib-endmill
Spindle Speed	70 000 min <sup>-1</sup>
Cutting Feed	1 500 mm/min
D.O.C	ap = 0.02 mm

#### RBX5

#### Stainless steel SUS303

Tool life is doubled with over 1200 holes and cutting time is reduced to 1/3.



Cutter	Ø 0.5 mm solid drill
Spindle Speed	40 000 min <sup>-1</sup>
Cutting Feed	20 mm/min
Peck	0.01 mm

### Automatic tool change



ATC type is available by supplying air via a stop block to enhance productivity with unmanned operation.

### 3 types of Air Turbine Spindle

RBX5 = 50 000 min<sup>-1</sup>

RBX7 = 80 000 min<sup>-1</sup>

RBX12 = 120 000 min<sup>-1</sup>

Application Range		RBX5	RBX7	RBX12
Drill	Ø < 0.1 mm	△	△	○
	Ø 0.1 - 0.3 mm	○	○	⊙
	Ø 0.3 - 0.5 mm	○	⊙	○
	Ø 0.5 - 1.0 mm	⊙	○	△
	Ø 1.0 - 1.5 mm	△	x	x
End Mill	Ø < 0.5 mm	○	⊙	⊙
	Ø 0.1 - 1.0 mm	⊙	⊙	△
	Ø 1.0 - 1.5 mm	⊙	△	x
Jig Grinding		⊙	⊙	○

⊙ Optimum  
△ Dependent upon cutting conditions

○ Acceptable  
x Not recommended for use

## High Spindle

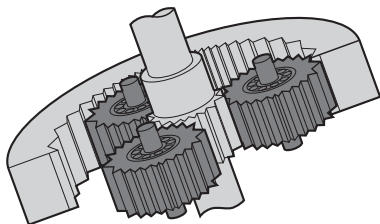
Precision speed increaser tool improves drilling and end-milling performance on existing machines by multiplying the spindle speed by 4, 5, or 6 times.

- max. 24 000 min<sup>-1</sup>



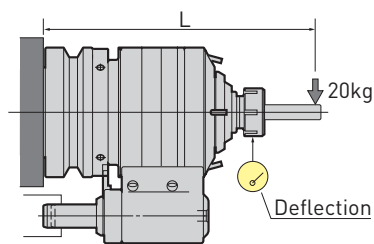
### Reinforced gear driving system

The planetary gears, which have been constantly upgraded since the development of the first „High Spindle“ back in 1970, achieves smooth operation with minimal heat generation and high torque transmission.



### Rigidity increased 1.7 times

Larger diameter body and spindle with double angular contact bearings and reinforced locating pin assembly greatly increase rigidity.



Model	L	Deflection	Comparison
BBT40-GTG5-10-140-65	200	36 µm	58 % less
BBT50-GTG6-10-158-80	220	25 µm	78 % less
BBT50-GTG4-16-177-80	240	11 µm	93 % less

### Reduce load to machine spindle

Continuous use at high spindle speeds will reduce the life of a machine spindle due to the excessive load to the motor and bearings. The High Spindle reduces this load and greatly extends the life of a costly machine spindle.

### Multi-directional coolant supply

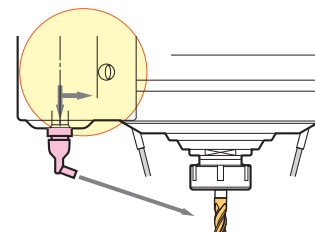
Universal Coolant Nozzles are capable of being adjusted to suit the length of cutting tool. Thus, the maximum coolant delivery to the cutting edge is assured.

Note: High Spindle can be operated without coolant running through the housing.



### Pinpoint coolant jet for shorter cutting tools

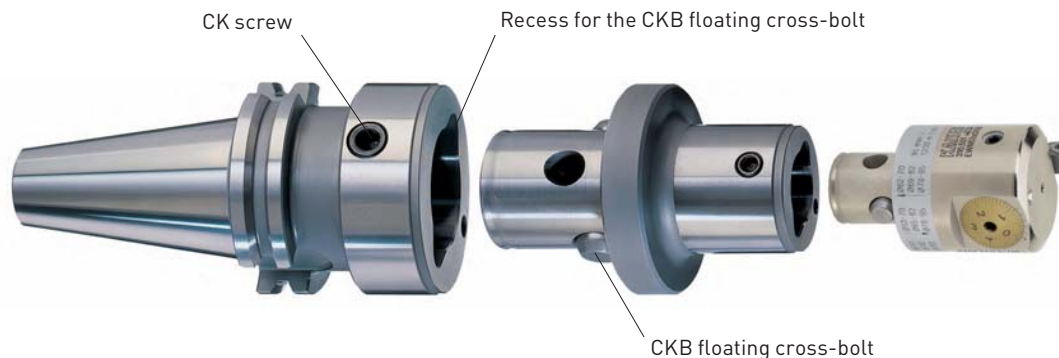
A 1/8 pipe tap thread is provided in the High Spindle so that various types of customer supplied coolant-jet nozzles can be utilized which will provide pinpoint delivery to the cutting edge of short tools (BDV/ BBT taper models only).





## CK, CKB, CKN: Various Connections - One System

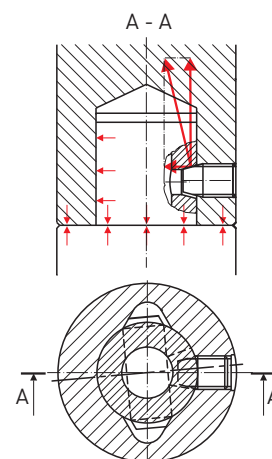
Based on a cylindrical connection with radial locking screw, the world-famous modular precision tool system BIG KAISER CK has continuously been improved over the years, and has adapted to customer's needs and the increases in machine tool performance. Compatibility to existing tools has always been a requirement for newer designs. This means that all BIG KAISER connections are almost 100% compatible, and all the components are kept in stock.



### CKB Connection: Highly Efficient and Easy to Handle

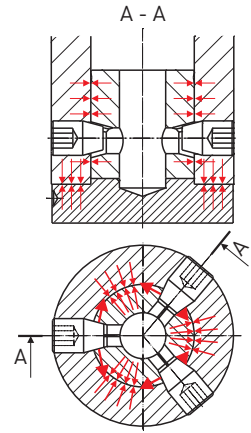
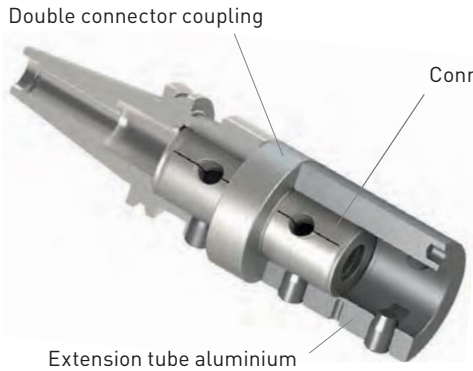
The modular components are clamped with the lateral locking screw (CK-screw). The floating cross bolt is automatically centred in the trapezoid-shaped recesses in the mating part and ensures an absolutely uniform distribution of the torque forces.

- Simple, efficient operation -no special equipment or tools needed
- Maximum rigidity due to high preloading forces and large contact surfaces
- Precise cutting edge location even when using several adapters
- High interchange accuracy, maximum radial change error is 0.002 mm



## CKN Connection: for Lightweight and High Performance Tools

Based on a 3-screw-connection and a male pilot with 3 partial slits, the CKN connection is designed for lightweight- and high performance tools. The main components for the lightweight program are double connector couplings made of steel and extension tubes made of aluminium. The high performance program for enhanced radial stiffness is entirely made of steel components.



### CKN Connection: Lightweight Program

The double connector coupling enables the use of aluminium extension tubes which result in a considerable weight reduction for larger tools. The torque transmission from the aluminium tube to the connector made of steel over three screws guarantees no reduction of cutting performance in comparison to tool combinations made of steel only.

CKN: the strongest tool connection for lightweight tools



### CKN Connection: High Performance Program

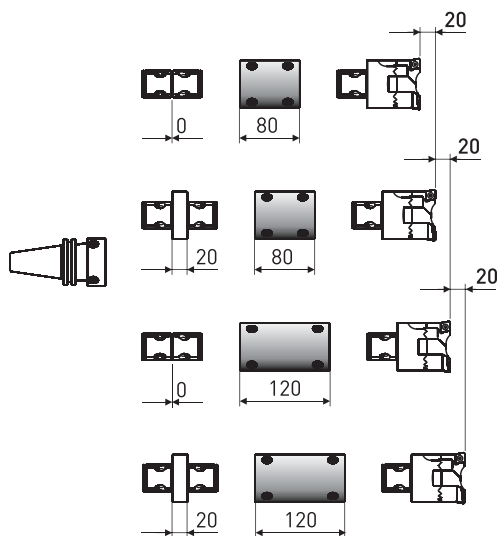
Tool combinations made of steel components, offer highest bending resistance for heavy duty milling with long tools.



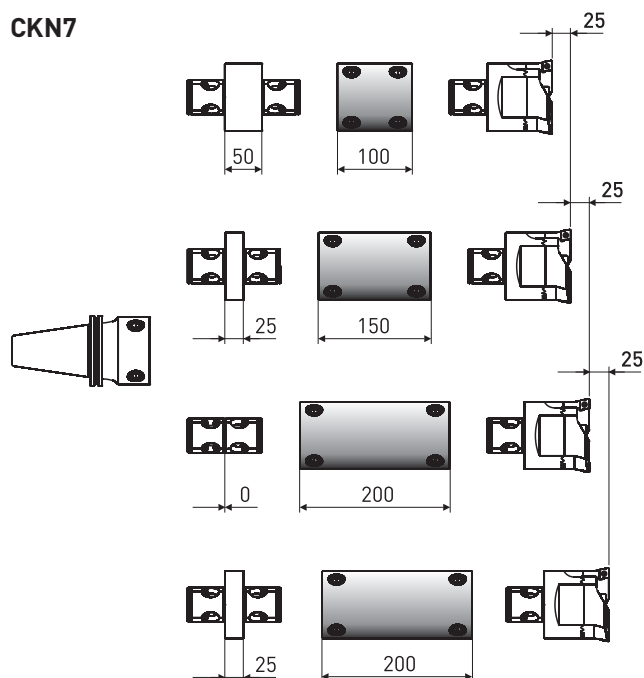
## Optimized Tool Lengths

A few millimeters difference in tool lengths can determine whether a boring operation will be successful or not. The CKN components are made with a very fine length graduation of 20 mm for CKN6 and 25 mm for CKN7.

### CKN6



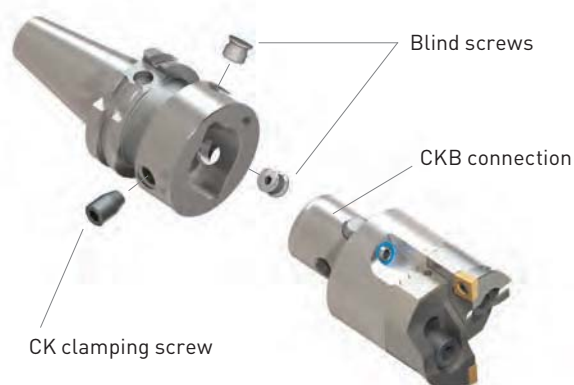
### CKN7



- Double connector coupling made of steel and aluminium extensions for the transmission of high torques
- Weight reductions up to 50% and equal cutting performance, compared to tool combinations made of steel
- Reduced weight allows easier handling and eliminates manual tool change in many cases
- Max. rigidity of the tool connection due to high clamping force and expansion of the slotted tool connector
- Vibration damping due to the use of different materials

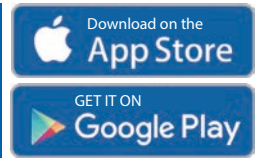
## Compatibility CKN - CKB

For compatibility reasons, the CKN shanks will be delivered with only one CK screw and two blind screws assembled. For CKN assemblies, the remaining two CK screws will be supplied with the mating component having the male CKN connection.



## EWE Digital Fine Boring Heads

Fine boring heads EWE with digital display and direct electronic measuring system on the tool carrier, feature absolute setting accuracy. The boring heads are designed for ultra precise boring operations in the range from Ø 2 to Ø 152 mm with highest spindle speeds.



Same accessories for fine boring heads EWE and EWN.

- Boring range: Ø 2 - 152



EWE 2-152



EWE 2-32

### Body protection grade: IP 69K

The high quality coating of the tool body ensures a complete protection against corrosion. The built in electronic is safe from dust and high pressure spray water according to the protection category IP69K.

### Digital display with a resolution of 0,001 mm Ø and Piezo button

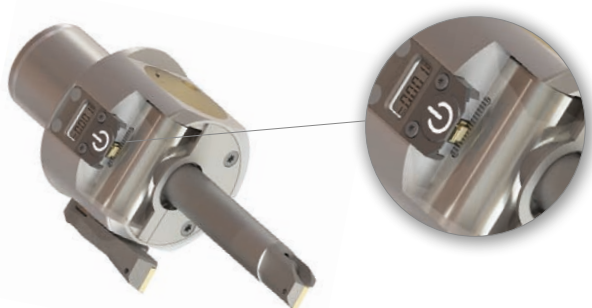


Automatic switch off function which always stores the last displayed value and integrated power management for optimized battery life.

Piezo button for maintenance-free use

### Electronic components – made by BIG KAISER

All electronic components are entirely developed and manufactured in the electronic lab of BIG KAISER in Switzerland. Before shipping, every digital boring head is calibrated and tested separately.



### Integral execution available

Can be used for cylindrical bar from dia 2-80 and with peripheral insert holders from dia 80-152mm.



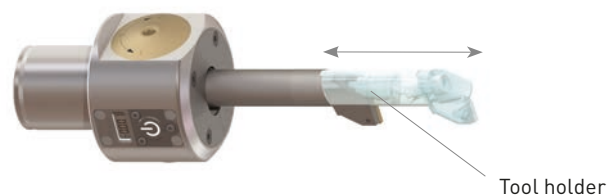
EWE 2-152 HSK-A63

### Maximum rotation speed: 14 000 min<sup>-1</sup>

Tool carrier in center position allows n max. of 14 000 min<sup>-1</sup> due to minimized imbalance.

### Variable length adjustment of the tool holder

Best cutting results are only reachable if the tool holder is as short as possible. The EWE features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.



Tool holder

EWE is defined as "Evolution" model of original digital boring head called EWD. Accessories of EWE are fully compatible with EWD and EWN.

## EWN Fine Boring Heads

Fine boring heads with centric boring bars in modular and integral execution for accurate, high performance boring operations.

Same accessories for fine boring heads EWN and EWE.

- Boring range:  $\varnothing$  0.4 - 152



EWN 2-152



EWN 2-32

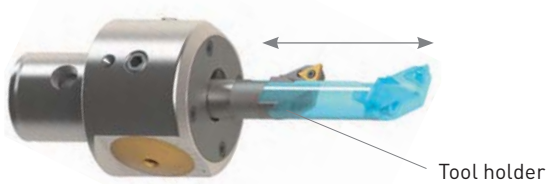
EWN 04-22

EWN 04-15

EWN 04-7

### Variable tool length adjustment of the tool holder

Best cutting results are only reachable if the tool holder is as short as possible. The EWN features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.



Tool holder

### Large dial disc for a parallax-free reading

Thanks to the use of a vernier, diameter adjustments of 0.001 mm can be executed precisely.

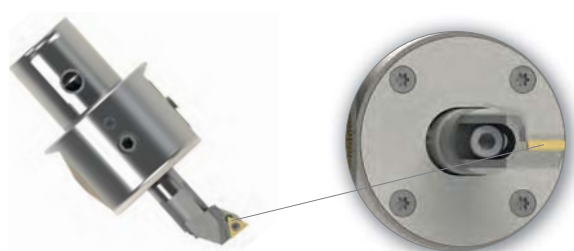
### Many integral executions available

In addition to the boring heads with CK-connection integral executions of the EWN 2-152 are available for DV, HSK, BT and BIG CAPTO spindles.



### Fine balanced when tool carrier is set in center position

Tool holders made of carbide with adjustable insert holders permit diameter setting on the insert holder. The heavy tool holder remains in the center position and does not create any imbalance. The imbalance created by the insert holder is in most cases insignificant.



### EWN 2-152: Huge boring range with just one tool

Additional boring range with peripheral insert holders from  $\varnothing$  80 - 152 mm.

$\varnothing$  2 - 54 mm

$\varnothing$  54 - 80 mm

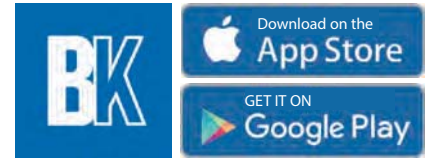
$\varnothing$  80 - 152 mm





## EWE Digital Fine Boring Heads

The boring heads EWE with digital technology combine all advantages of the analogue boring heads EWN. Thanks to the large display with a resolution of 0.001 mm Ø bores with extremely tight tolerances can be machined.



**Fine boring heads EWE and EWN feature equal boring ranges and body dimensions and allow the use of the same accessories.**

- Boring range: Ø 41 - 203



EWE 68

### Digital display with a resolution of 0,001 mm Ø



Automatic switch off function which always stores the last displayed value and integrated power management for optimized battery life.

Piezo button for maintenance-free use.

### Direct measuring diameter allows corrections in both directions

With a direct electronic measuring system on the tool carrier and a resolution of 0.001 mm Ø, the fine boring heads EWE enable diameter corrections with an unmatched accuracy.

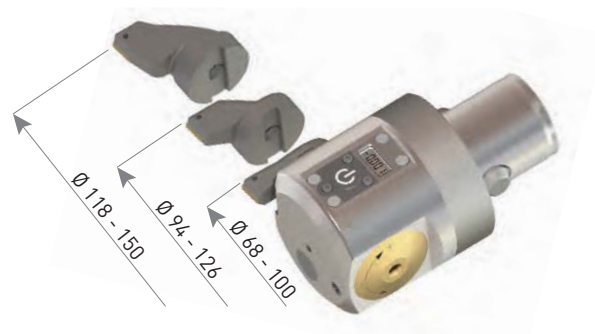


### Body protection grade: IP 69K

The high quality coating of the tool body ensures a complete protection against corrosion. The built in electronic is safe from dust and high pressure spray water according to the protection category IP69K.

### Large boring range

Every EWE has a large work range due to three different insert holders. For example: The EWE 68 can manufacture a diameter range from Ø 68 to 150 mm.



EWE is defined as "Evolution" model of original digital boring head called EWD. Accessories of EWE are fully compatible with EWD and EWN.

## EWN Fine Boring Heads

The fine boring heads EWN series 310 cover a range of  $\varnothing$  20 - 203 mm with only 7 fine boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1200 m/min are permitted.

**Fine boring heads EWN and EWE feature equal boring ranges and body dimensions and allow the use of the same accessories.**

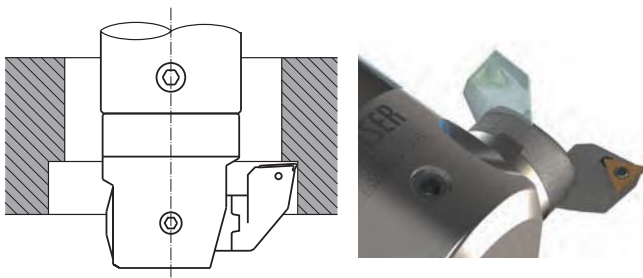
- Boring range:  $\varnothing$  20 - 203



EWN 53

### Back boring

Insert holder can be mounted in opposite direction for an easy changeover to back boring.



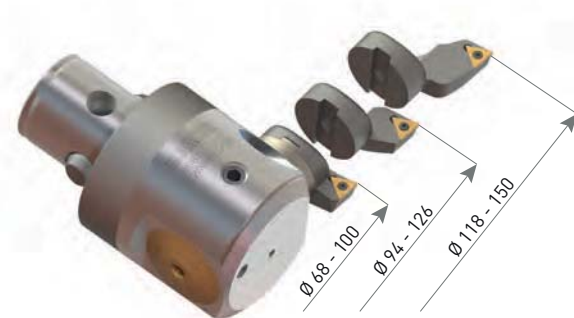
### Versatile tool

Insert holders for many types of inserts (TP, TC, CC with different angles) as well as accessories for face grooving are available.



### Large boring range

Every EWN fine boring head has a large work range due to three different insert holders. For example: The EWN 68 can manufacture a diameter range from  $\varnothing$  68 to 150 mm.



### Suitable with outer diameter turning system

Fine boring heads EWN/EWE are suitable for OD turning applications in the diameter range  $\varnothing$  16 - 2856 mm. There are two different OD turning systems available.

$\varnothing$  16 - 120 mm

$\varnothing$  49 - 2856 mm



## EWB Balanced Fine Boring Head

The precision balancing of the EWB with peripheral insert holder occurs automatically by the adjustment of the diameter. The EWB with centric boring bar is precisely balanceable via a balancing ring. To balance the whole tool combination there are prebalanced shanks and components available. Even at max. speeds, balanced tools guarantee vibration-free boring, resulting in increased productivity and highest precision.

- Max. speed: 2 000 m/min



EWB 41

### Ready to work

The EWB fine boring heads will be delivered with assembled insert holder.

### Aluminium executions available

The fine boring heads EWB-AL are made of high tensile aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%. This means that weight problems during ATC and handling are eliminated.



### Self balancing mechanism

A counterweight built into the boring head compensates for the imbalance caused by the movement of the tool carrier.



EWB 2-50

### Variable length adjustment of the tool holder

Best cutting results are only reachable if the tool holder is as short as possible. The EWB features variable length adjustment of the tool holders which ensures the shortest and therefore the most rigid tool assembly.

### Boring bars made of carbide

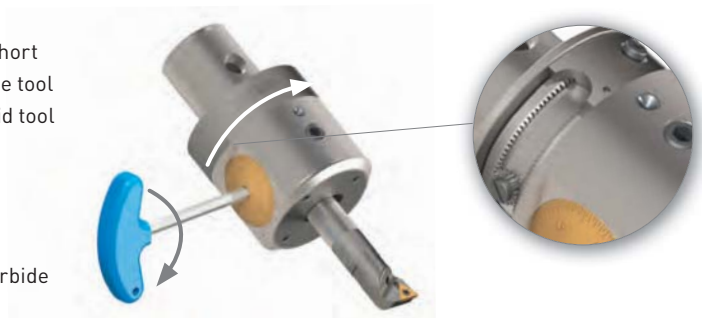
For optimized cutting results dedicated boring bars made of carbide are available.



EWB 2-32

### Precisely balanceable

The EWB fine boring heads have an integrated balancing mechanism. The imbalance of the boring head is compensated by a unique manually adjustable balancing ring.





## SW Rough Boring Heads

The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance.

- Boring range: Ø 20 - 203

SW 68



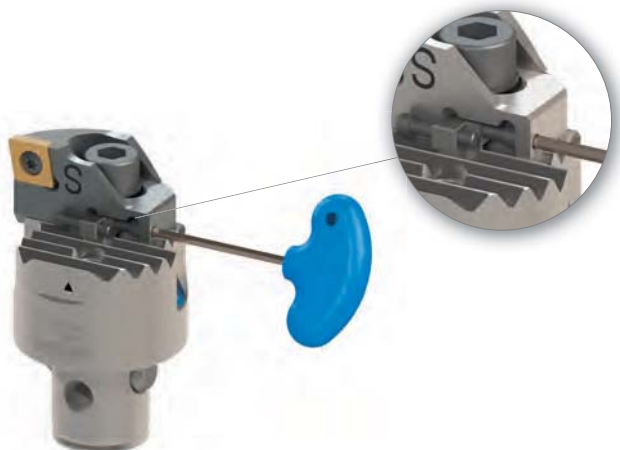
### Accessories for different applications

On the same body insert holders for back boring, chamfering or face grooving can be mounted.



### Precise presetting

Presetting of the tool diameter and length without presetter thanks to fixed tool length and diameter scale.



### SW AL: Aluminium executions available



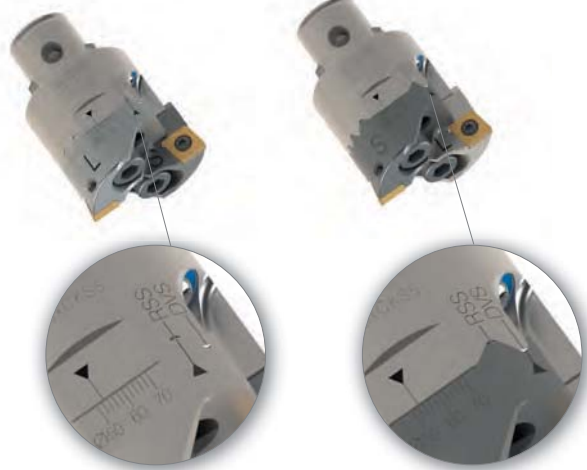
The rough boring heads SW AL of BIG KAISER set new standards for high performance roughing. The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance. Moreover it is more economical than circular interpolation milling when you have to execute deep bores. The rough boring heads are available in the sizes from SW 68 AL up to SW 148 AL.

### BALANCE/STEP cut: Simply switch insert holders

A tool body with supports for insert holders of different heights, and insert holders of different lengths, provide an unmatched versatility to the new roughing tool. Without changing any components and without length adjustment, two different roughing methods, the rotationally-symmetrical-roughing (RSS/BALANCE) and the double offset roughing (DVS/STEP), can be executed.

RSS/BALANCE

DVS/STEP



## Series 318 Large Diameter Boring Tools

The series 318 is based on aluminum extension slides of different lengths, which support a variety of aluminum and steel components for roughing and finishing tool assemblies. The mounting components are pinned to fit onto specific locations on the slides, and secured with steel bolts. The precise positioning of the components on the slide along with incremental adjustment scales for insert holders permit diameter and length setting without a tool presetter.

• Boring range: Ø 200 - 620

• Boring range: Ø 620 - 3 000



### DV40 and HSK-A63 up to 340 mm

Even on machines with smaller spindles the series 318 can be operated.

### Innovative construction

Coolant supply through all components directly to the cutting edge. High strength and hard coated aluminium, and nickel coated steel components for scratch resistant and rust protected surfaces.



### Versatile system

Series 318 is for various applications such as rough boring, fine boring, OD turning, and face grooving.



Roug Boring

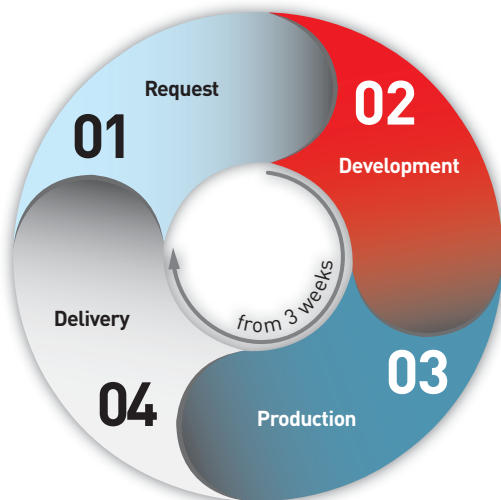
Fine Boring

Face Grooving

OD Turning

## BIG KAISER Special Tools

You need an insert holder or a shank in a special execution for your BIG KAISER boring head? No problem: the BIG KAISER team for special tools will quickly and professionally deal with your request.



### Your advantages

- Offer in 24h
- Delivery from 3 weeks
- Competent advice from our experienced team

### Insert holders

- Roughing with free insert selection for the SW rough boring heads
- Insert holder in any shape and size for the EWN/EWE fine boring heads
- For contouring, chamfering or OD turning



### Tools for several diameters

- Rough boring tool with fixed insert pockets and cartridges. Thanks to CKB connection, the tool is independent of a spindle system
- Fine boring tool with BIG KAISER adjustment cartridges  
Adjustment precision: 0.01mm Ø



## BIG KAISER Insert Development

The customer shall reach the best possible results in terms of performance, precision and cost efficiency for all boring operations with BIG KAISER rough and fine boring tools. Therefore, not only outstanding boring tools are required, but also inserts, specially designed for boring, which fulfil the highest demands.



*«The selection of the indexable insert is decisive for the machining process and reduces production costs.»*

Stefan Appenzeller, Head of Product Management BIG KAISER

The results of the developments and tests are shown in the BIG KAISER app. In there, you'll find the most suitable inserts for the variety of workpiece materials and machining processes in relation to the tool configuration. The app shows precise cutting data for all applications.



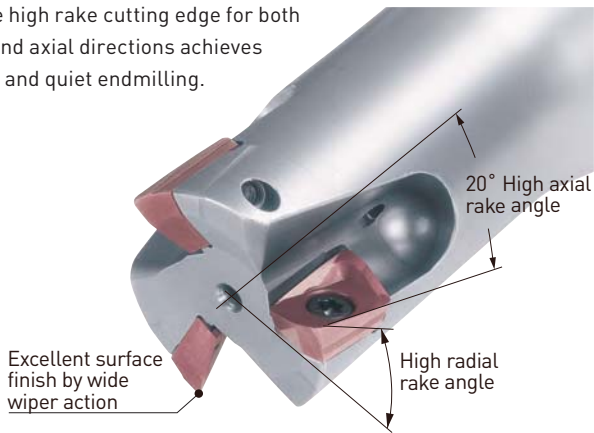
## FULLCUT MILL

Indexable insert endmills with both excellent sharpness and toughness, achieving the performance of solid endmills.



### Sharp cutting edge by both high radial and axial rake angles

Positive high rake cutting edge for both radial and axial directions achieves smooth and quiet endmilling.



### Amazing cutting performance, brought by integral design and face contact body

Integral design style with taper shank and flange contact with the machine spindle provides higher precision and rigidity thus achieving cutting conditions only otherwise available on larger machines.

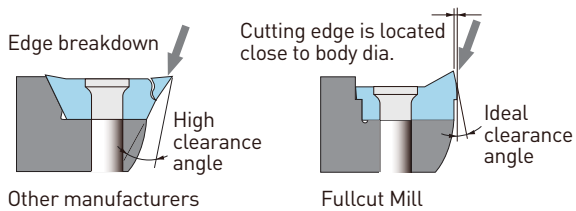
#### BBT and BDV type



#### HSK type



### Strong cutting edge reduces edge chipping



### Contact Grip

- Threaded coupling with taper and face contact
- Resistant to chatter due to the dual contact connection
- FCM or FCR heads can be installed on the base holder

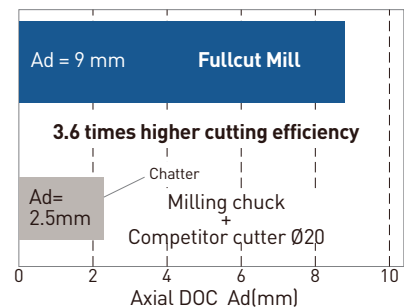


### Amazing cutting performance even on #40 taper machine

Comparison of axial DOC between integral type with face contact and straight shank type. 3.6 times higher cutting performance than other manufacturer.

#### Cutting condition

Machine: BBT40 (BIG-PLUS)  
 Slot milling: 20 mm  
 Work material: C50 (S50C)  
 Spindle speed: 2400 min<sup>-1</sup>  
 Speed: V = 150 m/min  
 Feed: 0.12 mm/tooth





**Fullcut Mill Type FCR**

Unique inserts designed for ramping make multi-functional cutting possible.

- Cutter: Ø 16 - 33

Higher rigidity with integral body with dual contact system.

BBT and BDV Type    HSK Type    Cylindrical Shank Type

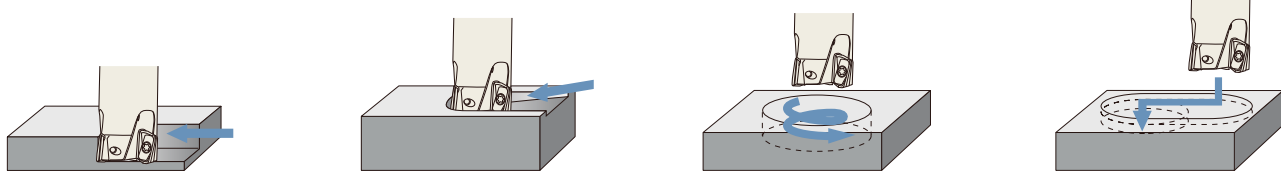


**Shoulder Milling**

**Ramping**

**Helical Milling**

**Peck-Drilling**



**Fullcut Mill Type FCM**

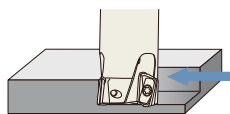
- Cutter: Ø 12 - 100

A variety of shanks including simultaneous fit with integral body.

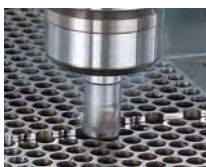
BBT and BDV Type    HSK Type    Cylindrical Shank Type    Arbor Type



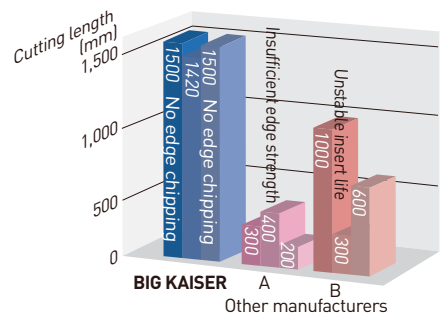
**Shoulder Milling**



**Tough cutting edge of Fullcut Mill is proven**



An evaluation of cutting length/life as measured when machining the most arduous workpiece by milling over a continuous series of holes. This is the condition most likely to cause edge chipping.

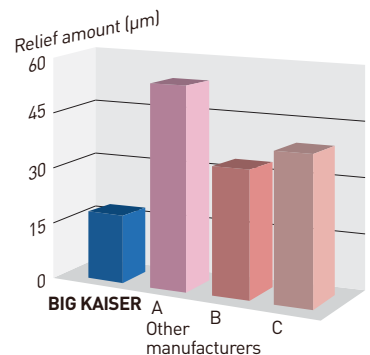
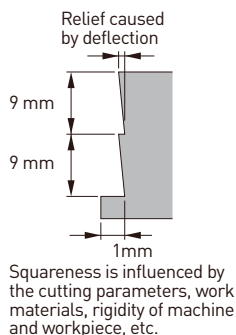


**Finishing with indexable endmill - Why not?**



Insert with the minimum nose radius of 0.2mm and superb squareness to achieve high precision end milling comparable with solid carbide tools.

- Work material: SUS304
- Vertical M/C: No. 40
- Cutter dia.: Ø 25 mm
- Feed: 0.12 mm/tooth





## SPEED Finisher

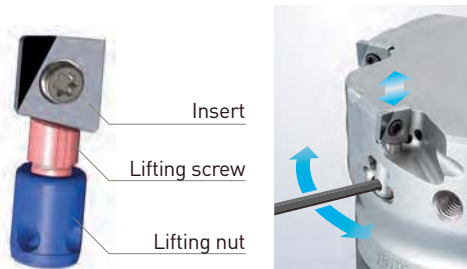
Amazing improvement of surface finish at high speed cutting.  
 RZ = 0.55 µm with aluminum die casting ADC12  
 RZ = 0.67 µm with gray cast iron FC250

- Cutter: Ø 50, Ø 63, Ø 80, Ø 100, Ø 125



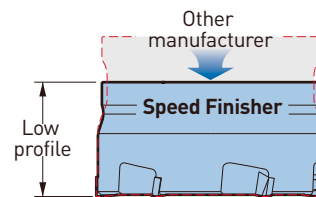
### Quick adjustment of cutting edge height

After clamping the insert, lifting screw lifts up the insert directly by revolving the lifting nut from its side. Simple construction aids easy adjusting operation. Fine pitch thread of the lifting screw ensures precise adjustment.



### Lightweight & high rigidity

Low-profile cutter body enhances rigidity, minimizes vibration and distortion, leading to the minimized height difference of the machined surface. Lighter weight resulted from reduced mass aids performance on small machine tools such as BT30 spindle.



### PL Presetter

Exclusive PL Presetter shortens the setup time further up to 15 sec./insert while avoiding chipping of the cutting edge.

- The cutting edge presetting is required




### Secure coolant supply to the cutting edges

Coolant is supplied to the cutting edge directly in combination with the Face Mill Arbor type FMH. Especially effective to avoid built-up edges when cutting aluminum and possible re-cutting of the swarf.



### Application example

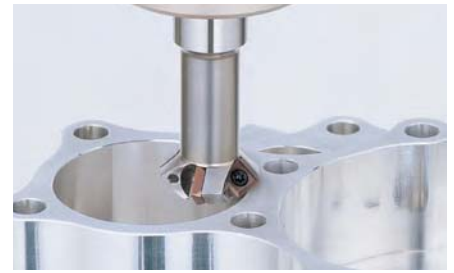
(Cutter: Ø 80 mm)

Workpiece	Conditions	Surface Roughness	Height Difference	No. of Workpieces	Result
Crankcase ADC12 	Cutting speed: 4 000 m/min Spindle speed: 15 900 min <sup>-1</sup> Feed rate: 9 550 mm/min Depth of cut: 2.5 mm	Ra=0.08 µm Rz=0.55 µm	Within 1 µm	24 000	Rough and finish processes are combined in a single operation.

# C-CUTTER mini

Compact design with 4 inserts and small cutting diameter. High performance chamfer cutter to achieve ultra high feed rate by reducing the cutting diameter to the lowest limit.

- For multi-functional cutting: chamfering, back chamfering and face milling



## 4 Inserts, small diameter and new coating achieve triple effect

### 1. Superb design. Ultra high feed by 4 Inserts.

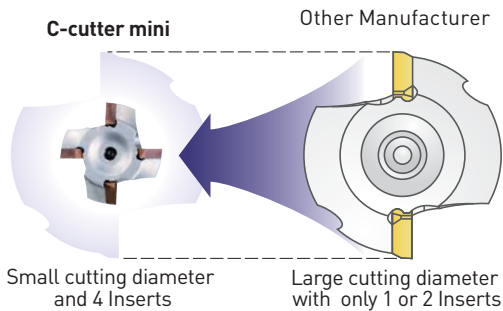
Compared with 1 or 2 inserts per cutter, a 4 insert cutter multiplies feed rate.

### 2. Increased spindle speed by ultra compact diameter

A smaller tool diameter means faster spindle speeds.

### 3. Latest coating (ACP200) increases the cutting speed.

Wear resistant multi layer PVD coating increases the cutting speed.



$$\begin{aligned} \text{Feed rate} &= \begin{matrix} \text{UP} \\ \text{Considerably improved} \end{matrix} \text{Spindle speed} \times \text{Feed per tooth} \times \begin{matrix} \text{UP} \\ \text{Number of teeth} \end{matrix} \\ \text{Spindle speed} &= \frac{\begin{matrix} \text{UP} \\ \text{Cutting speed} \end{matrix}}{\pi \times \begin{matrix} \text{UP} \\ \text{Small dia.} \end{matrix} \times \text{Cutting diameter}} \end{aligned}$$

### World smallest hex insert

Highly-efficient back chamfering from 6 mm starting hole diameter. 3-corner insert saves cost.

Inscribed circle Ø 3.97



### Versatility of the insert

Sharp cutting edge of C-Cutter mini insert make superior surface finish. The same insert can be used with BIG KAISER's original design face mill arbor, Surface Mill.



### New series for starting hole for tapping are available from M8 to M20 range



### Surface Mill Rz = 1.42

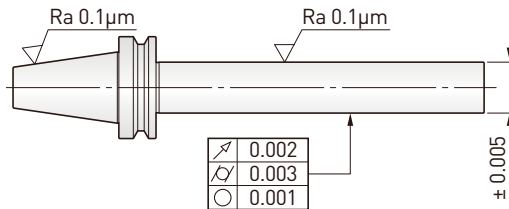
Material = C50  
V = 200 m/min  
Fz = 0.2 mm/min  
Ap = 3  
Ad = 75

# DynaTest



### Precision standard of BIG KAISER Test Arbors

BIG KAISER provides high quality test bars, produced under a strict quality control system.



Runout	0.002 mm
Roundness	0.001 mm
Cylindricity	0.003 mm
Roughness	Ra: 0.1 μm
Diameter tol.	±0.005 mm

### Aluminum case

An aluminum case is provided to protect and store the test bars. (Some models are provided in a wooden box.)



### Calibration certificate and traceability system

BIG KAISER can offer a calibration certificate with traceability on request as per ISO9000 requirements.

## Torque Fit

Controlling tightening torque for BIG KAISER Tool assembly station with integrated torque measuring system.

- Digital display helps to reach the proper torque
- Tightening values for BIG KAISER collet chuck series data are preset
- Beeping on & after the proper tightening
- User mode for the customized torque value
- Error LED lighting at the overtightening
- Replaceable adaptors available for different interfaces



The starting point for the high precision cutting is proper tightening.

Insufficient tightening	Variant cutting edge position	Cutting Error Dimensional Error
	Collet deformation Deteriorated runout	Shorter Cutter Life Shorter Tool Holder Life

## Level Master

2-axis simultaneous detection leveler. LED displays level conditions for both axis simultaneously. LED and buzzer indication when leveling is complete.



- LED lamp + beep sound
- Simultaneous 2-axis detection saves the extra time & cost of using 2 levelers.
- 0.01 mm/m readable value

Standard Type

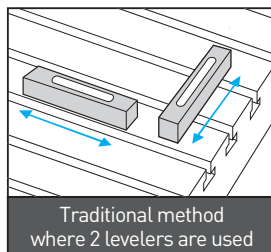
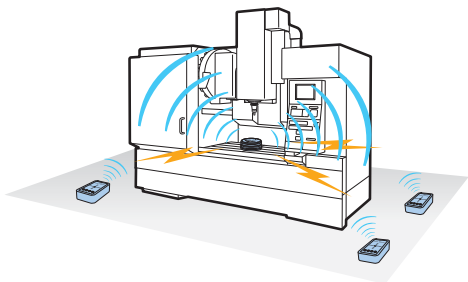
Wireless Type



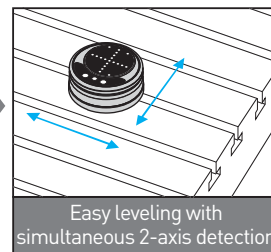
### Easy leveling with the remote display

Leveling by the single operator can be achievable by the use of the remote display while 2 operators have been necessary until now to allow them to conduct the level detecting inside the machine housing and the table leveling from outside of the machine separately.

### Simultaneous 2-axis detection



Traditional method where 2 levelers are used

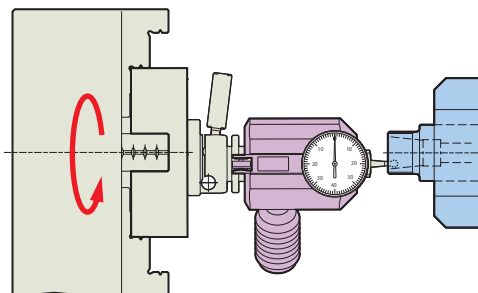
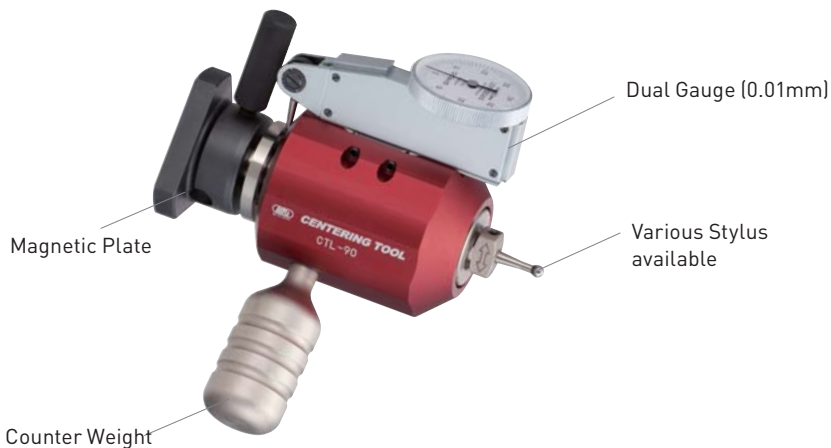


Easy leveling with simultaneous 2-axis detection

## Centering Tool for Lathes

Revolutionary centering tool for lathe machines that allows the operator to fix the center very easily and quickly.

- Centering the tool holder while watching the dial gauge made possible, as the dial position is static at front
- Easy setting with fine adjustment mechanism (adjustment amount: 0.01mm)
- Magnet base allows for flexible mounting positions
- Compact designed body is suitable for small lathe machining







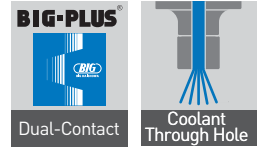
## Tool Holders BBT/BT, JIS B 6339

<b>MEGA Micro Chuck</b>	<b>46 - 47</b>
<b>MEGA New Baby Chuck</b>	<b>48 - 51</b>
<b>MEGA E Chuck</b>	<b>52</b>
<b>MEGA Double Power Chuck</b>	<b>53 - 54</b>
<b>MEGA Perfect Grip</b>	<b>55</b>
<b>New Baby Chuck</b>	<b>56 - 57</b>
<b>New Hi-Power Milling Chuck</b>	<b>58 - 59</b>
<b>Hydraulic Chucks</b>	<b>60 - 63</b>
<b>Shrink Chucks</b>	<b>64 - 65</b>
<b>MEGA Synchro Tapping Holder</b>	<b>66 - 67</b>
<b>Side Lock Holders</b>	<b>68 - 69</b>
<b>Morse Taper Holders</b>	<b>70</b>
<b>Holdings for Screw-On Cutters / Side Cutter Arbors</b>	<b>71</b>
<b>Face Mill Arbors</b>	<b>72</b>
<b>Smart Damper</b>	<b>73</b>
<b>CK Shanks</b>	<b>74 - 76</b>
<b>BIG CAPTO Basic Holder</b>	<b>77</b>
<b>Angle Heads</b>	<b>78 - 87</b>
<b>Air Turbine Spindle / High Spindle</b>	<b>88 - 92</b>
<b>Dyna Test</b>	<b>93</b>

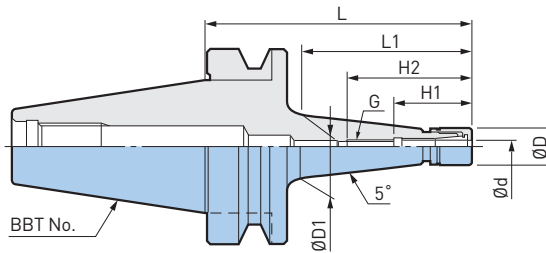


# MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.



A.1



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 0.45 - 8.05 mm

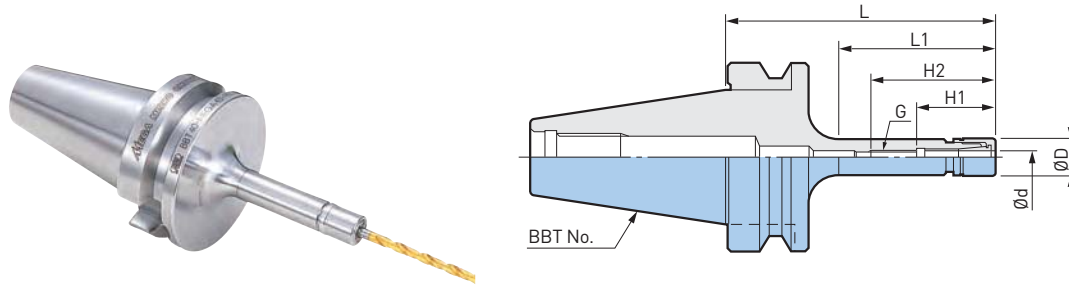
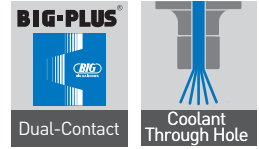
Model	Order No.	Ød	ØD	ØD1	L	L1	H1	H2	G	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)
BBT30-MEGA3S - 45T	969.209	0.45 - 3.25	10	11.5	45	20	22	38	M4 P0.7	40 000	NBC3S-	MGN3S	0.42
- 75T	969.210			16	75	48							0.45
- 90T	969.211			18.5	90	63							0.48
-MEGA4S - 75T	969.214	0.45 - 4.05	12	17.5	75	48	26.5	47	M5 P0.8	40 000	NBC4S-	MGN4S	0.47
- 90T	969.215			20.0	90	63							0.50
-MEGA6S - 60T	969.218	0.45 - 6.05	14	16.5	60	33	28.5	49	M7 P0.75	40 000	NBC6S-	MGN6S	0.45
- 75T	969.319			19	75	48							0.47
- 90T	969.220			22	90	63							0.51
-105T	969.221			24.5	105	78							0.56
-120T	969.222			22	120	93							0.62
-MEGA8S - 75T	803.597	2.95 - 8.05	18	23.0	75	48	31	50.5	M9 P0.75	40 000	NBC8S-	MGN8S	0.51
-105T	803.598			28.0	105	78							0.62
BBT40-MEGA3S - 90T	969.322	0.45 - 3.25	10	17.5	90	58	22	38	M4 P0.7	28 000	NBC3S-	MGN3S	1.1
-120T	969.323			23	120	88				22 000			1.2
-MEGA4S - 60T	969.324	0.45 - 4.05	12	14	60	28	26.5	47	M5 P0.8	35 000	NBC4S-	MGN4S	1.0
- 90T	969.326			19.5	90	58				28 000			1.1
-120T	969.328			24.5	120	88				22 000			1.2
-MEGA6S - 60T	969.330	0.45 - 6.05	14	15.5	60	28	28.5	49	M7 P0.75	35 000	NBC6S-	MGN6S	1.1
- 75T	969.331			18.0	75	43				32 000			1.1
- 90T	969.332			21	90	58				28 000			1.1
-105T	969.333			23.5	105	73				25 000			1.1
-120T	969.334			26	120	88				22 000			1.2
-135T	969.335			29	135	103				20 000			1.3
-MEGA8S - 90T	801.720	2.95 - 8.05	18	24.5	90	58	31	50.5	M9 P0.75	30 000	NBC8S-	MGN8S	1.2
-120T	803.601			30	120	88				22 000			1.2

1. MEGA nut is included.

Spare Parts			Accessories							
	MEGA Nut		MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		α Taper Cleaner	
					▶ 247	▶ 249				
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-	MGN6S-PS	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-	MGN8S-PS	NBB8S	805.802	SC-NBC8S	805.827

# MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.



A.1

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 0.45 - 8.05 mm

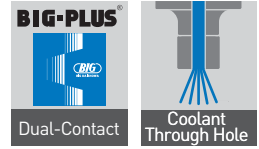
Model	Order No.	Ød	ØD	L	L1	H1	H2	G	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)
BBT30-MEGA6S - 90	969.504	0.45 - 6.05	14	90	62	28.5	49	M7 P0.75	40 000	NBC6S-	MGN6S	0.47
-105	800.058			105	73							0.49
-MEGA8S - 90	803.608	2.95 - 8.05	18	90	60	31	50.5	M9 P0.75	35 000	NBC8S-	MGN8S	0.51
BBT40-MEGA4S - 90	969.506	0.45 - 4.05	12	90	53	26.5	47	M5 P0.8	35 000	NBC4S-	MGN4S	1.0
-MEGA6S - 90	969.508	0.45 - 6.05	14			28.5	49	M7 P0.75		NBC6S-	MGN6S	1.0
-MEGA8S - 90	803.599	2.95 - 8.05	18		55	31	50.5	M9 P0.75	30 000	NBC8S-	MGN8S	1.1

1. MEGA nut is included.

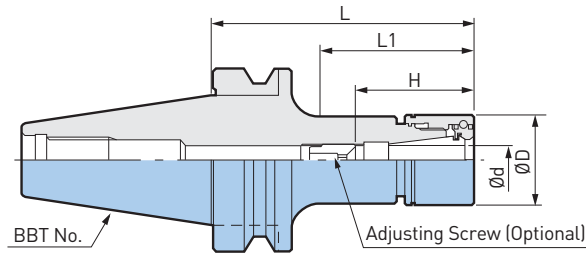
Spare Parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		α Taper Cleaner	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-	MGN6S-PS	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-	MGN8S-PS	NBB8S	805.802	SC-NBC8S	805.827

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



A.1



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 0.25 - 25.4 mm

Model	Order No.	Ød	ØD	L	L1	H	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)
BBT30-MEGA6N - 60	969.509	0.25 - 6	20	60	32	23 - 43	40 000	NBC 6-	MGN6	0.47
- 75	969.341			75	47		35 000			0.50
- 90	969.510			90	62		30 000			0.53
-105	969.342			105	77		20 000			0.56
-120	969.343			120	90					0.59
-MEGA8N - 60	969.511	0.5 - 8	25	60	34	26 - 45	40 000	NBC 8-	MGN8	0.51
- 75	969.344			75	49		35 000			0.56
- 90	969.512			90	64		30 000			0.61
-105	969.345			105	79		18 000			0.67
-120	969.346			120	92					0.72
-MEGA10N - 60	969.513	1.5 - 10	30	60	34	38 - 48	40 000	NBC10-	MGN10	0.54
- 75	969.347			75	49		30 000			0.61
- 90	969.534			90	64		25 000			0.68
-105	969.348			105	79		18 000			0.75
-120	978.207			120	94		15 000			0.82
-MEGA13N - 60	969.516	2.5 - 13	35	60	34	44 - 63	40 000	NBC13-	MGN13	0.57
- 75	969.349			75	49		30 000			0.67
- 90	969.517			90	64		25 000			0.77
-105	969.350			105	79		18 000			0.87
-120	969.518			120	94		15 000			0.97
-MEGA16N - 60	969.519	2.5 - 16	42	60	37	48 - 63	35 000	NBC16-	MGN16	0.61
- 75	969.351			75	52	25 000	0.75			
- 90	969.520			90	67	48 - 68	20 000			0.89
-105	969.352			105	82	18 000	1.04			
-MEGA20N - 60 *	969.521			2.5 - 20	46	60	-			70
- 75	969.353	75	-			20 000	0.78			
- 90	969.522	90	-			51 - 68	15 000	0.93		
-105	969.354	105	-			13 000	1.08			
-MEGA25N - 85 *	806.379	15.5 - 25.4	60			85	-	80	12 000	NBC25-

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. \* Adjusting screw cannot be used.
4. Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA Nut		MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw		
					▶ 250	▶ 260					
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-	MPS6-	NBA6B	961.527	M7	12	2
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-	MPS8-	NBA8B	961.550	M9	13	2.5
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-	MPS10-	NBA10B	961.572	M11	16	3
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-	MPS13-	NBA13B	961.598	M14	20	4
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-	MPS16-	NBA16B	961.632	M18	20	4
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-	MPS20-	NBA20B	961.680	M21	20	4
MEGA25N	MGN25	806.388	MGR60L	969.468L	NBC25-	-	NBA25B	806.389	M27	20	4

∅ 0.25 - 25.4 mm

Model	Order No.	∅d	∅D	L	L1	H	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)
BBT40 -MEGA6N - 60	969.523	0.25 - 6	20	60	27	23 - 43	35 000	NBC6-	MGN6	1.0
- 75	969.361			75	38					1.1
- 90	969.524			90	53					1.1
-105	969.362			105	68		1.2			
-120	969.363			120	83		1.2			
-135	969.525			135	98		1.2			
-165	969.526			165	128		1.2			
-200	969.527			200	163		1.3			
-MEGA8N - 60	969.528	0.5 - 8	25	60	27	26 - 45	35 000	NBC8-	MGN8	1.0
- 75	969.364			75	38					1.1
- 90	969.529			90	53					1.1
-105	969.365			105	68		1.2			
-120	969.366			120	83		1.2			
-135	969.530			135	98		1.3			
-165	969.531			165	128		1.3			
-200	969.532			200	163		1.4			
-MEGA10N - 60	969.533	1.5 - 10	30	60	27	38 - 48	35 000	NBC10-	MGN10	1.1
- 75	969.367			75	38					1.2
- 90	969.514			90	53					1.2
-105	969.368			105	68		1.3			
-120	969.369			120	83		1.4			
-135	969.535			135	98		1.4			
-165	969.536			165	128		1.5			
-200	969.537			200	163		1.7			
-MEGA13N - 60	969.538	2.5 - 13	35	60	31	44 - 63	35 000	NBC13-	MGN13	1.1
- 75	969.370			75	40					1.2
- 90	969.539			90	55					1.3
-105	969.371			105	70		1.4			
-120	969.372			120	85		1.5			
-135	969.540			135	100		1.6			
-165	969.541			165	130		1.8			
-200	969.542			200	165		2.0			
-MEGA16N - 60	969.543	2.5 - 16	42	60	31	48 - 68	30 000	NBC16-	MGN16	1.2
- 75	969.373			75	40					1.3
- 90	969.544			90	55					1.4
-105	969.374			105	70		1.6			
-120	969.375			120	85		1.7			
-135	969.545			135	100		1.8			
-165	969.546			165	130		2.0			
-200	969.547			200	165		2.3			
-MEGA20N - 60	969.548	2.5 - 20	46	60	31	51 - 68	30 000	NBC20-	MGN20	1.1
- 75	969.376			75	42					1.3
- 90	969.549			90	57					1.4
-105	969.377			105	72		1.6			
-120	969.378			120	87		1.8			
-135	969.550			135	102		1.9			
-165	969.551			165	132		2.1			
-200	969.552			200	167		2.5			
-MEGA25N - 75	806.380	15.5 - 25.4	60	75	47	64-74	24 000	NBC25-	MGN25	1.6
- 90	806.381			90	62		20 000			1.9
-105	806.382			105	77		19 000			2.2
-120	806.383			120	92		17 000			2.5

A.1

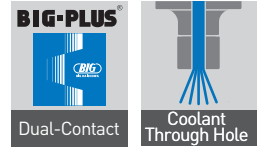
1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

For BBT50, refer to the following page.

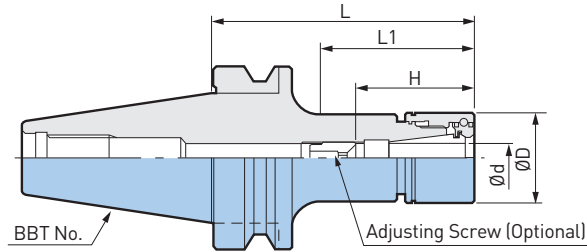


# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



A.1



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 0.25 - 25.4 mm

Model	Order No.	Ød	ØD	L	L1	H	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)
BBT50 -MEGA6N - 90	969.553	0.25 - 6	20	90	37	23 - 43	20 000	NBC 6-	MGN6	3.7
-120	969.554			120	67					3.8
-165	969.555			165	112					3.9
-200	969.556			200	147					4.0
-MEGA8N - 90	969.557	0.5 - 8	25	90	42	26 - 45	20 000	NBC 8-	MGN8	3.8
-120	969.558			120	67					3.9
-165	969.559			165	112					4.1
-200	969.560			200	147					4.2
-MEGA10N - 90	969.561	1.5 - 10	30	90	42	38 - 48	20 000	NBC10-	MGN10	3.9
-120	969.562			120	67					4.0
-165	969.563			165	112					4.3
-200	969.564			200	147					4.7
-250	969.565			250	197					4.7
-300	969.566	300	247	4.9						
-MEGA13N - 90	969.567	2.5 - 13	35	90	42	44 - 63	18 000	NBC13-	MGN13	4.0
-120	969.568			120	67					4.2
-165	969.569			165	112					4.5
-200	969.570			200	147					4.7
-250	969.571			250	197					5.0
-300	969.572	300	247	5.3						

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

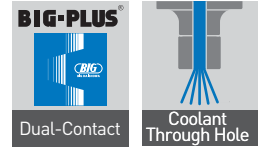
Spare Parts			Accessories								
	MEGA Nut		MEGA Wrench		NBC Collet		MEGA Perfect Seal	Adjusting Screw		Rubber	
					▶ 250	▶ 260					
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-	MPS6-	NBA6B	961.527	M7	12	2
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-	MPS8-	NBA8B	961.550	M9	13	2.5
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-	MPS10-	NBA10B	961.572	M11	16	3
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-	MPS13-	NBA13B	961.598	M14	20	4
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-	MPS16-	NBA16B	961.632	M18	20	4
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-	MPS20-	NBA20B	961.680	M21	20	4
MEGA25N	MGN25	806.388	MGR60L	969.468L	NBC25-	-	NBA25B	806.389	M27	20	4

Model	Order No.	Ød	ØD	L	L1	H	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)
BBT50 -MEGA16N - 75	969.573	2.5 - 16	42	75	31	48 - 68	17 000	NBC16-	MGN16	4.0
- 90	969.574			90	42					4.2
-120	969.575			120	72					4.4
-165	969.576			165	117		16 000			4.8
-200	969.577			200	152		13 000			5.1
-250	969.578			250	202		10 000			5.5
-MEGA20N - 75	969.579	2.5 - 20	46	75	31	51 - 68	16 000	NBC20-	MGN20	4.1
- 90	969.580			90	42					4.2
-120	969.581			120	72					4.5
-165	969.582			165	117		15 000			4.9
-200	969.583			200	152		13 000			5.3
-250	969.584			250	202		10 000			5.7
-MEGA25N - 90	806.384	15.5 - 25.4	60	90	46	64 - 74	19 000	NBC25-	MGN25	4.3
-120	806.385			120	72		17 000			4.9
-165	806.386			165	117		15 000			5.8
-200	806.387			200	152		13 000			6.4

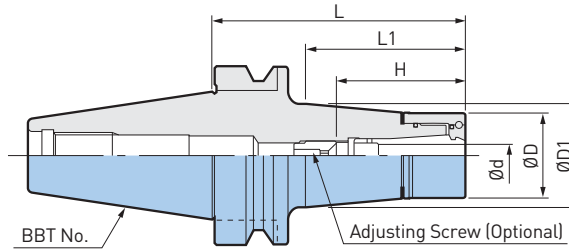
1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

# MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.



A.1



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 3 - 12 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)		
BBT30-MEGA6E - 75	968.167	3 - 6	25	30	75	50	37 - 45	35 000	MEC6-	MEN 6	0.62		
-MEGA8E - 50	968.170	3 - 8	30	30.5	50	25	42 - 51	40 000	MEC8-	MEN 8	0.53		
- 75	968.171			35	75	50		35 000			0.68		
-MEGA10E - 50	968.174	3 - 10	35	35.5	50	25	48 - 58	39 000	MEC10-	MEN10	0.57		
- 75	968.175			40	75	51		35 000			0.77		
-MEGA13E - 50	968.178	3 - 12	42	42.5	50	27	50 - 60	38 000	MEC13-	MEN13	0.61		
- 75	968.179			75	52	34 000		0.86					
- 90	968.180			90	67	25 000		1.01					
- 105	968.181			105	82			1.17					
BBT40-MEGA6E - 60	968.183	3 - 6	25	26.5	60	28	37 - 45	30 000	MEC6-	MEN 6	1.1		
- 90	968.185			31.5	90	58		27 000			1.3		
-135	968.188			39	135	103					1.6		
-MEGA8E - 60	968.191	3 - 8	30	31	60	28	42 - 48	30 000	MEC8-	MEN 8	1.2		
- 90	968.193			36	90	58					42 - 51	27 000	1.3
-135	968.196			44	135	103							1.8
-MEGA10E - 60	968.199	3 - 10	35	36	60	29	48 - 58	30 000	MEC10-	MEN10	1.3		
- 90	968.201			41	90	58					27 000	1.5	
-135	968.204			49	135	103							2.0
-MEGA13E - 60	968.207	3 - 12	42	43	60	29	50 - 60	30 000	MEC13-	MEN13	1.3		
- 75	968.208			45	75	43					1.5		
- 90	968.209			48	90	59					1.7		
-105	968.210			51	105	75					1.9		
-120	968.211			53.5	120	91					2.1		
-135	968.212			56	135	106					2.4		
-165	968.213			57.5	165	137					2.8		
-200	968.214			62.5	200	173					3.7		
BBT50-MEGA6E -120	968.217	3 - 6	25	36			37 - 45	20 000	MEC 6-	MEN 6	4.0		
-MEGA8E -120	968.221	3 - 8	30	40.5	120	77	42 - 51		MEC 8-	MEN 8	4.1		
-MEGA10E -120	968.225	3 - 10	35	45.5			48 - 58	MEC10-	MEN10	4.2			
-MEGA13E - 90	968.228	3 - 12	42	46.5	90	47	50 - 60	18 000	MEC13-	MEN13	4.0		
-120	968.229			52	120	77					4.4		
-165	968.230			59	165	121					5.2		

1. MEGA E nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA E Nut		MEGA Wrench		MEGA E Collet	MEGA E Perfect Seal	Adjusting Screw			Rubber	
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6E	MEN6	968.461	MGR25	969.456	MEC6-	EPS6-	NBA6B	961.527	M7	12	2
MEGA8E	MEN8	968.462	MGR30	969.458	MEC8-	EPS8-	NBA8B	961.550	M9	13	2.5
MEGA10E	MEN10	968.463	MGR35	969.460	MEC10-	EPS10-	NBA10B	961.572	M14	16	3
MEGA13E	MEN13	968.464	MGR42	969.462	MEC13-	EPS13-	NBA13B	961.598	M18	20	4

# MEGA Double Power Chuck Type D

Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and type DS to feed coolant to cutting tool periphery.



A.1

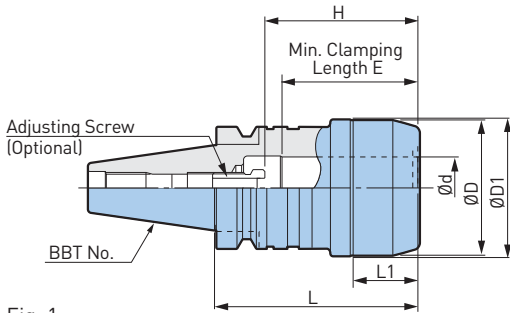


Fig. 1

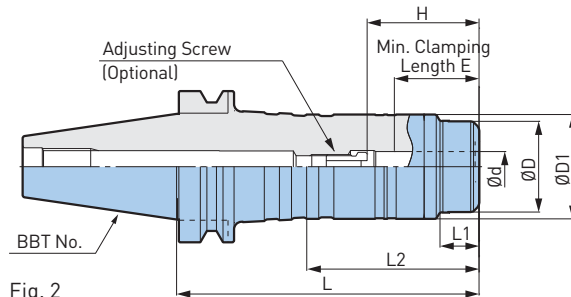


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 3 - 32 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	max. min <sup>-1</sup>	Weight (kg)
BBT40 -MEGA16D - 75A	801.711	2	16	42	53	75	25	38	71	55	30 000	1.5
-105A	801.730					105						2.1
-MEGA20D - 75A	803.148		20	50	55	75	34	44	69 - 79	56		1.6
-105A	803.116					105						2.0
-MEGA25D - 75A	801.731	1	25	62	63	75	39	-	73 - 83	57	27 000	2.0
-105A	803.198					105			71 - 81			2.3
-MEGA32D - 90A	803.199		32	70	71	90	33	-	71 - 81	64	26 000	2.1
-105A	803.131					105			79 - 89			2.4
-135A	803.135	135				22 000			3.1			
BBT50 -MEGA20D -105	969.593	2	20	60	69	105	25	36	69 - 79	56	20 000	5.1
-MEGA25D -105	969.595					105						5.4
-135	969.596		25	70	77	135	32	45	76 - 86	65	19 000	6.5
-165	968.033					165						17 000
-MEGA32D -105	969.597		32	80	86	105	39	54	78 - 95	71	20 000	5.4
-165	968.037					165						15 000
-200	968.038	200				12 000						9.9

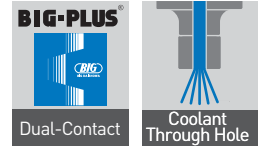
1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. As a back stop for cutting tools for the MEGA16D models, a commercially available hex socket head screw can be used.

For Straight Collet ▶ 272

Accessories									
MEGA Wrench		Adjusting Screw							
MEGA Double Power Chuck	Model	Order No.	Model	Order No.	ØD	L	L1	G	W
BBT30 -MEGA16DS	MGR46L	969.465L	-	-	-	-	-	-	-
-MEGA20DS	MGR50L	969.464L	HMA-16	962.311	19	27	6	M16P1.5	8
BBT40 -MEGA16D/DS	MGR42L	969.462L	-	-	-	-	-	-	-
-MEGA20D/DS	MGR50L	969.464L	HMA-M16	962.311	19	27	6	M16P1.5	8
-MEGA25D/DS	MGR62L	969.469L							
-MEGA32D/DS	MGR70L	969.470L							
BBT50 -MEGA16DS	MGR46L	969.465L	-	-	-	-	-	-	-
-MEGA20D/DS	MGR60L	969.468L	HMA-M16	962.311	19	27	6	M16P1.5	8
-MEGA25D/DS	MGR70L	969.470L							
-MEGA32D/DS	MGR80L	969.471L							

# MEGA Double Power Chuck Type DS

Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.



A.1

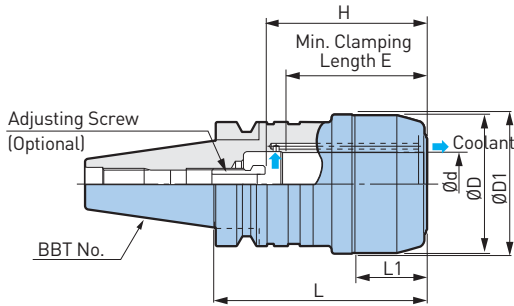
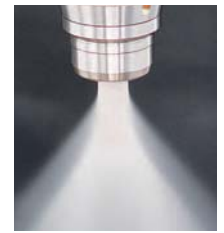


Fig. 1

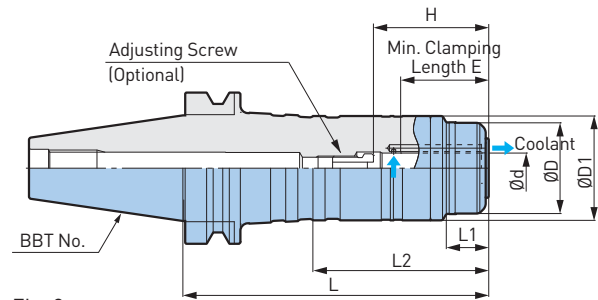


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 3 - 32 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	max. min <sup>-1</sup>	Weight (kg)	
BBT30-MEGA16DS - 60	978.030	1	16	46	47	62.5	28	-	64	52	30 000	0.76	
-MEGA20DS- 65	978.184		20	50	51	67.5	33		62		25 000	0.82	
BBT40-MEGA16DS - 75A	801.712	2	16	42	53	77	27	40	73	57	30 000	1.5	
-105A	803.149					107						2.1	
-135A	803.117					137						2.7	
-165A	803.200					167						3.3	
-MEGA20DS- 75A	803.150		20	50	55	77	36	46	71 - 81	58	30 000	1.6	
-105A	803.118					107						2.0	
-120A	803.201					122						2.3	
-135A	803.132					137						2.5	
-165A	803.161					167						3.2	
-200A	803.189					202						4.1	
-MEGA25DS- 75A	803.119	1	25	62	63	41	-	75 - 85	59	27 000	2.0		
-105A	801.713							107		2.3			
-135A	803.162							137		3.0			
-165A	803.136							167		3.7			
-MEGA32DS- 90A	803.202	1	32	70	71	35	-	73 - 83	66	26 000	2.1		
-105A	803.133							107		2.4			
-135A	803.137							137		3.1			
-165A	803.163							167		3.7			
-200A	803.187							202		4.5			
BBT50-MEGA16DS -105	968.708	2	16	46	55	107.5	26	36	73	52	21 000	4.6	
-135	968.076					137.5					5.2		
-165	968.077					167.5					5.7		
-MEGA20DS-105	968.709		20	60	69	107.5	28	38	71 - 81	58	20 000	5.1	
-135	968.710					137.5					6.0		
-165	968.080					167.5					6.8		
-MEGA25DS-105	968.711		25	70	77	107.5	34	47	78 - 88	67	20 000	5.4	
-135	968.712					137.5					6.5		
-165	968.083					167.5					7.6		
-MEGA32DS- 90	968.086		1	32	80	86	94.5	42	57	80 - 97	73	20 000	4.8
-105	968.713						107.5					5.4	
-135	968.714						137.5					7.0	
-165	968.087						167.5					8.5	
-200	968.088						202.5					9.9	

1. Wrench and axial adjusting screw are to be ordered separately.

2. "H" indicates the adjustment length with an adjusting screw.

3. As a back stop for cutting tools for MEGA16DS, a commercially available hex socket head screw can be used.

For Straight Collet ▶ 272

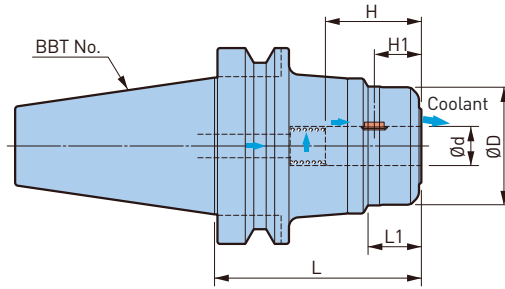
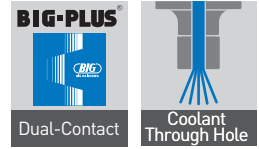
For Adjusting Screw ▶ 274

For MEGA Wrench ▶ 275



# MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.



A.1

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 16 - 32 mm

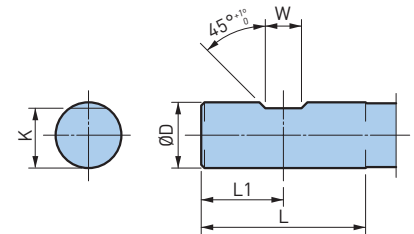
Model	Order No.	Ød	ØD	L	L1	H	H1	MEGA Wrench	Weight (kg)
BBT40 -MEGA16DPG - 75	806.362	16	46	75	24	47	23	MGR46L	1.7
-MEGA20DPG -100	806.363	20	60	100	27	49	24	MGR60L	2.1
BBT50 -MEGA16DPG -105	805.449	16	46	105	24	47	23	MGR46L	4.6
	805.450			165					5.8
-MEGA20DPG -105	805.451	20	60	105	27	49	24	MGR60L	5.1
	805.452			165					6.9
-MEGA25DPG -105	805.453	25	70	105	33	55	23	MGR70L	5.4
	805.454			165					7.7
-MEGA32DPG -105	805.455	32	80	105	41	59	23	MGR80L	5.6
	805.456			165					8.4

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.

## Weldon Shank Standards

(DIN1835-1)

The following standard shank is required for MEGA Perfect Grip.



ØD		L	L1	W		K	Tolerance	
Nominal	Tolerance			Nominal	Tolerance		Nominal	Tolerance
16	h6	48	24	10	+0.05 0	14.2	h13	
20		50	25	11		18.2		
25		56	32	12		23		
32		60	36	14		30		

### Caution

In case you are adding your own flat, the tool projection length in the MEGA Perfect Grip will be decided by the flat position. Refer to H1 in the MEGA Perfect Grip chart, decide the flat position to add, and then cut the cutter at L1 on cutter shank.

Spare Parts					Accessories	
	Key Grip		Spring		MEGA Wrench	
MEGA Perfect Grip	Model	Order No.	Model	Order No.	Model	Order No.
MEGA16DPG	PKG16-2P	805.492	PSP1519	805.496	MGR46L	969.465L
MEGA20DPG	PKG20-2P	805.493	PSP1823	805.497	MGR60L	969.468L
MEGA25DPG	PKG25-2P	805.494	PSP2420	805.498	MGR70L	969.470L
MEGA32DPG	PKG32-2P	805.495	PSP3128	805.499	MGR80L	969.471L

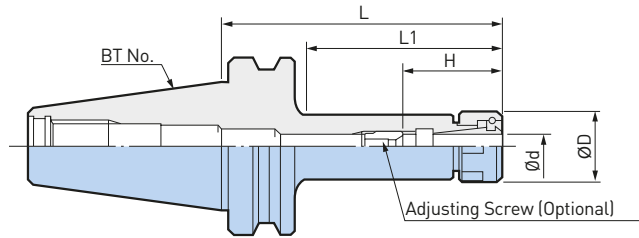
1. Key grip is available in a package of 2 pcs.
2. As key grip is a consumable item, it is recommended to replace on a regular basis.

# New Baby Chuck

The original high precision collet chuck to perform all machining applications.



A.1



Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Collet Model	Nut Model	Weight (kg)
BT30 -NBS6 - 60	961.917	0.25 - 6	20	60	32	20 - 40	NBC6-	NBN6	0.44
	961.902			75	47				0.47
	961.918			90	62				0.51
	800.031			120	90				0.57
-NBS8 - 60	961.919	0.5 - 8	25	60	33	23 - 42	NBC8-	NBN8	0.46
	961.920			90	63				0.55
-NBS10 - 60	961.921	1.5 - 10	30	60	34	35 - 45	NBC10-	NBN10	0.51
	961.908			75	49				0.58
	961.922			90	64				0.66
	800.597			120	94				0.81
-NBS13 - 60	961.923	2.5 - 13	35	60	34	41 - 60	NBC13-	NBN13	0.50
	961.924			90	64				0.72
-NBS16 - 60	961.925	2.5 - 16	42	60	37	45 - 65	NBC16-	NBN16	0.53
	961.926			90	67				0.81
-NBS20 - 60	961.915	2.5 - 20	46	60	38	48 - 58	NBC20-	NBN20	0.55
	961.916			90	68	48 - 65			0.90
	800.029			120	98	1.26			
BT40 -NBS6 - 90	961.932	0.25 - 6	20	90	53	20 - 40	NBC6-	NBN6	1.2
	961.933			135	98				1.3
-NBS8 - 90	961.935	0.5 - 8	25	90	53	23 - 42	NBC8-	NBN8	1.2
	961.936			135	98				1.3
-NBS10 - 90	961.938	1.5 - 10	30	90	53	35 - 45	NBC10-	NBN10	1.2
	968.604			120	83				1.4
	961.939			135	98				1.5
-NBS13 - 90	961.941	2.5 - 13	35	90	55	41 - 60	NBC13-	NBN13	1.4
	961.942			135	100				1.7
-NBS16 - 90	961.944	2.5 - 16	42	90	55	45 - 65	NBC16-	NBN16	1.5
	968.610			120	85				1.8
	961.945			135	100				1.9
-NBS20 - 60	961.946	2.5 - 20	46	60	28	48 - 65	NBC20-	NBN20	1.2
	961.947			90	57				1.5
	968.613			120	87				1.9
	961.948			135	102				2.1
-165	961.959			165	132				2.5

1. New baby nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

For Tap Driving Back Stop ▶ 259

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Collet Model	Nut Model	Weight (kg)
BT50 -NBS6 -120	961.962	0.25 - 6	20	120	67	20 - 40	NBC6-	NBN6	4.0
	961.963			165	112				4.1
	961.964			200	147				4.2
-NBS8 -120	961.966	0.5 - 8	25	120	67	23 - 42	NBC8-	NBN8	4.1
	961.967			165	112				4.2
-NBS10 -120	961.970	1.5 - 10	30	120	67	35 - 45	NBC10-	NBN10	4.1
	961.971			165	112				4.4
	961.972			200	147				4.6
-NBS13 - 90	961.975	2.5 - 13	35	90	42	41 - 60	NBC13-	NBN13	4.2
	961.976			120	67				4.4
	961.977			165	112				4.7
	961.978			200	147				5.0
-NBS16 -120	961.983	2.5 - 16	42	120	72	45 - 65	NBC16-	NBN16	4.4
	961.984			165	117				4.8
	961.985			200	152				5.2
-NBS20 - 90	961.988	2.5 - 20	46	90	42	48 - 65	NBC20-	NBN20	4.2
	961.989			120	72				4.5
	961.990			165	117				4.9
	961.991			200	152				5.3
	961.992			250	202				5.9

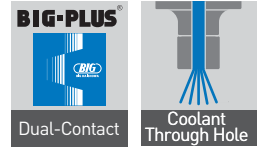
1. New baby nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. \* Coolant-through hole is not available.
4. Nut-less model available upon request.

For Tap Driving Back Stop ▶ 259

Spare Parts			Accessories								
	New Baby Nut		Wrench		NBC Collet		Baby Perfect Seal	Adjusting Screw		Rubber	
											
					▶ 250		▶ 262				
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
NBS6	NBN6	961.526	NBK6	961.525	NBC6-	BPS6-	NBA6B	961.527	M7	12	2
NBS8	NBN8	961.549	NBK8	961.548	NBC8-	BPS8-	NBA8B	961.550	M9	13	2.5
NBS10	NBN10	961.571	NBK10	961.570	NBC10-	BPS10-	NBA10B	961.572	M11	16	3
NBS13	NBN13	961.597	NBK13	961.596	NBC13-	BPS13-	NBA13B	961.598	M14	20	4
NBS16	NBN16	961.631	NBK16	961.630	NBC16-	BPS16-	NBA16B	961.632	M18	20	4
NBS20	NBN20	961.679	NBK20	961.678	NBC20-	BPS20-	NBA20B	961.680	M21	20	4

# New Hi-Power Milling Chuck Type S

The original design of slit structure assures heavy and finish end milling with high power and precision.



A.1

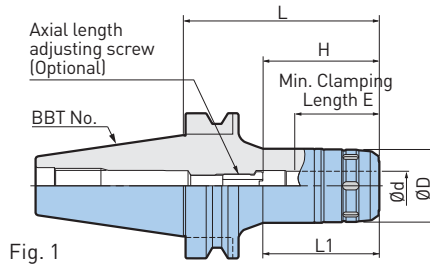


Fig. 1

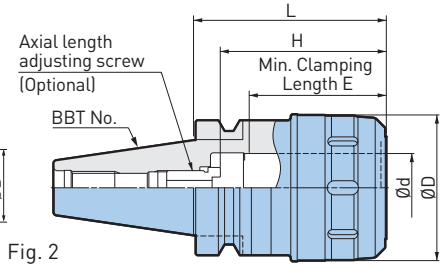


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 3 - 42 mm

Model	Order No.	Fig.	Ød	ØD	L	L1	H	E	Wrench	Weight (kg)	
BBT30 -HMC16S - 70 *	964.101S	1	16	43	70	47	71	55	FK45-50L	0.78	
-HMC20S - 75	964.102S	2	20	50	75	-	56 - 66	56		0.93	
-HMC25S - 90	964.103S		25	55	90	-	64 - 74	57		1.12	
-HMC32S -105	978.181S		32	62	105		70 - 80	58	FK58-62L	1.41	
BBT40 -HMC16S - 75 *	964.190S	1	16	43	75	45	71	55	FK45-50L	1.3	
-120 *	800.144				120	90				1.8	
-HMC20S - 75	964.191S		75	46	1.4						
-105	964.194S		20	50	105	75	69 - 79	56		1.9	
-120	964.196S				120	90	2.1				
-HMC25S - 75	964.192S		25	59	75	47	73 - 83	57	FK58-62L	1.5	
-105	964.195S				105	77				2.1	
-135	800.146				135	107				2.8	
-HMC32S - 90	978.279S		2	32	68	90	-	71 - 81	64	FK68-75L	2.0
-105	800.147					105	-	79 - 89			2.3
-135	800.148	135				-	3.0				
BBT50 -HMC16S -105 *	800.278	1	16	43	105	57	71	55	FK45-50L	4.2	
-135 *	800.279				135	80				4.6	
-165 *	800.280				165	100				5.0	
-200	800.281				200	120				5.8	
-HMC20S -105	800.282		20	50	105	57	69 - 79	56		FK45-50L	4.3
-135	800.283				135	80					4.8
-165	800.284				165	100					5.4
-200	800.285				200	125					6.0
-HMC25S -105	800.287		25	59	105	57	76 - 86	57	FK58-62L	4.5	
-135	800.288				135	87				5.2	
-165	800.289				165	105				5.9	
-200	800.290				200	125				7.5	
-HMC32S -105	800.291		32	68	105	64	88 - 98	72	FK68-75L	4.6	
-135	800.292				135	89				5.4	
-165	800.293				165	105				6.4	
-200	800.294				200	130				7.4	
-HMC42S -105	806.709			42	85	105	65	93 - 105	73	FK80-90L	5.2

1. Wrench and axial adjusting screw are to be ordered separately.

2. "H" indicates the adjustment length with an adjusting screw.

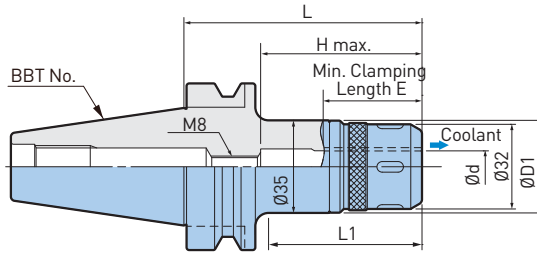
3. \* As a back stop for cutting tools for the HMC16S models, a commercially available hex socket head screw can be used.

For Straight Collet ▶ 272 - 274

For Wrench ▶ 275

# New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.



A.1

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 6 - 12 mm

Model	Order No.	Ød	ØD1	L	L1	H max.	E	Wrench	Weight (kg)
BBT30 -HMC12J - 60	805.814	12	35	60	38	65	43	FK31-33	0.58
BBT40 -HMC12J - 90	805.815			90	63				1.4
-120	805.816			120	70				1.6
BBT50 -HMC12J -105	805.817			105	67				4.0
-135	805.818			135	70				4.3
-165	805.819			165	90				4.7

1. Wrench is to be ordered separately.

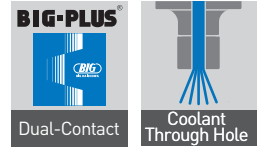
For Straight Collet ▶ 272

Accessories									
		Wrench		Adjusting Screw					
New Hi-Power Milling Chuck	Model	Order No.	Model	Order No.	ØD	L	L1	G	W
BBT30/40/50 -HMC12J	FK31-33	806.462	-	-	-	-	-	-	-
-HMC16S	FK45-50L	801.037	-	-	-	-	-	-	-
-HMC20S			HMA-M16	962.311	19	27	6	M16P1.5	8
BBT30 -HMC25S	FK52-55	962.294	HMA-M16	962.311	19	27	6	M16P1.5	8
-HMC32S	FK58-62L	801.038	HMA-M16S	962.312	19	27	6	M16P1.5	10
BBT40/50 -HMC25S	FK58-62L	801.038	HMA-M16	962.311	19	27	6	M16P1.5	8
-HMC32S	FK68-75L	801.039	HMA-M16S	962.312	19	27	6	M16P1.5	10
-HMC42S	FK80-90L	804.771	HMA-M24	062.313	30	36	95	M24P1.5	10



# Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.



A.1

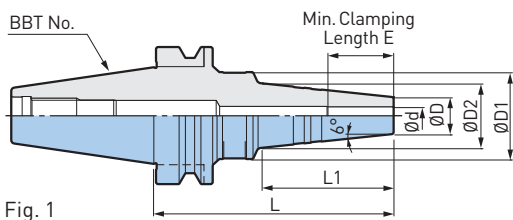


Fig. 1

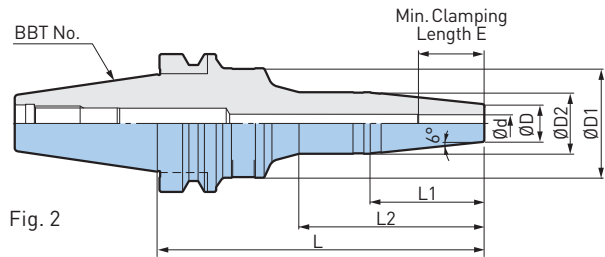


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 3 - 12 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	L2	E	Weight (kg)		
BBT30 -HDC3S - 90	805.462	1	3	14	42	25	90	50	-	16	0.65		
-HDC4S - 60	803.053		4		46	20				60	28	19	0.51
- 90	805.820		5		42	25				90	50	22	0.65
-HDC5S - 90	805.821		6		42	25						25	0.65
-HDC6S - 90	803.054		8	17	28	90	50	31		0.67			
-HDC8S - 90	803.055		10	19	30			33		0.70			
-HDC10S - 90	803.051		12	21	46			32		36	0.72		
-HDC12S - 90	803.052												
BBT40 -HDC3S - 90	805.463	1	3	14	38	19	60	22	-	16	1.3		
-HDC4S - 60	803.060		4		44	26				135	57	84	19
- 90	803.061	2	44		26	135	57	84		19	1.4		
-135	805.464	2	44		26	135	57	84		19	1.4		
-HDC6S - 110	803.062	1	6	38	27	110	60	-	25	1.3			
-150	803.063	2	6	48	26	150	57	85	25	1.6			
-HDC8S - 110	803.064	1	8	40	30	110	60	-	31	1.4			
-150	803.065	2	8	50	28	150	52	85	31	1.7			
-HDC10S - 110	803.056	1	10	42	32	110	60	-	33	1.4			
-150	803.057	2	10	50	30	150	52	85	33	1.7			
-HDC12S - 110	803.058	1	12	44	34	110	60	-	36	1.4			
-150	803.059	2	12	50	32	150	52	85	36	1.8			
BBT50 -HDC6S - 150	803.068	2	6	14	52	26	150	57	83	25	4.2		
-200	805.822				56		200		100		4.6		
-HDC8S - 150	803.069		8	17	54	28	150	52	83	31	4.3		
-200	805.823				58		200		100		4.7		
-HDC10S - 150	803.066		10	19	56	30	150	52	83	33	4.3		
-200	805.824				60		200		100		4.8		
-HDC12S - 150	803.067		12	21	58	32	150	52	83	36	4.4		
-200	805.825				62		200		100		4.8		

1. Adjusting screw and straight collet can not be used.

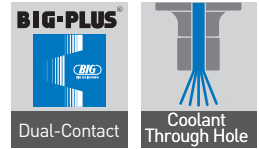
For Inner Bore Cleaner ▶ 286

**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# Hydraulic Chuck Jet Through

Coolant or oil-mist is supplied to cutting edge securely. Maximum performance to high-precision operation at 5-axis machining.



A.1

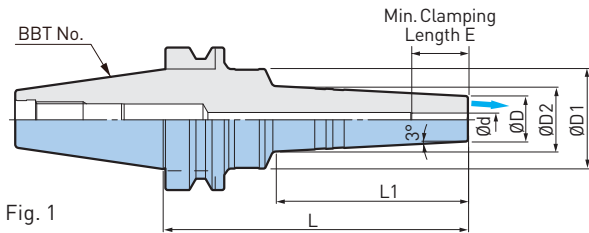


Fig. 1

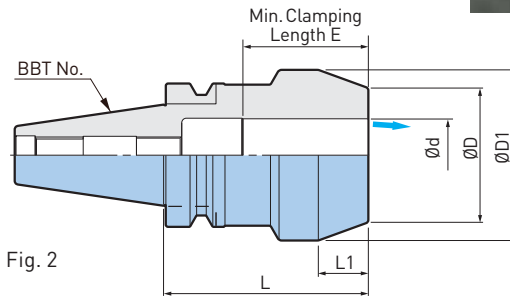


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

$\varnothing 3 - 32 \text{ mm}$

Model	Order No.	Fig.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	$\varnothing D2$	L	L1	E	Weight (kg)	
BBT30 -HDC4J - 60	805.077	1	4	20	46	23	60	28	19	0.54	
-HDC6J - 90	805.078		6		42	26				0.69	
-HDC8J - 90	805.079		8		22	28				0.71	
-HDC10J - 90	805.080		10	24	44	30		90	50	33	0.74
-HDC12J - 90	805.081		12	26	32	0.76					
-HDC16J - 90	805.480		16	34	40	0.86					
-HDC20J - 90	805.481		20	38	52	43		49	43	0.86	
BBT40 -HDC4J - 90	805.082	1	4	20	38	25	90	45	19	1.3	
-135	805.549				44	30	135	85		1.5	
-HDC6J - 90	805.083		6	22	38	25	90	45	25	1.3	
-135	805.084				44	29	135	85		1.5	
-HDC8J - 90	805.085		8	24	40	27	90	45	31	1.3	
-135	805.086				46	31	135	85		1.6	
-HDC10J - 90	805.087		10	26	42	29	90	45	33	1.3	
-135	805.088				48	33	135	85		1.6	
-HDC12J - 90	805.089		12	34	44	31	90	45	36	1.3	
-135	805.090				50	35	135	85		1.7	
-HDC16J - 90	805.482		16	38	46	40	90	46	43	1.4	
-135	805.483				50	44	135	89		1.9	
-HDC20J - 90	805.484		20	51	48	44	90	47	49	1.5	
-135	805.485				53	48	135	90		2.0	
-HDC25J - 90	805.677	25	59	63	56	90	41	1.9			
-HDC32J - 90	805.678	2	32	75	-	90	20	56	2.3		
BBT50 -HDC6J - 120	805.091	1	6	20	48	26	120	55	25	4.1	
-HDC8J - 120	805.092		8		50	28				4.1	
-HDC10J - 120	805.093		10		52	30				4.2	
-HDC12J - 120	805.094		12	26	54	32		56	43	4.2	
-HDC16J - 120	805.486		16	34	58	41				4.4	
-HDC20J - 120	805.487		20	38	62	45				4.5	
-HDC25J - 120	805.679		25	48	70	58		59	49	5.2	
-HDC32J - 120	805.680		32	58	78	67		60	56	5.6	

1. Adjusting screw cannot be used.

2. Straight collet can be used for HDC16J or bigger  $\varnothing d$  size models.

For Straight Collet ▶ 272

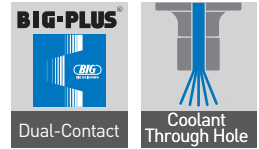
For Inner Bore Cleaner ▶ 286

**Caution**

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# Hydraulic Chuck Standard

For high precision machining in automotive, aerospace, Medical and Die & Mold.



A.1

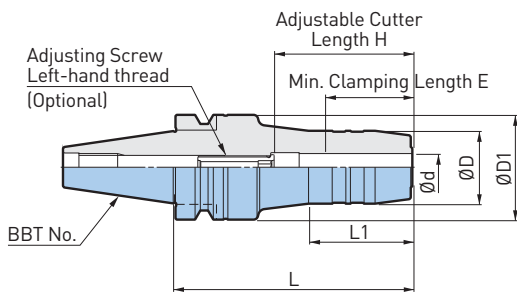


Fig. 1

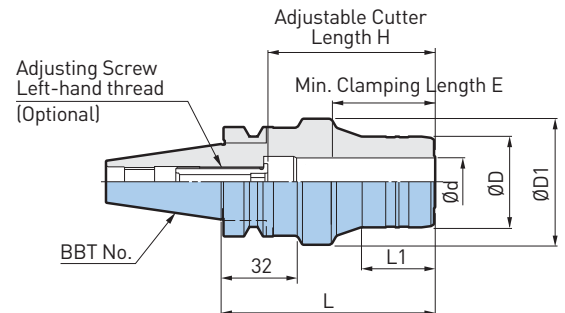


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 3 - 25 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	H	E	Adjusting Screw (optional)	Weight (kg)
BBT30 -HDC6	- 45	1	6	30	46	45	7	35 - 50	28	HDA6-05020	0.61
	- 75			26		75	40	28 - 50		HDA6-05032	0.67
	-105			105		43				0.82	
-HDC8	- 45	1	8	32	46	45	7	35 - 50	28	HDA8-06020	0.61
	- 75			28		75	41	28 - 50		HDA8-06032	0.69
	-105			105		44				0.84	
-HDC10	- 45	1	10	34	46	45	7	45 - 55	33	HDA10-08015	0.60
	- 75			30		75	36	33 - 55		HDA10-08032	0.74
	-105			105		45				0.91	
-HDC12	- 45	1	12	36	46	45	7	55 - 60	38	HDA12-10010	0.58
	- 75			32		75	36	38 - 60		HDA12-10032	0.75
	-105			105		45				0.94	
-HDC16	- 45 **	1	16	42	46	45	7	70	43	-	0.55
	- 75			38		75	35	43 - 70		HDA16-12030	0.77
	-105			105		47				HDA16-12037	1.06
-HDC20	- 60 *	2	20	38	53	60	-	43 - 54	43	HDA16-12030	0.77
	- 75			46	75	16	46 - 70			0.85	
	-105			105	40	43 - 70	HDA16-12037	1.02			
-HDC25	-105	2	25	55	63	105	44	52 - 80	52	HDA25-16039	1.60

1. Straight collet (reduction sleeve) is available.
2. \* Straight collet can not be used.
3. \*\* Adjusting screw can not be used.

For Straight Collet ▶ 272

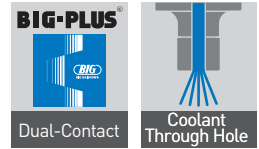
For Inner Bore Cleaner ▶ 286

For Adjusting Screw ▶ 282

### Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

Hydraulic Chuck Standard



A.1

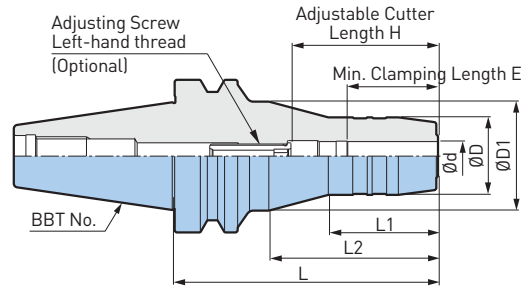


Fig. 2

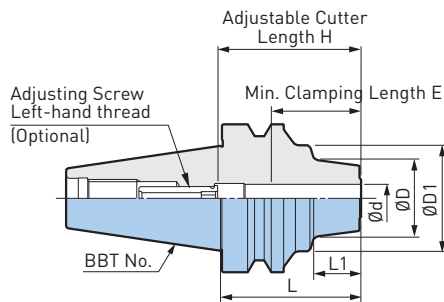


Fig. 1

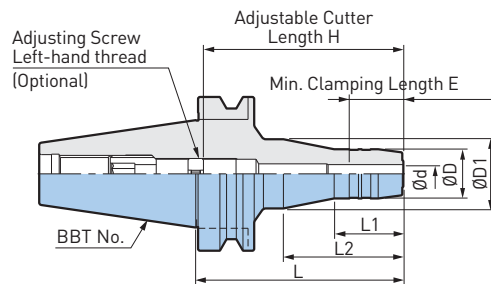


Fig. 3

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 3 - 31 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	Adjusting Screw (optional)	Weight (kg)										
BBT40 -HDC6 - 60	800.131	1	6	27	45	60	19	-	28 - 50	28	HDA6-05032	1.2										
- 90	978.343	2		26		90	44	50				1.4										
-110	800.128			110		70	1.5															
-HDC8 - 90	978.192	2	8	28	45	90	-	50	HDA8-06032	1.4												
-HDC10 - 60	800.088					1	31	60		20	-	1.2										
- 90	978.027	2	10	30	45	90	45	50	33 - 55	33	HDA10-08032	1.4										
-110	800.085					110	70	1.5														
-HDC12 - 60	978.046	1	12	32	45	60	20	-	38 - 60	38	HDA12-10032	1.2										
- 90	800.096					2	90	45				50	49	1.4								
-110	800.093						110	69				1.6										
-HDC14 - 90	978.028	2	14	34	45	90	46	49	43 - 70	43	HDA16-12037	1.4										
-HDC16 - 90	978.193		16	38	45	90	47	49				1.4										
-HDC18 - 90	978.194		18	40	45	90	48	-				1.5										
-HDC19 - 75 *	800.111		19	49.2	-	75	43	-				111	-	1.4								
-HDC20 - 90	800.115		2	20	42	50	90	48				50	43 - 70	43	HDA16-12037	1.4						
-110	800.112	110					70	1.7														
-HDC24 - 75 *	800.116	2	24	63	-	75	47	-	104	45	-	1.6										
-HDC31 - 75 *	805.826						31	74	30			-	76	56	1.8							
BBT50 -HDC6L -105	800.023	3	6	26	45	105	44	48	80 - 120	28	HDA6-20010	4.2										
-HDC8L -105	800.027											8	28	45	44	48	33	38	4.2			
-HDC10L -105	800.264																			10	30	47
-HDC12L -105	800.268		12	32	45	47	48	43	45	4.2												
-HDC16L -105	800.272										16	38	47	4.3								
-HDC19L - 90 *	800.001		19	49.2	-	90	45	-	149	43	-	4.2										
-HDC20L -105	800.002		2	20	42	50	105	47	48	71 - 111	43	HDA20-12047	4.4									
-HDC24L - 90 *	800.008												24	63	-	90	41	-	149	45	-	4.5
-HDC31L - 90 *	800.015																					31

1. Straight collet (reduction sleeve) is available.

2. \* Adjusting screw cannot be used. "H" is the max. tool shank length can be inserted for these models.

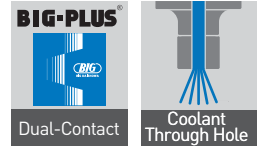
For Straight Collet ▶ 272

For Inner Bore Cleaner ▶ 286

For Adjusting Screw ▶ 282

### Shrink Chuck Slim

Slim design avoids interference with the side wall and draft of the mold.



A.1

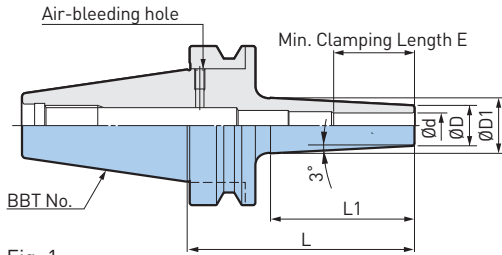


Fig. 1

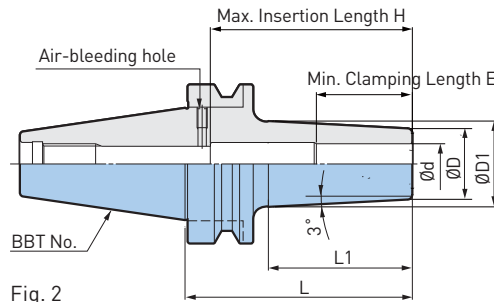


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 6 - 12 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	E	H	Weight (kg)	
BBT30 -SRC6S -105	978.179	1	6	10	18	105	77	26	-	0.48	
-SRC8S -105	978.180		8	13	21			0.51			
-SRC10S -105	800.063		2	10	16			24	32	62	0.55
-SRC12S -105	978.007			12	19			27	36	72	0.60
BBT40 -SRC6S -120	800.168	1	6	10	19	120	86	26	-	1.1	
-165	978.136				23.5	165	127			1.3	
-SRC8S -120	978.205		8	13	22	120	86	1.2			
-165	978.137				26.5	165	129	1.3			
-SRC10S -120	978.367		10	16	25	120	86	32		1.2	
-165	978.138				29.5	165	129	1.4			
-SRC12S -120	800.163		12	19	28	120	87	36		1.3	
-165	978.139				33	165	131	1.5			

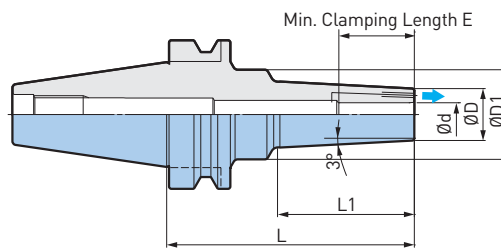
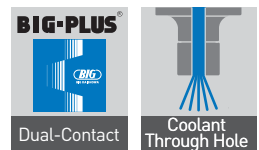
1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

### Shrink Chuck Jet Through

Efficient coolant supply to the cutting tool periphery.



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 6 - 12 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	E	Weight (kg)
BBT40 -SRC6J -105	804.751	6	16	32	105	55	26	1.3
-SRC8J -105	804.752	8	19	35				1.3
-SRC10J -105	804.749	10	22	38		58	32	1.4
-SRC12J -105	804.750	12	24	40		63	36	1.4
BBT50 -SRC6J -165	804.755	6	16	42	165	93	26	4.1
-SRC8J -165	804.756	8	19	45				99
-SRC10J -165	804.753	10	22	48		103	32	4.3
-SRC12J -165	804.754	12	24	50		108	36	4.3

1. Use carbide cutter within a tolerance of h6.

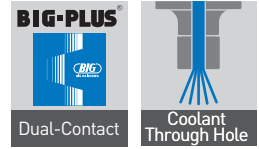
For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.



# Shrink Chuck Standard

Substantial body provides higher rigidity. Available from 4 mm clamping diameter.



A.1

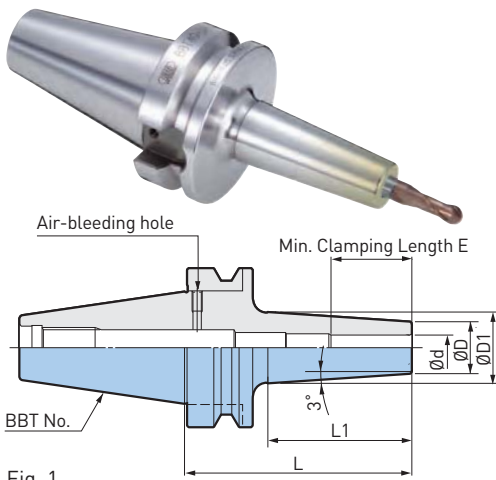


Fig. 1

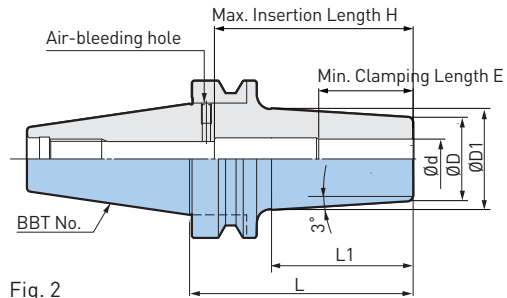


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 4 - 20 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	E	H	Weight (kg)											
BBT30 -SRC4 - 75 *	978.001	1	4	10	15	75	44	16	-	0.45											
-SRC6 - 75	978.002		6	14	19					47	26	0.47									
-SRC8 - 75	978.003		8	18	23							32	62	0.51							
-SRC10 - 75	978.004		10	22	27		36	72						0.56							
-SRC12 - 75	978.005		12	24	29					48	38			80	0.58						
-SRC16 - 75	978.006		16	28	33							0.62									
BBT40 -SRC4 - 90 *	978.291	2	4	10	15.5	90	52	16	-	1.1											
-SRC6 - 90	978.056		6	14	20					57	26	1.1									
-SRC8 - 90	978.057		8	18	24							32	-	1.2							
-SRC10 - 90	978.058		10	22	28									36	-	1.2					
-SRC12 - 90	978.059		12	24	30											38	80	1.2			
-SRC16 - 90	978.060		16	28	34													165	132	1.3	
-165	800.164		42	165	132	90	57	42												1.9	
-SRC20 - 90	978.061		20	34	40					165	132									42	1.4
-165	800.165		48	165	132							100	-								2.1
BBT50 -SRC6 -105	978.105		1	6	14									20.5	105						61
-165	800.354													26	165	116	26				-
-SRC8 -105	978.107			8	18									24.5	105	61		32	-		
-165	800.355	30				165	116	36	-					4.0							
-SRC10 -105	978.109	10		22	28.5	105	61			36	-			3.8							
-165	800.350				34	165	116	38	-			4.2									
-SRC12 -105	978.111	12		24	30.5	105	61			38	-	3.9									
-165	800.351				36	165	116	42	-			4.2									
-SRC16 -105	978.113	16		28	34.5	105	61			42	-	3.9									
-165	978.114				40.0	165	116	42	-			4.3									
-SRC20 -105	978.115	20		34	40	105	61			42	-	4.0									
-165	800.352				46.0	165	116	4.6													

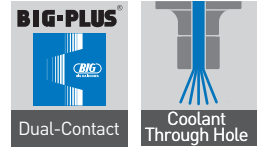
1. Use carbide cutter within a tolerance of h6.
2. \* Use carbide cutter within a tolerance of h5.

For Inner Bore Cleaner ▶ 286

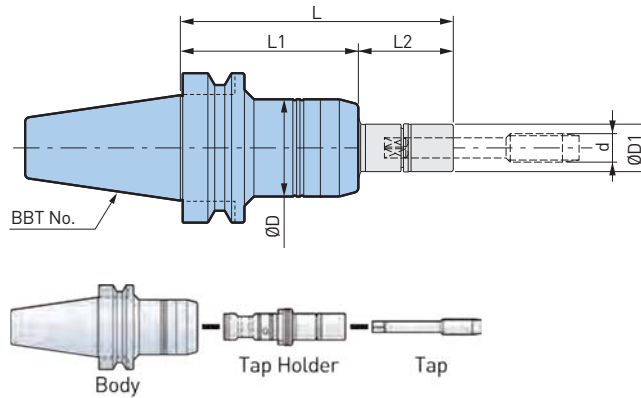
Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

# MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



A.1



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

M3 - M20 mm

Model	Order No.	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)
BBT30 -MGT6 - 70	965.401	MGT6 -d- 30	M3 - M8	36	16	100	70	30	0.69
		- 70				140		70	
		-100				170		100	
-MGT12 - 70	965.402	MGT12-d- 30	M5 - M12 P1/8	41	20	100	70	30	0.74
		- 70				140		70	
		-100				170		100	
-MGT20 -110	965.403	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	145	110	35	1.45
		- 85				195		85	
		-115				225		115	
BBT40 -MGT6 - 75	965.404	MGT6 -d- 30	M3 - M8	36	16	105	75	30	1.3
		- 70				145		70	
		-100				175		100	
-MGT12 - 75	965.405	MGT12-d- 30	M5 - M12 P1/8	41	20	105	75	30	1.4
		- 70				145		70	
		-100				175		100	
-MGT20 - 95	965.406	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	130	95	35	1.8
		- 85				180		85	
		-115				210		115	
BBT50 -MGT6 - 90	965.407	MGT6 -d- 30	M3 - M8	36	16	120	90	30	3.9
		- 70				160		70	
		-100				190		100	
-MGT12 - 90	965.408	MGT12-d- 30	M5 - M12 P1/8	41	20	120	90	30	4.0
		- 70				160		70	
		-100				190		100	
-MGT20 -105	965.409	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	140	105	35	4.4
		- 85				190		85	
		-115				220		115	

1. Tap holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.



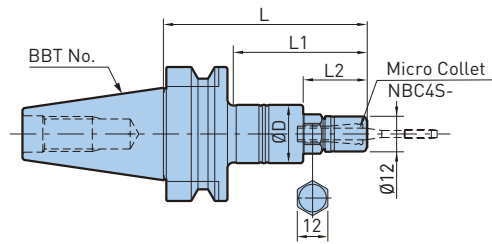
For Tap Holder ▶ 276  
 For Accessories ▶ 280  
 For MEGA Wrench ▶ 281

# MEGA Synchro Tapping Holder

For small Tap MGT3



A.1



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

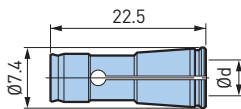
M1 - M3

Model	Order No.	Tapping Range	ØD	L	L1	L2	Weight (kg)
BBT30 -MGT3 -70	965.400	M1 - M3	20	70	46	22	0.49
BBT40 -MGT3 -90	805.723			90	61		1.2

1. Nut is included. MEGA Wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the hex portion of the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

For Accessories ▶ 281

## Micro Collet for MGT3



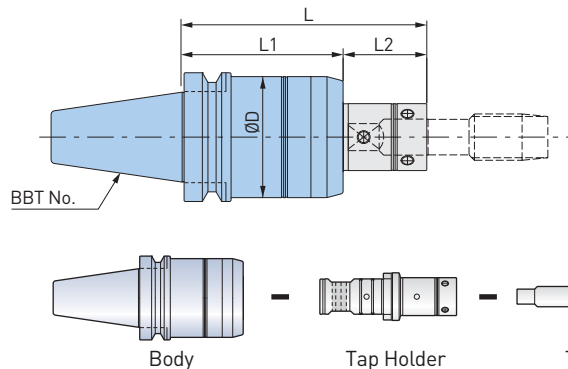
Model	Order No.	Tapping Range			Tap Shank
		DIN371	ISO529	JIS	Ød
NBC4S-2.5AA	961.468	M1 - M1.8	M2		2.5
-2.8AA	968.353	M2 - M2.6	M2.2, M2.5		2.8
-3.0AA	961.470	-	-	M1 - M2.6	3.0
-3.1AA	968.355	-	M3		3.15
-3.5AA	961.472	M3	-		3.5
-4.0AA	961.474	-	-	M3	4.0

1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ 247

## For large Tap MGT36

Compensation for synchronization error eliminates heavy thrust load of large diameter tapping.



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

M22 - M36

Model	Order No.	Tapping Range	ØD	L	L1	L2	Weight (kg)
BBT50-MGT36-125	800.323	M22 - M36 P5/8 - P1	94	190	125	65	7.2

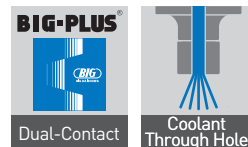
1. Tap holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.

For MGT36 Tap Holder ▶ 279

For Accessories ▶ 280



# Side Lock Holders for Weldon



A.1

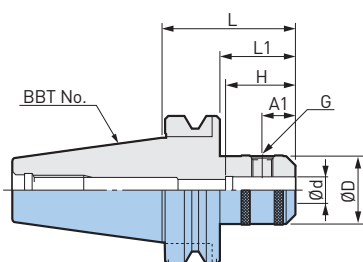


Fig. 1

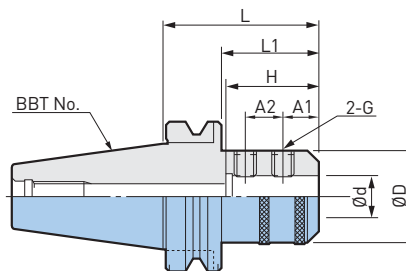


Fig. 2

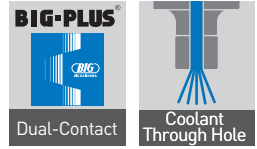
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 6 - 50 mm

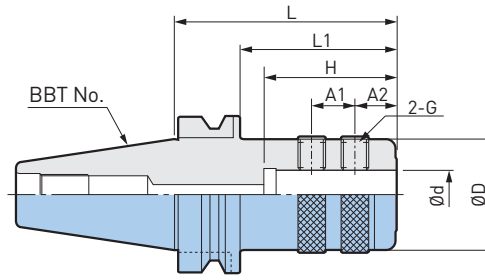
Model	Order No.	Fig.	Ød (H5)	ØD	L	L1	A1	A2	H	G	Weight (kg)		
BBT30 -ISL6 - 60	961.394	1	6	25	60	38	18	-	85 *	M6	0.52		
-ISL8 - 60	961.395		8	28			M8		0.55				
-ISL10 - 60	961.396		10	35			20		M10	0.64			
-ISL12 - 60	961.397		12	42			22.5		M12	0.74			
-ISL16 - 60	966.341		16	48			24		M14	0.81			
BBT40 -ISL12 - 75	961.362	1	12	42	75	48	22.5	-	110 *	M12	1.5		
-ISL16 - 75	961.363		16	48			24		M14	1.5			
-ISL20 - 75	961.364		20	52			25		M16	1.6			
-ISL25 - 90	961.365	2	25	63.5	90	63	24	25	60	M18xP2	2.1		
-ISL32 - 105	961.366		32	72	105	-	28	82	M20xP2	2.9			
BBT50 -ISL16 - 90	961.367	1	16	48	90	52	24	-	145 *	M14	4.4		
-ISL20 - 90	961.368		20	52			25		M16	4.5			
-ISL25 - 105	961.369	2	25	65	105	67	24	25	60	M18xP2	4.6		
-ISL32 - 105	978.017		32	72			28	5.3					
-ISL40 - 120	978.018		40	90			30	32			90	M20xP2	6.5
-ISL50 - 121	978.294		50	99.5			121	83				35	35

1. "H" is the max. tool shank length that can be inserted into the holder.
2. H dimension marked with \* indicates this dimension to the back end of the retention knob.
3. Use a cutting tool in accordance to DIN 1835 B/DIN 6535 HB.

Side Lock Holders for Drills



A.1



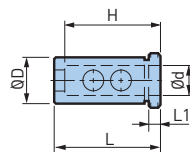
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 20 - 40 mm

Model	Order No.	Ød	ØD	L	L1	A1	A2	H	G	Weight (kg)		
BBT30 -TSL20 - 75	978.314	20	48	75	-	14	14	50	M10	0.98		
	978.315	25		80		15	20	56	M16	0.97		
	805.243	32		85		20	60	1.38				
BBT40 -TSL16 - 90	800.175	16	48	90	63	14	14	48	M10	1.7		
	800.177	20		90	63	14	14	50		1.7		
	800.179	25		90	63	14	14	56		1.6		
	978.318	32		63	105	78	15	20	60	M16	2.4	
	978.317	40		68	105	-	15	25	70		2.4	
	BBT50 -TSL16 - 90	800.369		16	48	90	52	14	14	48	M10	4.2
		800.374		20		90	52	14	14	50		4.2
800.375		25	90	52		14	14	56	4.3			
800.380		32	63	105		67	15	20	60	M16	4.8	
800.385		40	68	105		67	15	25	70		4.8	

1. "H" is the max. tool shank length that can be inserted into the holder.
2. Not compatible with Weldon DIN 1835B.

SL Sleeves for TSL Side Lock Holder



Model	Order No.	Ød	ØD	L	L1	H
OSL25 -16	962.596	16	25	62	5.5	48
	962.597	20				50
OSL32 -16	962.586	16	32	66	5.5	48
	962.598	20				50
	962.599	25				56
OSL40 -16	804.678	16	40	76	5.5	48
	804.679	20				50
	962.581	25				56
	962.582	32				60



# Morse Taper Holders

Precise finish of inner taper guarantees high concentricity.



A.1

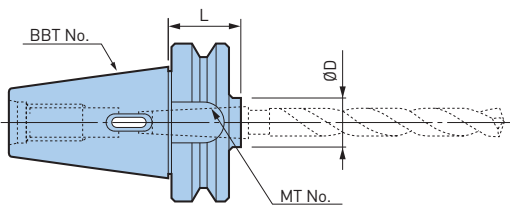


Fig. 1

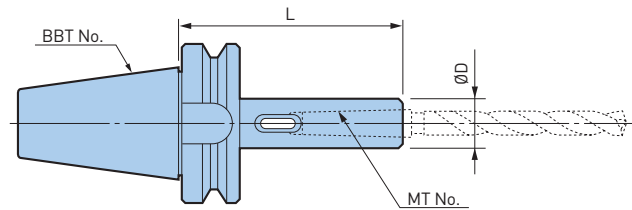


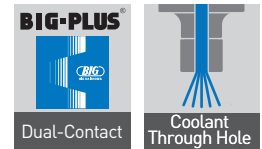
Fig. 2

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

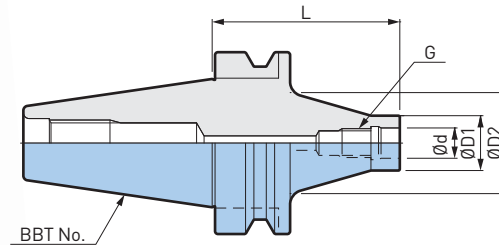
Model	Order No.	Fig.	MT No.	ØD	L	Weight (kg)
BBT30 -MTA1 - 60	978.274	1	1	25	60	0.52
-MTA2 - 60	978.254		2	32		0.55
-MTA3 - 80	978.255		3	40	80	0.74
BBT40 -MTA1 - 45	978.399	1	1	25	45	1.0
-120	800.158	2			120	1.3
-MTA2 - 45	978.164	1	2	32	45	1.0
-120	800.159	2			120	1.6
-MTA3 - 75	978.400	1	3	40	75	1.0
-135	800.160	2			135	1.7
-MTA4 - 90	978.165	2	4	50	90	1.6
BBT50 -MTA1 - 45	800.329	1	1	25	45	3.9
-120	800.325	2			120	4.2
-MTA2 - 45	800.335	1	2	32	45	3.9
-135	800.330	2			135	4.3
-MTA3 - 45	800.341	1	3	40	45	3.8
-150	800.336	2			150	4.6
-MTA4 - 75	800.347	1	4	50	75	3.9

## HOLDERS for Screw-On Cutter

General metric screw-on type cutting tools can be used with these models.



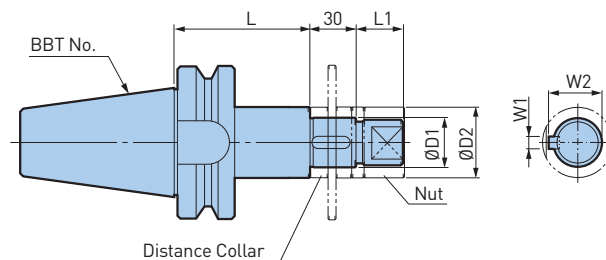
A.1



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	ØD1	ØD2	L	G	Weight (kg)
BBT30 -M10 - 19 - 45	806.601	10.5	19	35	45	M10	0.45
-M12 - 24 - 40	806.602	12.5	24	40	40	M12	0.45
-M16 - 29 - 35	806.603	17	29		35	M16	0.41
BBT40 -M10 - 19 - 65	806.604	10.5	19	35	65	M10	1.1
-M12 - 24 - 60	806.605	12.5	24	40	60	M12	1.1
-M16 - 29 - 55	806.606	17	29	45	55	M16	1.2

## Side Cutter Arbors



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	ØD1 (h6)	W1	W2	ØD2	L	L1	Weight (kg)
BBT40 -SCA25.4 - 75	804.760	25.4	6.35	27.78	40	75	25	1.9
-120	804.762					120		2.3
-SCA31.75 - 75	804.761	31.75	7.92	34.92	46	75	30	2.4
BBT50 -SCA25.4 - 90	804.757	25.4	6.35	27.78	40	90	25	4.7
-135	804.763					135		5.1
-SCA31.75 - 90	804.758					31.75		7.92
-135	804.764	135	5.7					
-SCA38.1 - 90	804.759	38.1	9.52	42.06	55		90	
-135	804.765					135	6.8	

1. Nut is included.
2. Distance collars of 5 mm, 8 mm, 10 mm and 12 mm are included.

### Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.

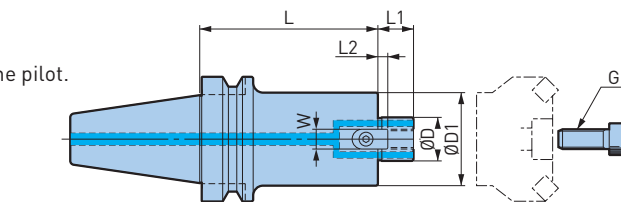
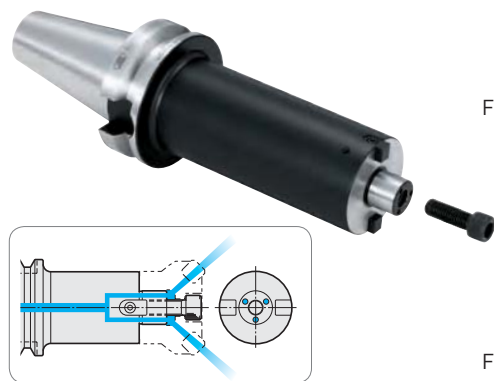
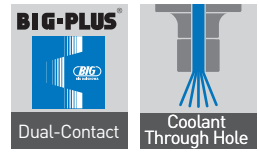


Fig. 1

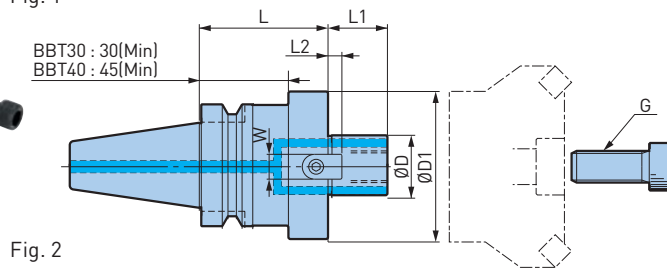


Fig. 2

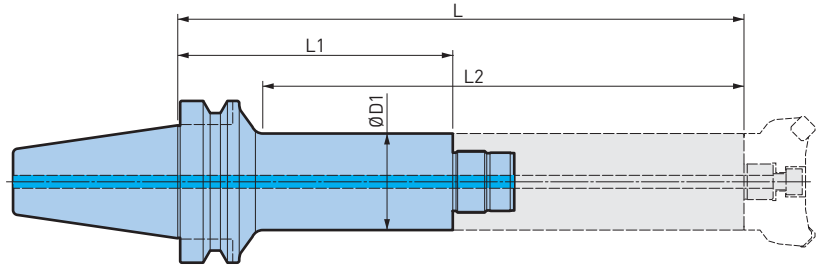
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Fig.	ØD (H6)	ØD1	L	L1	Drive Keys		G	Weight (kg)
							L2	W		
BBT30 -FMH16 - 37 - 35	978.326	1	16	37	35	16	5	8	M8	0.55
-FMH22 - 47 - 45	978.259	2	22	47	45	18	5	10	M10	0.77
-FMH22 - 60 - 45	805.569			60	45	18	5	10	M10	0.90
-FMH27 - 60 - 45	978.273			27	60	45	20	6	12	M12
BBT40 -FMH16 - 37 - 40	800.066	1	16	37	40	16	5	8	M8	1.1
-FMH22 - 47 - 45	978.145	1	22	47	45	18	5	10	M10	1.3
- 60	978.324				60					1.5
- 90	800.074				90					1.9
-150	978.378				150					2.7
-FMH22 - 60 - 45	978.368	1	22	60	45	18	5	10	M10	1.5
- 60	800.075				60					1.8
- 90	978.208				90					2.5
-FMH27 - 60 - 45	978.219	1	27	60	45	20	6	12	M12	1.5
- 60	800.079				60					1.8
- 90	978.128				90					2.5
-FMH27 - 76 - 60	800.080	2	27	76	60	20	6	12	M12	2.1
- 90	800.081	2	32	96	90	22	7	14	M16	2.8
-FMH32 - 96 - 60	978.035				60					2.4
BBT50 -FMH16 - 37 - 60	800.207	1	16	37	60	16	5	8	M8	3.8
-105	800.204				105					4.1
-150	800.205				150					4.5
-200	800.206				200					4.9
-FMH22 - 47 - 60	978.129	1	22	47	60	18	5	10	M10	4.1
-105	978.130				105					4.7
-150	978.131				150					5.3
-200	978.148				200					6.0
-250	800.221				250					6.7
-FMH22 - 60 - 60	978.403	1	22	60	60	18	5	10	M10	4.2
-105	978.167				105					5.2
-150	800.224				150					5.2
-FMH27 - 60 - 45	800.237	1	27	60	45	20	6	12	M12	3.9
- 90	978.174				90					5.0
-150	978.175				150					6.3
-200	800.235				200					7.4
-250	978.029				250					8.5
-300	800.236				300					9.6
-FMH32 - 96 - 45	978.132	1	32	96	45	22	7	14	M16	4.2
- 90	978.133				90					6.8
-150	978.143				150					10.2
-200	978.183				200					13.3
-300	800.256	1	40	100	300	26	8.5	16	M20 (MBA-M20H)	19.0
-FMH40 -100 - 45	978.149				45					4.4
- 75	961.371				75					6.2
-105	961.372	105	8.1							

- Hexagon socket head cap screw is included.
- By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ 282

### Smart Damper Basic Holders for Mills

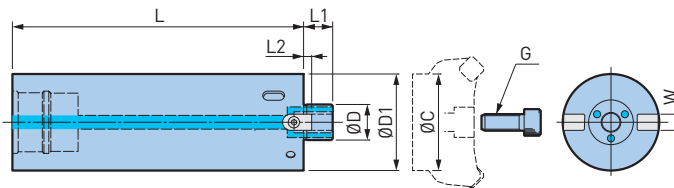
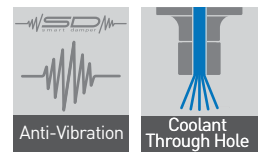


A.1

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	ØD1	L	L1	L2	Damper Head Model	Weight (kg)
BBT50 -SDF36 - 47 - 70	806.579	47	250	70	197	FMH DP-47	4.3
-120	806.580		300	120	247		5.0
-170	804.975		350	170	297		5.6
-220	804.970		400	220	347		6.3
BBT50 -SDF36 - 60 - 70	806.581	60	250	70	197	FMH DP-60	4.6
-120	806.582		300	120	247		5.7
-170	804.973		350	170	297		6.7
-220	804.974		400	220	347		7.8

### Smart Damper Damper Heads for Mills



Model	Order No.	ØD	ØD1	L	L1	L2	W	G	Wrench	ØC min.	Weight (kg)
SDF36-FMH22DP -47-180	804.969	22	47	180	18	5	10	M10	FK45-50L	36	3.0
-60-180	804.971	22	60		18	5	10	M10	FK58-62L	49	4.5
FMH27DP-60-180	804.972	27	60		20	6	12	M12		46	4.5

1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

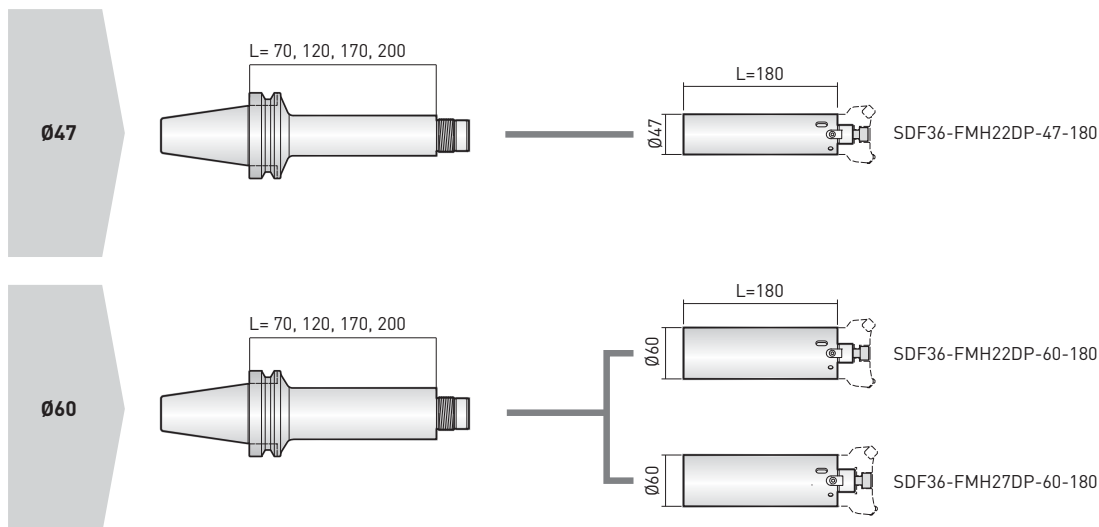
For Clamp Bolt ▶ 282

For Wrench ▶ 275

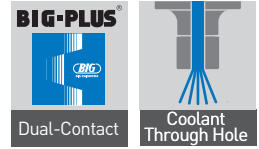
#### Combinations

Basic Holder

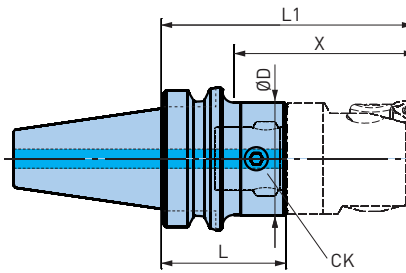
Damper Head



# CK Shanks with Center Through Coolant



A.1



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

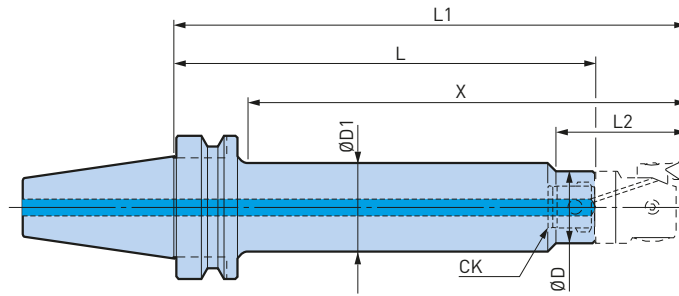
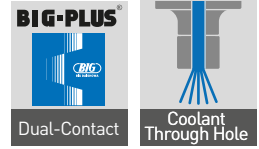
Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
BBT30 -CKB1 - 72	328.308	CKB1	19	72	104	73	0.51
-CKB2 - 83	328.260	CKB2	24	82.5	118	93	0.57
-CKB3 - 39	328.272	CKB3	31	39	79	53	0.45
-CKB4 - 73	328.261	CKB4	39	73	120	93	0.78
-CKB5 - 63	328.262	CKB5	50	63	120	93	0.80
-CKB6 - 64	328.289	CKB6	64	64	135	108	0.93
BBT40 -CKB1 - 72	869.017	CKB1	19	72	104	73	1.1
-CKB2 - 83	806.680	CKB2	24	82.5	118	88	1.2
-CKB3 - 124	806.681	CKB3	31	124	164	133	1.5
-CKB4 - 118	806.284	CKB4	39	118	165	133	1.8
-CKB5 - 108	806.682	CKB5	50	108	165	133	2.1
-CKN6 - 46	323.832N	CKN6	63.5	46	117	85	1.0
-CKN6 - 61	323.831N	CKN6	63.5	61	132	100	1.3
BBT50 -CKB1 - 102	869.002	CKB1	19	102	134	73	4.0
-CKB2 - 113	869.011	CKB2	24	112.5	148	107	4.0
-CKB3 - 124	806.683	CKB3	31	124	164	122	4.3
-CKB4 - 178	869.015	CKB4	39	178	225	182	4.9
-CKB5 - 183	806.684	CKB5	50	183	240	197	5.9
- 263	806.685	CKB5	50	263	320	277	7.0
-CKN6 - 72	323.874N	CKN6	63.5	72	143	100	4.0
-CKB6 - 229	806.686	CKB6	64	229	300	257	8.2
- 289	806.687	CKB6	64	289	360	317	9.7
-CKN7 - 86	323.871N	CKN7	90	86	203 (173)	160 (130)	4.9
-CKB7 - 136	323.875	CKB7	90	136	253 (223)	210 (180)	7.4
-CKB7 - 183	806.688	CKB7	90	183	300 (270)	257 (227)	9.9
- 243	806.689	CKB7	90	243	360 (330)	317 (287)	12.7

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Heads ▶ Chapter B



### Extra Long CK Shanks with Center Through Coolant



A.1

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

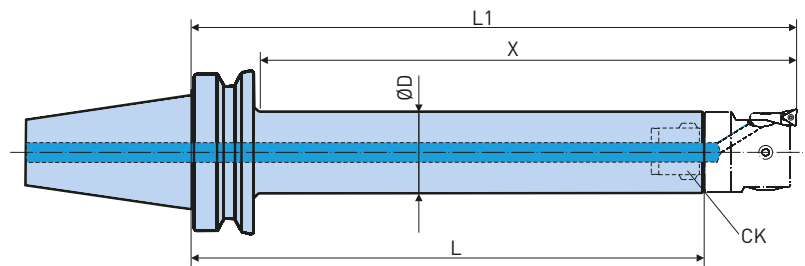
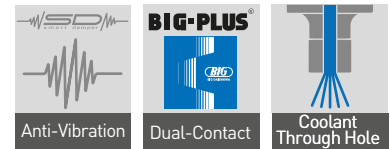
Model	Order No.	CK	ØD	ØD1	L	L1	L2	X	Weight (kg)
BBT50 -CKB4 - 48 - 193	806.690	CKB4	39	48	193	240	65	197	5.5
- 238	806.692				238	285		242	6.1
-CKB5 - 62 - 243	806.693	CKB5	50	62	243	300	80	257	8.1
- 303	806.694				303	360		317	9.5
-CKB6 - 72 - 259	806.695	CKB6	64	72	259	330	100	287	10.3
- 314	869.018				314	385		342	12.0
- 80 - 289	806.696			80	289	360		317	12.9
- 349	806.697				349	420		377	15.2

1. L1, L2 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

Fine Boring Heads ▶ Chapter B

### Smart Damper CK Shanks

Tool shanks with integrated damping system for highly efficient deep hole finish boring.



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
BBT50 -CKB5DP - 314	328.228	CKB5	50	314	371	318	7.8
-CKB6DP - 380	328.230	CKB6	64	380	451	408	12.3

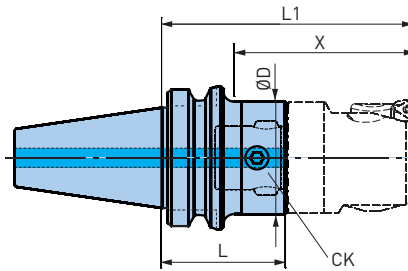
1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Heads ▶ Chapter B

### CK Shanks with Center Through Coolant



A.1

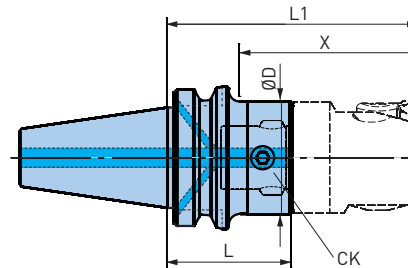


Model	Order No.	CK	$\varnothing D$	L	L1	X	Weight (kg)
BT30 -CKB1 - 35	323.707	CKB1	19	34.5	67	40	0.35
-CKB5 - 38	329.866	CKB5	50	38	95	68	0.48
BT40 -CKB6 - 46	326.160	CKB6	63.5	46	117	85	1.0
-CKB6 - 61	323.731	CKB6	63.5	61	132	100	1.3
BT50 -CKB6 - 72	323.770	CKB6	63.5	72	143	100	4.0
-CKB7 - 86	323.771	CKB7	90	86	203 (173)	160 (130)	5.0

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Heads ▶ Chapter B

### CK Shanks with Center and Flange Through Coolant

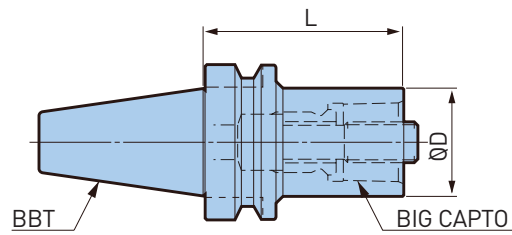
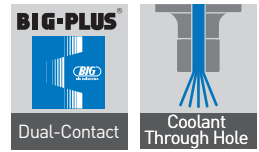


Model	Order No.	CK	$\varnothing D$	L	L1	X	Weight (kg)
BT30 -CKB3 - 34ADF	323.705	CKB3	31	34	74	47	0.39
BT40 -CKB3 - 42ADF	323.738	CKB3	31	42	82	50	0.97
-CKB4 - 65ADF	326.141	CKB4	39	65	112	80	1.2
-CKB5 - 55ADF	323.730	CKB5	50	55	112	80	1.2
-CKB5 - 105ADF	326.153	CKB5	50	105	162	130	1.9
-CKN6 - 46ADF	323.735N	CKN6	63.5	46	117	85	1.0
-CKN6 - 61ADF	323.736N	CKN6	63.5	61	132	100	1.3
BT50 -CKN6 - 72ADF	323.775N	CKN6	63.5	72	143	100	3.9
-CKB6 - 132ADF	323.777	CKB6	63.5	132	203	160	5.4
-CKN7 - 86ADF	323.776N	CKN7	90	86	203 (173)	160 (130)	5.0

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

For Boring Heads ▶ Chapter B

### BIG CAPTO Basic Holders



A.1

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	BIG CAPTO	ØD	L	Weight (kg)
BBT40 -C3 - 30	973.598	C3	32	30	1.0
-C4 - 40	802.350	C4	40	40	1.1
-C5 - 50	973.600	C5	50	50	1.2
-C6 - 75	973.601	C6	63	75	1.7
BBT50 -C3 - 40	973.602	C3	32	40	3.6
-C4 - 40	973.603	C4	40		3.6
-C5 - 40	973.604	C5	50		3.5
-C6 - 50	973.605	C6	63		3.5
-C8 - 70	803.736	C8	80		70

1. Clamp bolt is included.

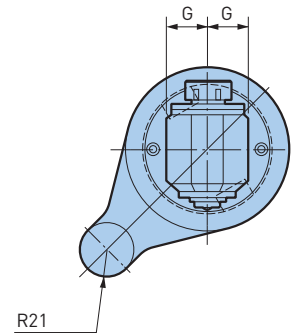
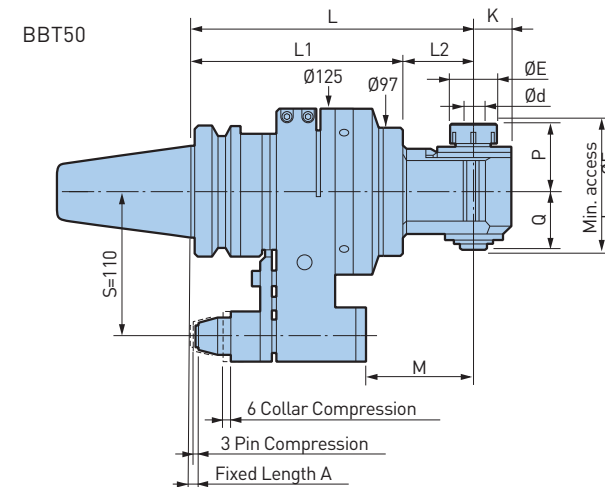
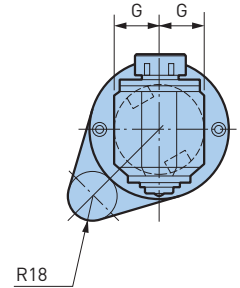
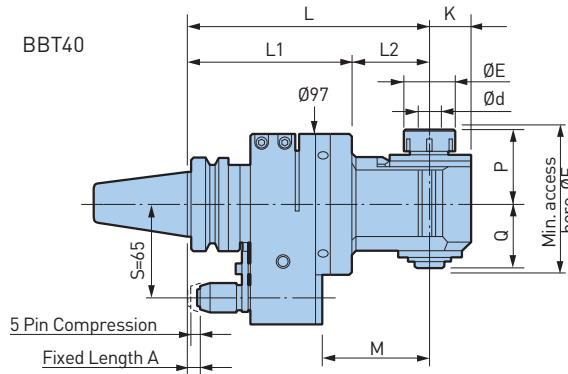
For BIG CAPTO Tools ► Chapter A4

### New Baby Chuck Type

It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.



A.1



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet Model	Max. min <sup>-1</sup>	Weight (kg)
BBT40 -AG90/NBS6 -170	802.463	0.25 - 6	20	21	17	170	115	55	77	33	29	67	NBC6	6000	5.1
	802.465					200		85	107						5.3
	802.467					230		115	137						5.5
	802.469					260		145	167						5.7
-AG90/NBS10 -170	802.449	1.5 - 10	30	30	25	170	115	55	77	45	43	91	NBC10	6000	5.5
	802.451					200		85	107						5.9
	802.453					230		115	137						6.2
-AG90/NBS13 -170	802.455	2.5 - 13	35	31	28	170	115	55	77	52	45	101	NBC13	6000	5.6
	802.457					200		85	107						6.0
	802.459					230		115	137						6.3
-AG90/NBS20S -165S	802.462	2.5 - 20	46	35	33	165	112	53	72	65	62	132	NBC20	3000	8.0
BBT50 -AG90/NBS6 -215	802.515	0.25 - 6	20	21	17	215	160	55	82	33	29	67	NBC6	6000	12.6
	802.518					245		85	112						12.8
	802.521					275		115	142						13.0
	802.524					305		145	172						13.2
-AG90/NBS10 -215	802.494	1.5 - 10	30	30	25	215	160	55	82	45	43	91	NBC10	6000	13.0
	802.497					245		85	112						13.4
	802.500					275		115	142						13.7
-AG90/NBS13 -215	802.503	2.5 - 13	35	31	28	215	160	55	82	52	45	101	NBC13	6000	13.1
	802.506					245		85	112						13.5
	802.509					275		115	142						13.8
-AG90/NBS20 -230	802.512	2.5 - 20	46	35	35	230	160	70	97	65	62	132	NBC20	3000	14.2

1. The standard fixed length A is 8 mm for BBT40 and 6 mm for BBT50. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC - EAA) can not be used.
4. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250

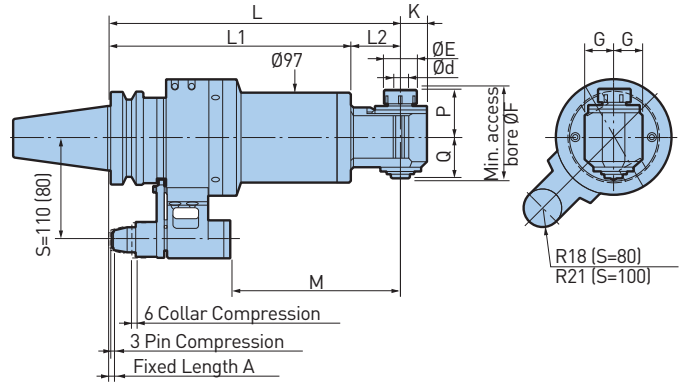
For Stop Block ▶ 290

# New Baby Chuck Type Extra Long Type

For drilling and key slotting in deep hole of large workpiece.



A.1



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet Model	Max. min <sup>-1</sup>	Weight (kg)
BBT50 -AG90/NBS6 -315LS	805.035	0.25 - 6	20	21	17	315	260	55	182	33	29	67	NBC6	6 000	18.9
	805.036					345		85	212						19.1
	805.037					375		115	242						19.3
	805.038					405		145	272						19.5
-AG90/NBS10 -315LS	805.047	1.5 - 10	30	30	25	315	260	55	182	45	43	91	NBC10	6 000	19.3
	805.048					345		85	212						19.7
	805.049					375		115	242						20.0
-AG90/NBS13 -315LS	805.057	2.5 - 13	35	31	28	315	260	55	182	52	45	101	NBC13	6 000	19.4
	805.058					345		85	212						19.8
	805.060					375		115	242						20.1
-AG90/NBS20 -330LS	805.067	2.5 - 20	46	35	35	330	260	70	197	65	62	132	NBC20	3 000	20.5
BBT50 -AG90/NBS6 -415LS	805.039	0.25 - 6	20	21	17	415	360	55	282	33	29	67	NBC6	6 000	23.3
	805.040					445		85	312						23.5
	805.041					475		115	342						23.7
	805.042					505		145	372						23.9
	805.050					415		55	282						23.7
-AG90/NBS10 -415LS	805.051	1.5 - 10	30	30	25	415	360	55	282	45	43	91	NBC10	6 000	24.1
	805.052					445		85	312						24.4
	805.052					475		115	342						24.4
-AG90/NBS13 -415LS	805.061	2.5 - 13	35	31	28	415	360	55	282	52	45	101	NBC13	6 000	23.8
	805.062					445		85	312						24.2
	805.063					475		115	342						24.5
-AG90/NBS20 -430LS	805.069	2.5 - 20	46	35	35	430	360	70	297	65	62	132	NBC20	3 000	24.9
BBT50 -AG90/NBS6 -515LS	805.043	0.25 - 6	20	21	17	515	460	55	382	33	29	67	NBC6	6 000	27.7
	805.044					545		85	412						27.9
	805.045					575		115	442						28.1
	805.046					605		145	472						28.3
	805.053					515		55	382						28.1
-AG90/NBS10 -515LS	805.054	1.5 - 10	30	30	25	515	460	55	382	45	43	91	NBC10	6 000	28.5
	805.055					545		85	412						28.8
	805.055					575		115	442						28.8
-AG90/NBS13 -515LS	805.064	2.5 - 13	35	31	28	515	460	55	382	52	45	101	NBC13	6 000	28.2
	805.065					545		85	412						28.6
	805.066					575		115	442						28.9
-AG90/NBS20 -530LS	805.070	2.5 - 20	46	35	35	530	460	70	397	65	62	132	NBC20	3 000	29.3

1. The standard fixed length A is 6 mm. Other lengths are available upon request.
2. Clamping nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmill model NBC - EAA can not be used.
4. Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250

For Stop Block ▶ 290

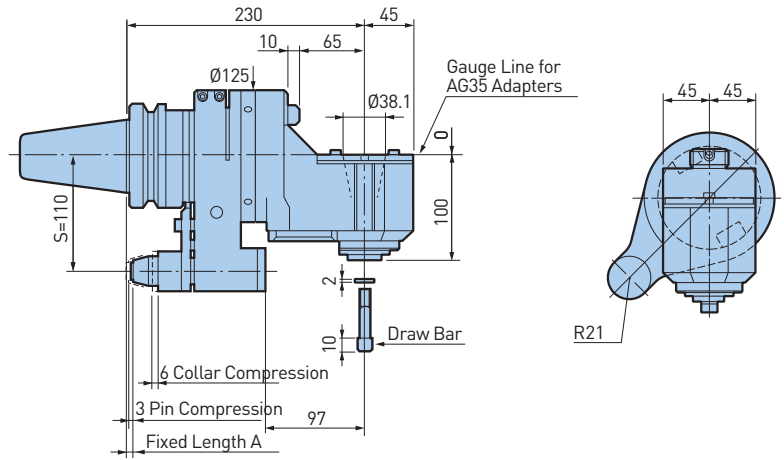




## Build-Up Type

Designed for greater rigidity by having the face of the spindle bore in line with the center of the machine spindle. Also helps minimize interference problems with ATC and storage problems within the magazine.

A.1



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

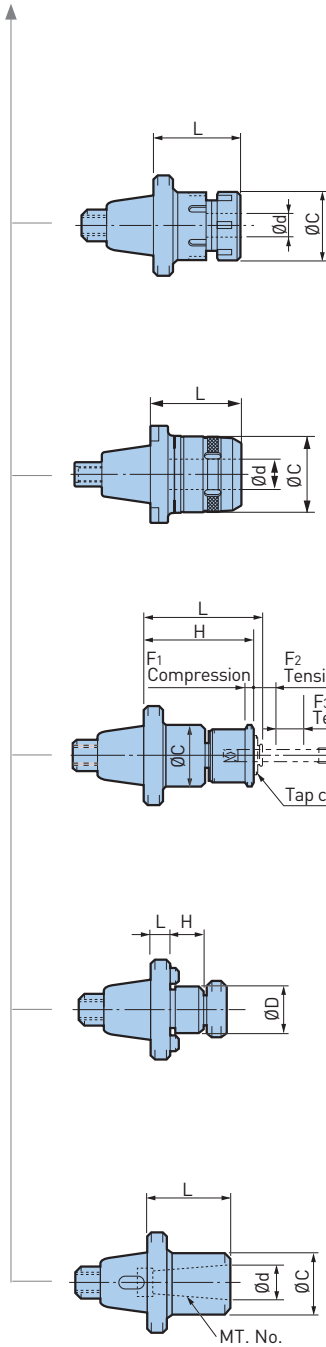
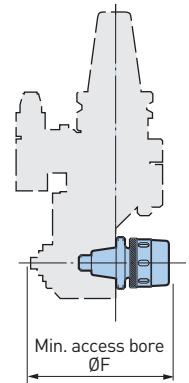
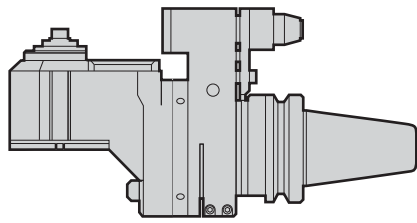
Model	Order No.	Max. min <sup>-1</sup>	Weight (kg)
BBT50 -AG90/AGH35-230	802.489	3 000	15.0
-AG90/AGH35-230S	802.490	3 000	16.3

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Coolant can be supplied through the locating pin.

For Stop Block ▶ 290

For Adapters ▶ 81

AG35 adapters



New Baby Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -NBS10	962.793	1.5 - 10	47	30	162	0.6
-NBS13	962.794	2.5 - 13	54	35	168	0.7
-NBS16	962.795	2.5 - 16		42	170	0.8
-NBS20	962.796	2.5 - 20		46		0.9

1. New baby collet and wrench are to be ordered separately.

For New Baby Collet ▶ 250

For Wrench ▶ 271

New Hi-Power Milling Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -HMC20S	802.742	20	60	50	178	1.5

1. Wrench (FK45-50L) is included.

For Straight Collet ▶ 272

Auto Tapper Type B (automatic depth control)

Model	Order No.	d	L	ØC	H	F1	F2	F3	Weight (kg)
AG35 -ATB12E	802.435	M4 - M12	80	40.5	72	0.5	5	4	1.0
-ATB20E	802.436	M8 - M20	115	57.5	102.5		6.5	5	1.7

1. Please contact BIG KAISER agent for tap collet.

Face Mill Arbor

Model	Order No.	ØD	L	H	Weight (kg)
AG35 -FMH22 -30	802.740	22	30	18	1.0
-FMH27 -20	802.741	27	20	20	1.0

Morse Taper Adapter

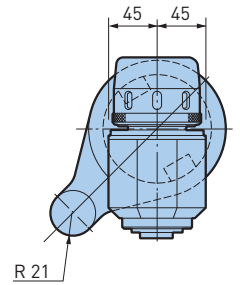
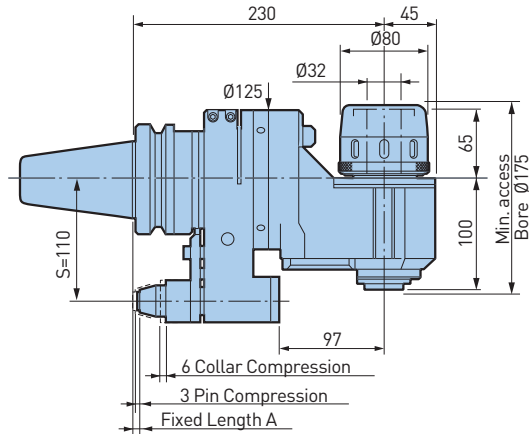
Model	Order No.	Ød	MT. No.	L	ØC	ØF	Weight (kg)
AG35 -MT1	962.785	12.065	1	50	24	164	0.6
-MT2	962.786	17.78	2	60	32	180	0.7

## HMC Type

Improved versatility is achieved from the 32 mm capacity Milling Chuck by using parallel reduction collets and other accessories.



A.1



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

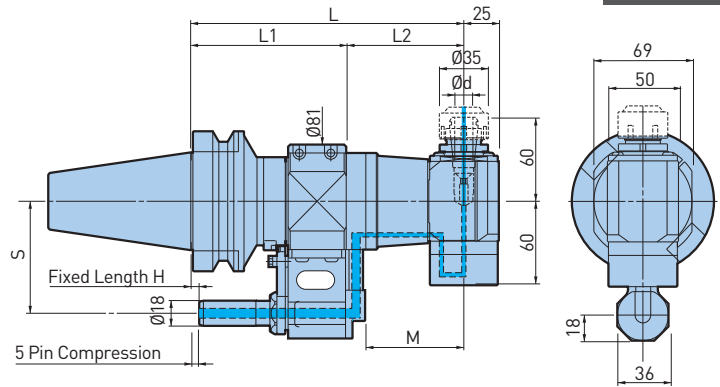
Model	Order No.	Max. min <sup>-1</sup>	Weight (kg)
BBT50 -AG90/HMC32-230	802.492	3 000	16.8
-AG90/HMC32-230S	802.493	3 000	18.1

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. The standard fixed length A is 6 mm, other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Wrench (FK80-90) is included.
5. Coolant can be supplied through the locating pin.

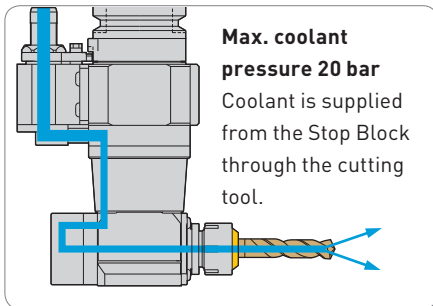
For Stop Block ▶ 290  
For Straight Collet ▶ 272



### OAG Type



A.1



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	L	L1	L2	M	Collet Model	Nut Model	Max. min <sup>-1</sup>	Weight (kg)
BBT40 -OAG90-13-170	802.482	2.5 - 13	170	86	84	70.5	NBC13	BPS13	5 000	6.0
BBT50 -OAG90-13-195	802.545		195	111						9.2

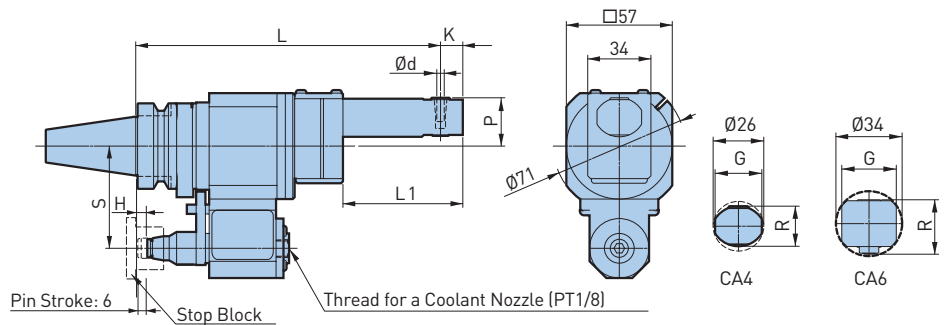
1. The standard fixed length A is 6 mm other lengths are available upon request.
2. Standard "S" is 80 mm for BBT50 and 65 mm for BBT40.
3. New baby nut and wrench are included. New baby collet is to be ordered separately.

For New Baby Collet ▶ 250

For Baby Perfect Seal ▶ 262

For Stop Block ▶ 290

### Light Weight Type for BBT30



max. 2 000 min<sup>-1</sup>



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	L	L1	K	P	G	R	Ratio	Collet Model	Weight (kg)
BBT30 -AG90-CA4SG-164	805.570	3 - 4	164	64.5	12	26	24	21	1 : 1.13	CA4 -	1.90
-AG90-CA6SG-164	805.571	3 - 6	164	67	14.5	28	28	28.5	1 : 0.91	CA6 -	1.98

1. H and S dimension and angle must be indicated before ordering.
2. Tolerance of the cutting tool shank must be within h7.
3. Exclusive collet is to be ordered separately.

For Exclusive Collet ▶ 84

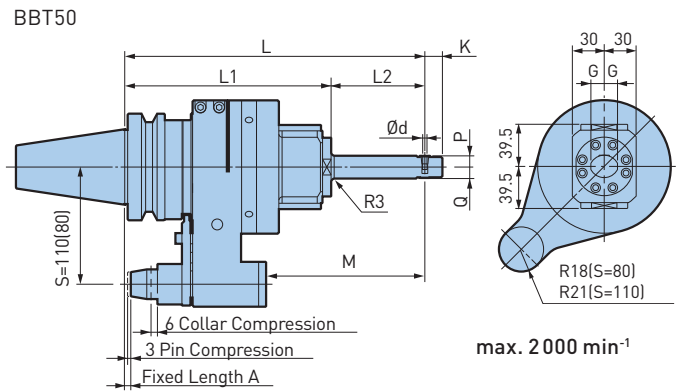
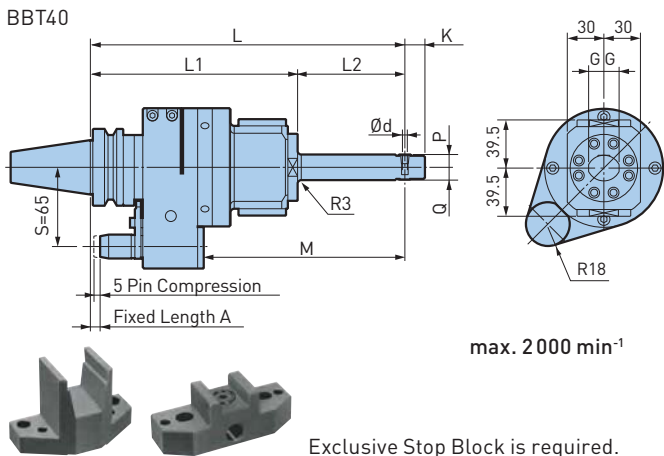
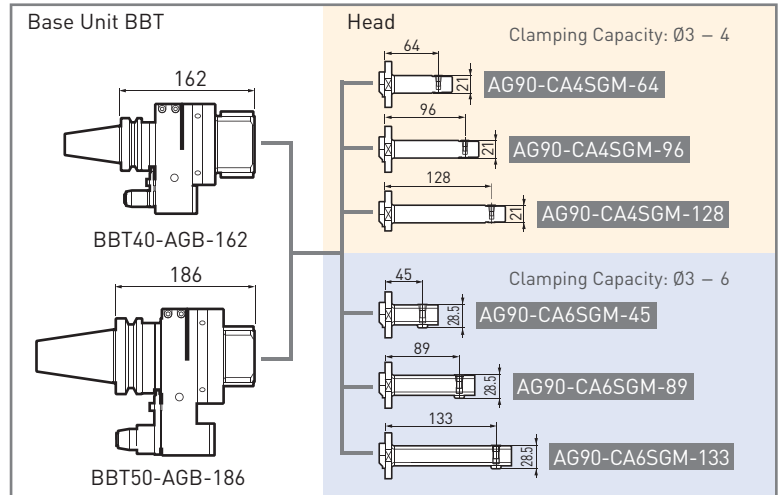
For Stop Block ▶ 290

### Small Bore Type

Angular operation in a  $\varnothing 30$  mm bore (min.) is possible. Modular heads enhance versatility. Head is aligned with spindle center for easy programming.



A.1



Exclusive Stop Block is required.

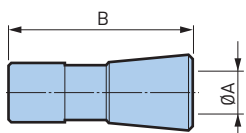
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Base	Head	$\varnothing d$	G	K	L	L1	L2	M	P	Q	Speed Ratio	Weight (kg)		
														S=65	S=80	S=110
BBT40-AG90	-CA4SGM -226	BBT40-AGB-162	AG90-CA4SGM - 64	3-4	12.5	16.5	226	170	56	133	10.5	10.5	1:1.06	5.6		
			- 96				258		88	165				5.7		
			-128				290		120	197				5.8		
	-CA6SGM -207		AG90-CA6SGM - 45	3-6	15	20	207	194	37	114	12.5	16	1:0.77	5.7		
			- 89				251		81	158				5.9		
			-133				295		125	202				6.1		
BBT50-AG90	-CA4SGM -250	BBT50-AGB-186	AG90-CA4SGM - 64	3-4	12.5	16.5	250	194	56	117	10.5	10.5	1:1.06	-	11.9	12.5
			- 96				282		88	149				12	12.6	
			-128				314		120	181				12.1	12.7	
	-CA6SGM -231		AG90-CA6SGM - 45	3-6	15	20	231	194	37	98	12.5	16	1:0.77	-	12	12.6
			- 89				275		81	142				12.2	12.8	
			-133				319		125	186				12.4	13	

- Standard fixed length A is 6 mm for BBT50 and 8 mm for BBT40. Other lengths are available upon request.
- Order No. for BBT50 is with S = 110. S = 80 type for BBT50 is available upon request.
- Internal coolant can not be used.
- Exclusive collet is to be ordered separately.

For Stop Block ▶ 290

#### Exclusive Collet for Small Bore Type and Light Weight



Model	Order No.	$\varnothing A$	B
CA4 -3	804.666	3	16.5
-3.5	804.667	3.5	
-4	804.668	4	

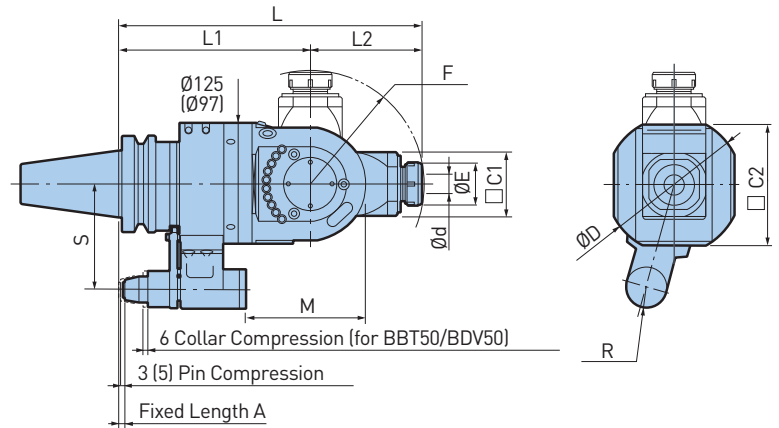
Model	Order No.	$\varnothing A$	B
CA6 -3	804.669	3	22
-4	804.670	4	
-5	804.671	5	
-6	804.672	6	



## Universal Type

Suitable for all cutting angles. In addition to the cutter head being adjustable a full 360°, the spindle also becomes easily and precisely adjustable from 0° to 90° by 1 increments.

A.1



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	ØE	ØD	□C1	□C2	L	L1	L2	M	F	R	S	Collet Model	Max. min <sup>-1</sup>	Weight (kg)
BBT40 -AGU/NBS13-270	802.480	2.5 - 13	35	115	51	97	270	170	100	124	102	18	65	NBC13	6 000	9.7
BBT50 -AGU/NBS20-315	802.318	2.5 - 20	46	140	65	125	315	200	115	125	118	21	110	NBC20	4 000	20.8

- Standard fixed length A is 6 mm for BBT50 and 8 mm for BBT40. Other lengths are available upon request.
- Order No. for BBT50 is with S = 110. S = 80 type for BBT50 is available upon request.
- Figures in ( ) in the drawing indicate dimensions for BBT40.
- New baby nut and wrench are included.
- Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250

For Stop Block ▶ 290



Easily adjustable spindle angle from 0° to 90°.



Unique setting mechanism enables the spindle angle to be precisely set at 1° increments.



Specially selected materials and special design for clamping the head guarantees rigidity for even end milling applications.

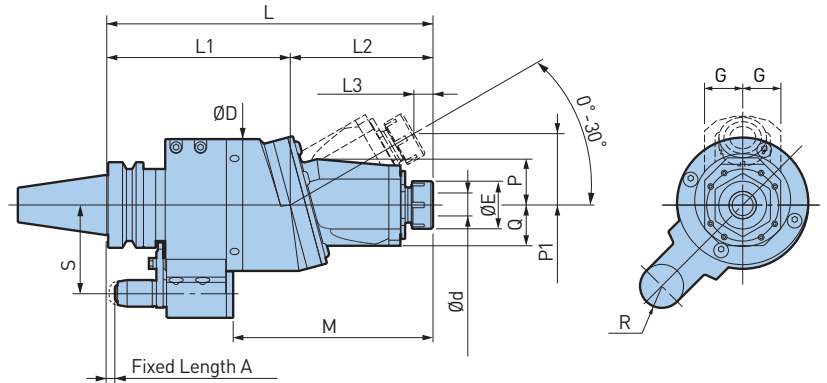


### AGU30 Type

Spindle angle is adjustable from 0° to 30°. Large swivel flange assures high rigidity.



A.1



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	ØD	ØE	G	L	L1	L2	L3 max.	Q	P	P1 max.	R	S	M	Collet Model	Max. min <sup>-1</sup>	Weight (kg)
BBT40 -AGU30/NBS13-240	802.481	2.5 - 13	97	35	29	240	135	105	14	30	34	52.5	18	65	147	NBC13	6 000	6.9
BBT50 -AGU30/NBS20-295	802.544	2.5 - 20	125	46	36.5	295	165	130	17	39	45	65	21	110	162	NBC20	4 000	16.1

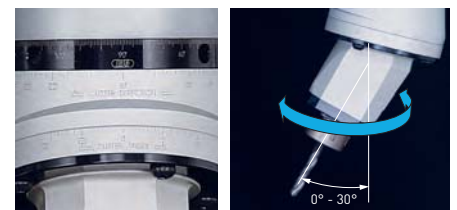
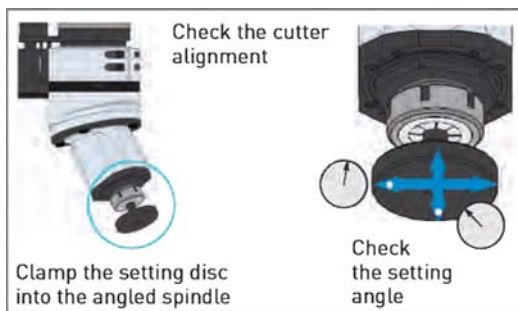
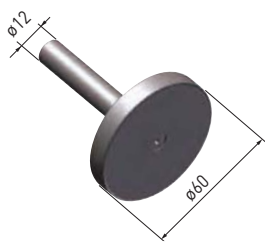
- Standard fixed length A is 6 mm for BBT50 and 8 mm for BBT40. Other lengths are available upon request.
- Order No. for BBT50 is with S = 110. S = 80 type for BBT50 is available upon request.
- New baby nut, wrench and setting disc are included.
- Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250

For Stop Block ▶ 290

### Setting Disc (Included Accessory)

For precise adjustment of the spindle angle or direction.



Spindle angle is easily adjustable from 0° to 30° using the scale indication on the body.

Application Examples

A.1



**AG90-Series (Build-Up Type)**

**Standard Type**

BBT50-AG90/AGH35-230  
 (with AG35-FMA25.4-20)  
 Workpiece: Carbon Steel C55  
 Cutter: 80 mm Face Mill  
 Cutting Depth: 2 mm  
 Spindle Speed: 600 min<sup>-1</sup>  
 Cutting Speed: 150 m/min.  
 Cutting Feed: 360 mm/min.

**S-Type**

BBT50-AG90/AGH35-230S  
 (with AG35-FMA25.4-20)  
 Workpiece: Carbon Steel C55  
 Cutter: 80 mm Face Mill  
 Cutting Depth: 3 mm  
 Spindle Speed: 600 min<sup>-1</sup>  
 Cutting Speed: 150 m/min.  
 Cutting Feed: 360 mm/min.



**AG90-Series (HMC Type)**

**Standard Type**

BBT50-AG90/HMC32-230  
 Workpiece: Carbon Steel C55  
 Cutter: 20 mm Face Mill  
 Cutting Depth: 3 mm  
 Spindle Speed: 400 min<sup>-1</sup>  
 Cutting Speed: 25 m/min.  
 Cutting Feed: 72 mm/min.

**S-Type**

BBT50-AG90/HMC32-230S  
 Workpiece: Carbon Steel C55  
 Cutter: 20 mm Face Mill  
 Cutting Depth: 4 mm  
 Spindle Speed: 400 min<sup>-1</sup>  
 Cutting Speed: 25 m/min.  
 Cutting Feed: 72 mm/min.



**AGU-Series (AGU30 Type)**

BBT40-AGU30/NBS13-240  
 Workpiece: Pre-hardened steel (HRC40)  
 Cutter: R5 2-flute carbide ball end mill  
 Cutting Depth: Ad = 0.1 mm  
 Spindle Speed: 6 000 min<sup>-1</sup>  
 Peck Feed: Pf = 0.4  
 Cutting Speed: 90 m/min.  
 Cutting Feed: 900 mm/min.

Special Designs

Our long experience and expertise enables us to design and manufacture special custom made Angle Heads for almost any customer application.

Special angle



Special length



Coolant feeder



BBT30

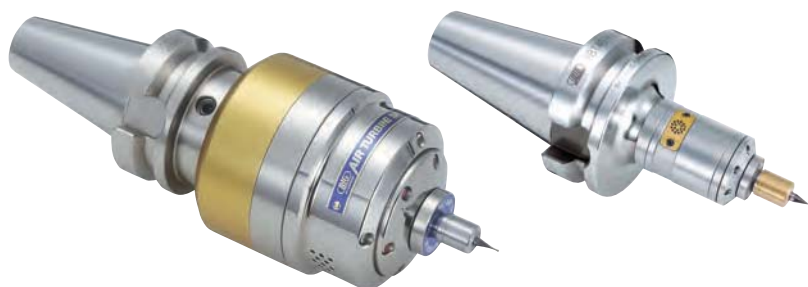


# Air Turbine Spindle

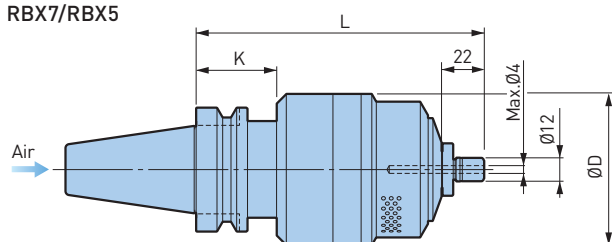
## Center Through Type



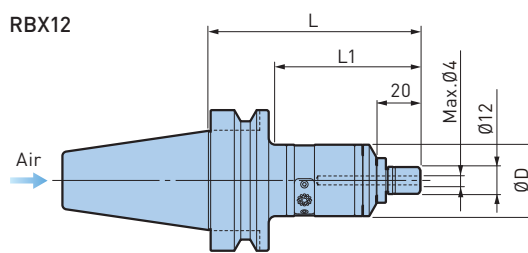
A.1



RBX7/RBX5



RBX12



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Operation Speed (min <sup>-1</sup> )	L	L1	ØD	K	Nut Model	Weight (kg)
BBT30 -RBX12C -4S- 95	804.890	100 000 - 120 000	95	70	32	-	MGN4S-HG	0.7
BBT40 -RBX5C -4S-150	802.403	40 000 - 50 000	150	-	96	43	MGN4S	4.1
-RBX7C -4S-150	802.409	60 000 - 80 000			78			3.1
-RBX12C -4S- 95	804.891	100 000 - 120 000	95	65	32	-	MGN4S-HG	1.3
BBT50 -RBX5C -4S-160	802.415	40 000 - 50 000	160	-	96	53	MGN4S	7.3
-RBX7C -4S-160	802.420	60 000 - 80 000			78			6.3

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-\_) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247

For Air Filter ▶ 90

### Caution

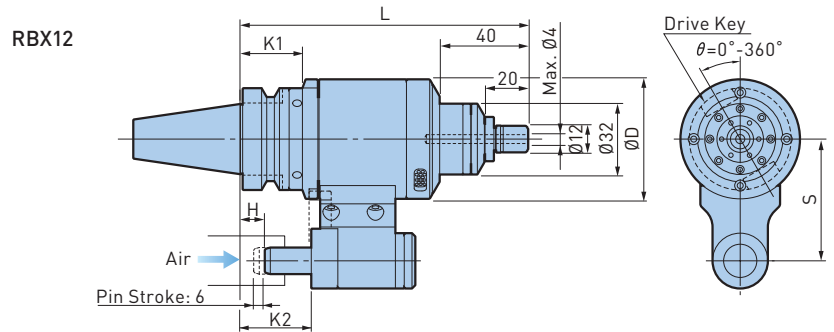
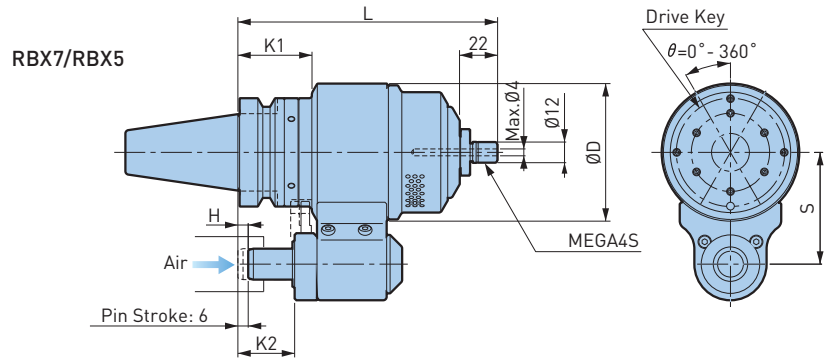
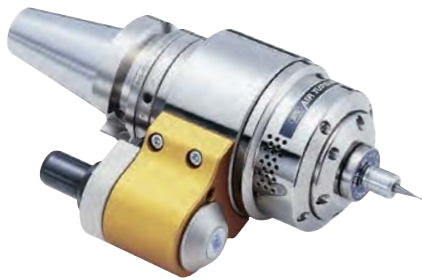
Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.



# Air Turbine Spindle

## Side Through Type

A.1



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Operation Speed (min <sup>-1</sup> )	L	ØD	K1	K2	S	H	Nut Model	Weight (kg)
BBT30 -RBX7 -4S-152-55	802.395	60 000 - 80 000	152	80	28	33	55	-10 - 22	MGN4S	2.7
-RBX12 -4S-130-55	804.883	100 000 - 120 000	130	54	28	32	55	0 - 20	MGN4S-HG	1.7
BBT40 -RBX5 -4S-151-65	802.398	40 000 - 50 000	151	96	43	33	65	-24 - 21	MGN4S	5.0
-RBX7 -4S-151-65	802.404	60 000 - 80 000	151	80	43	33	65	-24 - 21	MGN4S	4.0
-RBX12 -4S-135-65	804.885	100 000 - 120 000	135	63	-	33	65	-24 - 21	MGN4S-HG	3.0
BBT50 -RBX5 -4S-166-80	802.411	40 000 - 50 000	166	100	58	48	80	-9 - 36	MGN4S	9.7
-RBX7 -4S-166-80	802.416	60 000 - 80 000								8.7

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-\_) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247

For Air Filter ▶ 90

For Stop Block ▶ 290



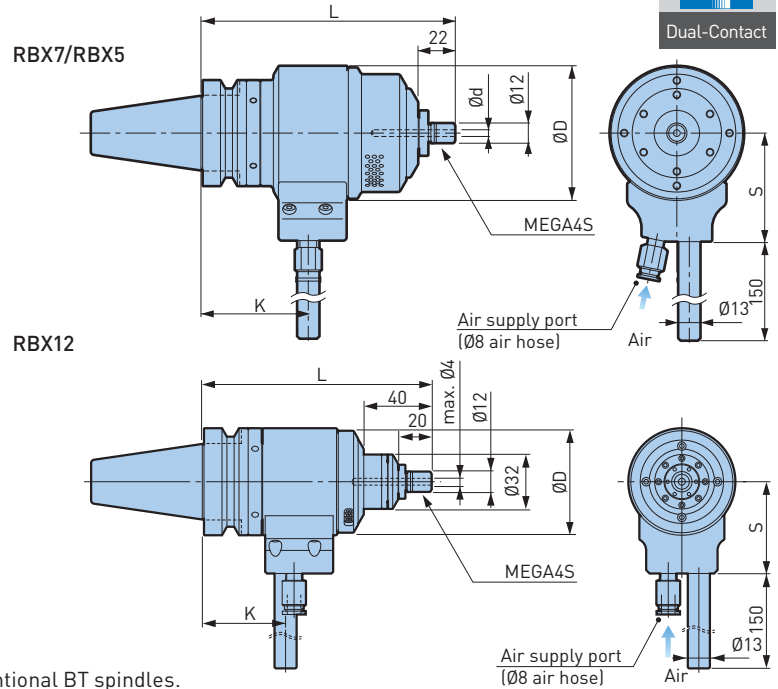
# Air Turbine Spindle

## Manual Type

A.1



Exclusive Stop Block is required.



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

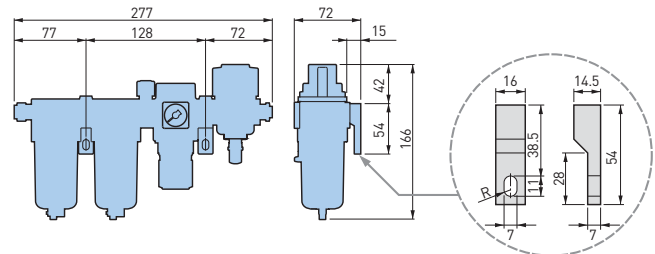
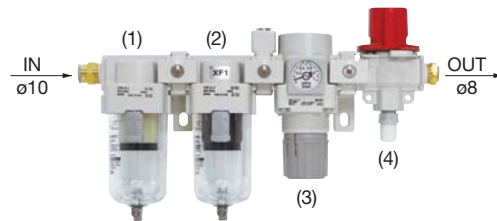
Model	Order No.	Operation Speed (min <sup>-1</sup> )	L	ØD	K	S	Nut Model	Weight (kg)
BBT30 -RBX7 -4S-152H	802.396	60 000 - 80 000	152	80	64.5	65	MGN4S	2.7
-RBX12 -4S-130H	804.886	100 000 - 120 000	130	54	46	50	MGN4S-HG	1.7
BBT40 -RBX5 -4S-151H	802.399	40 000 - 50 000	151	96	63	71	MGN4S	5.0
-RBX7 -4S-151H	802.405	60 000 - 80 000		80		65		4.0
-RBX12 -4S-135H	804.887	100 000 - 120 000	135	63	49	54	MGN4S-HG	2.7
BBT50 -RBX5 -4S-166H	802.412	40 000 - 50 000	166	100	78	80	MGN4S	9.7
-RBX7 -4S-166H	802.417	60 000 - 80 000						8.7

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-\_) and XF1 (air unit) are to be ordered separately.

## Air Filter Regulator for RBX

### Model XF1

1. Mist separator (filtration: 0,3 µm).
2. Micro mist separator (filtration: 0,01 µm).
3. Precision regulator.
4. Three ports valves for extracting pressurization (non-grease type).



Model	Order No.
XF1	962.661

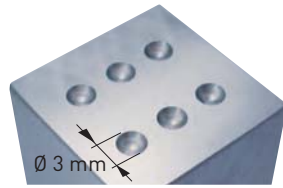
## Accessories for RBX

Accessories							
Air Turbine Spindle	Model	Order No.	Model	Order No.	Model	Order No.	Model
RBX12-4S	-	-	MGN4S-HG	805.747	MGR12	969.450	NBC4S-
RBX7-4S	MGN4S	969.481	-	-	-	-	-
RBX5-4S	MGN4S	969.481	-	-	-	-	-

**Application Examples**

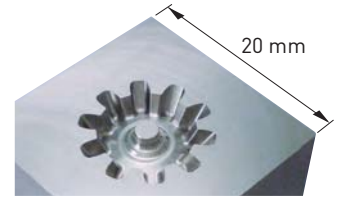
**RBX12**

**Dimpling on sintered HSS**  
Machining time 90 sec./hole



Cutter	Ball nose endmill CBN
Spindle Speed	120 000 min <sup>-1</sup>
Cutting Feed	1500 mm/min
D.O.C	ap = 0.01 mm

**Milling on die steel**  
Machining time 23 min.

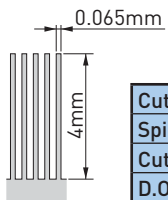


Cutter	Ball nose endmill CBN
Spindle Speed	120 000 min <sup>-1</sup>
Cutting Feed	2400 mm/min
D.O.C	ap = 0.01 mm

A.1

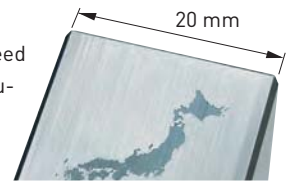
**RBX7**

**Aluminium A2017**  
Outstanding runout accuracy permits perfect thin wall cutting.



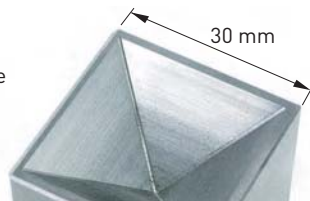
Cutter	Ø 0.5 mm Rib-endmill
Spindle Speed	70 000 min <sup>-1</sup>
Cutting Feed	1500 mm/min
D.O.C	ap = 0.02 mm

**Prehardened steel HRC40**  
Drastic time reduction by ultra high speed rotation. Excellent dynamic runout accuracy makes DOC of 5 µ clearly visible.



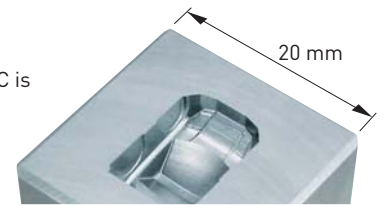
Cutter	R0.1 mm Ball nose endmill
Spindle Speed	80 000 min <sup>-1</sup>
Cutting Feed	400 mm/min
D.O.C	ap = 0.01 mm

**Prehardened steel HRC40**  
Overall cutting length of 656 m can be achieved with one ball nose endmill. Drastically extended tool life.



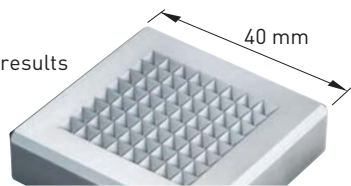
Cutter	R0.5 mm Ball nose endmill
Spindle Speed	65 000 min <sup>-1</sup>
Cutting Feed	4200 mm/min
D.O.C	ap = 0.02 mm; ae = 0.05 mm

**Prehardened steel HRC40**  
Original 5hour operation in MC is reduced to 2 hours.



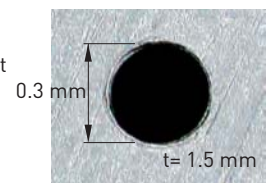
Cutter	R0.2 mm Ball nose endmill
Spindle Speed	70 000 min <sup>-1</sup>
Cutting Feed	1000 mm/min
D.O.C	ap = 0.01 mm

**Prehardened steel HRC40**  
No thermal expansion of spindle results in finely detailed surface finish.



Cutter	R0.5 mm Ball nose endmill
Spindle Speed	75 000 min <sup>-1</sup>
Cutting Feed	400 mm/min
D.O.C	ap = 0.02 mm

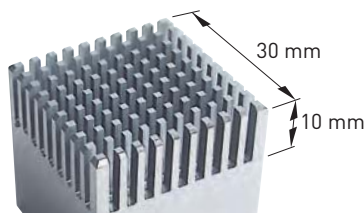
**Aluminium A2017**  
High-precision drilling is possible without center drill operation. Even after 3500 holes, no problems can be found on the cutting edge.



Cutter	Ø 0.3 mm Solid drill
Spindle Speed	75 000 min <sup>-1</sup>
Cutting Feed	200 mm/min
Peck	0.03 mm

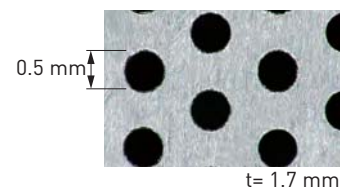
**RBX5**

**Prehardened steel HRC40**  
Even a taper endmill that has high cutting forces can achieve stable cutting.



Cutter	Ø 1.5 mm Rib-endmill
Spindle Speed	40 000 min <sup>-1</sup>
Cutting Feed	1000 mm/min
D.O.C	ap = 0.05 mm

**Stainless steel SUS303**  
Tool life is doubled with over 1200 holes and cutting time is reduced to 1/3.



Cutter	Ø 0.5 mm Solid drill
Spindle Speed	40 000 min <sup>-1</sup>
Cutting Feed	20 mm/min
Peck	0.01 mm





# High Spindle GTG Type

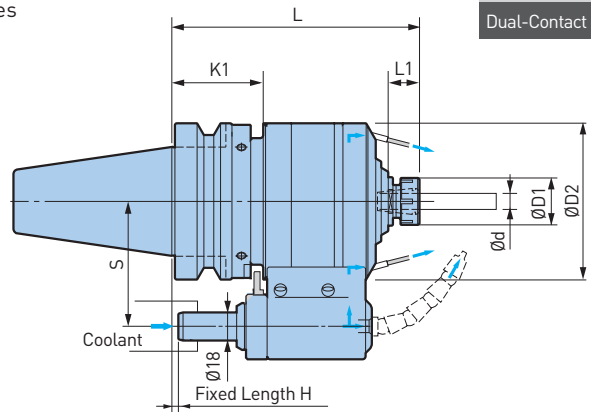
## Speed Inserter

High Spindle improves drilling and end-milling performance on existing machines by multiplying the spindle speed 4, 5 or 6 times.

A.1



Exclusive Stop Block is required.



BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	Ød	L	L1	ØD1	ØD2	K1	S	Collet	Speed Ratio	Max. min <sup>-1</sup>	Weight (kg)
BBT40 -GTG5-10-140	802.964	1.5 - 10	140	20	30	80	43	65	NBC10	4.67	20 000	4.8
BBT50 -GTG6-10-158	802.970	1.5 - 10	158	20	30	100	58	80	NBC10	5.67	20 000	8.8
-GTG4-16-177	802.968	2.5 - 16	177	25.5	42	110	58	80	NBC16	3.80	15 000	10.6

1. The standard fixed length H is 6 mm. Other lengths are available upon request.
2. In case of more than 30 min. continuous use, rotation speed must be reduced by 20%.
3. Please do not use with neat oil coolant.
4. Nut, wrench and following collet are included.

For Stop Block ▶ 290

For Collet ▶ 250

## Application Examples

Model	BBT40-GTG5-10-140	BBT50-GTG6-10-158	BBT50-GTG6-10-158	BBT50-GTG4-16-177
Cutter	Solid carbide endmill Ø8 / 2 flutes	Solid carbide endmill Ø6 / 2 flutes	Solid carbide drill Ø2	Solid carbide drill Ø16
Workpiece Material	Duralumin (A-2017)	S55C / CK55	Duralumin (A-2017)	Duralumin (A-2017)
Revolution	20 000 min <sup>-1</sup>	16 000 min <sup>-1</sup>	20 000 min <sup>-1</sup>	15 000 min <sup>-1</sup>
Feed Rate	3 000 mm/min	3 500 mm/min	2 000 mm/min	1 000 mm/min
Result	High metal removal rate 90 cm <sup>3</sup> /min	High metal removal rate 35 cm <sup>3</sup> /min	Extended tool life 1200 holes by 1 drill	Surface roughness Ry max. 2 µm

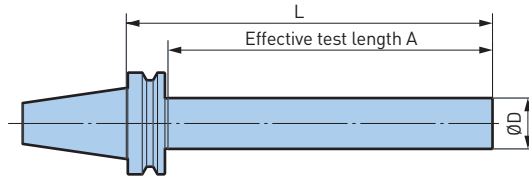


## Dyna Test

Periodic inspection of machine tools to control production stability.

### BIG-PLUS BT Type

Shorter models are ideal for measuring ATC repeatability.



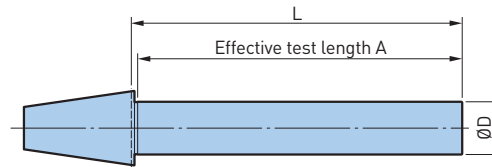
BIG-PLUS tools can be used in machining centers with conventional BT spindles.

Model	Order No.	L	A	ØD	Weight (Kg)
BBT30 -32 - L150	800.054	150	125	32	1.1
- L235	961.264	235	210		1.5
BBT40 -50 - L200	800.065	200	170	50	2.8
- L350	978.119	350	320		4.3
BBT50 -50 - L200	800.184	200	159	50	5.2
- L360	978.290	360	319		6.9

1. Taper length is in accordance with JIS BT standard.

A.1

### Basic Type



Model	Order No.	L	A	ØD	Weight (Kg)
NT30 -32 - L150	801.759	150	142	32	1.0
- L225	978.253	225	217		1.4
NT40 -50 - L200	801.760	200	184	50	2.5
- L335	801.761	335	319		3.9
NT50 -50 - L200	801.762	200	191	50	3.8
- L335	801.763	335	326		5.3



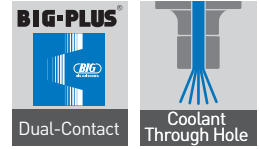
## Tool Holders DV/BDV (DIN 69871)

MEGA Micro Chuck	96
MEGA New Baby Chuck	97 - 98
MEGA E Chuck	99
MEGA Double Power Chuck	100
MEGA Perfect Grip	101
New Baby Chuck	102 - 103
New Hi-Power Milling Chuck	104 - 105
Hydraulic Chucks	106
Shrink Chucks	107
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Side Lock Holders	109
Holdings for Screw-On Cutter	110
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Air Turbine Spindle / High Spindle	121 - 125
Dyna Test	126

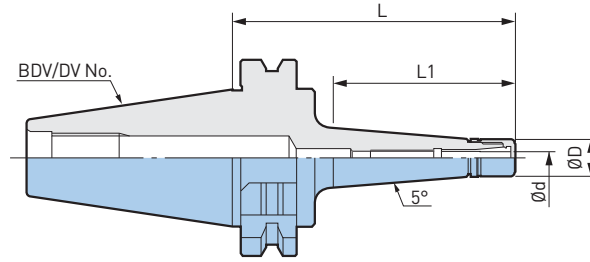


## MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.



A.2



BIG-PLUS tools can be used in machining centers with conventional spindles.

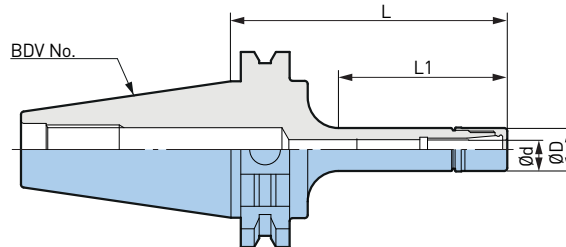
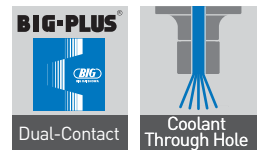
Ø 0.45 - 8.05 mm

Model	Order No.	Ød	ØD	L	L1	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)
DV30 -MEGA6S- 60T	805.016	0.45 - 6.05	14	60	36	40 000	NBC6S-	MGN6S	0.41
-MEGA8S- 75T	805.246	2.95 - 8.05	18	75	51	35 000	NBC8S-	MGN8S	0.48
BDV40-MEGA3S- 90T	969.302	0.45 - 3.25	10	90	60	28 000	NBC3S-	MGN3S	0.9
-MEGA4S- 90T	969.305	0.45 - 4.05	12	90	60	28 000	NBC4S-	MGN4S	1.0
-MEGA6S- 60T	969.307	0.45 - 6.05	14	60	30	35 000	NBC6S-	MGN6S	0.9
- 90T	969.308			90	60	28 000			1.0
-120T	969.309			120	90	22 000			1.1
-MEGA8S- 90T	806.747	2.95 - 8.05	18	90	60	28 000	NBC8S-	MGN8S	1.0

1. MEGA nut is included.

## MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.



BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 0.45 - 6.05 mm

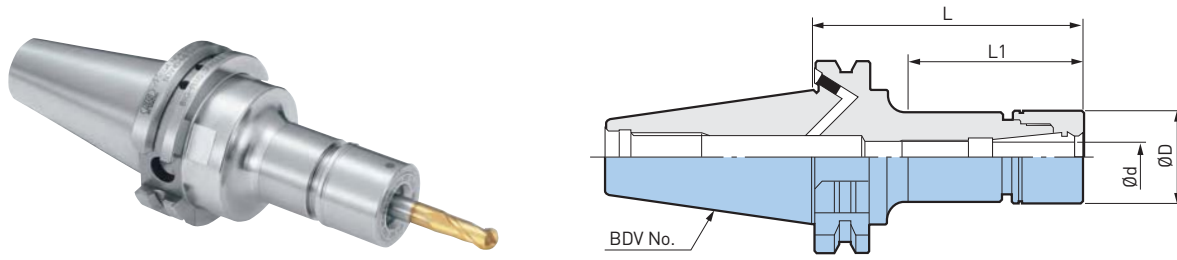
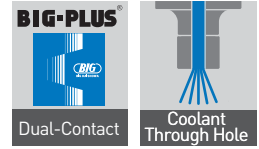
Model	Order No.	Ød	ØD	L	L1	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)
BDV40-MEGA6S-90	969.208	0.45 - 6.05	14	90	55	35 000	NBC6S-	MGN6S	1.1

1. MEGA nut is included.

Spare Parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		α Taper Cleaner	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-	MGN6S-PS	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-	MGN8S-PS	NBB8S	805.802	SC-NBC8S	805.827

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 0.25 - 25.4 mm

Model	Order No.	Ød	ØD	L	L1	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)
DV30 -MEGA10N - 75	805.247	1.5 - 10	30	75	54	30 000	NBC10-	MGN10	0.60
BDV40-MEGA6N - 90	969.224	0.25 - 6	20	90	55	35 000	NBC6-	MGN6	1.1
	969.225			135	100	20 000			1.2
-MEGA8N - 90	969.229	0.5 - 8	25	90	57	35 000	NBC8-	MGN8	1.1
	969.230			135	102	20 000			1.3
-MEGA10N - 90	969.234	1.5 - 10	30	90	59	35 000	NBC10-	MGN10	1.2
	969.235			135	104	20 000			1.4
-MEGA13N - 90	969.239	2.5 - 13	35	90	61	35 000	NBC13-	MGN13	1.3
	969.240			135	106	20 000			1.6
	969.241			165	136	15 000			1.8
-MEGA16N - 90	969.244	2.5 - 16	42	90	65	30 000	NBC16-	MGN16	1.5
	969.245			135	110	20 000			1.9
	969.246			165	140	15 000			2.2
-MEGA20N - 60	969.248	2.5 - 20	46	60	40	30 000	NBC20-	MGN20	1.3
	969.249			90	70				1.6
	969.250			135	115				2.0
	969.251			165	145				2.3
	969.252			200	180				2.6
-MEGA25N - 90	806.375	15.5 - 25.4	60	90	70	19 000	NBC25-	MGN25	1.8
	806.376			120	100				16 000

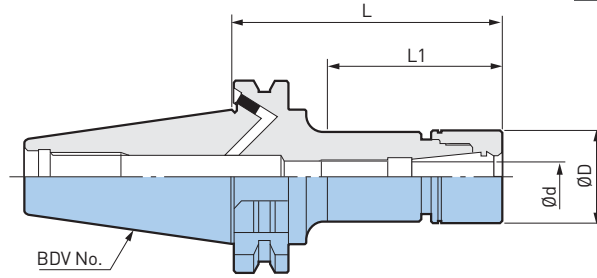
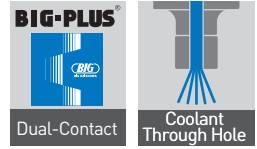
- MEGA nut is included.
- Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA Nut		MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw		
					▶ 250	▶ 260					
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-	MPS6-	NBA6B	961.527	M7	12	2
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-	MPS8-	NBA8B	961.550	M9	13	2.5
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-	MPS10-	NBA10B	961.572	M11	16	3
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-	MPS13-	NBA13B	961.598	M14	20	4
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-	MPS16-	NBA16B	961.632	M18	20	4
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-	MPS20-	NBA20B	961.680	M21	20	4
MEGA25N	MGN25	806.388	MGR60L	969.468L	NBC25-	-	NBA25B	806.389	M27	20	4



# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 0.25 - 25.4 mm

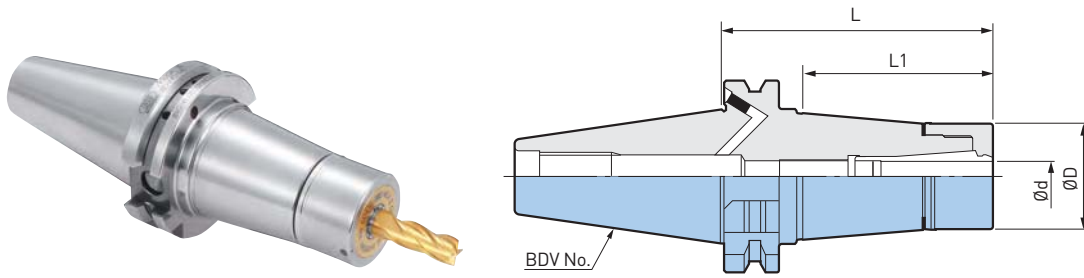
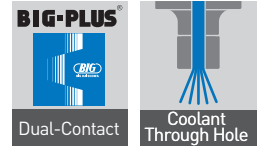
Model	Order No.	Ød	ØD	L	L1	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)
BDV50 -MEGA6N - 90	969.253	0.25 - 6	20	90	50	20 000	NBC6-	MGN6	3.0
-120	969.254			120	80				3.0
-165	969.255			165	125				3.1
-MEGA10N - 90	969.261	1.5 - 10	30	90	55	20 000	NBC10-	MGN10	3.2
-120	969.262			120	80				3.3
-165	969.263			165	125				3.5
-MEGA13N - 90	969.267	2.5 - 13	35	90	55	18 000	NBC13-	MGN13	3.2
-120	969.268			120	80				3.4
-165	969.269			165	125				3.7
-MEGA16N - 90	969.274	2.5 - 16	42	90	55	17 000	NBC16-	MGN16	3.4
-120	969.275			120	85				3.7
-165	969.276			165	130				4.1
-200	969.277			200	165				4.4
-MEGA20N - 90	969.280	2.5 - 20	46	90	55	16 000	NBC20-	MGN20	3.5
-120	969.281			120	85				3.8
-165	969.282			165	130				4.3
-200	969.283			200	165				4.6
-MEGA25N -105	806.377	15.5 - 25.4	60	105	77	16 000	NBC25-	MGN25	4.0
-135	806.378			135	107				15 000

1. MEGA nut is included.
2. Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA Nut 		MEGA Wrench 		NBC Collet 		MEGA Perfect Seal 		Adjusting Screw 		
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-	MPS6-	NBA6B	961.527	M7	12	2
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-	MPS8-	NBA8B	961.550	M9	13	2.5
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-	MPS10-	NBA10B	961.572	M11	16	3
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-	MPS13-	NBA13B	961.598	M14	20	4
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-	MPS16-	NBA16B	961.632	M18	20	4
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-	MPS20-	NBA20B	961.680	M21	20	4
MEGA25N	MGN25	806.388	MGR60L	969.468L	NBC25-	-	NBA25B	806.389	M27	20	4

# MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 3 - 12 mm

Model	Order No.	Ød	ØD	L	L1	max. min <sup>-1</sup>	Collet Model	Nut Model	Weight (kg)	
BDV40 -MEGA6E - 90	968.142	3 - 6	25	90	60	30 000	MEC6-	MEN6	1.2	
-MEGA8E - 60	968.144	3 - 8	30	60	30		MEC8-	MEN8	1.2	
- 90	968.145			90	63		MEC10-	MEN10	1.3	
-MEGA10E - 60	968.147	3 - 10	35	60	33		MEC13-	MEN13	1.3	
- 90	968.148			90	64				1.4	
-MEGA13E - 60	968.150			60	35				1.5	
- 90	968.151			90	61				1.7	
- 120	968.152	120	95	29 000	1.9					
BDV50 -MEGA6E -120	968.154	3 - 6	25	120	90	20 000	MEC6-	MEN6	3.3	
-MEGA8E -120	968.156	3 - 8	30				MEC8-	MEN8	3.4	
-MEGA10E -120	968.159	3 - 10	35				MEC10-	MEN10	3.6	
-MEGA13E - 90	968.161	3 - 12	42	90	60	18 000	MEC13-	MEN13	3.6	
-120	968.162			120	90				3.8	
-165	968.163			165	137				16 000	4.4

1. MEGA E nut is included.
2. Nut-less model available upon request.

Spare Parts			Accessories									
	MEGA E Nut		MEGA Wrench		MEGA E Collet	MEGA E Perfect Seal	Adjusting Screw		Rubber			
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B	
MEGA6E	MEN6	968.461	MGR25	969.456	MEC6-	EPS6-	NBA6B	961.527	M7	12	2	
MEGA8E	MEN8	968.462	MGR30	969.458	MEC8-	EPS8-	NBA8B	961.550	M9	13	2.5	
MEGA10E	MEN10	968.463	MGR35	969.460	MEC10-	EPS10-	NBA10B	961.572	M14	16	3	
MEGA13E	MEN13	968.464	MGR42	969.462	MEC13-	EPS13-	NBA13B	961.598	M18	20	4	

# MEGA Double Power Chuck Type DS

Flange contacting nut assures highest rigidity. Unique design ensures efficient coolant supply to the cutting tool periphery.



A.2

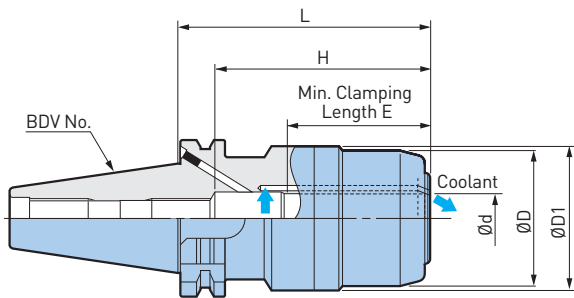


Fig. 1

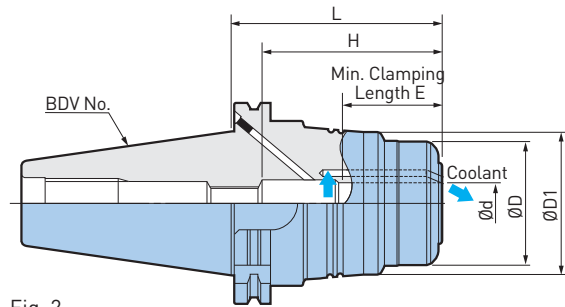


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 3 - 42 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	H	E	max. min <sup>-1</sup>	Weight (kg)
BDV40 -MEGA16DS - 90A *	803.075	1	16	42	52.6	92	73	57	25 000	1.8
-MEGA20DS -100A	803.076		20	50	55	102	71 - 81	58	22 000	1.9
-135A	805.596					137			20 000	2.5
-MEGA25DS -100A	803.077		25	62	62.7	102	73 - 83	59	18 000	2.4
-135A	805.597					137			16 000	3.0
-MEGA32DS -100A	803.078		32	70	70.7	102	78 - 88	66	12 000	2.2
-135A	805.598				137			10 000	3.0	
BDV50 -MEGA16DS - 70 *	969.023	2	16	46	55	72.5	73	52	20 000	3.5
-MEGA20DS -100	969.025		20	60	69	102.5	71 - 81	58	20 000	4.9
-135	805.753					137.5			19 000	5.7
-MEGA25DS -105	968.059		25	70	77	107.5	78 - 88	67	18 000	5.4
-135	805.600					137.5			17 000	6.3
-MEGA32DS -105	968.060		32	80	86	107.5	80 - 97	73	15 000	5.7
-135	805.601				137.5			13 000	6.7	
-MEGA42DS -105	968.061	1	42	99	99.7	107	90 - 107	73	12 000	6.1

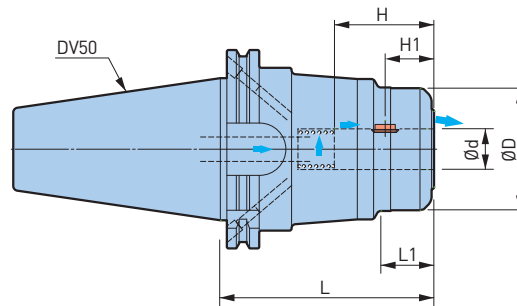
1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. \* Adjusting screw can not be used.

For Straight Collet ▶ 272

Accessories									
		MEGA Wrench		Adjusting Screw					
MEGA Double Power Chuck	Model	Order No.	Model	Order No.	ØD	L	L1	G	W
BDV40 -MEGA16DS	MGR42L	969.462L	-	-	-	-	-	-	-
-MEGA20DS	MGR50L	969.464L	HMA-M16	962.311	19	27	6	M16P1.5	8
-MEGA25DS	MGR62L	969.469L							
-MEGA32DS	MGR70L	969.470L	HMA-M16S	962.312					10
BDV50 -MEGA16DS	MGR46L	969.465L	-	-	-	-	-	-	-
-MEGA20DS	MGR60L	969.468L	HMA-M16	962.311	19	27	6	M16P1.5	8
-MEGA25DS	MGR70L	969.470L							
-MEGA32DS	MGR80L	969.471L	HMA-M24	962.313	30	36	9.5	M24P1.5	10
-MEGA42DS	MGR99L	969.472L							

## MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.



A.2

Ø 20 - 32 mm

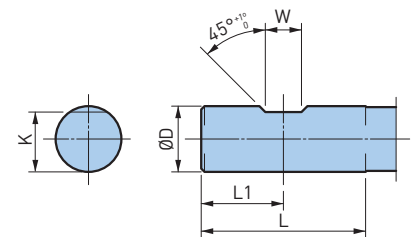
Model	Order No.	Ød	ØD	L	L1	H	H1	MEGA Wrench	Weight (kg)
DV50 -MEGA20DPG -105ADF	805.808	20	60	105	27	49	24	MGR60L	5.1
-MEGA25DPG -105ADF	805.809	25	70		33	55	23	MGR70L	5.4
-MEGA32DPG -105ADF	805.810	32	80		41	59		MGR80L	5.6

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.

## Weldon Shank Standards

(DIN1835-1)




The following standard shank is required for MEGA Perfect Grip.



ØD		L	L1	W		K	Tolerance	
Nominal	Tolerance			Nominal	Tolerance		Nominal	Tolerance
20	h6	50	25	11	+0.05 0	18.2	h13	
25		56	32	12		23		
32		60	36	14		30		

### Caution

In case you are adding your own flat, the tool projection length in the MEGA Perfect Grip will be decided by the flat position. Refer to H1 in the MEGA Perfect Grip chart, decide the flat position to add, and then cut the cutter at L1 on cutter shank.

Spare Parts					Accessories	
Key Grip 		Spring 			MEGA Wrench 	
MEGA Perfect Grip	Model	Order No.	Model	Order No.	Model	Order No.
MEGA20DPG	PKG20-2P	805.493	PSP1823	805.497	MGR60L	969.468L
MEGA25DPG	PKG25-2P	805.494	PSP2420	805.498	MGR70L	969.470L
MEGA32DPG	PKG32-2P	805.495	PSP3128	805.499	MGR80L	969.471L

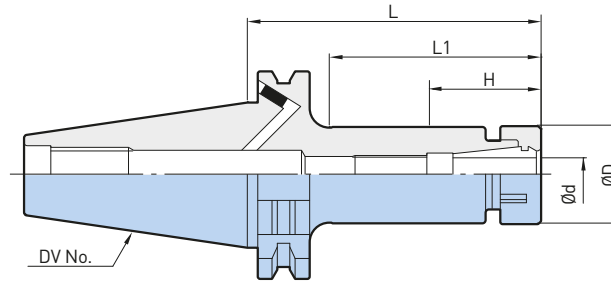
1. Key grip is available in a package of 2 pcs.
2. As key grip is a consumable item, it is recommended to replace on a regular basis.

# New Baby Chuck

The original high precision collet chuck to perform all machining applications.



A.2



Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Collet Model	Nut Model	Weight (kg)
DV40 -NBS6 - 60	961.831	0.25 - 6	20	60	34	20 - 40	NBC6-	NBN6	0.9
- 90	969.032			90	60				1.0
-135	961.833			135	105				1.0
-NBS8 - 60	969.034	0.5 - 8	25	60	34	23 - 42	NBC8-	NBN8	0.9
- 90	961.835			90	62				1.0
-135	969.036			135	107				1.2
-NBS10 - 60	969.037	1.5 - 10	30	60	34	35 - 45	NBC10-	NBN10	1.0
- 90	969.038			90	64				1.1
-135	961.839			135	104				1.4
-NBS13 - 60	969.040	2.5 - 13	35	60	37	41 - 60	NBC13-	NBN13	1.0
- 90	969.041			90	66				1.2
-135	969.042			135	106				1.6
-NBS16 - 60	969.043	2.5 - 16	42	60	38	45 - 65	NBC16-	NBN16	1.1
- 90	969.044			90	68				1.4
-135	969.045			135	113				1.8
-NBS20 - 60	969.046	2.5 - 20	46	60	40	48 - 65	NBC20-	NBN20	1.3
- 90	969.047			90	70				1.6
-135	969.048			135	115				2.0
-165	969.059			165	145				2.3
-200	969.060			200	180				2.6

1. New baby nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

For Tap Driving Back Stop ▶ 259

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Collet Model	Nut Model	Weight (kg)
DV50 -NBS6 -120	969.062	0.25 - 6	20	120	85	20 - 40	NBC6-	NBN6	2.8
	969.063			165	125				3.1
-NBS8 -120	969.066	0.5 - 8	25	120	80	23 - 42	NBC8-	NBN8	3.2
	969.067			165	130				3.0
-NBS10 - 90	969.069	1.5 - 10	30	90	60	35 - 45	NBC10-	NBN10	2.9
	969.070			120	85				3.0
-165	969.071			165	130				3.2
	969.075	2.5 - 13	35	90	60	41 - 60	NBC13-	NBN13	3.0
961.876	120			80	3.4				
-165	969.077			165	125				3.7
	969.082	2.5 - 16	42	90	60	45 - 65	NBC16-	NBN16	3.0
969.083	120			85	3.9				
-200	969.084			165	130				4.3
	969.085			200	165				4.6
-NBS20 - 75	969.087	2.5 - 20	46	75	45	48 - 65	NBC20-	NBN20	3.1
	969.088			90	60				3.2
-120	961.889			120	85				4.0
	969.090			165	130				4.5
-200	969.091			200	165				4.8

1. New baby nut is included.
2. Nut-less model available upon request.

For Tap Driving Back Stop ▶ 259

Spare Parts			Accessories								
	New Baby Nut		Wrench		NBC Collet		Baby Perfect Seal		Adjusting Screw		
											
					▶ 250	▶ 262					
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
NBS6	NBN6	961.526	NBK6	961.525	NBC6-	BPS6-	NBA6B	961.527	M7	12	2
NBS8	NBN8	961.549	NBK8	961.548	NBC8	BPS8-	NBA8B	961.550	M9	13	2.5
NBS10	NBN10	961.571	NBK10	961.570	NBC10-	BPS10-	NBA10B	961.572	M11	16	3
NBS13	NBN13	961.597	NBK13	961.596	NBC13-	BPS13	NBA13B	961.598	M14	20	4
NBS16	NBN16	961.631	NBK16	961.630	NBC16-	BPS16-	NBA16B	961.632	M18	20	4
NBS20	NBN20	961.679	NBK20	961.678	NBC20-	BPS20-	NBA20B	961.680	M21	20	4

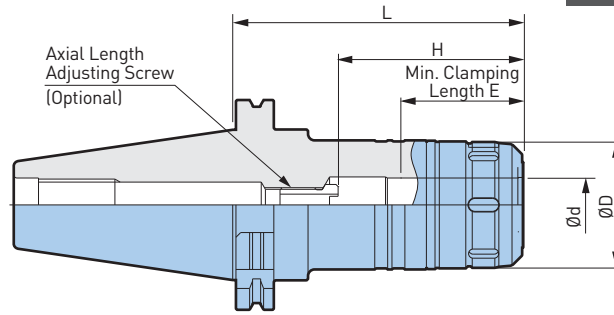


## New Hi-Power Milling Chuck Type S

The original design of slit structure assures heavy and finish end milling with high power and precision.



A.2



BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 3 - 42 mm

Model	Order No.	Ød	ØD	L	H	E	Wrench	Weight (kg)
BDV40 -HMC20S - 85	962.121S	20	50	85	69 - 79	56	FK45-50L	1.6
-105	800.972			105				1.9
-120	800.973			120				2.1
-HMC25S - 95	800.975	25	59	95	71 - 81	57	FK58-62L	2.0
-105	800.974			105				2.2
-HMC32S - 95	962.124S	32	68	95	79 - 89	64	FK68-75L	2.1
-105	800.976			105				2.3
-135	800.977			135				3.0
BDV50 -HMC20S -105	805.430	20	50	105	69 - 79	56	FK45-50L	3.9
-135	805.431			135				4.3
-HMC25S -105	805.424	25	59	105	76 - 86	57	FK58-62L	4.2
-135	805.433			135				4.8
-HMC32S -105	804.995	32	68	105	88 - 98	72	FK68-75L	4.4
-135	805.435			135				5.2
-165	805.436			165				6.0
-HMC42S -135	805.438	42	85	135	93 - 105	73	FK80-90L	6.3

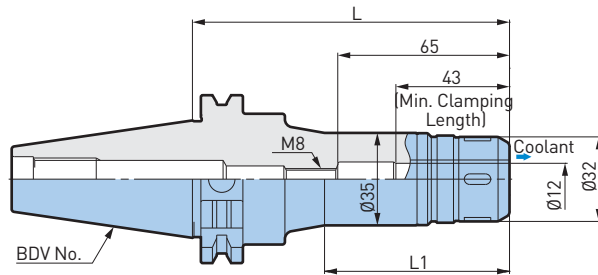
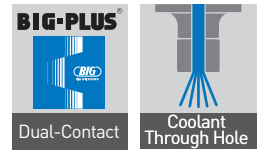
1. Wrench and axial adjusting screw are to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.

For Straight Collet ▶ 272

Accessories									
		Wrench		Adjusting Screw					
New Hi-Power Milling Chuck	Model	Order No.	Model	Order No.	ØD	L	L1	G	W
BDV40 -HMC20S	FK45-50L	801.037	HMA-M16	962.311	19	27	6	M16P1.5	8
-HMC25S	FK58-62L	801.038	HMA-M16S	962.312					10
-HMC32S	FK68-75L	801.039	HMA-M16S	962.312					10
BDV50 -HMC20S	FK45-50L	801.037	HMA-M16	962.311	19	27	6	M16P1.5	8
-HMC25S	FK58-62L	801.038	HMA-M16S	962.312					10
-HMC32S	FK68-75L	801.039	HMA-M16S	962.312					10
-HMC42S	FK80-90L	804.771	HMA-M24	962.313	30	36	9.5	M24P1.5	10

## New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 6 - 12 mm

Model	Order No.	L	L1	Wrench	Weight (kg)
BDV40 -HMC12J	- 90	806.810	90	FK31-33	1.4
	-120	806.811	120		1.6
BDV50 -HMC12J	-105	806.812	105	FK31-33	3.5
	-135	806.813	135		3.8

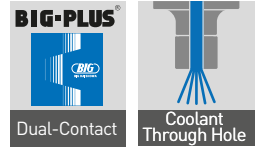
1. Wrench is to be ordered separately.

For Straight Collet ▶ 272

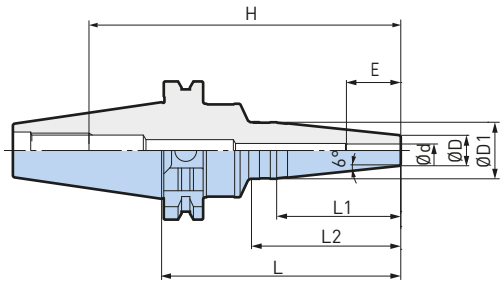
Accessories		
	Wrench	
New Hi-Power Milling Chuck	Model	Order No.
BDV -40/50 -HMC12J	FK31-33	806.462

## Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.



A.2



BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 4 - 12 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	L2	H	E	Weight (kg)
BDV40 -HDC 4S -110	806.347	4	14	26	110	57	68	145	19	1.2
-HDC 6S -110	806.348	6							25	1.2
-HDC 8S -110	806.349	8	31	1.3						
-HDC10S -110	806.350	10	33	1.3						
-HDC12S -110	806.351	12	36	1.3						
						52	69			
						70				

1. "E" indicates the minimum clamping length.
2. Adjusting Screw and straight collet cannot be used.
3. „H“ indicates the maximum cutting tool insertion length.

For Inner Bore Cleaner ▶ 286

## Hydraulic Chuck Standard

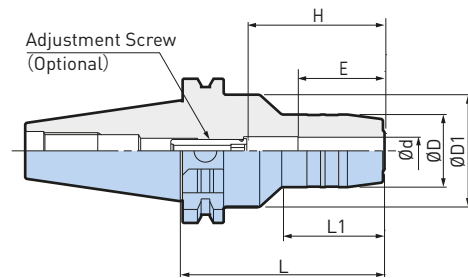


Fig. 1

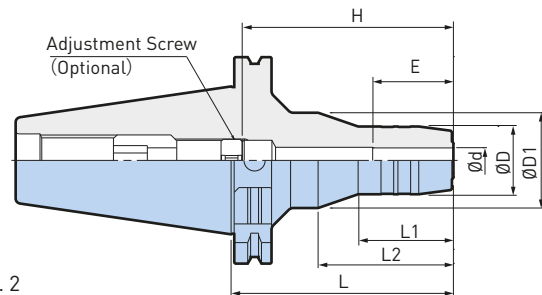


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 3 - 20 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	L2	H	E	Adjusting Screw	Weight (kg)
BDV40 -HDC 6 - 90	806.352	1	6	26	49.5	90	43	-	28 - 50	28	HDA6-05032	1.3
-HDC 8 - 90	806.353		8	28						HDA8-06032		
-HDC10 - 90	806.354		10	30						HDA10-08032		
-HDC12 - 90	806.355		12	32			38 - 60	38	HDA12-10032			
-HDC14 - 90	806.356		14	34				43 - 70	43	HDA16-12037		
-HDC16 - 90	806.357		16	38								
-HDC18 - 90	806.358		18	40			91	56	-			
-HDC20 - 90	806.359		20	42								
-HDC31 - 90	806.441		31	62						74		
BDV50 -HDC12L -105	806.360		2	12			32	45	105	44	63	100 - 120
-HDC20L -105	806.361	20		42	50	46	63			71 - 111	43	HDA20-12047

1. "E" indicates the minimum clamping length.
2. "H" indicates the adjustment length with an adjusting screw.

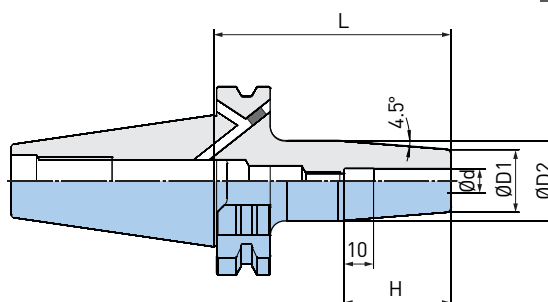
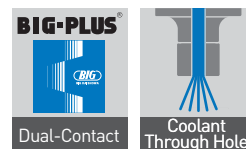
For Adjusting Screw ▶ 282

For Straight Collet ▶ 272

For Inner Bore Cleaner ▶ 286

## Shrink Chuck Standard

Substantial body provides higher rigidity.



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 6 - 25 mm

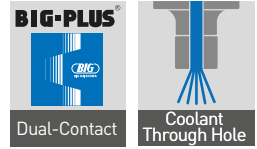
Model	Order No.	Ød	ØD1	ØD2	L	H	Weight (kg)			
BDV40 -SRC6D	- 80	490.506	21	27	80	36	1.0			
	-120	490.556			120		1.2			
	-SRC8D - 80	490.508			8		80	1.0		
	-120	490.558					120	1.2		
	-SRC10D - 80	490.510			10		80	1.1		
	-120	490.560					120	1.3		
	-SRC12D - 80	490.512	12	24	32	80	1.1			
	-120	490.562				120	1.3			
	-SRC14D - 80	490.514				14	1.1			
	-SRC16D - 80	490.516	16	27	34	80	1.1			
	-120	490.566				120	1.4			
	-SRC18D - 80	490.518	18	1.3						
-SRC20D - 80	490.520	20	33	42	80	1.2				
-120	490.570				120	1.6				
BDV50 -SRC6D	- 80	490.606	21	27	80	36	2.8			
	-160	490.656			160		3.5			
	-SRC8D - 80	490.608			8		27	80	3.5	
	-160	490.658					38	160	3.5	
	-SRC10D - 80	490.610			10		24	32	80	2.8
	-160	490.660							41	160
	-SRC12D - 80	490.612	12	24	32	80	2.8			
	-160	490.662				41	160	3.5		
	-SRC14D - 80	490.614				14	2.9			
	-160	490.664	14	27	34	44	160	3.6		
	-SRC16D - 80	490.616				16	34	80	2.8	
	-160	490.666	44	160	3.6					
	-SRC18D - 80	490.618	18	33	42	42	80	3.0		
	-160	490.668				50	160	3.9		
	-SRC20D - 80	490.620	20	33	42	80	3.0			
	-160	490.670				50	160	3.9		
	-SRC25D -100	490.625				25	44	53	100	3.5
	-160	490.675	61	160	4.5					

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ 286

# MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



A.2

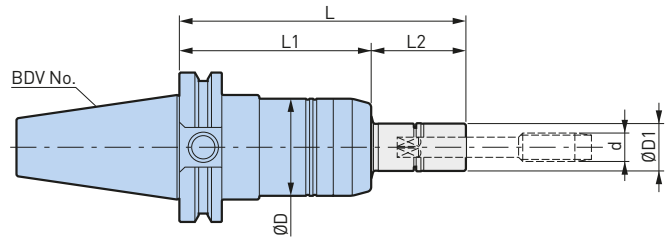


Fig. 1

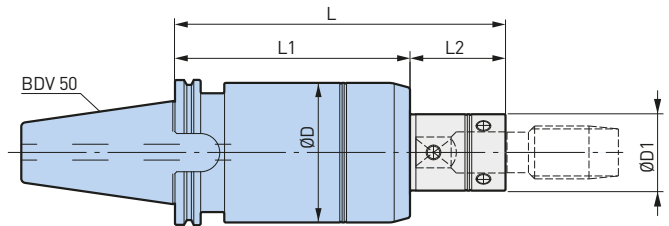
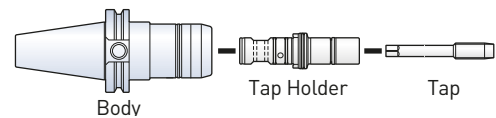


Fig. 2



BIG-PLUS tools can be used in machining centers with conventional spindles.

M3 - M36

Model	Order No.	Fig.	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)
BDV40 -MGT6 - 80	963.401	1	MGT6 -d- 30	M3 - M8	36	16	110	80	30	1.3
			- 70				150		70	
			-100				180		100	
-MGT12 - 80	963.402	1	MGT12 -d- 30	M5 - M12 P1/8	41	20	110	80	30	1.3
			- 70				150		70	
			-100				180		100	
-MGT20 -105	963.403	1	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	140	105	35	1.9
			- 85				190		85	
			-115				220		115	
BDV50 -MGT6 - 85	963.404	1	MGT6 -d- 30	M3 - M8	36	16	115	85	30	3.2
			- 70				155		70	
			-100				185		100	
-MGT12 - 85	963.405	1	MGT12 -d- 30	M5 - M12 P1/8	41	20	115	85	30	3.2
			- 70				155		70	
			-100				185		100	
-MGT20 -105	963.406	1	MGT20-d- 35	M10 - M20 P1/4 - P1/2	54	30	140	105	35	3.8
			- 85				190		85	
			-115				220		115	
BDV50 -MGT36 -160	805.002	2	MGT36-d- 65	M22 - M36 P5/8 - P1	94	30 - 50	225	160	65	8.7

1. Tap Holder is to be ordered separately.
2. Rigid tapping function is required on the machine tool.
3. MEGA Wrench is not required for MGT36.



## Side Lock Holders for Weldon



A.2

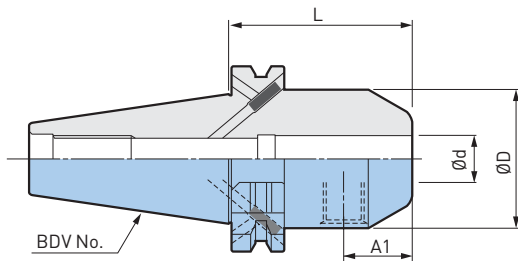


Fig. 1

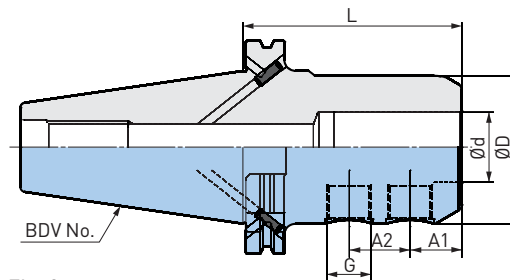


Fig. 2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Ø 6 - 40 mm

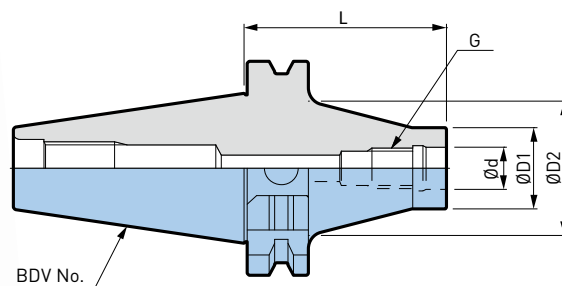
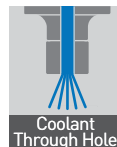
Model	Order No.	Fig.	Ød	ØD	L	A1	A2	G	Weight (kg)
BDV40 -ISL6 - 50	490.106	1	6	25	50	17.5	-	M6	0.9
-ISL8 - 50	490.108		8	28		-	M8	0.9	
-ISL10 - 50	490.110		10	35		19.5	-	M10	1.0
-ISL12 - 50	490.112		12	42		22.0	-	M12	1.1
-ISL14 - 50	490.114		14	44	63	-	-	1.1	
-ISL16 - 63	490.116		16	48		23.5	-	M14	1.3
-ISL18 - 63	490.118		18	50		-	-	1.3	
-ISL20 - 63	490.120		20	52		24.5	-	M16	1.4
-ISL25 - 100	490.125	2	25	65	100	23.5	25	2 - M18	2.5
-ISL32 - 100	490.132		32	72		23.5	28	2 - M20	2.6
BDV50 -ISL6 - 63	490.206	1	6	25	63	17.5	-	M6	2.7
-ISL8 - 63	490.208		8	28		-	M8	2.8	
-ISL10 - 63	490.210		10	35		19.5	-	M10	2.9
-ISL12 - 63	490.212		12	42		22.0	-	M12	3.0
-ISL14 - 63	490.214		14	44	100	-	-	3.0	
-ISL16 - 63	490.216		16	48		23.5	-	M14	3.1
-ISL18 - 63	490.218		18	50		-	-	3.1	
-ISL20 - 63	490.220		20	52		24.5	-	M16	3.2
-ISL25 - 80	490.225	2	25	65	80	23.5	25	2 - M18	3.9
-ISL32 - 100	490.232		32	70		23.5	28	2 - M20	4.5
-ISL40 - 100	490.240		40	90	29.5	32	2 - M20	5.5	

1. Use a cutting tool in accordance to DIN 1835 B / DIN 6538 HB



## Holders for Screw-On Cutter

General metric screw-on type cutting tools can be used with these models.



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Ød	ØD1	ØD2	L	G	Weight (kg)
BDV40 -M10-19 - 65	806.607	10.5	19	35	65	M10	1.0
-M12-24 - 60	806.608	12.5	24	40	60	M12	1.0
-M16-29 - 55	806.609	17	29	45	55	M16	1.1

### Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.

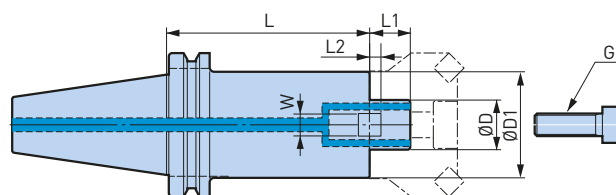
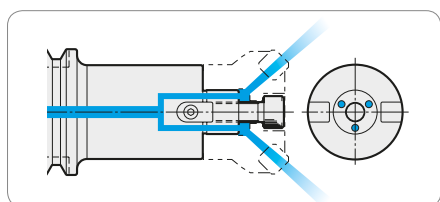
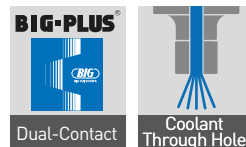


Fig. 1

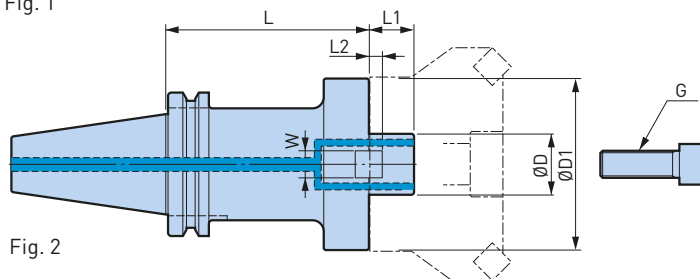


Fig. 2

A.2

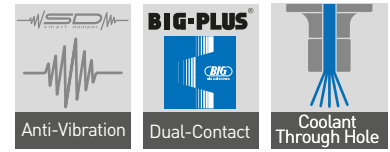
BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Fig.	ØD	ØD1	L	L1	Drive Keys		G	Weight (kg)	
							L2	W			
BDV40 -FMH22 - 47 - 45	805.584	1	22	47	45	18	5	10	M10	1.2	
- 90	805.585				90					1.8	
-150	805.604				150					2.5	
- 60 - 50	805.605			60	50					1.4	
- 90	805.606	90	2.0								
-FMH27 - 60 - 50	805.586	2	27	60	50	20	6	12	M12	1.4	
- 90	805.608				90					2.0	
- 76 - 60	805.609				60					1.9	
- 90	805.610			90	2.3						
-FMH32 - 96 - 60	805.611		32	96	60	22	7	14	M16	2.1	
BDV50 -FMH22 - 47 - 60	805.758	1	22	47	60	18	5	10	M10	3.1	
-105	805.623				105					3.7	
-150	805.624				150					4.3	
-200	978.226				200					4.9	
- 60 - 60	805.626			60	60					3.5	
-105	805.627				105					4.4	
-150	805.628				150					5.4	
-200	805.629				200					6.5	
-FMH27 - 60 - 45	805.630		2	27	60	45	20	6	12	M12	3.2
- 90	805.631					90					4.1
-150	805.632					150					5.4
-200	805.633					200					6.5
- 76 - 45	805.635				76	45					3.6
- 90	805.636					90					5.1
-150	805.637					150					7.2
-200	805.638					200					8.9
-FMH32 - 96 - 50	805.639	2	32	96	50	22	7	14	M16	4.1	
- 90	805.640				90					6.2	
-150	805.641				150					8.4	
-200	805.642				200					10.4	
-FMH40 -100 - 50	805.643		40	100	50	26	8.5	16	M20	4.3	
- 75	805.644				75					5.6	
-105	805.645				105					6.9	

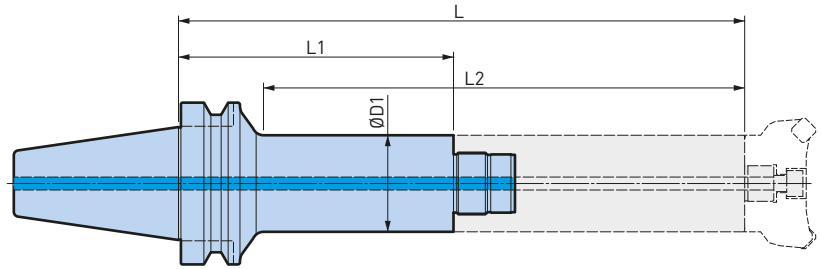
- Hexagon socket head cap screw is included.
- By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

For Clamp Bolt ▶ 282

### Smart Damper Basic Holders for Mills



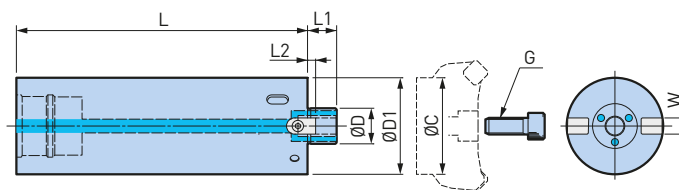
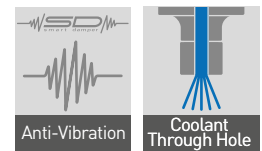
A.2



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	ØD1	L	L1	L2	Damper Head	Weight (kg)
BDV50 -SDF36 - 47 -170	805.296	47	350	170	325	FMH DP-47	4.9
- 60 -170	805.298	60	350	170	325	FMH DP-60	6.2
-220	805.299		400	220	375		7.3

### Smart Damper Damper Heads for Mills



Model	Order No.	ØD	ØD1	L	L1	L2	W	G	Wrench	ØC min.	Weight (kg)
SDF36 -FMH22DP - 47 -180	804.969	22	47	180	18	5	10	M10	FK45-50L	36	3.0
- 60 -180	804.971		60							49	4.5
-FMH27DP - 60 -180	804.972	27	60	20	6	12	M12	FK58-62L	46	4.5	

1. Wrench and cutter clamping bolt are included.
2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

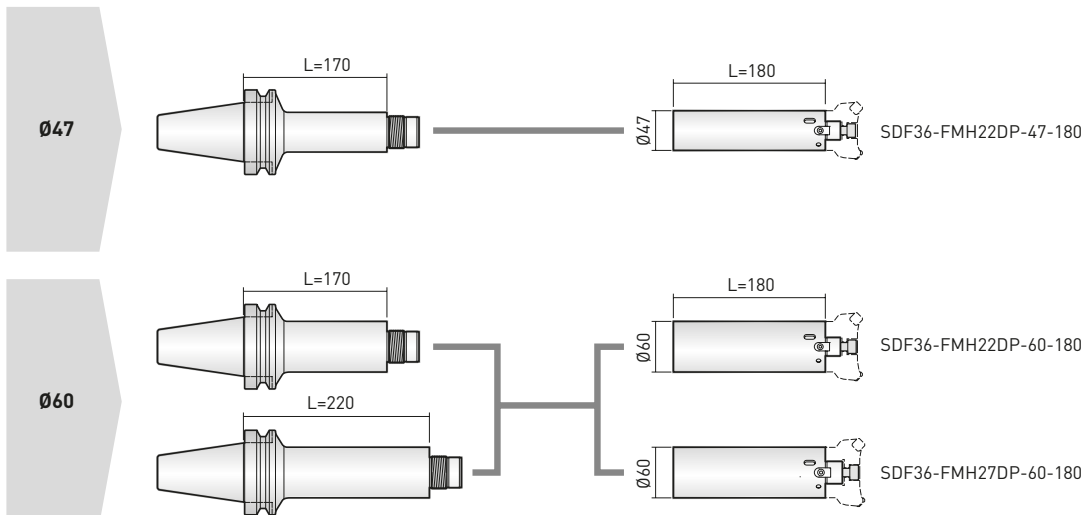
For Clamp Bolt ▶ 282

For Wrench ▶ 275

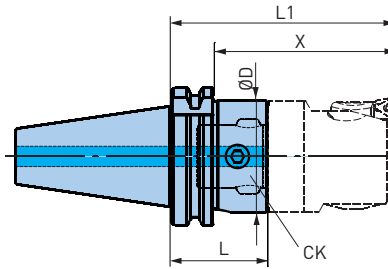
#### Combinations

Basic Holder

Damper Head



## CK Shanks with Center Through Coolant



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

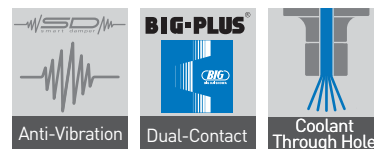
Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
BDV40 -CKB4 - 73ADF	323.826	CKB4	39	73	120	80	0.9
-CKB5 - 43ADF	323.825	CKB5	50	43	100	60	1.0
-CKN6 - 59	323.821N	CKN6	63.5	59	130	90	1.1
BDV50 -CKB5 - 83ADF	323.868	CKB5	50	83	140	100	2.9
-CKN6 - 69	323.860N	CKN6	63.5	69	140	100	3.4
-CKN6 - 129	323.864N	CKN6	63.5	129	200	160	4.8
-CKN6 - 229	323.865N	CKN6	63.5	229	300	260	7.0
-CKN7 - 83	323.861N	CKN7	90	83	200 (170)	160 (130)	4.5
-CKB7 - 133	323.862	CKB7	90	133	250 (220)	210 (180)	7.0
-CKN7 - 243	323.866N	CKN7	90	243	360 (330)	320 (290)	13.2

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

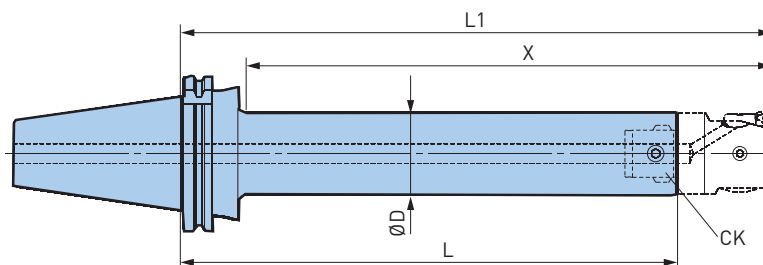
For Boring Head ▶ Chapter B

## Smart Damper CK Shanks

Tool shanks with integrated damping system for highly efficient deep hole fine boring.



A.2



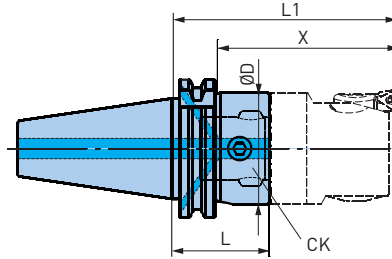
BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
BDV50 -CKB5DP -301	328.233	CKB5	50	301	358	318	7.5
-CKB6DP -377	328.235	CKB6	64	377	448	408	12.1

1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.

For Boring Head ► Chapter B

## CK Shanks with Center and Flange Through Coolant



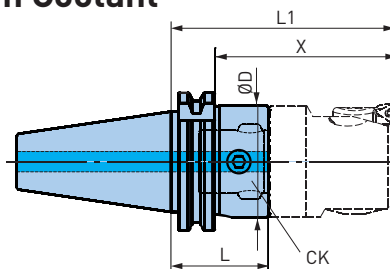
A.2

Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
DV30 -CKB3 - 31ADF	323.701	CKB3	31	31	71	47	0.38
DV40 -CKB1 - 91ADF	326.011	CKB1	19	90.5	123	83	1.2
-CKB2 - 85ADF	326.021	CKB2	24	84.5	120	80	1.2
-CKB3 - 35ADF	323.728	CKB3	31	35	75	50	0.9
-CKB3 - 80ADF	326.031	CKB3	31	80	120	80	1.3
-CKB4 - 73ADF	326.041	CKB4	39	73	120	80	1.3
-CKB5 - 43ADF	326.057	CKB5	50	43	100	60	1.1
-CKB5 -143ADF	326.054	CKB5	50	143	200	160	2.6
-CKN6 - 59ADF	323.726N	CKN6	63.5	59	130	90	1.2
-CKB6 - 99ADF	323.722	CKB6	63.5	99	170	130	2.1
-CKB6 -129ADF	326.064	CKB6	63.5	129	200	160	2.8
DV50 -CKB3 -130ADF	325.933	CKB3	31	130	170	130	3.8
-CKB4 - 93ADF	325.942	CKB4	39	93	140	100	3.7
-CKB4 -153ADF	325.944	CKB4	39	153	200	160	4.3
-CKB5 - 83ADF	325.952	CKB5	50	83	140	100	3.8
-CKB5 -143ADF	325.954	CKB5	50	143	200	160	4.7
-CKB5 -183ADF	325.955	CKB5	50	183	240	200	4.6
-CKN6 - 69ADF	323.765N	CKN6	63.5	69	140	100	3.5
-CKN6 -129ADF	323.767N	CKN6	63.5	129	200	160	4.9
-CKB6 -169ADF	325.965	CKB6	63.5	169	240	200	5.5
-CKN6 -229ADF	323.768N	CKN6	63.5	229	300	260	7.2
-CKN7 - 83ADF	323.766N	CKN7	90	83	200 (170)	160 (130)	4.8
-CKN7 -273ADF	323.769N	CKN7	90	273	390 (360)	350 (320)	13.7

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

For Boring Head ► Chapter B

## CK Shanks with Center Through Coolant



Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
DV30 -CKB1 - 32	323.703	CKB1	19	31.5	64	40	0.35
-CKB5 - 50	326.005	CKB5	50	50	107	83	0.6
DV40 -CKB5 - 43	326.050	CKB5	50	43	100	60	0.9
-CKB6 - 59	323.721	CKB6	63.5	59	130	90	1.2
DV50 -CKB6 - 69	323.760	CKB6	63.5	69	140	100	3.4
-CKB6 - 129	325.964	CKB6	63.5	129	200	160	4.7
-CKB7 - 83	323.761	CKB7	90	83	200 (170)	160 (130)	4.6

1. X and L1 dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Cutting edge and drive key grooves are located in the same orientation.
3. ADF indicates both flange through and center through coolant available.

For Boring Head ► Chapter B





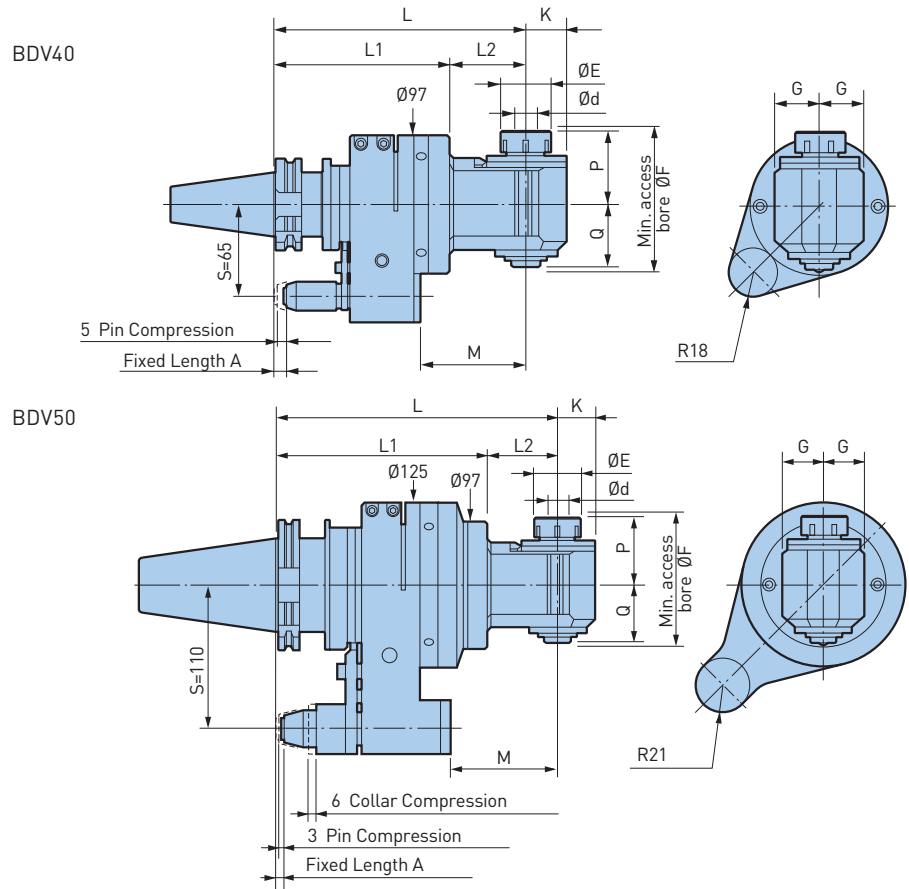
## New Baby Chuck Type

It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.

A.2



Exclusive Stop Block is required.



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet Model	Max. min <sup>-1</sup>	Weight (kg)	
BDV40 -AG90/NBS6	-180	0.25 - 6	20	21	17	180	125	55	77	33	29	67	NBC6	6000	5.1	
	-210					210		85	107						5.3	
	-240					240		115	137						5.5	
	-270					270		145	167						5.7	
	-AG90/NBS10					-180		180	55						77	5.5
-AG90/NBS10	-210	1.5 - 10	30	30	25	210	125	85	107	45	43	91	NBC10	6000	5.9	
	-240					240		115	137						6.2	
	-AG90/NBS13					-180		180	55						77	5.6
-AG90/NBS13	-210	2.5 - 13	35	31	28	210	125	85	107	52	45	101	NBC13	6000	6.0	
	-240					240		115	137						6.3	
	-AG90/NBS20S -175S					802.552		2.5 - 20	46						35	33
BDV50 -AG90/NBS6	-215	0.25 - 6	20	21	17	215	160	55	82	33	29	67	NBC6	6000	12.6	
	-245					245		85	112						12.8	
	-275					275		115	142						13.0	
	-305					305		145	172						13.2	
	-AG90/NBS10					-215		215	55						82	13.0
-AG90/NBS10	-245	1.5 - 10	30	30	25	245	160	85	112	45	43	91	NBC10	6000	13.4	
	-275					275		115	142						13.7	
	-AG90/NBS13					-215		215	55						82	13.1
-AG90/NBS13	-245	2.5 - 13	35	31	28	245	160	85	112	52	45	101	NBC13	6000	13.5	
	-275					275		115	142						13.8	
	-AG90/NBS20					-230		802.568	2.5 - 20						46	35

1. The standard fixed length A is 8 mm for BDV40 and 6 mm for BDV50. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC - EAA) can not be used.
4. Coolant can be supplied through the locating pin.

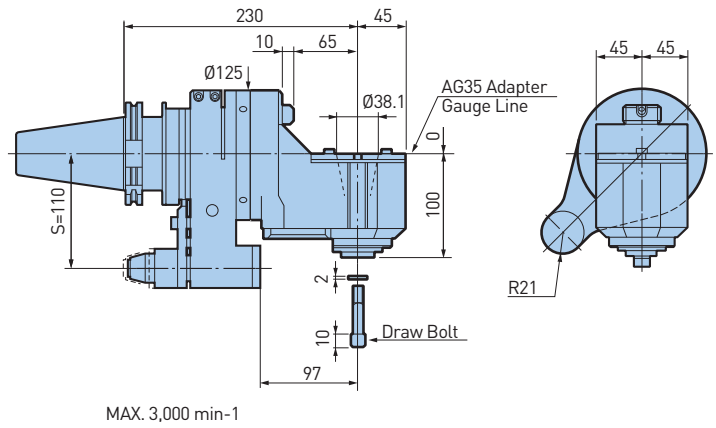
For New Baby Collet ▶ 250

For Stop Block ▶ 290



## Build-Up Type

Designed for greater rigidity by having the face of the spindle bore in line with the center of the machine spindle. Also helps minimize interference problems with ATC and storage problems within the magazine.



A.2



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Max. min <sup>-1</sup>	Weight (kg)
BDV50 -AG90/AGH35-230	802.558	3 000	15.0
-AG90/AGH35-230S	802.559	3 000	16.3

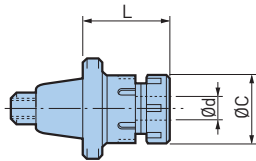
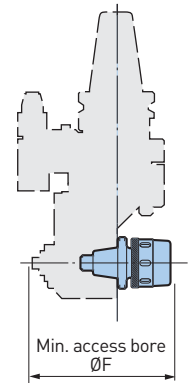
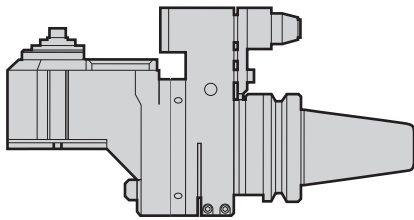
1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Coolant can be supplied through the locating pin.

For Stop Block ▶ 290

For Adapters ▶ 118

AG35 adapters

A.2



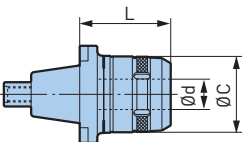
New Baby Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -NBS10	962.793	1.5 - 10	47	30	162	0.6
-NBS13	962.794	2.5 - 13	54	35	168	0.7
-NBS16	962.795	2.5 - 16		42	170	0.8
-NBS20	962.796	2.5 - 20		46	170	0.9

1. New baby collet and wrench are to be ordered separately.

For New Baby Collet ▶ 250

For Wrench ▶ 271

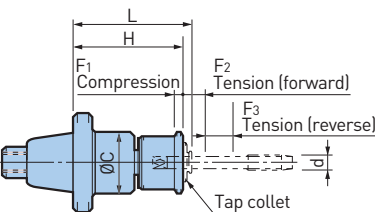


New Hi-Power Milling Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -HMC20S	802.742	20	60	50	178	1.5

1. Wrench (FK45-50L) is included.

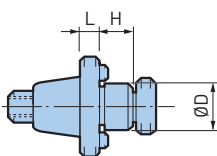
For Straight Collet ▶ 272



Auto Tapper Type B (automatic depth control)

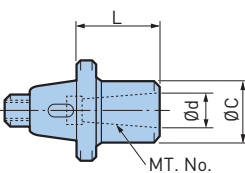
Model	Order No.	d	L	ØC	H	F1	F2	F3	Weight (kg)
AG35 -ATB12E	802.435	M4 - M12	80	40.5	72	0.5	5	4	1.0
-ATB20E	802.436	M8 - M20	115	57.5	102.5		6.5	5	1.7

1. Please contact BIG KAISER agent for tap collet.



Face Mill Arbor

Model	Order No.	ØD	L	H	Weight (kg)
AG35 -FMH22 -30	802.740	22	30	18	1.0
-FMH27 -20	802.741	27	20	20	1.0

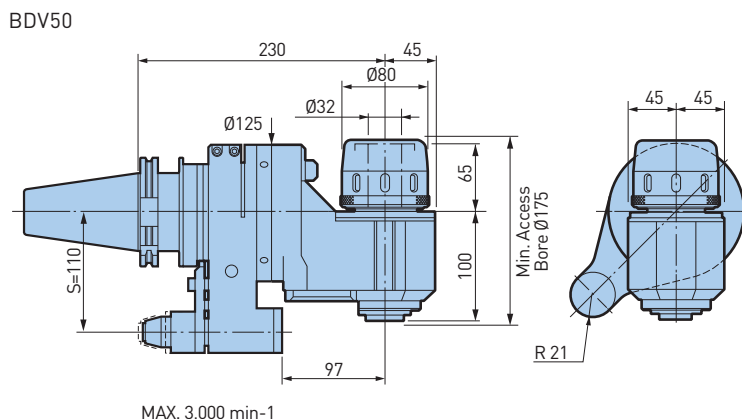


Morse Taper Adapter

Model	Order No.	Ød	MT. No.	L	ØC	ØF	Weight (kg)
AG35 -MT1	962.785	12.065	1	50	24	164	0.6
-MT2	962.786	17.78	2	60	32	180	0.7

### HMC Type

Improved versatility is achieved from the 32 mm capacity Milling Chuck by using parallel reduction collets and other accessories.



A.2



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Max. min <sup>-1</sup>	Weight (kg)
BDV50 -AG90/HMC32 -230	802.560	3 000	16.8
-AG90/HMC32 -230S	802.561	3 000	18.1

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Wrench (FK80-90) is included.
5. Coolant can be supplied through the locating pin.

For Stop Block ▶ 290

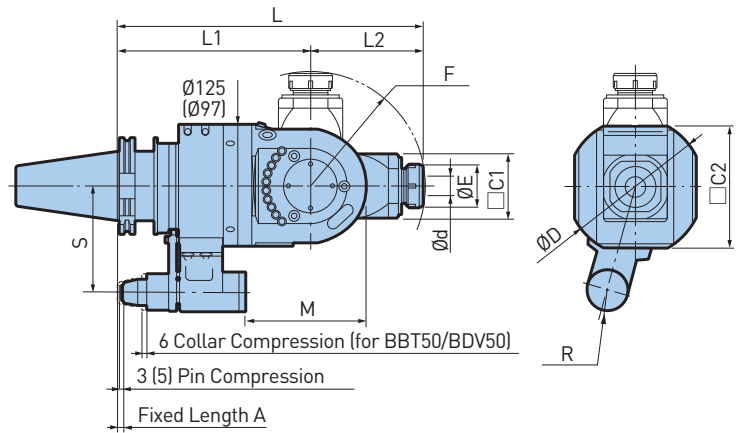
For Straight Collet ▶ 272

## Universal Type

Suitable for all cutting angles. In addition to the cutter head being adjustable a full 360°, the spindle also becomes easily and precisely adjustable from 0° to 90° by 1 increments.



A.2



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Ød	ØE	ØD	□C1	□C2	L	L1	L2	M	F	R	S	Collet Model	Max. min <sup>-1</sup>	Weight (kg)
BDV40 -AGU/NBS13-280	802.557	2.5 - 13	35	115	51	97	280	180	100	124	102	18	65	NBC13	6 000	9.7
BDV50 -AGU/NBS20-315	802.573	2.5 - 20	46	140	65	125	315	200	115	125	118	21	110	NBC20	4 000	20.8

- Standard fixed length A is 6 mm for BDV50 and 8 mm for BDV40. Other lengths are available upon request.
- Order No. for BDV50 is with S = 110. S = 80 type for BDV50 is available upon request.
- Figures in ( ) in the drawing indicate dimensions for BDV40.
- New baby nut and wrench are included.
- Coolant can be supplied through the locating pin.

For New Baby Collet ▶ 250

For Stop Block ▶ 290



Easily adjustable spindle angle from 0° to 90°.



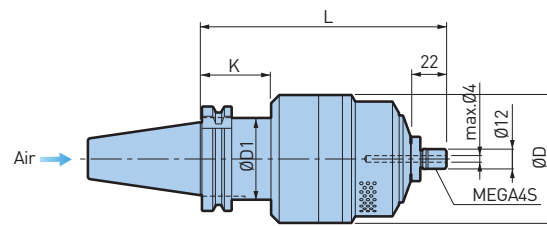
Unique setting mechanism enables the spindle angle to be precisely set at 1° increments.



Specially selected materials and special design for clamping the head guarantees rigidity for even end milling applications.

## Air Turbine Spindle

### Center Through Type



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Operation Speed (min <sup>-1</sup> )	L	ØD	ØD1	K	Nut Model	Weight (kg)
BDV40 -RBX5C -4S-150	962.642	40 000 - 50 000	150	96	49.6	43	MGN4S	4.1
	801.040	60 000 - 80 000		78				3.1
BDV50 -RBX5C -4S-145	802.422	40 000 - 50 000	145	96	68	38	MGN4S	6.8
	802.424	60 000 - 80 000		78				5.8

1. Nut, wrench (RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-\_) and XF1 (air unit) are to be ordered separately.

For Air Filter ▶ 123

For Micro Collet ▶ 247

### Caution

Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

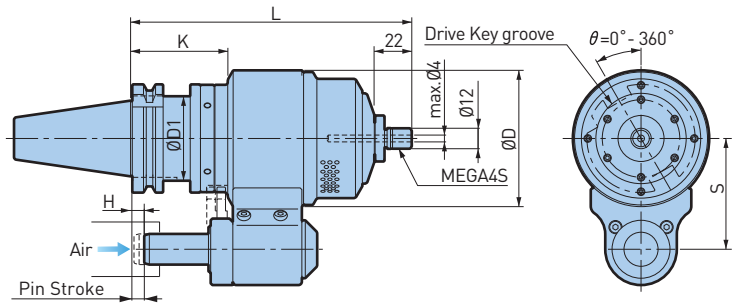


# Air Turbine Spindle

## Side Through Type



A.2



Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Operation Speed (min <sup>-1</sup> )	L	ØD	ØD1	K	S	H	Nut Model	Weight (kg)
BDV40 -RBX5 -4S-165-65	962.668	40 000 - 50 000	165	96	49.6	57	65	-10 - 35	MGN4S	5.0
	962.667	60 000 - 80 000		80						4.0
BDV50 -RBX5 -4S-170-80	962.670	40 000 - 50 000	170	100	68	62	80	-5 - 40	MGN4S	9.7
	962.669	60 000 - 80 000								8.7

1. Nut, wrench (RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-\_) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247

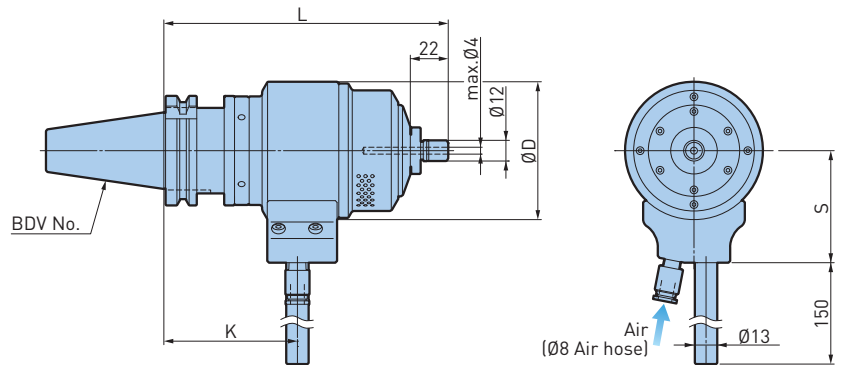
For Air Filter ▶ 123

For Stop Block ▶ 290



# Air Turbine Spindle

## Manual Type



A.2

BIG-PLUS tools can be used in machining centers with conventional spindles.

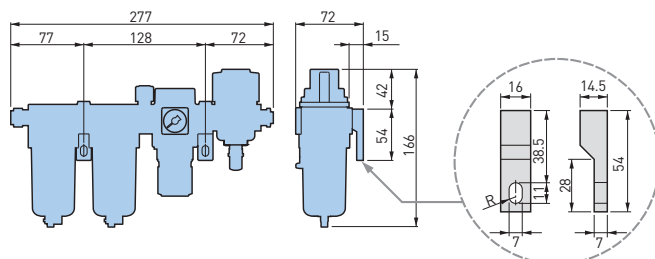
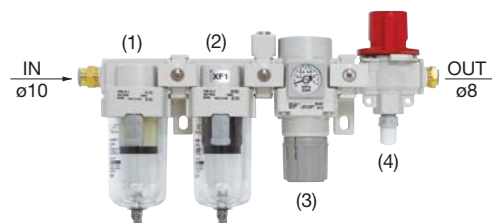
Model	Order No.	Operation Speed (min <sup>-1</sup> )	L	ØD	K	S	Weight (kg)
BDV40 -RBX5 -4S-165H	962.649	40 000 - 50 000	151	96	63	71	5.0
-RBX7 -4S-165H	801.681	60 000 - 80 000		80		65	4.0
BDV50 -RBX5 -4S-170H	802.421	40 000 - 50 000	166	100	78	80	9.7
-RBX7 -4S-170H	802.423	60 000 - 80 000					8.7

1. Nut, wrench (RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-\_) and XF1 (air unit) are to be ordered separately.

## Air Filter Regulator for RBX

### Model XF1

1. Mist separator (filtration: 0,3 µm).
2. Micro mist separator (filtration: 0,01 µm).
3. Precision regulator.
4. Three ports valves for extracting pressurization (non-grease type).



Model	Order No.
XF1	962.661

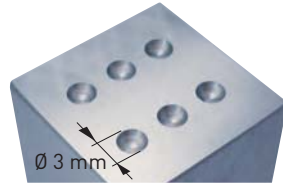
### Accessories for RBX

Accessories					
	MEGA Nut		MEGA Wrench		Micro Collet
Air Turbine Spindle	Model	Order No.	Model	Order No.	Model
RBX7-4S	MGN4S	969.481	MGR12	969.450	NBC4S-
RBX5-4S					

## Application Examples

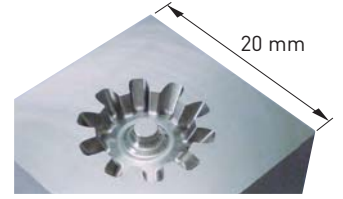
### RBX12

**Dimpling on sintered HSS**  
Machining time 90 sec./hole



Cutter	Ball nose endmill CBN
Spindle Speed	120 000 min <sup>-1</sup>
Cutting Feed	1500 mm/min
D.O.C	ap = 0.01 mm

**Milling on die steel**  
Machining time 23 min.

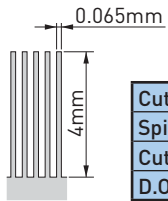


Cutter	Ball nose endmill CBN
Spindle Speed	120 000 min <sup>-1</sup>
Cutting Feed	2400 mm/min
D.O.C	ap = 0.01 mm

A.2

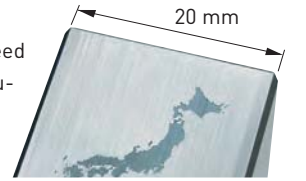
### RBX7

**Aluminium A2017**  
Outstanding runout accuracy permits perfect thin wall cutting.



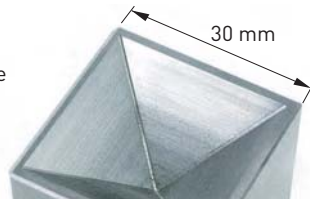
Cutter	Ø 0.5 mm Rib-endmill
Spindle Speed	70 000 min <sup>-1</sup>
Cutting Feed	1500 mm/min
D.O.C	ap = 0.02 mm

**Prehardened steel HRC40**  
Drastic time reduction by ultra high speed rotation. Excellent dynamic runout accuracy makes DOC of 5 µ clearly visible.



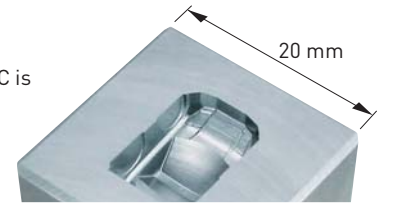
Cutter	R0.1 mm Ball nose endmill
Spindle Speed	80 000 min <sup>-1</sup>
Cutting Feed	400 mm/min
D.O.C	ap = 0.01 mm

**Prehardened steel HRC40**  
Overall cutting length of 656 m can be achieved with one ball nose endmill. Drastically extended tool life.



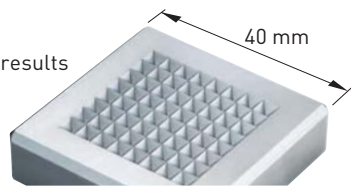
Cutter	R0.5 mm Ball nose endmill
Spindle Speed	65 000 min <sup>-1</sup>
Cutting Feed	4200 mm/min
D.O.C	ap = 0.02 mm; ae = 0.05 mm

**Prehardened steel HRC40**  
Original 5hour operation in MC is reduced to 2 hours.



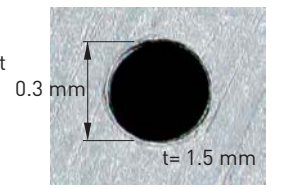
Cutter	R0.2 mm Ball nose endmill
Spindle Speed	70 000 min <sup>-1</sup>
Cutting Feed	1000 mm/min
D.O.C	ap = 0.01 mm

**Prehardened steel HRC40**  
No thermal expansion of spindle results in finely detailed surface finish.



Cutter	R0.5 mm Ball nose endmill
Spindle Speed	75 000 min <sup>-1</sup>
Cutting Feed	400 mm/min
D.O.C	ap = 0.02 mm

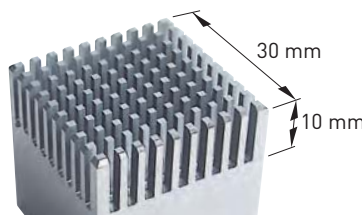
**Aluminium A2017**  
High-precision drilling is possible without center drill operation. Even after 3500 holes, no problems can be found on the cutting edge.



Cutter	Ø 0.3 mm Solid drill
Spindle Speed	75 000 min <sup>-1</sup>
Cutting Feed	200 mm/min
Peck	0.03 mm

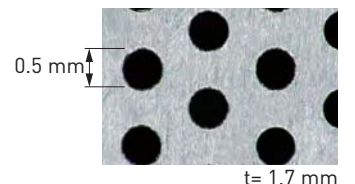
### RBX5

**Prehardened steel HRC40**  
Even a taper endmill that has high cutting forces can achieve stable cutting.



Cutter	Ø 1.5 mm Rib-endmill
Spindle Speed	40 000 min <sup>-1</sup>
Cutting Feed	1000 mm/min
D.O.C	ap = 0.05 mm

**Stainless steel SUS303**  
Tool life is doubled with over 1200 holes and cutting time is reduced to 1/3.

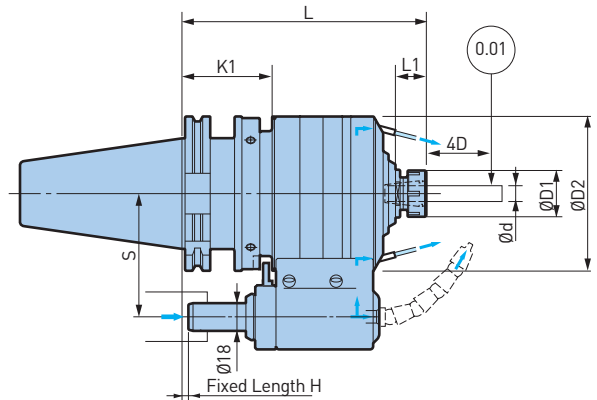


Cutter	Ø 0.5 mm Solid drill
Spindle Speed	40 000 min <sup>-1</sup>
Cutting Feed	20 mm/min
Peck	0.01 mm

# High Spindle GTG Type

## Speed Inserter

High Spindle improves drilling and end-milling performance on existing machines by multiplying the spindle speed 4, 5 or 6 times.



A.2

Exclusive Stop Block is required.

BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	Ød	L	L1	ØD1	ØD2	K1	S	Collet Model	Speed Ratio	Max. min <sup>-1</sup>	Weight (kg)
BDV40 -GTG5-10-155	802.975	1.5 - 10	155	20	30	80	58	65	NBC10 -	4.67	20 000	5.0
BDV50 -GTG6-10-163	802.977	1.5 - 10	163	20	30	100	63	80	NBC10 -	5.67	20 000	9.0
-GTG4-16-182	802.976	2.5 - 16	182	25.5	42	110	63	80	NBC16 -	3.80	15 000	10.8

1. The standard fixed length H is 6 mm. Other lengths are available upon request.
2. In case of more than 30 min. continuous use, rotation speed must be reduced by 20%.
3. Please do not use with neat oil coolant.
4. Nut, wrench and following collet are included.

For Stop Block ▶ 290

For Collet ▶ 250

## Application Examples

Model	BBT40-GTG5-10-140	BBT50-GTG6-10-158	BBT50-GTG6-10-158	BBT50-GTG4-16-177
Cutter	Solid carbide endmill Ø8 / 2 flutes	Solid carbide endmill Ø6 / 2 flutes	Solid carbide drill Ø2	Solid carbide drill Ø16
Workpiece Material	Duralumin (A-2017)	S55C / CK55	Duralumin (A-2017)	Duralumin (A-2017)
Revolution	20 000 min <sup>-1</sup>	16 000 min <sup>-1</sup>	20 000 min <sup>-1</sup>	15 000 min <sup>-1</sup>
Feed Rate	3 000 mm/min	3 500 mm/min	2 000 mm/min	1 000 mm/min
Result	High metal removal rate 90 cm <sup>3</sup> /min	High metal removal rate 35 cm <sup>3</sup> /min	Extended tool life 1200 holes by 1 drill	Surface roughness Ry max. 2 µm

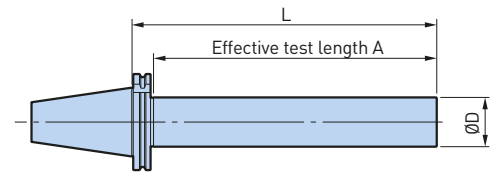
## Dyna Test

Periodic inspection of machine tools to control production stability.



### BIG-PLUS DV Type

A.2



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	L	A	ØD	Weight (Kg)
BDV40 -50 - L340SD	802.834	340	310	50	4.2
BDV50 -50 - L340SD	961.269	340	318		5.9

1. The drive key slot are symmetrical to allow BDV dyna test bar to be indexed 180 degrees.

## Tool Holders HSK

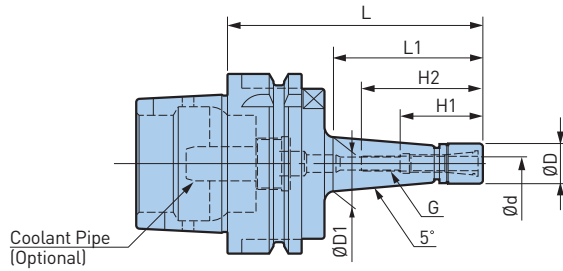
	HSK-A	HSK-E	HSK-F
MEGA Micro Chuck	128 - 129	163 - 164	170
MEGA New Baby Chuck	130 - 133	165 - 166	171
MEGA E Chuck	134		172
MEGA Double Power Chuck	135 - 136		173
MEGA Perfect Grip	137		
New Baby Chuck	138		
New Hi-Power Milling Chuck	139 - 140		
Hydraulic Chucks	141 - 143	167	
Shrink Chucks	144 - 145		
MEGA Synchro Tapping Holder	146 - 147		
Face Mill Arbors	148		
Smart Damper	149		
CK Shanks	150 - 151	168	
Angle Heads	152 - 159		
Air Turbine Spindle	160 - 162	169	
Dyna Test	174	174	174
Coolant Pipes	175	175	175

A.3

A 3

# MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.



Ø 0.45 - 8.05 mm

A.3

Model	Order No.	Ød	ØD	ØD1	L	L1	H1	H2	G	max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-A32-MEGA6S - 50T *	806.804	0.45 - 6.05	14	14.8	50	22	28.5	33	-	45 000	NBC6S-	0.17
- 60T *	978.370			16.0	60	30		43	-	40 000		0.18
-105T	978.372			22.1	105	76		63	M7 P0.75	35 000		0.27
HSK-A40-MEGA3S - 75T	968.936	0.45 - 3.25	10	16.0	75	44	22	38	M4 P0.7	32 000	NBC3S-	0.28
- 90T	968.937			18.0	90	60				28 000		0.31
-MEGA4S - 60T	968.934	0.45 - 4.05	12	14.0	60	27	26.5	44	M5 P0.8	35 000	NBC4S-	0.27
- 90T	802.355			20.0	90	60		47		28 000		0.33
-105T	802.356			23.0	105	76		25 000		0.37		
-MEGA6S - 60T *	968.925	0.45 - 6.05	14	16.0	60	29	28.5	49	M7 P0.75	35 000	NBC6S-	0.28
- 75T	968.926			19.0	75	45				32 000		0.31
- 90T	968.927			21.5	90	60				28 000		0.34
-105T	802.357			25.0	105	76				25 000		0.39
HSK-A50-MEGA6S - 75T	805.828			0.45 - 6.05	14	17.0				75		36
-105T	805.251	22.5	105			66	25 000	0.60				
HSK-A63-MEGA3S - 75T	968.961	0.45 - 3.25	10	14.0	75	36	22	38	M4 P0.7	32 000	NBC3S-	0.8
-120T	968.963			21.5	120	81				25 000		0.9
-MEGA4S - 75T	805.259	0.45 - 4.05	12	15.5	75	36	26.5	47	M5 P0.8	32 000	NBC4S-	0.9
- 90T	968.966			18.0	90	51				28 000		0.9
-120T	968.968			23.5	120	81				25 000		1.1
-MEGA6S - 60T	968.970	0.45 - 6.05	14	15.5	60	23	28.5	37	M7 P0.75	35 000	NBC6S-	0.8
- 75T	968.971			17.0	75	36		48		32 000		0.9
- 90T	805.260			20.0	90	51		28 000		0.9		
-105T	968.973			22.5	105	66		25 000		0.9		
-120T	805.261			25.0	120	81		22 000		1.0		
-135T	968.975			27.5	135	96		20 000		1.0		
-MEGA8S - 90T	801.724	2.95 - 8.05	18	23.5	90	51	31	50.5	M9 P0.75	30 000	NBC8S-	0.9
-120T	803.603			28.5	120	81				22 000		1.1

- MEGA nut is included.
- Coolant pipe is to be ordered separately.
- \* Internal thread (G) is not available.

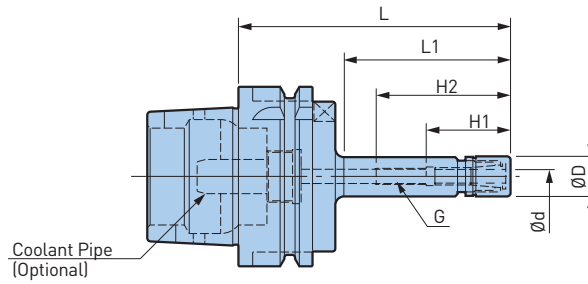
For Coolant Pipe ▶ 175

Spare Parts			Accessories							
	MEGA Nut		MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		α Taper Cleaner	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-	MGN6S-PS	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-	MGN8S-PS	NBB8S	805.802	SC-NBC8S	805.827



# MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.



A.3

Ø 0.45 - 8.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-A32-MEGA6S - 60 *	805.174	0.45 - 6.05	14	60	30	23.5	43	-	38 000	NBC6S-	0.18
-105	978.104			105	76		49	M7 P0.75	32 000		0.26
HSK-A40-MEGA3S - 60	968.933	0.45 - 3.25	10	60	26	22	39	M4 P0.7	30 000	NBC3S-	0.26
-MEGA4S - 60	968.931				27		44	M5 P0.8			0.26
- 90	968.932	0.45 - 4.05	12	90	57	26.5	47	M5 P0.8	25 000	NBC4S-	0.29
-MEGA6S - 60 *	968.929				60		28				40
- 90	968.930	0.45 - 6.05	14	90	58	28.5	49	M7 P0.75	25 000	NBC6S-	0.30
HSK-A50-MEGA6S - 75	805.250	0.45 - 6.05	14	75	36	28.5	49	M7 P0.75	30 000	NBC6S-	0.6
HSK-A63-MEGA4S - 75	968.965	0.45 - 4.05	12	75	36	26.5	48	M5 P0.8	30 000	NBC4S-	0.8
-105	805.257				105		61				47
-MEGA6S - 75	968.803	0.45 - 6.05	14	75	36	-	48	M7 P0.75	30 000	NBC6S-	0.9
-105	805.258				105		61				28.5
-MEGA8S - 90	803.600	2.95 - 8.05	18	90	48	31	50.5	M9 P0.75	30 000	NBC8S-	0.9

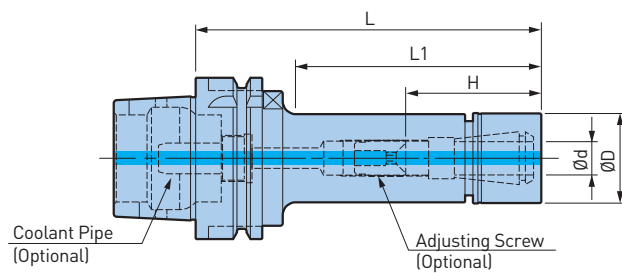
1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. \* Internal thread (G) is not available.

For Coolant Pipe ▶ 175

Spare Parts			Accessories							
MEGA Nut			MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		α Taper Cleaner	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-	MGN6S-PS	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-	MGN8S-PS	NBB8S	805.802	SC-NBC8S	805.827

## MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



Ø 0.25 - 25.4 mm

A.3

Model	Order No.	Ød	ØD	L	L1	H	Max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-A32 -MEGA6N - 75	979.010	0.25 - 6	20	75	37	23 - 43	30 000	NBC6-	0.25
-MEGA8N - 50 *	806.800	0.5 - 8	25	50	26	32	33 000	NBC8-	0.23
HSK-A40 -MEGA6N - 60 *	968.940	0.25 - 6	20	60	30	33	35 000	NBC6-	0.31
- 75	968.941			75	45	23 - 38			0.34
- 90	968.942			90	60	23 - 43			0.37
-MEGA8N - 60 *	968.943	0.5 - 8	25	60	30	41	35 000	NBC8-	0.35
- 90	968.945			90	60	26 - 44			0.44
-MEGA10N - 60 *	968.946	1.5 - 10	30	60	26	40	35 000	NBC10-	0.42
- 90	968.948			90	54	38 - 48			0.56
-MEGA13N - 75 *	968.949	2.5 - 13	35	75	55	55	25 000	NBC13-	0.55
- 90 *	968.950			90	70	64			0.64
-MEGA16N - 75 *	968.951	2.5 - 16	42	75	55	53	20 000	NBC16-	0.65
- 90 *	968.952			90	70	63			0.78
-MEGA20N - 90 *	968.953	2.5 - 20	46			66	15 000	NBC20-	0.86
HSK-A50 -MEGA6N - 75	805.252	0.25 - 6	20	75	37		30 000	NBC6-	0.6
-100	978.031			100	60	23 - 43	25 000		0.6
-135	968.745			135	93		20 000		0.7
-MEGA8N - 75	968.738	0.5 - 8	25	75	37	26 - 37	30 000	NBC8-	0.6
-100	978.239			100	62	26 - 45	28 000		0.7
-135	803.629			135	96		20 000		0.8
-MEGA10N - 75 *	805.253	1.5 - 10	30	75	38	46	33 000	NBC10-	0.7
-100	978.261			100	63	38 - 48	25 000		0.8
-135	803.622			135	98		20 000		1.0
-MEGA13N - 75 *	805.254	2.5 - 13	35	75	40	46	28 000	NBC13-	0.7
-100	801.179			100	65	44 - 56	25 000		0.9
-135	803.620			135	100	44 - 63	18 000		1.1
-MEGA16N - 75 *	805.255	2.5 - 16	42	75	49	48	28 000	NBC16-	1.0
-100	803.623			100	74	48 - 55	20 000		1.1
-135	803.619			135	109	48 - 68	15 000		1.4
-MEGA20N - 75 **	805.256	2.5 - 20	46	75	49	47	20 000	NBC20-	0.9
-100	968.742			100	74	51 - 54	15 000		1.3
-135	803.624			135	109	51 - 68	10 000		1.8
-MEGA25N - 95 *	806.370	15.5 - 25.4	60	95	69	65	12 000	NBC25-	1.3

- MEGA nut is included.
- Coolant pipe is to be ordered separately.
- "H" indicates the adjustment length with an adjusting screw.
- \* Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
- \*\* NBC-E collet and adjusting screw can not be used.
- Nut-less model available upon request.

For Coolant Pipe ▶ 175



∅ 0.25 - 25.4 mm

Model	Order No.	∅d	∅D	L	L1	H	Max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-A63 -MEGA6N - 75	968.811	0.25 - 6	20	75	35	23 - 38	35 000	NBC6-	0.9
	805.262			90	48	23 - 43	30 000		0.9
	968.812			105	63				0.9
	968.981			120	76	26 - 45	25 000		1.0
	968.813			135	91		20 000		1.0
	968.814			165	121		15 000		1.0
	-MEGA8N - 75			968.815	0.5 - 8	25	75		35
- 90	805.263	90	50	26 - 45			30 000	1.0	
-105	968.816	105	63					1.0	
-120	968.982	120	76	26 - 45			25 000	1.1	
-135	805.264	135	91				20 000	1.1	
-165	968.818	165	121				15 000	1.2	
-MEGA10N - 75 *	968.819	1.5 - 10	30	75			36	50	33 000
- 90	805.265			90	50	38 - 45	25 000	1.0	
-105	968.820			105	65	38 - 48		25 000	1.1
-120	968.983			120	80		20 000	1.2	
-135	805.266			135	93		15 000	1.3	
-165	968.822			165	123	15 000	1.4		
-MEGA13N - 75 *	968.823			2.5 - 13	35	75	37	49	30 000
- 90 *	805.267	90	51			64	25 000	1.1	
-105	968.824	105	66			44 - 56		25 000	1.2
-120	968.984	120	81			44 - 63	20 000	1.3	
-135	805.268	135	96				15 000	1.4	
-165	968.826	165	125				15 000	1.7	
-MEGA16N - 75 *	968.827	2.5 - 16	42			75	39	48	30 000
- 90 *	805.269			90	54	63	25 000	1.3	
-105	968.828			105	69	48 - 54	20 000	1.4	
-120	968.985			120	84	48 - 68	15 000	1.5	
-135	968.829			135	99		10 000	1.7	
-165	968.830			165	129		8 000	2.0	
-200	968.831			200	164	8 000	2.4		
-MEGA20N - 75 *	968.832	2.5 - 20	46	75	39	51	30 000	NBC20-	1.2
- 90 *	805.270			90	54	61	25 000		1.4
-105	968.833			105	69	51 - 54	20 000		1.5
-120	968.986			120	84	51 - 68	15 000		1.7
-135	805.271			135	99		10 000		1.8
-165	968.835			165	129		8 000		2.3
-200	968.836			200	164	8 000	2.7		
-MEGA25N - 90 *	806.371	15.5 - 25.4	60	90	-	63	20 000	NBC25-	1.8
-120 *	806.372			120	-	90	12 000		2.2

A.3

- MEGA nut is included. Coolant pipe is to be ordered separately.
- "H" indicates the adjustment length with an adjusting screw.
- \* Adjusting screws can not be used.
- Nut-less model available upon request.

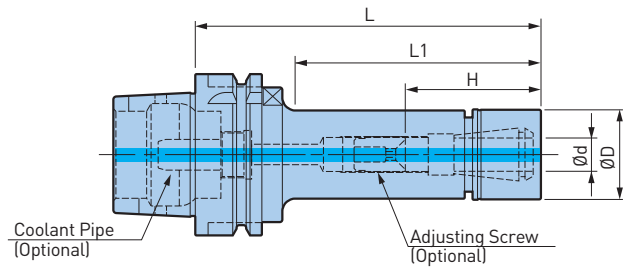
For Coolant Pipe ▶ 175

For A100 + 125, refer to the following pages.

Spare Parts			Accessories								
MEGA Nut			MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw		
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-	MPS6-	NBA6B	961.527	M7	12	2
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-	MPS8-	NBA8B	961.550	M9	13	2.5
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-	MPS10-	NBA10B	961.572	M11	16	3
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-	MPS13-	NBA13B	961.598	M14	20	4
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-	MPS16-	NBA16B	961.632	M18	20	4
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-	MPS20-	NBA20B	961.680	M21	20	4
MEGA25N	MGN25	806.388	MGR60L	969.468L	NBC25-	-	NBA25B	806.389	M27	20	4

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



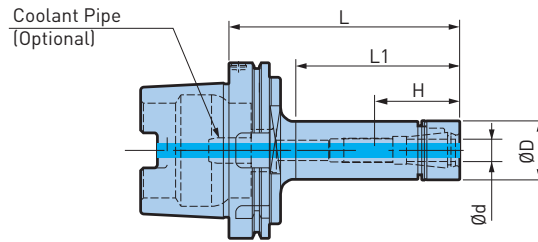
Ø 0.25 - 25.4 mm

A.3

Model	Order No.	Ød	ØD	L	L1	H	Max. min <sup>-1</sup>	Collet Model	Weight (kg)	
HSK-A100-MEGA6N - 90	968.841	0.25 - 6	20	90	43	23 - 43	20 000	NBC6-	2.5	
	801.146			105	58		18 000		2.5	
	968.842			120	73		14 000		2.5	
	801.147			135	88		12 000		2.6	
	968.843			165	113					
-MEGA8N - 90	968.844	0.5 - 8	25	90	43	26 - 45	20 000	NBC8-	2.5	
	968.989			105	58		18 000		2.6	
	968.845			120	73		14 000		2.6	
	968.990			135	88				2.7	
	968.846			165	113				2.7	
-MEGA10N - 90	968.847	1.5 - 10	30	90	43	38 - 45	20 000	NBC10-	2.6	
	968.991			105	58		18 000		2.7	
	968.848			120	73		38 - 48		2.7	
	968.992			135	88				2.8	
	968.849			165	113				3.0	
-MEGA13N - 90 *	968.850	2.5 - 13	35	90	43	44 - 63	18 000	NBC13-	2.7	
	968.993			105	58		70		16 000	2.8
	968.851			120	73		14 000		2.9	
	968.994			135	88				3.0	
	968.852			165	118				3.2	
	968.853			200	148				10 000	3.5
-MEGA16N - 90 *	968.854	2.5 - 16	42	90	47	48 - 68	15 000	NBC16-	2.8	
	968.995			105	58		70		14 000	2.9
	968.855			120	73		13 000		3.1	
	968.996			135	88				3.2	
	968.856			165	118				3.6	
	968.857			200	151				10 000	4.0
-MEGA20N - 90 *	968.858	2.5 - 20	46	90	47	51 - 68	15 000	NBC20-	2.9	
	968.997			105	58		70		14 000	3.0
	968.859			120	73		13 000		3.2	
	968.998			135	88				3.3	
	968.860			165	118				3.8	
	968.861			200	153				10 000	4.3
-MEGA25N -120 *	806.373	15.5 - 25.4	60	120	78	85	12 000	NBC25-	3.8	
	806.374			165	123	64 - 74	10 000		4.6	

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Coolant pipe is to be ordered separately.
4. \* Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
5. Nut-less model available upon request.

For Coolant Pipe ▶ 175



Ø 2.5 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Max. min-1	Collet Model	Weight (kg)
HSK-A125-MEGA20N-120	805.290	2.5 - 20	46	120	72	51 - 68	12 000	NBC20-	4.7
-165	806.575			165	117		10 000		5.2

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. Coolant pipe is to be ordered separately.
4. Nut-less model available upon request.

For Coolant Pipe ▶ 175

A.3

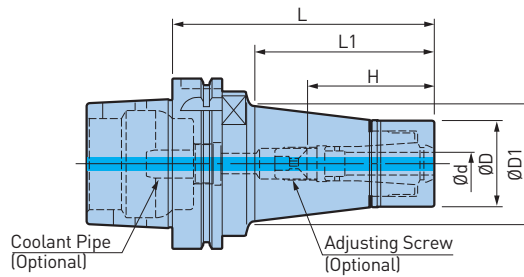
Spare Parts			Accessories								
	MEGA Nut		MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw		
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-	MPS6-	NBA6B	961.527	M7	12	2
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-	MPS8-	NBA8B	961.550	M9	13	2.5
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-	MPS10-	NBA10B	961.572	M11	16	3
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-	MPS13-	NBA13B	961.598	M14	20	4
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-	MPS16-	NBA16B	961.632	M18	20	4
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-	MPS20-	NBA20B	961.680	M21	20	4
MEGA25N	MGN25	806.388	MGR60L	969.468L	NBC25-	-	NBA25B	806.389	M27	20	4

# MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.



A.3



Ø 3 - 12 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H	Max. min <sup>-1</sup>	Collet Model	Weight (kg)	
HSK-A40 -MEGA6E - 60 *	968.235	3 - 6	25	26	60	24	41	35 000	MEC6-	0.39	
-MEGA8E - 65 *	968.238	3 - 8	30	34	65	30	44		MEC8-	0.46	
-MEGA10E - 70 *	968.241	3 - 10	35	35	70	35	48		MEC10-	0.52	
- 90	968.242				90	55	48 - 52	25 000	0.67		
-MEGA13E - 70 *	968.243	3 - 12	42	42	70	35	50	30 000	MEC13-	0.62	
HSK-A50 -MEGA8E - 75 *	803.222	3 - 8	30	33	75	40	42	30 000	MEC8-	0.7	
-MEGA10E - 75 *	978.170	3 - 10	35	38			48		MEC10-	0.8	
-MEGA13E - 75 *	978.010	3 - 12	42	-			49		50	MEC13-	0.9
-100	803.220			-	100	74	50 - 55	25 000	1.1		
HSK-A63 -MEGA6E - 65 *	968.247	3 - 6	25	26.5	65	28	43	30 000	MEC6-	0.9	
- 90	968.248			30	90	51	37 - 45			29 000	1.0
-105	968.249			33	105	66				1.1	
-MEGA8E - 67 *	968.252	3 - 8	30	31.5	67	30	45	30 000	MEC8-	0.9	
- 90	968.253			35	90	52	37 - 45	29 000		1.1	
-105	968.254			38	105	68		42 - 51		29 000	1.2
-MEGA10E - 75 *	968.257	3 - 10	35	37.5	75	37	48	30 000	MEC10-	1.1	
- 90 *	968.258			40	90	53	64			1.2	
-105	968.259			43	105	69	48 - 58			29 000	1.4
-120	968.260	46	120	85	28 000	1.5					
-MEGA13E - 75 *	968.262	3 - 12	42	44	75	31	49	30 000	MEC13-	1.2	
- 90 *	968.263			45	90	46	64			1.4	
-105	968.264			46	105	61	50 - 57			29 000	1.6
-120	968.265			47.5	120	77				28 000	1.8
-135	968.266			47	135	92				26 000	1.9
HSK-A100-MEGA13E - 90 *	968.287	3 - 12	42	46	90	48	50	18 000	MEC13-	2.9	
-105	968.288			48.5	105	63	50 - 61			16 000	3.1
-120	968.289			51.5	120	78				16 000	3.3
-135	968.290			54	135	93				14 000	3.6
-165	968.291			59	165	123	14 000			4.2	

- MEGA E nut is included.
- Coolant pipe is to be ordered separately.
- "H" indicates the adjustment length with an adjusting screw.
- \* Adjusting screws can not be used. "H" is the max. tool shank length can be inserted for these models.
- Nut-less model available upon request.

For Coolant Pipe ▶ 175

Spare Parts			Accessories										
	MEGA E Nut		MEGA Wrench		MEGA E Collet		MEGA E Perfect Seal		Adjusting Screw			Rubber	
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B		
MEGA6E	MEN6	968.461	MGR25	969.456	MEC6-	EPS6-	NBA6B	961.527	M7	12	2		
MEGA8E	MEN8	968.462	MGR30	969.458	MEC8-	EPS8-	NBA8B	961.550	M9	13	2.5		
MEGA10E	MEN10	968.463	MGR35	969.460	MEC10-	EPS10-	NBA10B	961.572	M11	16	3		
MEGA13E	MEN13	968.464	MGR42	969.462	MEC13-	EPS13-	NBA13B	961.598	M14	20	4		

# MEGA Double Power Chuck Type D

Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and type DS to feed coolant to cutting tool periphery.

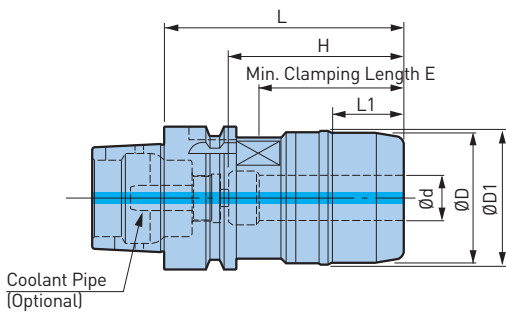


Fig. 1

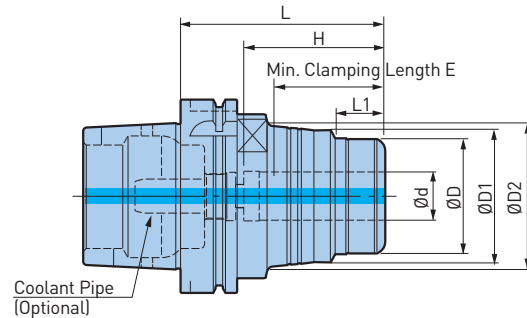


Fig. 2

Ø 3 - 32 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	H	E	Max. min <sup>-1</sup>	Weight (kg)
HSK-A40 -MEGA16D - 80	803.105	1	16	46	-	-	80	25	62	50	18 000	0.75
HSK-A50 -MEGA16D - 85	803.085	1	16	46	-	-	85	25	62	50	25 000	1.0
-MEGA20D - 85 *	978.011		20	50	-	-	86	30	63	51	20 000	1.1
HSK-A63 -MEGA16D - 90A	801.734	2	16	42	53	-	90	25	65	55	28 000	1.5
-MEGA20D - 90A	801.737		20	50	55					56		1.6
-MEGA25D -100A	803.101	1	25	62	63	-	100	39	75	57	24 000	2.0
-MEGA32D -105A	803.080		32	70	70.7					64		2.2
HSK-A100-MEGA20D -105	968.105	2	20	60	69	74	105	25	73	56	18 000	4.1
-MEGA25D -105	968.108		25	70	77	85				65		4.5
-MEGA32D -115	968.111		32	80	86	-	115	39	83	71		5.0
-135	968.112		135	-	-	-	135	39	103	71		16 000

1. Wrench and coolant pipe is to be ordered separately.
2. "H" is the max. tool shank length that can be inserted.
3. \* Adjustable straight collet (AC20-) can not be used.

For Straight Collet ▶ 272

For Coolant Pipe ▶ 175

## MEGA Wrench



MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.
HSK -A40/A50 -MEGA16D,16DS	MGR46L	969.465L	HSK -A100 -MEGA16DS	MGR46L	969.465L
HSK -A50 -MEGA20D,20DS	MGR50L	969.464L	-MEGA20D,20DS	MGR60L	969.468L
HSK -A63 -MEGA16D,16DS	MGR42L	969.462L	-MEGA25D,25DS	MGR70L	969.470L
-MEGA20D,20DS	MGR50L	969.464L	-MEGA32D,32DS	MGR80L	969.471L
-MEGA25D,25DS	MGR62L	969.469L	-MEGA42DS	MGR99L	969.472L
-MEGA32D,32DS	MGR70L	969.470L	HSK -A125 -MEGA20DS	MGR60L	969.468L
			-MEGA25DS	MGR70L	969.470L
			-MEGA32DS	MGR80L	969.471L
			-MEGA42DS	MGR99L	969.472L



# MEGA Double Power Chuck Type DS

Flange contacting nut assures highest rigidity. Unique design ensures efficient coolant supply to the cutting tool periphery.



A.3

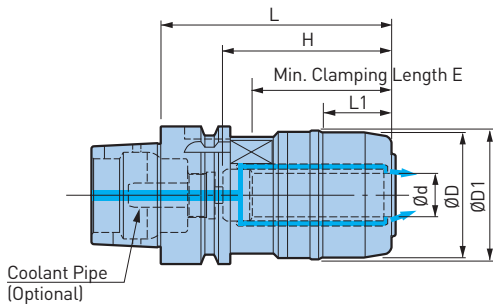


Fig. 1

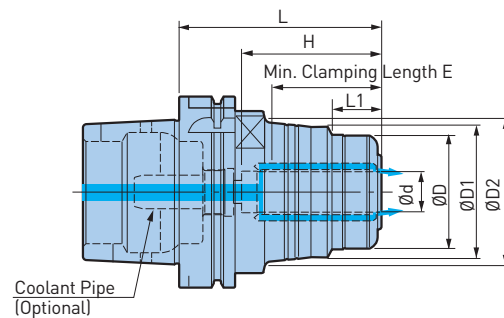


Fig. 2

Ø 3 - 42 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	H	E	Max. min <sup>-1</sup>	Weight (kg)	
HSK-A40 -MEGA16DS - 80	803.106	1	16	46	-	-	82.5	28	64	52	18 000	0.75	
HSK-A50 -MEGA16DS - 85	801.688	1	16	46	-	-	87.5	28	64	52	25 000	1.0	
-MEGA20DS - 85	803.088		20	50	-	-	88.5	33	65	53	20 000	1.05	
HSK-A63 -MEGA16DS - 80A	803.089	2	16	42	53	-	82	27	57	52	25 000	1.3	
-MEGA20DS - 90A	803.090		20	50	55		92	36	67	58		23 000	1.6
-120A	801.740		102	41	77		59	22 000	2.0				
-MEGA25DS -100A	803.102	1	25	62	-	-	102	41	77	59	22 000	2.0	
-MEGA32DS -105A	803.081		32	70	-	-	107.5	35	82	66		2.2	
HSK-A100-MEGA16DS -105	968.131	2	16	46	55	63	107.5	26	73	52	18 000	3.5	
-MEGA20DS -105	968.121		107.5	75	58	4.1							
-135	968.122		20	60	69	74	137.5	28	87	58	16 000	5.0	
-165 *	968.123		167.5	87	58	5.9							
-MEGA25DS -105	968.124		25	70	77	85	107.5	34	75	67	18 000	4.5	
-135	968.125		137.5	92	67	5.6							
-MEGA32DS -115	968.127		117.5	85	73	5.0							
-135	968.128		137.5	105	73	5.8							
-165	968.129		167.5	107	73	7.1							
-MEGA42DS -115	968.130		1	42	99	-	-	117	42	85	80	14 000	5.5
HSK-A125-MEGA20DS -135	805.658	2	20	60	69	80	137.5	64.4	87	58	8 000	6.7	
-165 *	805.659					79	167.5	124.4			7 000	7.6	
-MEGA25DS -135	805.660		25	70	77	83	137.5	94.4	92	67	8 000	7.1	
-MEGA32DS -135	805.750		137.5	87.4	73	7.8							
-165	805.661		32	80	86	93	167.5	117.4	107	73	6 000	9.1	
-MEGA42DS -120	805.662		1	42	99	99.7	-	122.5	77.7	85	80	7 000	7.9

1. Wrench and coolant pipe is to be ordered separately.
2. "H" is the max. tool shank length that can be inserted.
3. \* Adjusting screw (HMA-M16) can be used.

For Coolant Pipe ▶ 175

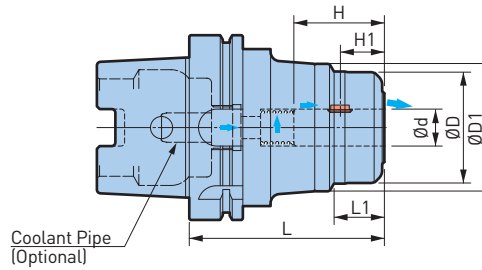
For Straight Collet ▶ 272

For Adjusting Screw ▶ 274

For MEGA Wrench ▶ 275

## MEGA Perfect Grip

100% security against pulling out of the cutting tool under any torque load.



A.3

Ø 16 - 32 mm

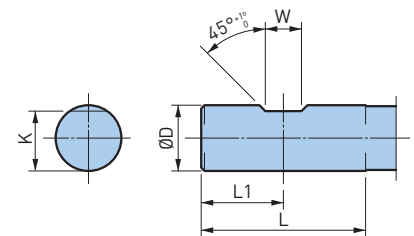
Model	Order No.	Ød	ØD	ØD1	L	L1	H	H1	MEGA Wrench	Weight (kg)
HSK-A63 -MEGA16DPG - 90	806.364	16	46	55	90	24	47	23	MGR46L	1.6
-MEGA20DPG-100	806.365	20	60	69	100	27	49	24	MGR60L	2.1
HSK-A100 -MEGA20DPG-105	805.457	20	60	69	105	27	49	24	MGR60L	4.1
-MEGA25DPG-105	805.458	25	70	77		33	55	23	MGR70L	4.5
-MEGA32DPG-115	805.459	32	80	86	115	41	59	23	MGR80L	5.0
HSK-A125 -MEGA20DPG-135	806.627	20	60	69	135	27	49	24	MGR60L	6.8
-MEGA25DPG-135	806.628	25	70	77		33	55	23	MGR70L	7.2
-MEGA32DPG-135	806.629	32	80	86		41	59	23	MGR80L	7.9

1. Key grip and spring are included with each holder.
2. MEGA wrench is to be ordered separately.
3. H1 shows distance from center of key grip to front end.
4. Coolant pipe is to be ordered separately.

## Weldon Shank Standards

(DIN1835-1)

The following standard shank is required for MEGA Perfect Grip.



ØD		L	L1	W		K	Tolerance
Nominal	Tolerance			Nominal	Tolerance		
16	h6	48	24	10	+0.05 0	14.2	h13
20				11		18.2	
25				12		23	
32				14		30	

### Caution

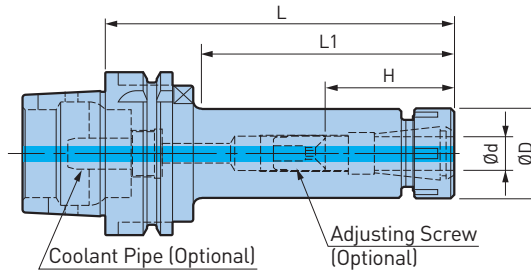
In case you are adding your own flat, the tool projection length in the MEGA Perfect GRIP will be decided by the flat position. Refer to H1 in the MEGA Perfect GRIP chart, decide the flat position to add, and then cut the cutter at L1 on cutter shank.

Spare Parts					Accessories	
Key Grip		Spring		MEGA Wrench		
MEGA Perfect Grip	Model	Order No.	Model	Order No.	Model	Order No.
MEGA20DPG	PKG20-2P	805.493	PSP1823	805.497	MGR60L	969.468L
MEGA25DPG	PKG25-2P	805.494	PSP2420	805.498	MGR70L	969.470L
MEGA32DPG	PKG32-2P	805.495	PSP3128	805.499	MGR80L	969.471L

1. Key grip is available in a package of 2 pcs.
2. As key grip is a consumable item, it is recommended to replace on a regular basis.

# New Baby Chuck

The original high precision collet chuck to perform all machining applications.



A.3

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Collet Model	Nut Model	Gewicht (kg)	
HSK-A63 -NBS6 - 75	968.771	0.25 - 6	20	75	35	20 - 35	NBC6-	NBN6	0.9	
	968.772			105	63	20 - 40			0.9	
	968.773			135	91	20 - 40			1.0	
	-NBS8 - 75	968.775	0.5 - 8	25	75	35	23 - 37	NBC8-	NBN8	0.9
		968.776			105	61	23 - 42			1.0
		968.777			135	91	23 - 42			1.1
	-NBS10 - 75 *	968.779	1.5 - 10	30	75	35	48	NBC10-	NBN10	1.0
		968.780			105	63	35 - 45			1.1
		968.781			135	93	35 - 45			1.3
	-NBS13 - 75 *	968.783	2.5 - 13	35	75	37	48	NBC13-	NBN13	1.0
		968.784			105	67	41 - 55			1.2
		968.785			135	97	41 - 60			1.5
-NBS16 - 75 *	968.787	2.5 - 16	42	75	37	45	NBC16-	NBN16	1.1	
	968.788			105	67	45 - 55			1.4	
	968.789			135	97	45 - 65			1.8	
	968.790			165	127	45 - 65			2.0	
	968.791			200	162	45 - 65			2.4	
	968.792			200	162	45 - 65			2.4	
-NBS20 - 75 *	968.792	2.5 - 20	46	75	39	48	NBC20-	NBN20	1.2	
	968.793			105	69	48 - 53			1.5	
	968.794			135	99	48 - 65			1.9	
	968.795			165	129	48 - 65			2.3	
	968.796			200	164	48 - 65			2.7	
	968.796			200	164	48 - 65			2.7	
HSK-A100 -NBS6 -120	968.572	0.25 - 6	20	120	68	20 - 40	NBC6-	NBN6	2.5	
	968.573			165	113	20 - 40			2.6	
-NBS8 -120	968.575	0.5 - 8	25	120	73	23 - 42	NBC8-	NBN8	2.6	
	968.578			165	113	23 - 42			2.7	
-NBS10 -120	968.580	1.5 - 10	30	120	73	35 - 45	NBC10-	NBN10	2.7	
	968.581			165	113	35 - 45			2.9	
-NBS13 -120	968.583	2.5 - 13	35	120	73	41 - 60	NBC13-	NBN13	2.9	
	968.584			165	113	41 - 60			3.2	
-NBS16 -120	968.587	2.5 - 16	42	120	73	45 - 65	NBC16-	NBN16	3.1	
	968.588			165	118	45 - 65			3.5	
	968.593			165	118	45 - 65			3.5	
-NBS20 -120	968.593	2.5 - 20	46	120	73	48 - 65	NBC20-	NBN20	3.3	
	968.594			165	118	48 - 65			3.8	

1. New baby nut is included. Coolant pipe is to be ordered separately.
2. "H" indicates the adjustment length with an adjusting screw.
3. Nut-less model available upon request.

4. \* Adjusting screws can not be used. "H" is the max. tool shank length can be inserted into these models.

For Coolant Pipe ▶ 175

For Tap Driving Back Stop ▶ 259

Spare Parts			Accessories									
New Baby Nut			Wrench		NBC Collet		Baby Perfect Seal	Adjusting Screw		Rubber		
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B	
NBS6	NBN6	961.526	NBK6	961.525	NBC6-	BPS6-	NBA6B	961.527	M7	12	2	
NBS8	NBN8	961.549	NBK8	961.548	NBC8-	BPS8-	NBA8B	961.550	M9	13	2.5	
NBS10	NBN10	961.571	NBK10	961.570	NBC10-	BPS10-	NBA10B	961.572	M11	16	3	
NBS13	NBN13	961.597	NBK13	961.596	NBC13-	BPS13-	NBA13B	961.598	M14	20	4	
NBS16	NBN16	961.631	NBK16	961.630	NBC16-	BPS16-	NBA16B	961.632	M18	20	4	
NBS20	NBN20	961.679	NBK20	961.678	NBC20-	BPS20-	NBA20B	961.680	M21	20	4	

# New Hi-Power Milling Chuck Type S

The original design of slit structure assures heavy and finish end milling with high power and precision.



A.3

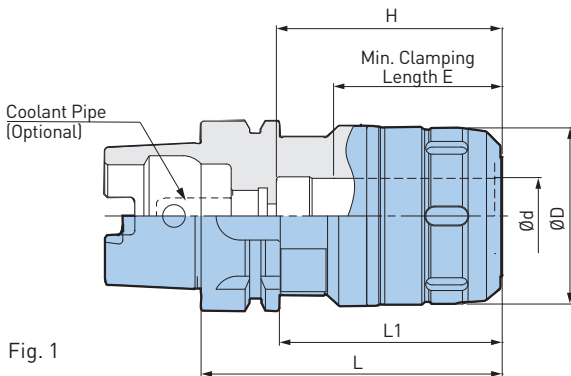


Fig. 1

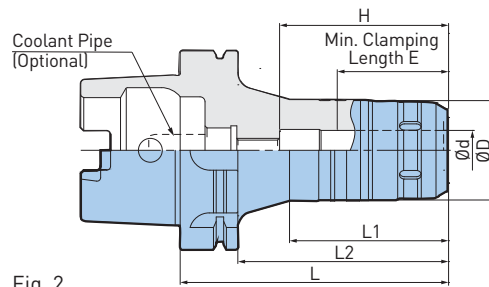


Fig. 2

Ø 3 - 42 mm

Model	Order No.	Fig.	Ød	ØD	L	L1	L2	H	E	Wrench	Weight (kg)
HSK-A40 -HMC20S - 85	805.100	1	20	50	85	65	-	66	56	FK45-50L	0.9
HSK-A50 -HMC20S - 90	805.101	1	20	50	90	64	-	66	56	FK45-50L	1.2
-HMC32S -115 ****	806.595		32	62	115	89	-	69	58	FK58-62L	1.6
HSK-A63 -HMC20S - 90	965.511S	1	20	50	90	64	-	65	56	FK45-50L	1.5
-120 **	805.102				120	94		85			1.9
-HMC25S -100	968.136S		25	59	100	74		75	57	FK58-62L	1.9
-135 *	805.103				135	109		66 - 76			2.5
-HMC32S -110	968.137S		32	68	110	84		85	64	FK68-75L	2.3
-135 **	805.104				135	109		90			2.6
-165 *	805.105	165			139	79 - 89	3.2				
HSK-A100-HMC20S -105	805.106	1	20	50	105	76	-	73	56	FK45-50L	3.0
-135 ***	805.107	135			80	106	85	3.5			
-165 *	805.108	165			100	136	69 - 79	4.1			
-HMC25S -105	805.110	1	25	59	105	76	-	73	57	FK58-62L	3.3
-135 ***	804.917	135			106	90	3.9				
-165 *	805.111	165			105	136	76 - 86	4.8			
-HMC32S -115	805.112	1	32	68	115	86	-	83	72	FK68-75L	3.9
-135	805.113				135	106	103	4.4			
-165 ***	805.114				165	105	136	105			5.4
-200 *	805.115				200	130	171	90 - 100			6.4
-HMC42S -115	805.117	1	42	85	115	86	-	83	73	FK80-90L	4.9

- Wrench and coolant pipe are to be ordered separately.
- "H" is the max. tool shank length that can be inserted into the holder.
- \* Axial length adjusting screw can be used. \*\*/ \*\*\* Commercially available hex socket head screws can be used as a back stop (\*\*=M8 /\*\*\*=M12). Coolant is blocked by utilizing these commercial screws.
- \*\*\*\* Only the straight collet (C32- ) can be used.

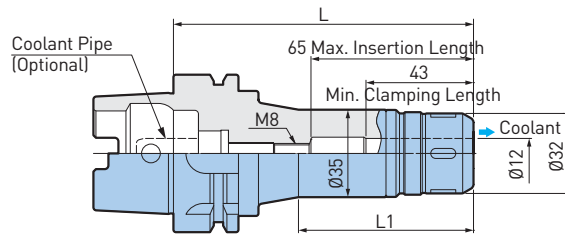
For Coolant Pipe ▶ 175

For Straight Collet ▶ 272

Accessories											
Wrench			Adjusting Screw								
New Hi-Power Milling Chuck	Model	Order No.	Model	Order No.	D	L	L1	G	W		
HSK-A40/A50/A63/A100 -HMC20S	FK45-50L	801.037	HMA-M16	962.311	19	27	6	M16P1.5	8		
HSK-A63/A100 -HMC25S	FK58-62L	801.038		962.312							
HSK-A50 -HMC32S	FK58-62L	801.038	HMA-M16S	-	-	-	-	-	-		
HSK-A63/A100 -HMC32S	FK68-75L	801.039									
HSK-A100 -HMC42S	FK80-90L	804.771	-	-	-	-	-	-	-		

## New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant.



Ø 6 - 12 mm

A.3

Model	Order No.	L	L1	Wrench	Weight (kg)
HSK-A63 -HMC12J - 90	805.829	90	52	FK31-33	1.1
-120 *	805.830	120	70		1.4

1. Wrench is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. \* Hex socketed head screw (M8) can be used as an adjusting screw.

For Straight Collet ▶ 272

For Coolant Pipe ▶ 175

Accessories		
	Wrench	
New Hi-Power Milling Chuck	Model	Order No.
HSK -A63 -HMC12J	FK31-33	806.462

# Hydraulic Chuck Super Slim

Ultra precise hydraulic chuck with extremely slim design.



A.3

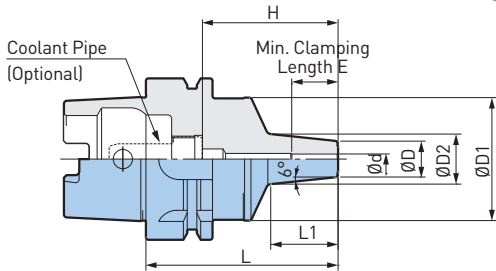


Fig. 1

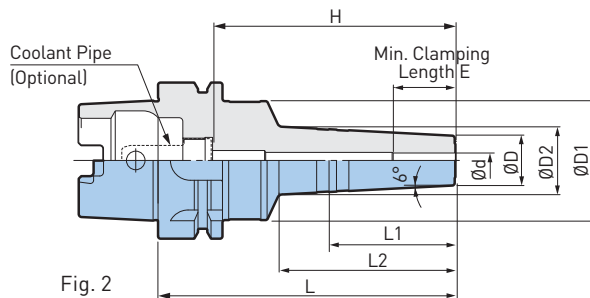


Fig. 2

Ø 4 - 12 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	L2	H	E	Weight (kg)
HSK-A40 -HDC4S - 65	805.527	1	4	14	33	21	65	28	-	49	19	0.33
HSK-A50 -HDC4S - 75	805.548	1	4	14	40	21	75	31	-	55	19	0.8
HSK-A63 -HDC3S - 90	805.465	1	3	14	48	24	90	43	-	68	16	1.1
-HDC4S - 75	803.072		4			20	75	26	-	53	19	1.0
-120	805.466		6			26	57	72	98	25	1.1	
-HDC6S -120	803.073	2	8	17	48	28	120	52	70	98	31	1.2
-HDC8S -120	803.074		10	30		95				33	1.2	
-HDC10S -120	803.070		12	32		94				33	1.2	
-HDC12S -120	803.071		12	21		93				36	1.2	

1. Adjusting screw and straight collet can not be used.
2. Coolant pipe is to be ordered separately.
3. "H" is the max. tool shank length that can be inserted into the holder.

For Coolant Pipe ▶ 175

For Inner Bore Cleaner ▶ 286

### Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# Hydraulic Chuck Jet Through

Coolant or oil-mist is supplied to cutting edge securely. Exert maximum performance to high-precision operation at 5-axis machining.



A.3

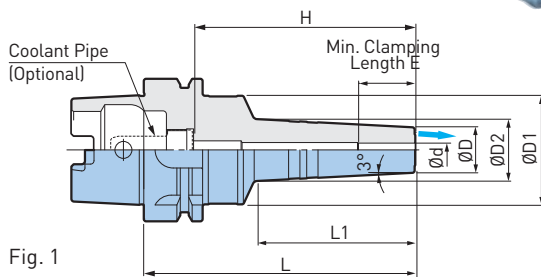


Fig. 1

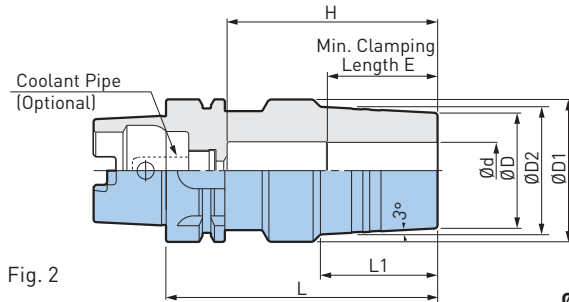


Fig. 2

Ø 3 - 32 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	L	L1	H	E	Weight (kg)				
HSK-A63 -HDC4J - 75	805.477	1	4	20	48	23	75	29	53	19	1.0				
-HDC6J -120	805.096		6	20		28									
-HDC8J -120	805.097		8	22		30									
-HDC10J -120	805.098		10	24		32									
-HDC12J -120	805.099		12	26		34									
-HDC16J -120	805.478		16	34		43						76	92	43	1.5
-HDC20J -120	805.479		20	38											
-HDC25J -120	805.831	2	25	51	63	57	50	93	49	2.1					
-HDC32J -120	805.832		32	60	69	-					53	56	2.3		

1. Adjusting screw can not be used.
2. Straight collet can be used for HDC16J or bigger Ød size models.
3. Coolant pipe is to be ordered separately.
4. "H" is the max. tool shank length that can be inserted into the holder.

For Coolant Pipe ▶ 175

For Inner Bore Cleaner ▶ 286

For Straight Collet ▶ 272

### Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.



# Hydraulic Chuck Standard

For high precision machining in automotive, aerospace, medical and die & mold.



A.3

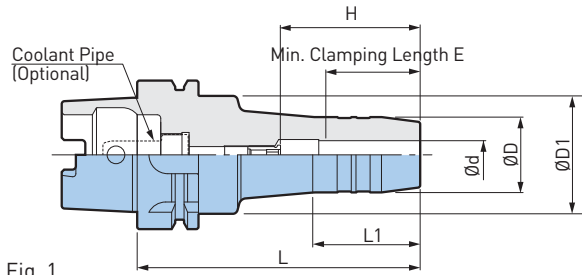


Fig. 1

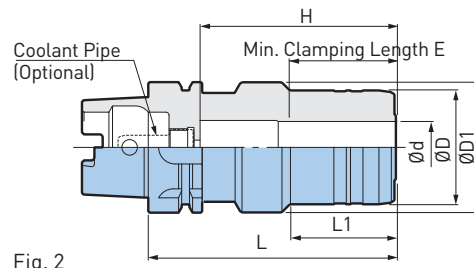


Fig. 2

Ø 3 - 32 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	H	E	Adjusting Screw (Optional)	Weight (kg)	
HSK-A63 -HDC6	- 70 *	1	6	26	50	70	24	46	28	-	1.0	
	-120					120	44	28 - 48		HDA 6-05032	1.2	
	-150					150		28 - 48		HDA 8-06032	1.4	
	-HDC8		-120	8		28	120	35	55	33	-	1.1
	-HDC10		- 80 *	10		30	80	45	33 - 53	33	HDA 10-08032	1.3
	-HDC12		- 85 *	12		32	85	40	60	-	-	1.1
	-120		120	45		38 - 58	38	HDA 12-10025	1.4			
	-HDC14		-120	14		34	120	45	58 - 68	43	HDA 16-12015	1.5
	-HDC15		-120	15		37	90	46	65	-	-	1.3
	-HDC16		-120	16		38	120	48	58 - 68	HDA 20-16015	1.6	
	-HDC18		- 90 *	18		40	90	48	58 - 68	-	-	1.3
	-HDC20		- 90 *	20		42	120	48	58 - 68	HDA 20-16015	1.6	
-120	120	48	58 - 68	43	HDA 20-16015	1.6						
-HDC31	- 95	2	31	63	74	95	27	70	56	-	1.7	
-HDC32	-125 *	2	32	60	69	125	59	100	56	-	2.4	
HSK-A100-HDC8	-120	1	8	28	50	120	44	28 - 48	28	HDA 8-06032	2.6	
	-HDC10		-120	10			30	45	33 - 53	33	HDA 10-08032	2.7
	-HDC12		-120	12			32	47	38 - 58	38	HDA 12-10025	2.7
	-HDC16		-135	16		38	135	53	43 - 68	43	HDA 16-12030	3.0
	-HDC20		-135	20		42	59	58 - 68	43	HDA 20-16015	3.1	
	-HDC32		-110 *	32		64	75	110	62	78	56	-

- H indicates the adjustment length with an adjusting screw.
- \* Adjusting screw cannot be used.
- Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

For Inner Bore Cleaner ▶ 286

For Straight Collet ▶ 272

For Adjusting Screw ▶ 282

### Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# Shrink Chuck Slim

Optimal operation with eliminated workpiece/jig interference is achieved in deep endmilling, wall machining and precision mold machining.



A.3

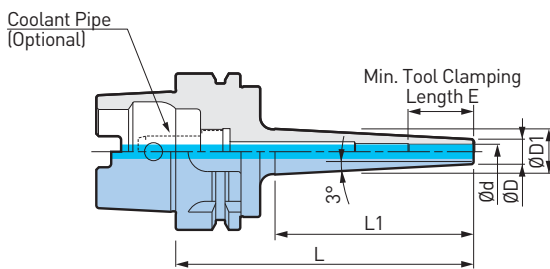


Fig. 1

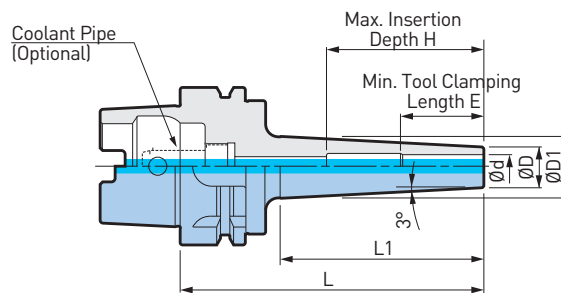


Fig. 2

Ø 6 - 12 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	H	E	Weight (kg)
HSK-A63 -SRC6S - 120	801.264	1	6	10	19	120	81	(98)	26	0.9
	801.265									
-SRC8S - 120	802.267	2	8	13	22	120	81	(98)	32	1.0
	801.268									
-SRC10S - 120	801.253	2	10	16	25	120	81	62	36	1.0
	801.254									
-SRC12S - 120	801.256	2	12	19	28	120	81	72	36	1.0
	801.257									

1. Use carbide cutter within a tolerance of h6.
2. Coolant pipe is to be ordered separately.
3. H dimensions in ( ) are reference length up to the coolant pipe.

For Coolant Pipe ▶ 175

For Inner Boring Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

# Shrink Chuck Standard

Substantial body provides higher rigidity. Available from 4mm clamping diameter.



A.3

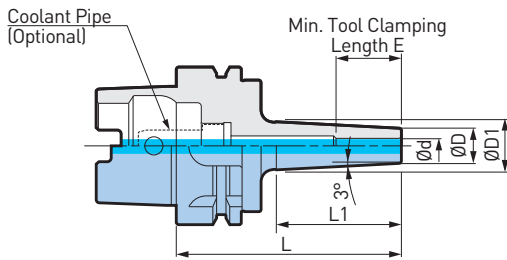


Fig. 1

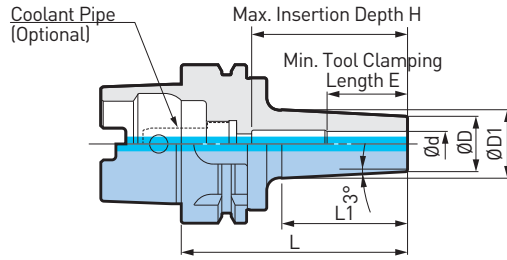


Fig. 2

Ø 4 - 20 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	H	E	Weight (kg)
HSK-A63 -SRC4 - 90 *	801.262	1	4	10	15	90	46	(68)	16	0.9
	978.295		6	14	20		51	(68)		0.9
-SRC6 - 90	801.263	2	6	14	26	150	108	(128)	26	1.1
-SRC8 - 90	978.296				24	90	51	(68)		1.0
-SRC10 - 150	801.266		30	150	110	(128)	1.2			
-SRC12 - 90	978.297		10	22	28	90	51	62	32	1.0
-SRC16 - 150	801.252				34	150	111			1.3
-SRC12 - 90	978.298		12	24	30	90	51	65	36	1.0
-SRC16 - 150	801.255				36	150	112			72
-SRC16 - 90	978.299		16	28	34	90	51	65	38	1.1
-SRC20 - 165	801.258				41	165	119			80
-SRC20 - 90	801.260		20	34	40	90	53	65	42	1.2
-SRC20 - 165	801.259	47			165	122	100			1.9

1. Use carbide cutter within a tolerance of h6.
2. \* Use carbide cutter within a tolerance of h5.
3. Coolant pipe is to be ordered separately.
4. H dimensions in ( ) are reference length up to the coolant pipe.

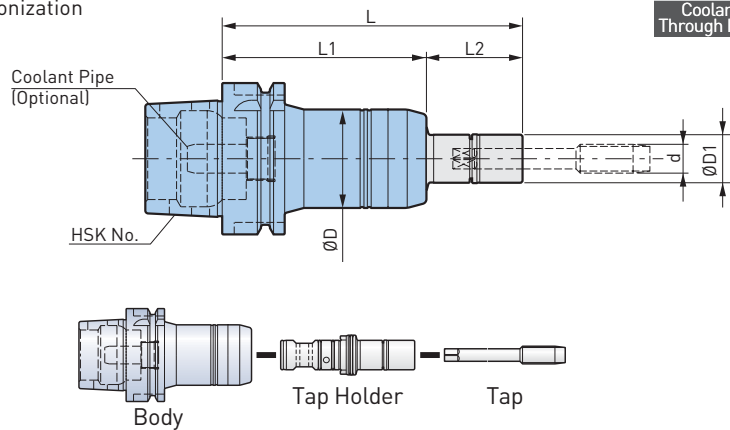
For Coolant Pipe ▶ 175

For Inner Boring Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

# MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



A.3

M3 - M20

Model	Order No.	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)
HSK-A40 -MGT6 - 80	965.601	MGT6-d - 30	M3 - M8	36	16	110	80	30	0.6
		- 70				150		70	
		-100				180		100	
-MGT12 - 85	965.602	MGT12-d - 30	M5 - M12 P1/8	41	20	115	85	30	0.7
		- 70				155		70	
		-100				185		100	
HSK-A50 -MGT6 - 85	965.603	MGT6-d - 30	M3 - M8	36	16	115	85	30	0.8
		- 70				155		70	
		-100				185		100	
-MGT12 - 85	965.604	MGT12-d - 30	M5 - M12 P1/8	41	20	115	85	30	0.9
		- 70				155		70	
		-100				185		100	
-MGT20 -125	978.325	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	160	125	35	1.6
		- 85				210		85	
		-115				240		115	
HSK-A63 -MGT6 - 85	965.606	MGT6-d - 30	M3 - M8	36	16	115	85	30	1.1
		- 70				155		70	
		-100				185		100	
-MGT12 - 85	965.607	MGT12-d - 30	M5 - M12 P1/8	41	20	115	85	30	1.2
		- 70				155		70	
		-100				185		100	
-MGT20 -110	965.608	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	145	110	35	1.8
		- 85				195		85	
		-115				225		115	
HSK-A100 -MGT6 - 95	965.609	MGT6-d - 30	M3 - M8	36	16	125	95	30	2.6
		- 70				165		70	
		-100				195		100	
-MGT12 - 95	965.610	MGT12-d - 30	M5 - M12 P1/8	41	20	125	95	30	2.7
		- 70				165		70	
		-100				195		100	
-MGT20 -115	965.611	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	150	115	35	3.3
		- 85				200		85	
		-115				230		115	
HSK-A125 -MGT12 -105	805.655	MGT12-d - 30	M5 - M12 P1/8	41	20	135	105	30	4.1
		- 70				175		70	
		-100				205		100	
-MGT20 -120	805.656	MGT20-d - 35	M12 - M20 P1/4 - P1/2	54	30	155	120	35	4.7
		- 85				205		85	
		-115				235		115	

1. Tap holder is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. Rigid tapping function is required on the machine tool.



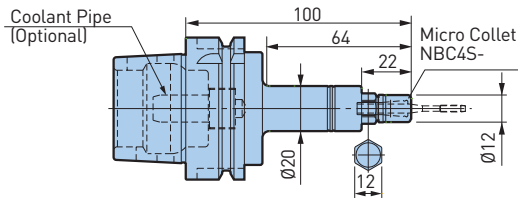
- For Coolant Pipe ▶ 175
- For Tap Holder ▶ 276
- For MEGA Wrench ▶ 281
- For Accessories ▶ 280

## MEGA Synchro Tapping Holder

For small Tap MGT3



M1 - M3



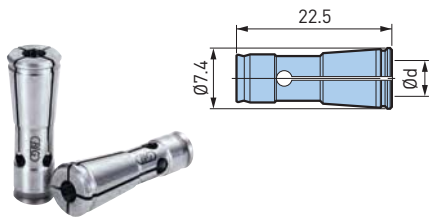
Model	Order No.	Weight (kg)
HSK-A63-MGT3-100	805.542	1.0

For Accessories ▶ 281

1. Nut is included. MEGA wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the hex portion of the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

A.3

### Micro Collet for MGT3

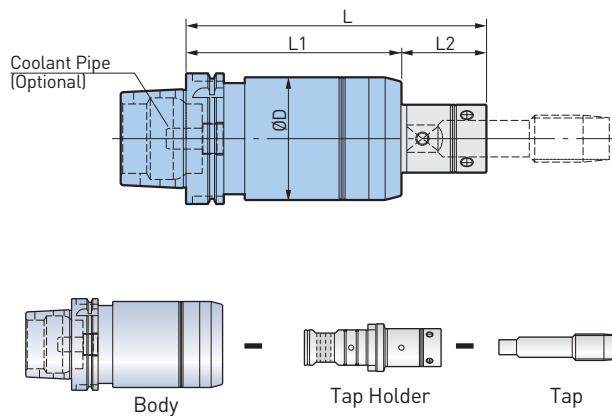


Model	Order No.	Tapping Range d			Tap Shank
		DIN371	ISO529	JIS	Ød
NBC4S-2.5AA	961.468	M1 - M1.8	M2		2.5
-2.8AA	968.353	M2 - M2.6	M2.2, M2.5		2.8
-3.0AA	961.470	-	-	M1 - M2.6	3.0
-3.1AA	968.355	-	M3		3.15
-3.5AA	961.472	M3	-		3.5
-4.0AA	961.474	-	-	M3	4.0

1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ 247

### For large Tap MGT36



M22 - M36

Model	Order No.	Tapping Range d	ØD	L	L1	L2	Weight (kg)
HSK-A100-MGT36-165	801.164	M22 - M36	94	230	165	65	8.2
HSK-A125-MGT36-170	805.657	P5/8 - 1	94	235	170	65	10.1

1. Tap holder is to be ordered separately.
2. Coolant pipe is to be ordered separately.
3. Rigid tapping function is required on the machine tool.



For Accessories ▶ 280

For MGT36 Tap Holder ▶ 277 / 279

For Coolant Pipe ▶ 175

### Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.



A.3

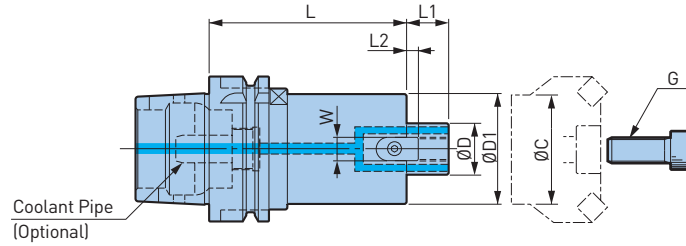
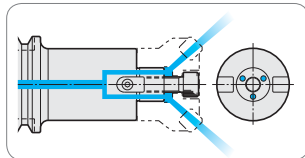


Fig. 1

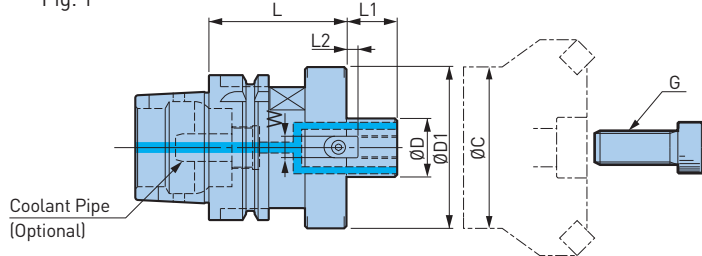


Fig. 2

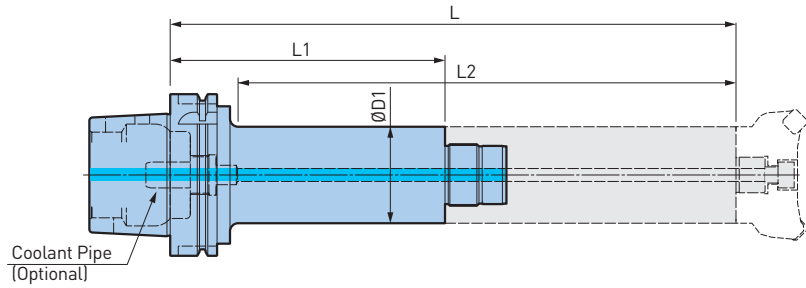
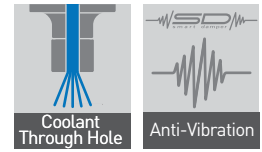
Model	Order No.	Fig.	ØD (h6)	ØD1	L	L1	Drive Keys		G	ØC min.	Weight (kg)														
							L2	W																	
HSK-A50 -FMH22 - 47 - 60	805.833	2	22	47	60	18	5	10	M10	36	0.8														
-FMH27 - 60 - 60	805.834		27	60		20	6	12	M12	46	1.0														
HSK-A63 -FMH16 - 37 - 45	979.194	1	16	37	45	16	5	8	M8	28	1.0														
-FMH22 - 47 - 60	801.189											60	18	5	10	M10	36	1.3							
- 90	978.186																		90	18	5	10	M10	36	1.7
-150	801.188																								
-FMH22 - 60 - 60	805.573											2	22	60	60	18	5	10	M10	38	1.4				
- 90	805.574	60	18	5	10	M10	38	1.8																	
-FMH27 - 60 - 60	978.185								60	20	6											12	M12	46	1.6
- 90	979.196																								
-FMH32 - 96 - 60	805.646	2	32	96	60	22	7	14	M16	58	2.0														
HSK-A100 -FMH22 - 47 -105	965.523	1	22	47	105	18	5	10	M10	36	3.4														
-150	978.120				150						4.0														
-200	978.121				200						4.7														
-FMH22 - 60 -105	801.092				1						22	60	105	18	5	10	M10	38	3.9						
-150	801.093	150	5.4																						
-200	801.094	200	6.1																						
-FMH27 - 60 - 60	801.102	1	27	60	60	20	6	12	M12	46	2.9														
- 90	801.103										90	3.7													
-FMH27 - 76 - 60	801.105	1	27	76	60	20	6	12	M12	62	3.2														
- 90	801.106				90						4.3														
-FMH32 - 96 - 60	801.118	2	32	96	60	22	7	14	M16	80	3.8														
- 90	801.119				90						5.5														
-FMH40 -100 - 75	801.125	2	40	100	75	26	8.5	16	M20 (MBA-M20H)	80	4.9														
-105	801.124				105						6.8														
HSK-A125 -FMH22A - 49 - 50	806.585	1	22	49	50	18	5	10	M10	40	4.0														
-100	806.586				100						4.8														
-150	806.587				150						5.4														
-200	806.588				200						36	6.7													
-FMH27A - 60 - 90	806.589				27						60	90	20	6	12	M12	46	5.1							
-150	806.590																	150	6.3						
-FMH32A - 78 - 60	806.591				32						76	60	22	7	14	M16	58	4.8							
- 96 -105	806.592											98						7.8							
-FMH40A - 80 - 90	806.593											105						7.8							
					40						80	90	28	8.5	16	M20	70	6.0							

- Hexagon Socket Head Cap Screw is included.
- By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.
- Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

For Clamp Bolt ▶ 282

### Smart Damper Basic Holders for Mills



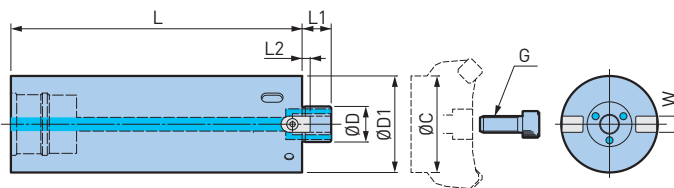
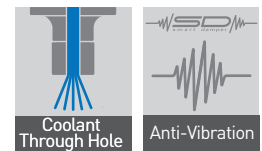
A.3

Model	Order No.	ØD1	L	L1	L2	Damper Head	Weight (kg)
HSK-A100 -SDF36 - 47 -170	804.976	47	350	170	310	FMH DP-47	4.4
	804.978		400	220	360		5.0
-SDF36 - 60 -170	804.977	60	350	170	310	FMH DP-60	5.5
	804.979		400	220	360		6.5
HSK-A125 -SDF36 - 47 -250	806.630	47	430	250	380	FMH DP-47	6.9
	806.631					60	FMH DP-60

1. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

### Smart Damper Damper Heads for Mills



Model	Order No.	ØD	ØD1	L	L1	L2	W	G	Wrench	ØC min.	Weight (kg)
SDF36-FMH22DP - 47 -180	804.969	22	47	180	18	5	10	M10	FK45-50L	36	3.0
	804.971		60							49	4.5
-FMH27DP - 60 -180	804.972	27	60		20	6	12	M12	FK58-62L	46	4.5

1. Wrench and cutter clamping bolt are included.

2. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.

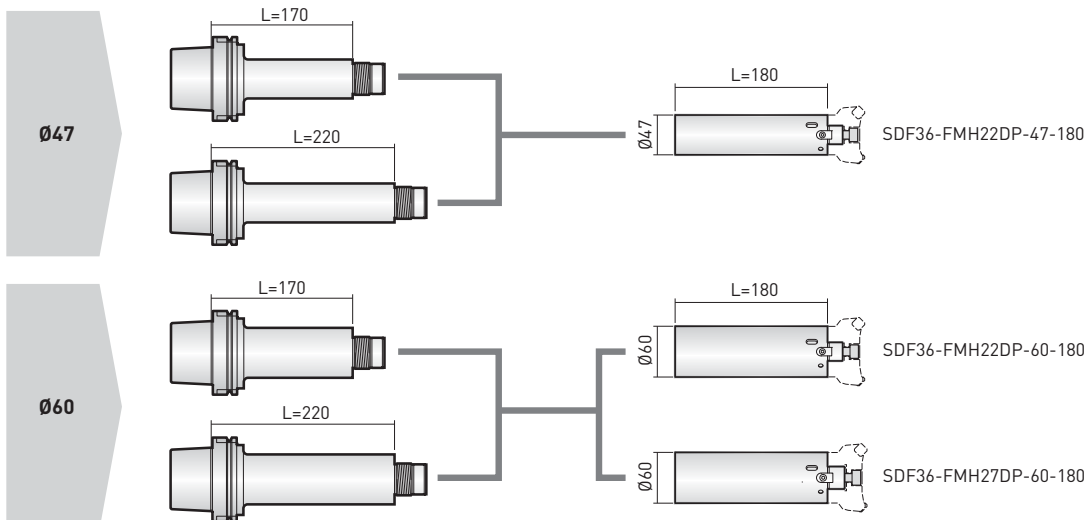
For Clamp Bolt ▶ 282

For Wrench ▶ 275

#### Combinations

#### Basic Holder

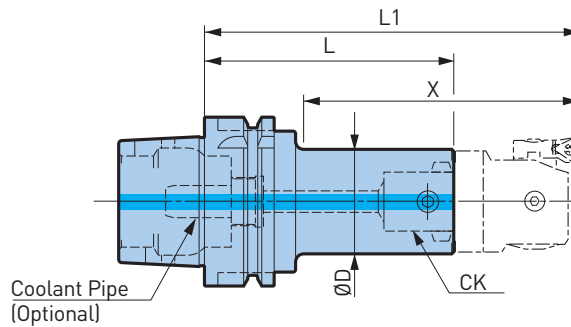
#### Damper Head





## CK Shanks with Center Through Coolant

With drive key grooves and orientation notch.



A.3

Taper Size	Order No.	CK	ØD	L	L1	X	Weight (Kg)
HSK-A25 -CKB2 - 30	328.279F *	CKB2	24	30	66	50	0.18
HSK-A32 -CKB2 - 33	328.278F	CKB2	24	33	69	43	0.20
HSK-A40 -CKB1 - 32	324.112F	CKB1	19	31.5	64	40	0.22
-CKB2 - 35	328.277F	CKB2	24	35	71	45	0.22
-CKB3 - 40	324.132F	CKB3	31	40	80	55	0.26
-CKB4 - 50	324.142F	CKB4	39	50	97	72	0.34
HSK-A50 -CKB3 - 44	324.232F	CKB3	31	44	84	53	0.5
-CKB4 - 48	324.242F	CKB4	39	48	95	64	0.5
-CKB5 - 61	324.252F	CKB5	50	61	118	87	0.7
HSK-A63 -CKB1 - 79	324.312F	CKB1	19	78.5	111	80	0.8
-CKB2 - 96	324.322F	CKB2	24	95.5	131	100	0.9
-CKB3 - 71	324.331	CKB3	31	71	111	80	0.9
-CKB3 - 71FB	324.331F	CKB3	31	71	111	80	0.9
-CKB3 - 121	324.332	CKB3	31	121	161	130	1.2
-CKB4 - 94	324.341	CKB4	39	94	141	110	1.2
-CKB4 - 94FB	324.341F	CKB4	39	94	141	110	1.2
-CKB4 - 114	324.342	CKB4	39	114	161	130	1.4
-CKB5 - 59	324.352	CKB5	50	59	116	85	1.0
-CKB5 - 59FB	324.352F	CKB5	50	59	116	85	1.0
-CKB5 - 89	324.353	CKB5	50	89	146	115	1.4
-CKB5 - 134	324.354	CKB5	50	134	191	160	2.0
-CKB6 - 70	324.361	CKB6	63.5	70	141	110	1.3
-CKB6 - 70FB	324.361F	CKB6	63.5	70	141	110	1.3
-CKN6 - 70	324.361N	CKN6	63.5	70	141	110	1.3
-CKB6 - 100	324.362	CKB6	63.5	100	171	140	1.9
-CKN6 - 160	324.367N	CKN6	63.5	160	231	200	3.2
HSK-A80 -CKB6 - 75	324.461	CKB6	63.5	75	146	115	2.0
HSK-A100 -CKB3 - 124	324.531	CKB3	31	124	164	130	2.5
-CKB4 - 147	324.541	CKB4	39	147	194	160	2.9
-CKB5 - 107	324.551	CKB5	50	107	164	130	3.0
-CKB5 - 177	324.552	CKB5	50	177	234	200	3.8
-CKB6 - 78	324.561	CKB6	63.5	78	149	115	2.9
-CKN6 - 78	324.561N	CKN6	63.5	78	149	115	2.8
-CKB6 - 108	324.563	CKB6	63.5	108	179	145	3.5
-CKN6 - 108	324.563N	CKN6	63.5	108	179	145	3.4
-CKN6 - 223	324.566N	CKN6	63.5	223	294	260	6.0
-CKB7 - 87	324.571	CKB7	90	87	204 (174)	170 (140)	4.1
-CKN7 - 87	324.571N	CKN7	90	87	204 (174)	170 (140)	4.1
-CKB7 - 127	324.572	CKB7	90	127	244 (214)	210 (180)	5.8
-CKN7 - 127	324.572N	CKN7	90	127	244 (214)	210 (180)	5.8
-CKN7 - 267	324.575N	CKN7	90	267	384 (354)	350 (320)	12.0
HSK-A125 -CKB6 - 94	869.024	CKB6	63.5	94	165	125	4.9
-CKB7 - 123	869.025	CKB7	90	123	240 (210)	195 (165)	7.5

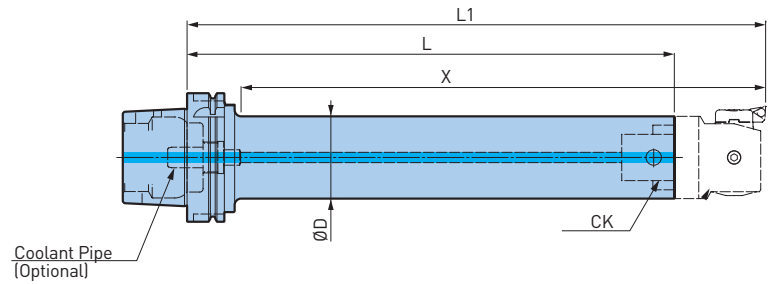
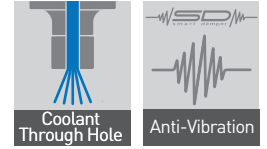
1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. HSK shanks with index "F" are precision balanced.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

For Boring Heads ▶ Chapter B

### Smart Damper CK Shanks

Tool shanks with integrated damping system for highly efficient deep hole fine boring.



A.3

Model	Order No.	CK	ØD	L	L1	X	Weight (kg)
HSK-A100 -CKB5DP - 303	328.238	CKB5	50	303	360	310	6.5
HSK-A100 -CKB6DP - 379	328.240	CKB6	64	379	450	400	11.2

1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

For Boring Heads ▶ Chapter B

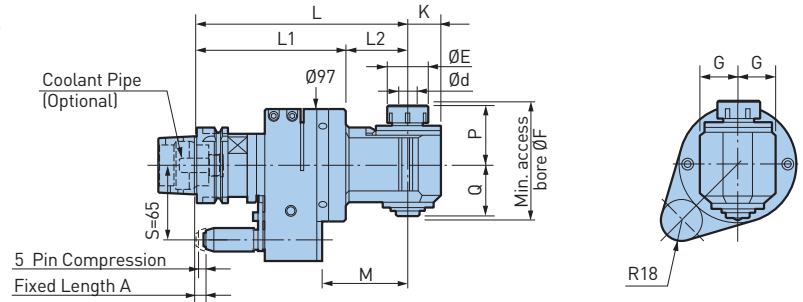
### New Baby Chuck Type

It is the outstanding rigidity and accuracy of the New Baby Chuck, used for holding the cutting tool, that produces high precision with less runout. Available in various sizes to meet specific production requirements.

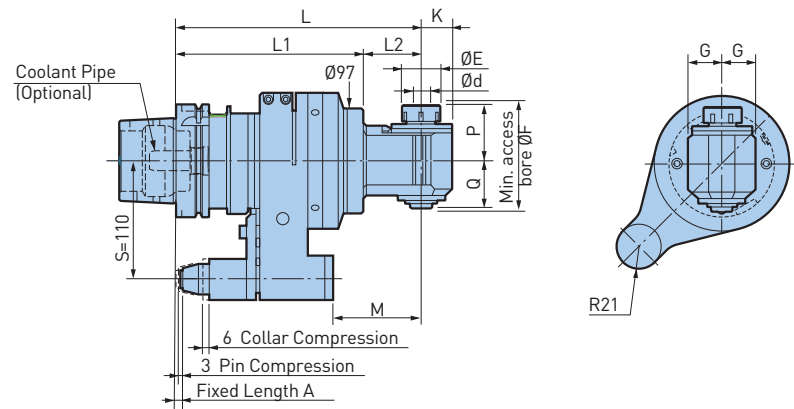
A.3



HSK-A63



HSK-A100



Exclusive Stop Block is required.

Model	Order No.	Ød	ØE	G	K	L	L1	L2	M	P	Q	ØF	Collet Model	Max. min <sup>-1</sup>	Weight (kg)	
HSK-A63-AG90/NBS6	-185	0.25 - 6	20	21	17	185	130	55	77	33	29	67	NBC6	6 000	5.0	
	-215					215		85	107						5.2	
	-245					245		115	137						5.4	
	-275					275		145	167						5.6	
	-AG90/NBS10					-185		802.702	185						55	77
-AG90/NBS10	-215	802.704	1.5 - 10	30	30	25	215	85	107	45	43	91	NBC10	6 000	5.8	
	-245	245					115	137	6.1							
	-AG90/NBS13	-185					802.708	185	55						77	5.5
-AG90/NBS13	-215	802.710	2.5 - 13	35	31	28	215	85	107	52	45	101	NBC13	6 000	5.9	
	-245	245					115	137	6.2							
	-AG90/NBS20S-180S	802.716					2.5 - 20	46	35						33	180
HSK-A100-AG90/NBS6	-225	0.25 - 6	20	21	17	225	170	55	82	33	29	67	NBC6	6 000	11.8	
	-255					255		85	112						12.0	
	-285					285		115	142						12.2	
	-315					315		145	172						12.4	
	-AG90/NBS10					-225		802.645	225						55	82
-AG90/NBS10	-255	802.648	1.5 - 10	30	30	25	255	85	112	45	43	91	NBC10	6 000	12.6	
	-285	285					115	142	12.9							
	-AG90/NBS13	-225					802.654	225	55						82	12.3
-AG90/NBS13	-255	802.657	2.5 - 13	35	31	28	255	85	112	52	45	101	NBC13	6 000	12.7	
	-285	285					115	142	13.0							
	-AG90/NBS20	-240					802.663	2.5 - 20	46						35	35

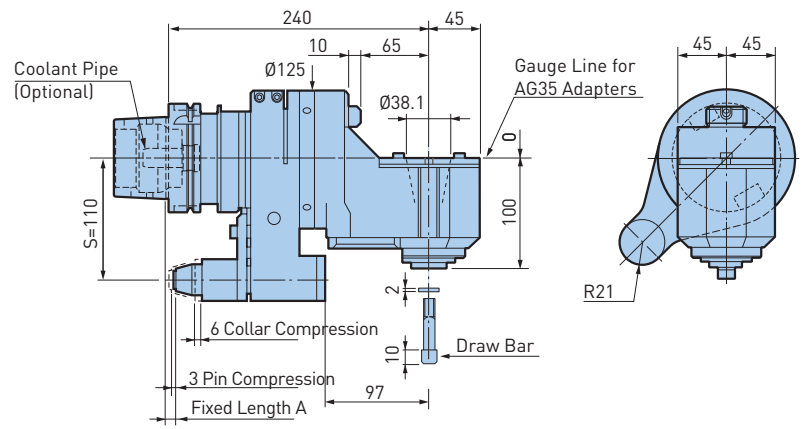
1. The standard fixed length A is 8 mm for HSK-A63 and 6 mm for HSK-A100. Other lengths are available upon request.
2. New baby nut and wrench are included. New baby collet is to be ordered separately.
3. New baby collet for endmilling (NBC - EAA) can not be used.
4. Coolant can be supplied through the locating pin.
5. Coolant pipe is to be ordered separately.

For New Baby Collet ▶ 250

For Stop Block ▶ 290

### Build-Up Type

Designed for greater rigidity by having the face of the spindle bore in line with the center of the machine spindle. Also helps minimize interference problems with ATC and storage problems within the magazine.



Exclusive Stop Block is required.

Model	Order No.	Max. min <sup>-1</sup>	Weight (kg)
HSK-A100 -AG90/AGH35-240	802.639	3 000	14.2
-AG90/AGH35-240S	802.640	3 000	15.5

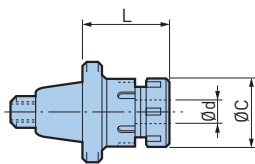
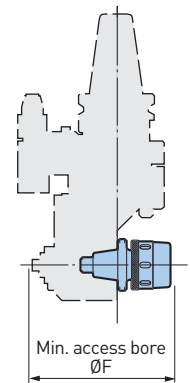
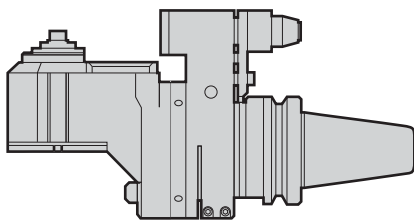
1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models.
2. Standard fixed length A is 6 mm. Other lengths are available upon request.
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Coolant can be supplied through the locating pin.
5. Coolant pipe is to be ordered separately.

For Stop Block ▶ 290  
For Adapters ▶ 154

A.3

AG35 adapters

A.3



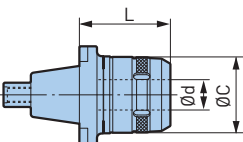
New Baby Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -NBS10	962.793	1.5 - 10	47	30	162	0.6
-NBS13	962.794	2.5 - 13	54	35	168	0.7
-NBS16	962.795	2.5 - 16		42	170	0.8
-NBS20	962.796	2.5 - 20		46		0.9

1. New baby collet and wrench are to be ordered separately.

For New Baby Collet ▶ 250

For Wrench ▶ 271

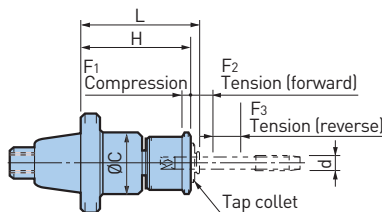


New Hi-Power Milling Chuck

Model	Order No.	Ød	L	ØC	ØF	Weight (kg)
AG35 -HMC20S	802.742	20	60	52	178	1.5

1. Wrench (FK45-50L) is included.

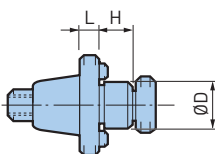
For Straight Collet ▶ 272



Auto Tapper Type B (automatic depth control)

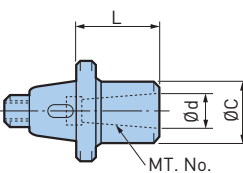
Model	Order No.	Ød	L	ØC	H	F1	F2	F3	Weight (kg)
AG35 -ATB12E	802.435	M4 - M12	80	40.5	72	0.5	5	4	1.0
-ATB20E	802.436	M8 - M20	115	57.5	102.5		6.5	5	1.7

1. Please contact BIG KAISER agent for tap collet.



Face Mill Arbor

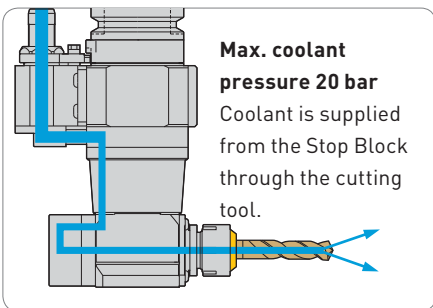
Model	Order No.	ØD	L	H	Weight (kg)
AG35 -FMH22 -30	802.740	22	30	18	1.0
-FMH27 -20	802.741	27	20	20	1.0



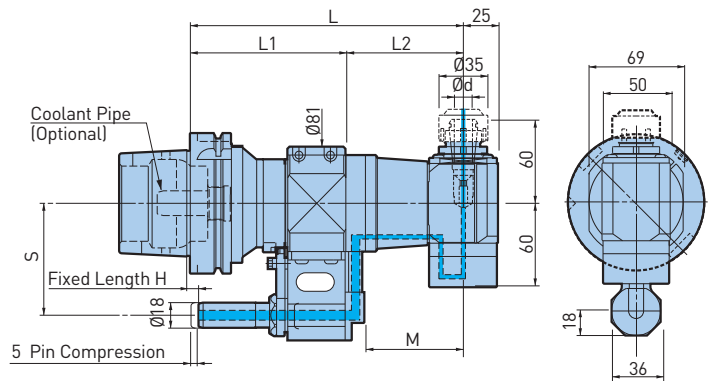
Morse Taper Adapter

Model	Order No.	Ød	MT. No.	L	ØC	ØF	Weight (kg)
AG35 -MT1	962.785	12.065	1	50	24	164	0.6
-MT2	962.786	17.78	2	60	32	180	0.7

OAG Type



Exclusive Stop Block is required.



Model	Order No.	Ød	L	L1	L2	M	Collet Model	Nut Model	Max. min <sup>-1</sup>	Weight (kg)
HSK-A63 -OAG90-13-185	802.736	2.5 -13	185	101	84	70.5	NBC13	BPS13	5 000	5.9
HSK-A100 -OAG90-13-195	802.697		195	111						8.4

1. Standard fixed length A is 6 mm. Other lengths are available upon request.
2. Standard "S" is 80 mm for HSK-A100 and 65 mm for HSK-A63.
3. New baby nut and wrench are included. New baby collet is to be ordered separately.
4. Coolant pipe is to be ordered separately.

For New Baby Collet ▶ 250

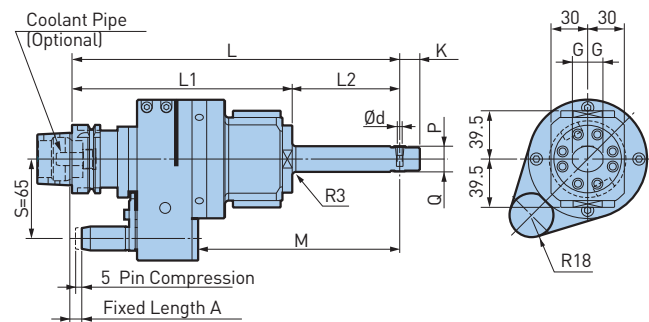
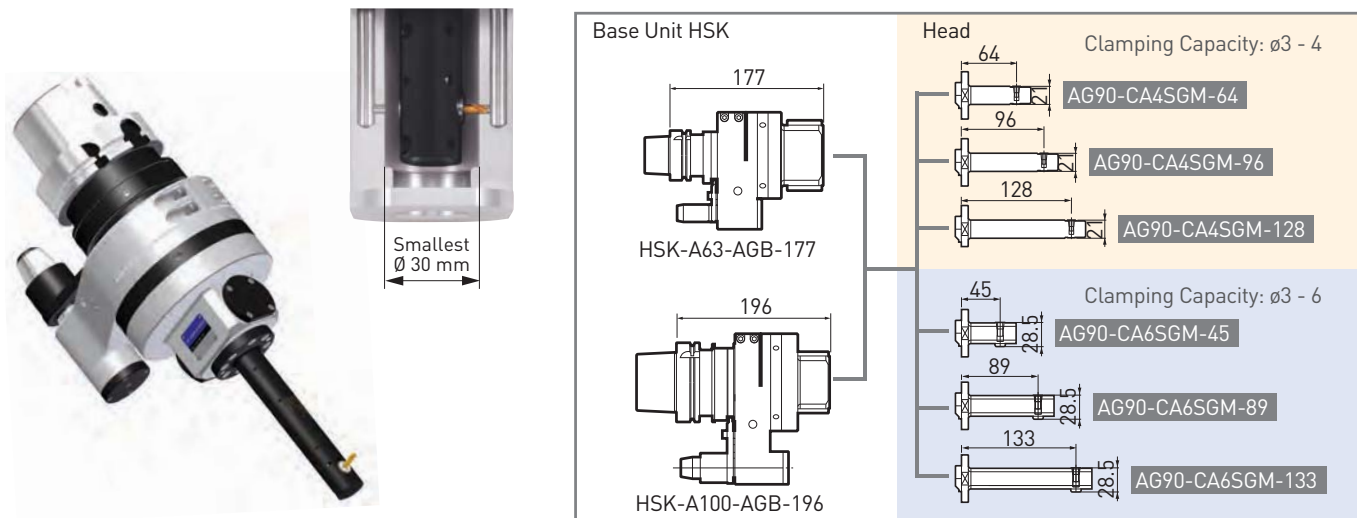
For Baby Perfect Seal ▶ 262

For Stop Block ▶ 290

### Small Bore Type

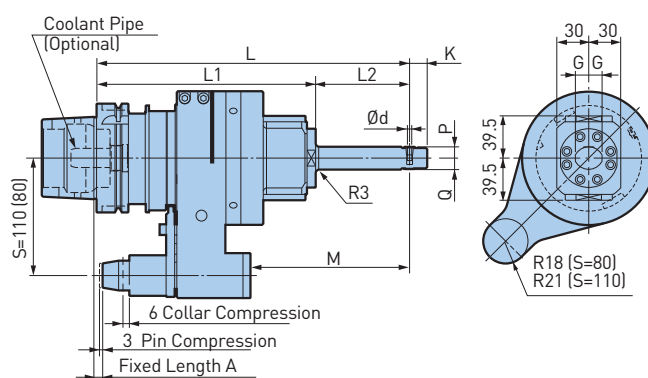
Angular operation in a  $\varnothing 30$  mm bore (min.) is possible. Modular heads enhance versatility. Head is aligned with spindle center for easy programming.

A.3



HSK-A63

max. 2000 min<sup>-1</sup>



HSK-A100

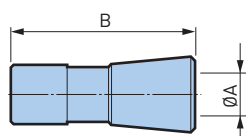
max. 2000 min<sup>-1</sup>

Model	Order No.	Base	Head	Ød	G	K	L	L1	L2	M	P	Q	Speed Ratio	Weight (kg)		
														S=65	S=80	S=110
HSK-A63-AG90-CA4SGM-241	802.727	HSK-A63-AGB-177	AG90-CA4SGM-64	3-4	12.5	16.5	241	185	56	133	10.5	10.5	1:1.06	5.5	-	-
-273	802.728		-96				273		88	165				5.6		
-305	802.729		-128				305		120	197				5.7		
HSK-A63-AG90-CA6SGM-222	802.730		AG90-CA6SGM-45	3-6	15	20	222		37	114	12.5	16	1:0.77	5.6		
-266	802.731		-89				266		81	158				5.8		
-310	802.732		-133				310		125	202				6.0		
HSK-A100-AG90-CA4SGM-260	802.680	HSK-A100-AGB-196	AG90-CA4SGM-64				3-4	12.5	16.5	260				204	56	117
-292	802.682		-96	292	88	149				11.2	11.8					
-324	802.684		-128	324	120	181				11.3	11.9					
HSK-A100-AG90-CA6SGM-241	802.686		AG90-CA6SGM-45	3-6	15	20	241	37	98	12.5	16	1:0.77	11.2		11.8	
-285	802.688		-89				285	81	145				11.4		12.0	
-329	802.690		-133				329	125	186				11.6		12.2	

- Standard fixed length A is 6 mm for HSK-A100 and 8 mm for HSK-A63. Other lengths are available upon request.
- Order No. for HSK-A100 is with S = 110. S = 80 type for HSK-A100 is available upon request.
- Internal coolant can not be used.
- Exclusive collet is to be ordered separately.
- Coolant pipe is to be ordered separately.

For StopBlock ▶ 290

#### Exclusive collet for Small Bore Angle Head



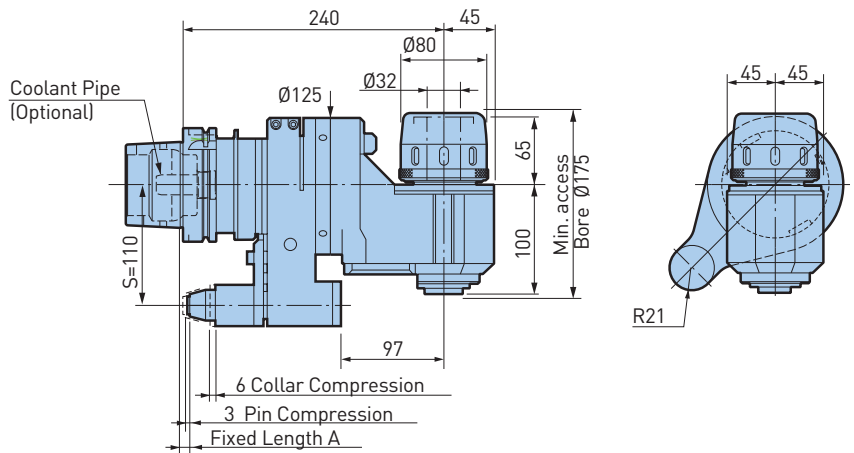
Model	Order No.	ØA	B
CA4 -3	804.666	3	16.5
-3.5	804.667	3.5	
-4	804.668	4	

Model	Order No.	ØA	B
CA6 -3	804.669	3	22
-4	804.670	4	
-5	804.671	5	
-6	804.672	6	



## HMC Type

Improved versatility is achieved from the 32 mm capacity Milling Chuck by using parallel reduction collets and other accessories.



Exclusive Stop Block is required.

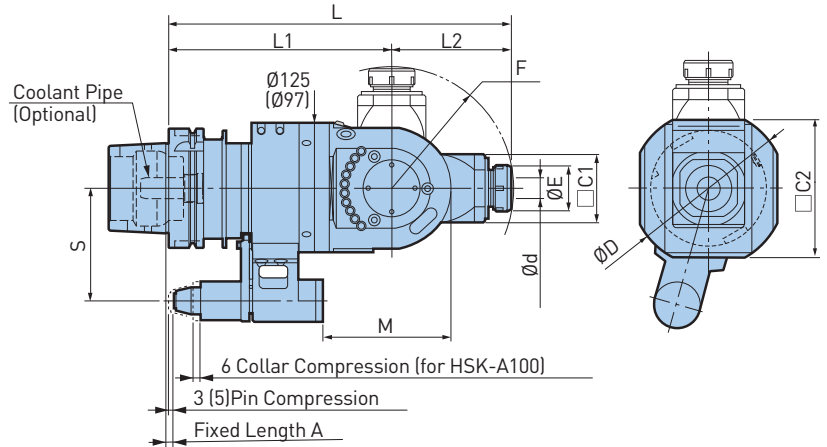
Model	Order No.	Max. min <sup>-1</sup>	Weight (kg)
HSK-A100-AG90/HMC32-240	802.642	3 000	16.0

1. Models with "S" at the end are high rigidity type. Approx. 30% stronger than standard models. For Stop Block ▶ 290
2. Standard fixed length A is 6 mm. Other lengths are available upon request. For Straight Collet ▶ 272
3. Order No. is with S = 110. S = 80 type is available upon request.
4. Wrench (FK80-90) is included.
5. Coolant can be supplied through the locating pin.
6. Coolant pipe is to be ordered separately.

## Universal Type

Suitable for all cutting angles. In addition to the cutter head being adjustable a full 360°, the spindle also becomes easily and precisely adjustable from 0° to 90° by 1 increments.

A.3



Exclusive Stop Block is required.

Model	Order No.	Ød	ØE	ØD	□C1	□C2	L	L1	L2	M	F	S	Collet Model	Max. min <sup>-1</sup>	Weight (kg)
HSK-A63 -AGU/NBS13 -285	802.734	2.5 - 13	35	115	51	97	285	185	100	124	102	65	NBC13	6000	9.6
HSK-A100 -AGU/NBS20 -325	802.695	2.5 - 20	46	140	65	125	325	210	115	125	118	110	NBC20	4000	20.0

- Standard fixed length A is 6 mm for HSK-A100 and 8 mm for HSK-A63. Other lengths are available upon request.
- Order No. for HSK-A100 is with S = 110. S = 80 type for HSK-A100 is available upon request.
- Figures in ( ) in the drawing indicate dimensions for HSK-A63.
- New baby nut and wrench are included.
- Coolant can be supplied through the locating pin.
- Coolant pipe is to be ordered separately.

For New Baby Collet ▶ 250

For Stop Block ▶ 290



Easily adjustable spindle angle from 0° to 90°.



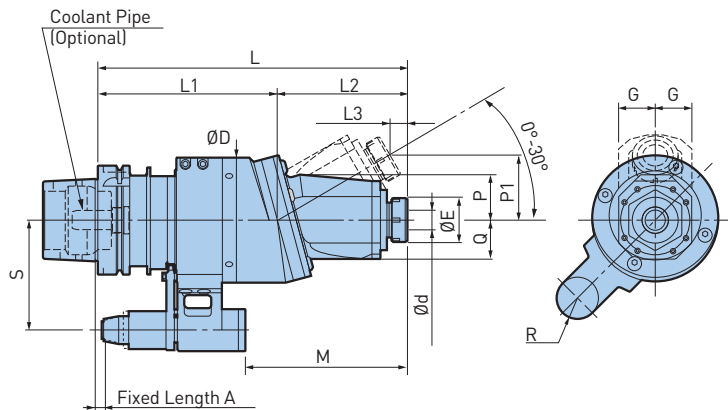
Unique setting mechanism enables the spindle angle to be precisely set at 1° increments.



Specially selected materials and special design for clamping the head guarantees rigidity for even end milling applications.

### AGU30 Type

Spindle angle is adjustable from 0° to 30°. Large swivel flange assures high rigidity.



A.3



Exclusive Stop Block is required.

Model	Order No.	Ød	ØD	ØE	G	L	L1	L2	L3 max.	Q	P	P1 max.	R	S	Max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-A63 -AGU30/NBS13 -255	802.735	2.5 - 13	97	35	29	255	150	105	14	30	34	52.5	18	65	6 000	NBC13	6.8
HSK-A100-AGU30/NBS20 -305	802.696	2.5 - 20	125	46	36.5	305	175	130	17	39	45	65	21	110	4 000	NBC20	15.3

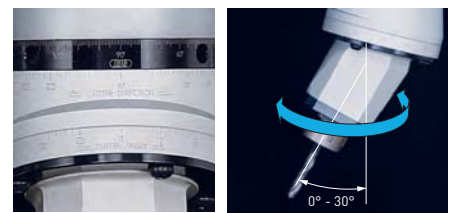
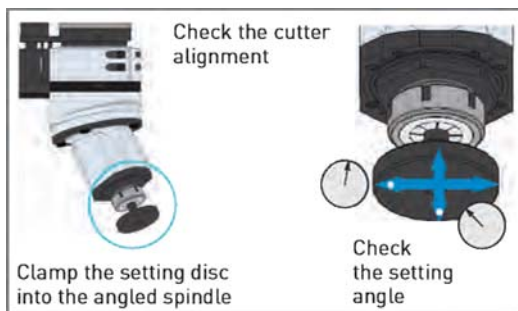
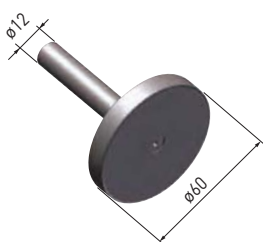
- Standard fixed length A is 6 mm for HSK-A100 and 8 mm for HSK-A63. Other lengths are available upon request.
- Order No. for HSK-A100 is with S = 110. S = 80 type for HSK-A100 is available upon request.
- New baby nut, wrench and setting disk are included.
- Coolant can be supplied through the locating pin.
- Coolant pipe is to be ordered separately.

For New Baby Collet ▶ 250

For Stop Block ▶ 290

### Setting Disc (included accessory)

For precise adjustment of the spindle angle or direction.



Spindle angle is easily adjustable from 0° to 30° using the scale indication on the body.

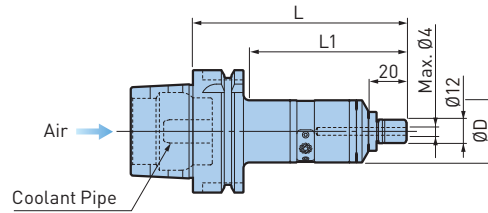
# Air Turbine Spindle

## Center Through Type

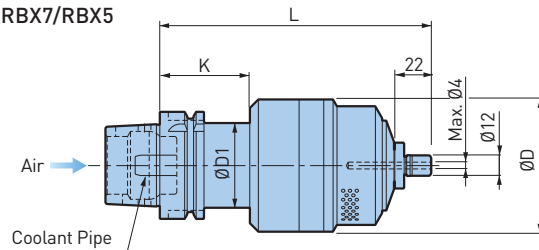


A.3

RBX12



RBX7/RBX5



Model	Order No.	Spindle Speed (min <sup>-1</sup> )	L	L1	ØD	ØD1	K	Nut Model	Weight (kg)	
HSK-A63 -RBX5C -4S-160	965.506	40 000 - 50 000	160	-	96	50	53	MGN4S	3.9	
	-RBX7C -4S-160	965.505		60 000 - 80 000	-				78	2.9
	-RBX12C -4S-110	805.749		100 000 - 120 000	110				81	32
HSK-A100 -RBX5C -4S-165	802.427	40 000 - 50 000	165	-	96	68	58	MGN4S	5.9	
	-RBX7C -4S-165	802.430		60 000 - 80 000	-				78	4.9

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27), coolant pipe and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

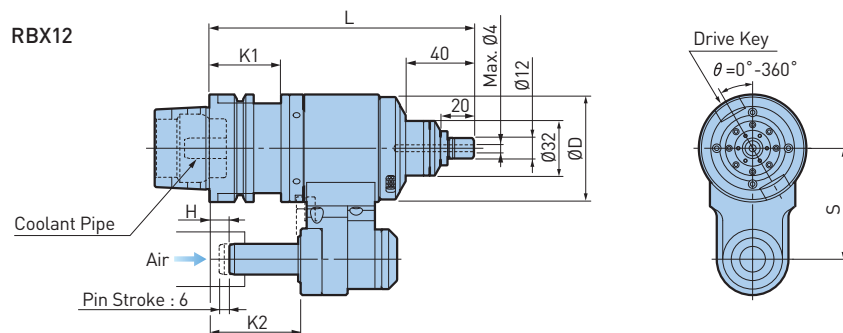
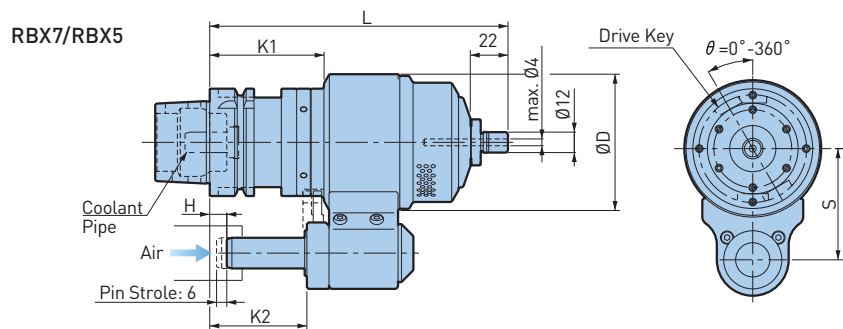
For Micro Collet ▶ 247

For Air Filter ▶ 162

### Caution

Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

# Air Turbine Spindle



Exclusive Stop Block is required.

Model	Order No.	Operation Speed (min <sup>-1</sup> )	L	ØD	K1	K2	S	H	Nut Model	Weight (kg)
HSK-A63 -RBX5 -4S-175-65	802.431	40 000 - 50 000	175	96	67	57	65	0 - 45	MGN4S	4.8
	802.433	60 000 - 80 000		80						3.8
HSK-A63 -RBX12-4S-155-65	805.748	100 000 - 120 000	155	63	42	53	65	-4 - 41	MGN4S-HG	3.0
HSK-A100 -RBX5 -4S-180-80	802.425	40 000 - 50 000	180	100	72	62	80	5 - 50	MGN4S	9.4
	802.428	60 000 - 80 000								8.4

1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27), coolant pipe and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247

For Air Filter ▶ 162

For Stop Block ▶ 290

A.3

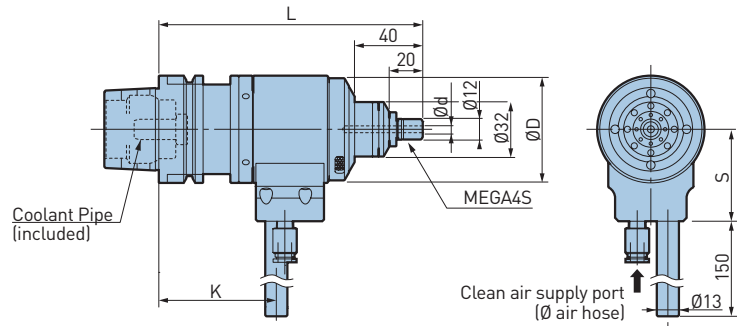
# Air Turbine Spindle

## Manual Type

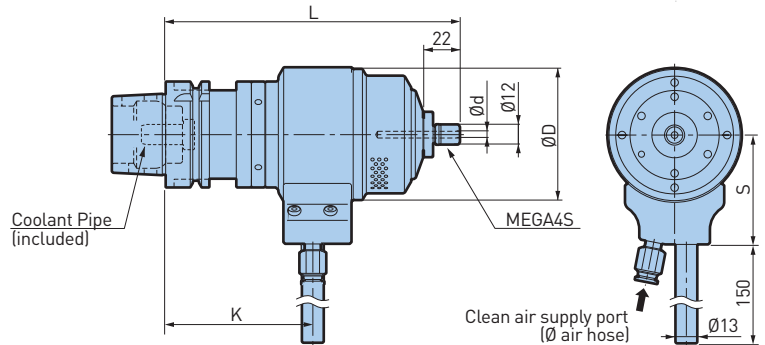
A.3



RBX12



RBX7/RBX5



Model	Order No.	Spindle Speed (min <sup>-1</sup> )	Ød	ØD	L	K	S	Nut Model	Weight (kg)
HSK-A63 -RBX5 -4S-175H	802.432	40 000 - 50 000	0.45 - 4.05	96	175	87	71	MGN4S	4.8
	802.434	60 000 - 80 000		80			65	MGN4S-HG	3.8
	806.710	100 000 - 120 000		63			54	MGN4S-HG	2.7
HSK-A100 -RBX5 -4S-180H	802.426	40 000 - 50 000	0.45 - 4.05	100	180	92	80	MGN4S	9.4
	802.429	60 000 - 80 000							8.4

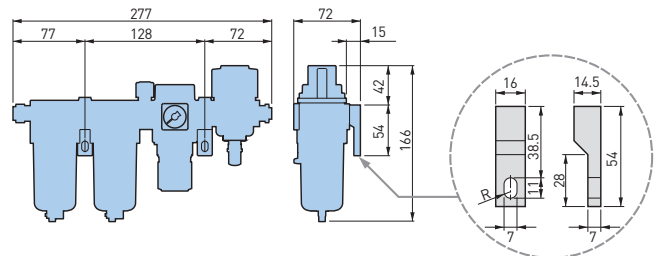
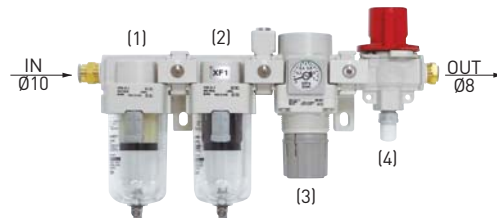
1. Nut, wrench (RBX12 : XW20/RBX5, 7 : XW27) and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

For Micro Collet ▶ 247

## Air Filter Regulator for RBX

### Model XF1

1. Mist separator (filtration: 0,3 µm).
2. Micro mist separator (filtration: 0,01 µm).
3. Precision regulator.
4. Three ports valves for extracting pressurization (non-grease type).



Model	Order No.
XF1	962.661

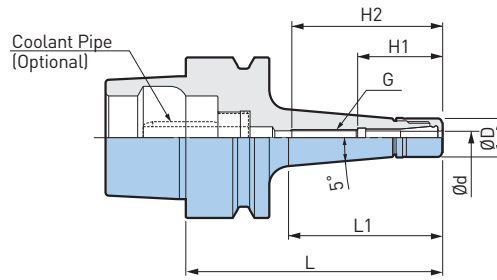
## Accessories for RBX

Accessories									
MEGA Nut		Exclusive Nut		MEGA Wrench		Micro Collet			
Air Turbine Spindle	Model	Order No.	Model	Order No.	Model	Order No.	Model		
RBX12-4S	-	-	MGN4S-HG	805.747	MGR12	969.450	NBC4S-		
RBX7-4S	MGN4S	969.481	-	-					
RBX5-4S	MGN4S	969.481	-	-					

▶ 247

# MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.









Ø 0.45 - 8.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	max. min <sup>-1</sup>	Collet Model	Weight (kg)	
HSK-E25 -MEGA3S - 45T *	968.870	0.45 - 3.25	10	45	32	22	32	-	50 000	NBC3S-	0.06	
	968.871			60	48		38	M4 P0.7	40 000		0.08	
	-MEGA6S - 45T *	968.874	0.45 - 6.05	14	45	33	28.5	31	-	50 000	NBC6S-	0.08
		968.875			60	49		40	M7 P0.75	40 000		0.10
HSK-E32 -MEGA3S - 60T	968.917	0.45 - 3.25	10	60	35	22	38	M4 P0.7	40 000	NBC3S-	0.15	
	968.880			45	23		26.5	26	-		50 000	NBC4S-
	968.881	60	35	46	M5 P0.8	40 000		0.16				
	-MEGA4S - 45T *	968.882	0.45 - 4.05	12	45	23	28.5	28	-	50 000	NBC6S-	0.14
		968.883			60	36		38	M7 P0.75	40 000		0.17
	-MEGA8S - 60T *	803.604	2.95 - 8.05	18	60	38	31	43	-	40 000	NBC8S-	0.20
	HSK-E40 -MEGA3S - 60T	968.919	0.45 - 3.25	10	60	35	22	39	M4 P0.7	40 000	NBC3S-	0.23
968.920		75			50	38		0.25				
-MEGA4S - 60T		968.890	0.45 - 4.05	12	60	35	26.5	44	M5 P0.8		NBC4S-	0.24
		968.891			75	50		47				0.27
-MEGA6S - 60T *		968.892	0.45 - 6.05	14	60	35	28.5	42	-		NBC6S-	0.24
		968.893			75	50		49				M7 P0.75
968.894		90	65	49	0.32							
HSK-E50 -MEGA6S - 80T		968.907	0.45 - 6.05	14	80	49	28.5	49	M7 P0.75		40 000	NBC6S-

1. MEGA nut is included.
2. \* Internal thread (G) is not available.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

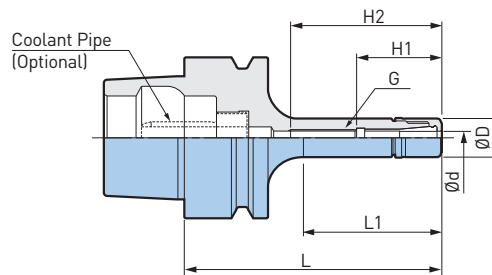
A.3

Spare Parts			Accessories									
	MEGA Nut 		MEGA Wrench 		Micro Collet 		Micro Seal Nut 		Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.		
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-	-	NBB3S	968.330	SC-NBC3S	961.278		
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-	-	NBB4S	968.364	SC-NBC4S	961.279		
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-	MGN6S-PS	NBB6S	961.498	SC-NBC6S	261.280		
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-	MGN8S-PS	NBB8S	805.802	SC-NBC8S	805.827		



# MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.



Ø 0.45 - 6.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-E25 -MEGA6S - 45 *	968.868	0.45 - 6.05	14	45	32	28	31	-	50 000	NBC6S-	0.07
	968.869			60	47	28.5	41	M7 P0.75	40 000		0.08
HSK-E32 -MEGA3S - 45 *	968.914	0.45 - 3.25	10	45	23	22	31	-	50 000	NBC3S-	0.13
	968.876			45	22	26.5					M5 P0.8
-MEGA4S - 45	968.877	0.45 - 4.05	12	60	34	26.5	46	-	50 000	NBC6S-	
	968.878			45	22		28.5				28
-MEGA6S - 45 *	968.879	0.45 - 6.05	14	60	35	28.5	38	-	50 000	NBC6S-	0.15
	968.879			60	35		28.5				38
HSK-E40 -MEGA3S - 40 *	968.915	0.45 - 3.25	10	40	19	22	24	-	50 000	NBC3S-	0.21
	968.716			45	23	27.5	27				-
-MEGA6S - 45 *	968.757	0.45 - 6.05	14	60	35	28.5	42	-	40 000	NBC6S-	
	968.757			60	35	28.5	42				-
HSK-E50 -MEGA6S - 55 *	978.100	0.45 - 6.05	14	55	26	28.5	35	-	45 000	NBC6S-	
	968.760			80	44		28.5				49

1. MEGA nut is included.
2. \* Internal thread (G) is not available.
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

Spare Parts			Accessories							
	MEGA Nut 		MEGA Wrench 		Micro Collet 	Micro Seal Nut 	Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-	MGN6S-PS	NBB6S	961.498	SC-NBC6S	261.280

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



A.3

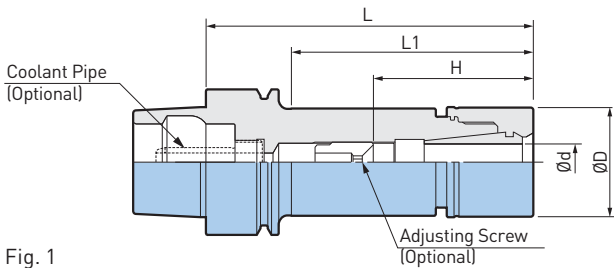


Fig. 1

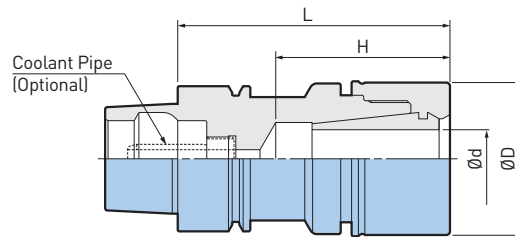


Fig. 2

Ø 0.25 - 16 mm

Model	Order No.	Fig.	Ød	ØD	L	L1	H	Max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-E25 -MEGA6N - 40 *	968.752	1	0.25 - 6	20	40	29	25	30 000	NBC6-	0.10
-MEGA8N - 45 *	968.753	2	0.5 - 8	25	45	-	30	25 000	NBC8-	0.12
-MEGA10N - 60 **	968.754	2	1.5 - 10	30	60	-	45	20 000	NBC10-	0.17
HSK-E32 -MEGA6N - 45 *	968.884	1	0.25 - 6	20	45	24	28	40 000	NBC6-	0.17
- 60	968.885	1	0.25 - 6	20	60	37	23 - 27	35 000	NBC6-	0.20
-MEGA8N - 50 *	968.886	1	0.5 - 8	25	50	29	33	40 000	NBC8-	0.22
HSK-E40 -MEGA6N - 50 *	968.717	1	0.25 - 6	20	50	26	31	40 000	NBC6-	0.26
- 60	968.895	1	0.25 - 6	20	60	34	23 - 26	35 000	NBC6-	0.28
- 75	968.718	1	0.25 - 6	20	75	49	23 - 41	30 000	NBC6-	0.31
- 90	968.896	1	0.25 - 6	20	90	64	23 - 43	28 000	NBC6-	0.35
-120	968.897	1	0.25 - 6	20	120	94	23 - 43	25 000	NBC6-	0.41
-MEGA8N - 55 *	968.719	1	0.5 - 8	25	55	31	36	40 000	NBC8-	0.31
- 75	968.720	1	0.5 - 8	25	75	51	26 - 41	30 000	NBC8-	0.38
-MEGA10N - 60 *	968.721	1	1.5 - 10	30	60	37	40	35 000	NBC10-	0.39
- 75 *	968.899	1	1.5 - 10	30	75	52	55	30 000	NBC10-	0.46
- 90	968.722	1	1.5 - 10	30	90	67	38 - 48	28 000	NBC10-	0.53
-MEGA13N - 65 *	968.900	1	2.5 - 13	35	65	44	44	30 000	NBC13-	0.45
- 75 *	968.723	1	2.5 - 13	35	75	54	55	25 000	NBC13-	0.53
- 90	968.901	1	2.5 - 13	35	90	69	44 - 48	25 000	NBC13-	0.62
-MEGA16N - 75 *	968.905	2	2.5 - 16	42	75	-	48	20 000	NBC16-	0.60

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.
3. "H" indicates the adjustment length with an adjusting screw.
4. \* Adjusting screws can not be used.
5. \*\* NBC-E collet and adjusting screw can not be used.
6. Nut-less model available upon request.

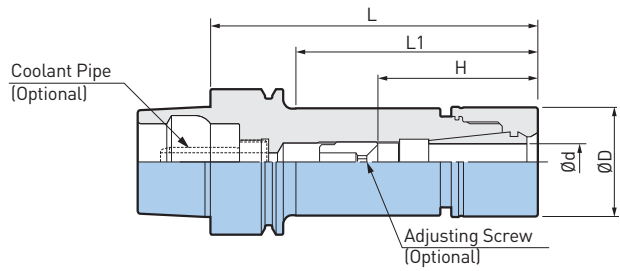
For Coolant Pipe ▶ 175

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



A.3



Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	Max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-E50 -MEGA6N - 70	968.728	0.25 - 6	20	70	38	23 - 39	30 000	NBC6-	0.50
-MEGA8N - 60 *	968.729	0.5 - 8	25	60	30	37	40 000	NBC8-	0.52
- 90	968.730			90	56	26 - 45	30 000		0.62
-MEGA10N - 60 **	968.731	1.5 - 10	30	60	30	35	35 000	NBC10-	0.56
-MEGA13N - 70 *	968.733			70	40	45	28 000	NBC13-	0.67
- 90	968.734	2.5 - 13	35	90	60	44 - 47	25 000		0.80
-150	968.910			150	120	44 - 63	15 000	1.24	
-MEGA16N - 90 *	968.736	2.5 - 16	42	90	63	65	25 000	NBC16-	1.00
-MEGA20N - 75 **	968.764			75	-	49		NBC20-	0.80
-100	968.911	2.5 - 20	46	100	-	51 - 54	20 000		1.10

- MEGA nut is included.
- Coolant pipe is to be ordered separately.
- "H" indicates the adjustment length with an adjusting screw.
- \* Adjusting screws can not be used. "H" is the max. tool shank length that can be inserted for these models.
- \*\* NBC-E collet and adjusting screw can not be used.
- Nut-less model available upon request.

For Coolant Pipe ▶ 175

Spare Parts			Accessories								
MEGA Nut			MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw		
MEGA New Baby Chuck			MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw		
Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B	
MEGA6N	MGN6 969.483	MGR20	969.454	NBC6-	MPS6-	NBA6B	961.527	M7	12	2	
MEGA8N	MGN8 969.484	MGR25	969.456	NBC8-	MPS8-	NBA8B	961.550	M9	13	2.5	
MEGA10N	MGN10 969.485	MGR30	969.458	NBC10-	MPS10-	NBA10B	961.572	M11	16	3	
MEGA13N	MGN13 969.486	MGR35	969.460	NBC13-	MPS13-	NBA13B	961.598	M14	20	4	
MEGA16N	MGN16 969.487	MGR42	969.462	NBC16-	MPS16-	NBA16B	961.632	M18	20	4	
MEGA20N	MGN20 969.488	MGR46	969.465	NBC20-	MPS20-	NBA20B	961.680	M21	20	4	

# Hydraulic Chuck Super Slim

Extremely slim design eliminates interference.

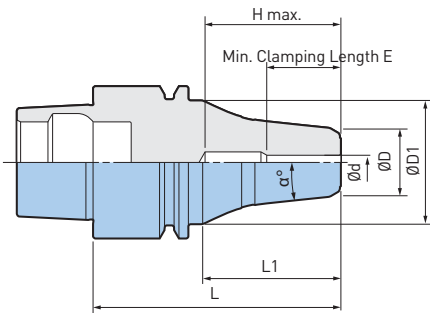


Fig. 1

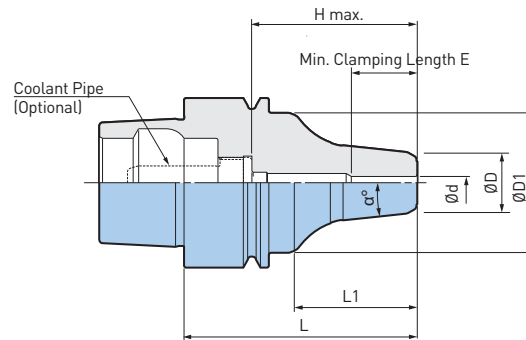


Fig. 2

Ø 3 - 6 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	L	L1	E	α°	H max.	Max. min <sup>-1</sup>	Weight (kg)
HSK-E25 -HDC3S -40	806.430	1	3	14	20	40	27	16	6	22	60 000	0.09
			4							21		
			6							26		
HSK-E32 -HDC3S -52	805.471	1	3	14	26	52	29	16	6	28	45 000	0.19
			4							19		
			6							25		
HSK-E40 -HDC3S -55	805.474	2	3	14	33	55	29	16	6	39	40 000	0.31
			4							19		
			6							25		
-HDC4S -40	806.431		4									
-HDC6S -45	806.734		6	12	23	45	31					0.11
-HDC4S -52	805.472		4									0.19
-HDC6S -57	805.473		6			57	34	25		33		0.20
-HDC4S -55	805.475		4									0.31
-HDC6S -60	805.476		6			60	34	25		40		0.32

- Center through coolant is not available for HSK-E25 and HSK-E32.
- Adjusting screw can not be used.
- Coolant pipe for HSK-E40 is to be ordered separately.

For Coolant Pipe ▶ 175

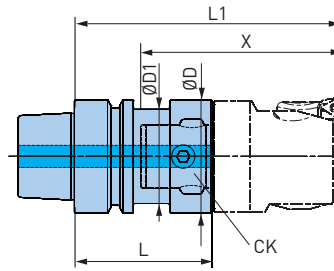
For Inner Bore Cleaner ▶ 286

### Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

## CK Shanks with Center Through Hole

Symmetrical execution for high speed machine spindles



A.3

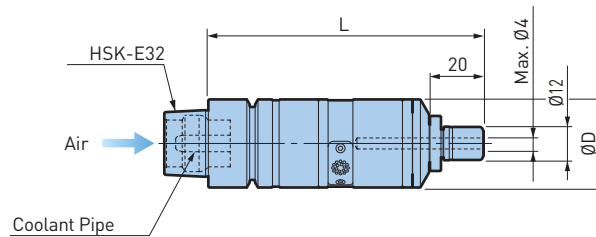
Model	Order No.	CK	ØD	ØD1	L	L1	X	Weight (Kg)
HSK-E25 -CKB1 -22	328.249F **	CKB1	19	19	22	55	40	0.05
-CKB2 -30	328.281F *	CKB2	24	24 *	30	66	50	0.08
HSK-E32 -CKB1 -40	328.257F	CKB1	19	19	40	73	50	0.16
-CKB2 -33	328.280F	CKB2	24	24	33	69	43	0.14
-CKB3 -48	328.151F	CKB3	31	25.8	48	88	68	0.22
-CKB4 -68	328.218F	CKB4	39	26	68	115	90	0.40
HSK-E40 -CKB1 -32	324.111F	CKB1	19	19	31.5	64	40	0.22
-CKB2 -35	324.121F	CKB2	24	24	35	71	45	0.20
-CKB3 -40	324.131F	CKB3	31	31	40	80	55	0.27
-CKB4 -50	324.141F	CKB4	39	33	50	107	72	0.36
HSK-E50 -CKB3 -44	324.231F	CKB3	31	31	44	84	53	0.47
-CKB4 -48	324.241F	CKB4	39	39	48	95	64	0.52
-CKB5 -61	324.251F	CKB5	50	41	61	118	87	0.71

1. L1 and X dimensions on the table are reference figures when EWN/EWE head is mounted.
2. \* The dimension ØD1 does not correspond to the HSK standard.
3. \*\* Without thread for coolant tubes.
4. All shanks are precision balanced.
5. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

# Air Turbine Spindle

## Center Through Type



A.3

Ø 0.45 - 4.05 mm

Model	Order No.	Spindle Speed (min <sup>-1</sup> )	L	ØD	Nut Model	Weight (kg)
HSK-E32 -RBX12C-4S-100	803.226	100 000 - 120 000	100	32	MGN4S-HG	0.45




1. Nut, wrench (RBX12 : XW20), coolant pipe and MEGA wrench (MGR12) are included.
2. Collet (NBC4S-) and XF1 (air unit) are to be ordered separately.

For Air Filter ▶ 162

### Caution

Clean air is an essential condition for the use of this product. Therefore, coolant should never be supplied through the spindle of the machine using the Air Turbine Spindle.

### Accessories for RBX

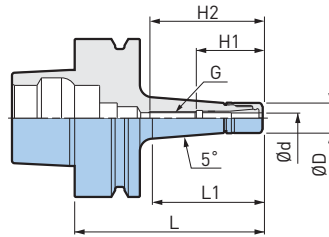
Accessories					
	Exclusive Nut 		MEGA Wrench 		Micro Collet 
Air Turbine Spindle	Model	Order No.	Model	Order No.	Model
RBX12-4S	MGN4S-HG	805.747	MGR12	969.450	NBC4S-

## MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.



A.3



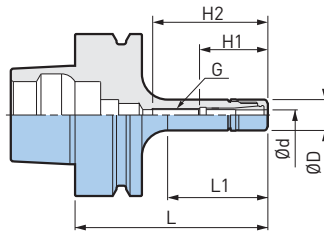
Ø 0.45 - 8.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	Max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-F63 -MEGA6S - 75T	803.589	0.45 - 6.05	14	75	44	28.5	41	M7 P0.75	32 000	NBC6S-	0.7
-MEGA8S - 75T	805.576	2.95 - 8.05	18			31	58	M9 P0.75		NBC8S-	0.7

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

## MEGA Micro Chuck Type S







Ø 0.45 - 6.05 mm

Model	Order No.	Ød	ØD	L	L1	H1	H2	G	Max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-F63 -MEGA6S - 90	803.592	0.45 - 6.05	14	90	61	28.5	49	M7 P0.75	27 000	NBC6S-	0.8
-105	803.591			105	76				25 000		0.8

1. MEGA nut is included.
2. Coolant pipe is to be ordered separately.

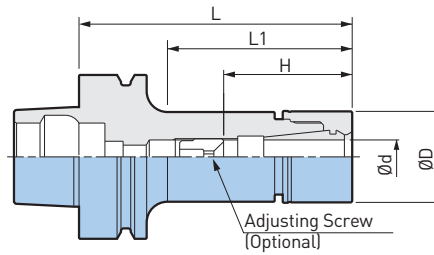
For Coolant Pipe ▶ 175

Spare Parts			Accessories									
	MEGA Nut 		MEGA Wrench 		Micro Collet 		Micro Seal Nut 		Micro Collet Protective Case 		α Taper Cleaner 	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.	Model	Order No.
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-	MGN6S-PS	NBB6S	961.498	SC-NBC6S	961.280		
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-	MGN8S-PS	NBB8S	805.802	SC-NBC8S	805.827		



# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



A.3

$\varnothing$  0.25 - 20 mm

Model	Order No.	$\varnothing d$	$\varnothing D$	L	L1	H	Max. min <sup>-1</sup>	Collet Model	Weight (kg)	
HSK-F63 -MEGA6N - 90	801.287	0.25 - 6	20	90	53	23 - 43	30 000	NBC6-	0.8	
	801.677			135	99		20 000		0.9	
-MEGA8N - 90	978.199	0.5 - 8	25	90	54	26 - 45	30 000	NBC8-	0.9	
	804.962			120	84		25 000		0.9	
-MEGA10N - 90	978.146	1.5 - 10	30	90	54	38 - 48	30 000	NBC10-	0.9	
	978.152			120	84		25 000		1.1	
-MEGA13N - 75 *	978.190	2.5 - 13	35	75	43	47	30 000	NBC13-	0.9	
	978.215			90	56				61	1.0
	801.283			105	71				44 - 53	25 000
-MEGA16N - 75 *	978.102	2.5 - 16	42	75	43	48	30 000	NBC16-	1.0	
	978.151			90	58		61		25 000	1.2
-MEGA20N - 75 *	978.047	2.5 - 20	46	75	45	51	30 000	NBC20-	1.1	
	978.147			90	60		61		25 000	1.3
	978.124			105	75		51 - 58		20 000	1.4

- MEGA nut is included.
- "H" indicates the adjustment length with an adjusting screw.
- \* Adjusting screw can not be used. "H" is the max. tool shank length that can be inserted for these models.
- Nut-less model available upon request.
- Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

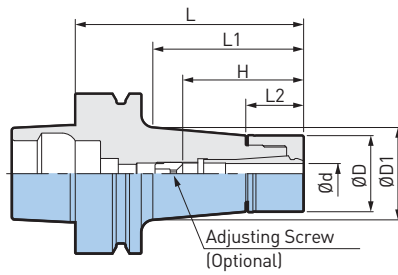
Spare Parts			Accessories									
MEGA Nut			MEGA Wrench		NBC Collet		MEGA Perfect Seal		Adjusting Screw		Rubber	
MEGA New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B	
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-	MPS6-	NBA6B	961.527	M7	12	2	
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-	MPS8-	NBA8B	961.550	M9	13	2.5	
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-	MPS10-	NBA10B	961.572	M11	16	3	
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-	MPS13-	NBA13B	961.598	M14	20	4	
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-	MPS16-	NBA16B	961.632	M18	20	4	
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-	MPS20-	NBA20B	961.680	M21	20	4	

## MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.



A.3



$\varnothing$  3 - 12 mm

Model	Order No.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	L1	L2	H	max. min <sup>-1</sup>	Collet Model	Weight (kg)
HSK-F63 -MEGA6E - 65 *	803.214	3 - 6	25	28.5	65	34	21	39	30 000	MEC6-	0.8
-MEGA8E - 65 *	803.218	3 - 8	30	33			22.5	41		MEC8-	0.8
-MEGA10E -120	803.213	3 - 10	35	47	120	91	23	48 - 58	29 000	MEC10-	1.6
-MEGA13E -135	803.216	3 - 12	42	52	135	108	25	50 - 60	26 000	MEC13-	2.0

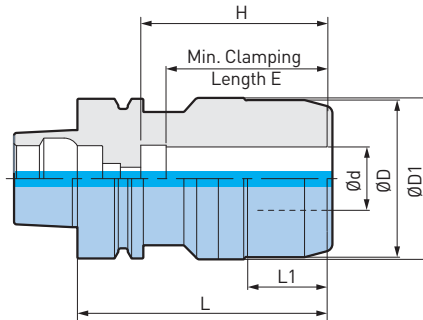
1. MEGA E nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. \* Adjusting screw can not be used. "H" is the max. tool shank length that can be inserted for these models.
4. Nut-less model available up on request.
5. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

Spare Parts			Accessories												
MEGA E Chuck	Model	Order No.	MEGA Wrench	Model	Order No.	MEGA E Collet	Model	Order No.	MEGA E Perfect Seal	Model	Order No.	Adjusting Screw	Model	Order No.	Rubber
MEGA6E	MEN6	968.461	MGR25	969.456	MEC6-	EPS6-	NBA6B	961.527	M7	12	2				
MEGA8E	MEN8	968.462	MGR30	969.458	MEC8-	EPS8-	NBA8B	961.550	M9	13	2.5				
MEGA10E	MEN10	968.463	MGR35	969.460	MEC10-	EPS10-	NBA10B	961.572	M11	16	3				
MEGA13E	MEN13	968.464	MGR42	969.462	MEC13-	EPS13-	NBA13B	961.598	M14	20	4				

## MEGA Double Power Chuck Type D

Close to integral rigidity and precision of a solid toolholder. Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and Type DS to feed coolant to cutting tool periphery.



Ø 3 - 32 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H	E	Max. min <sup>-1</sup>	Weight (kg)
HSK-F63 -MEGA16D - 80A	803.092	16	42	52.6	80	25	55	50	28 000	1.2
-MEGA20D - 90A	803.093	20	50	55	90	34	65	56		1.4
-MEGA25D -100A	803.103	25	62	62.7	100	39	75	57	25 000	1.8
-MEGA32D -105A	803.082	32	70	70.7	105	33.5	80	64	24 000	2.0

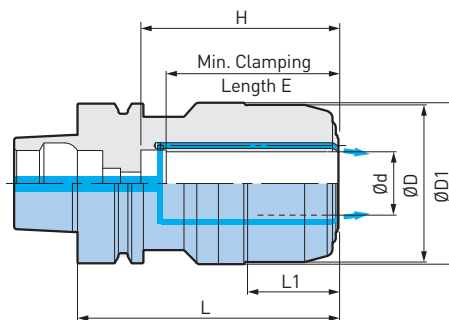
1. Wrench and coolant pipe are to be ordered separately.
2. "H" is the max. tool length that can be inserted.

For Straight Collet ▶ 272

For Coolant Pipe ▶ 175

## MEGA Double Power Chuck Type DS

Close to integral rigidity and precision of a solid toolholder. Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.



Ø 3 - 32 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H	E	Max. min <sup>-1</sup>	Weight (kg)
HSK-F63 -MEGA16DS - 80A	803.095	16	42	52.6	82	27	57	52	28 000	1.2
-MEGA20DS - 90A	803.096	20	50	55	92	36	67	58		1.4
-MEGA25DS -100A	803.104	25	62	62.7	102	41	77	59	25 000	1.8
-MEGA32DS -105A	803.083	32	70	70.7	107	35.5	82	66	24 000	2.0

1. Wrench and coolant pipe are to be ordered separately.
2. "H" is the max. tool length that can be inserted.

For Straight Collet ▶ 272

For Coolant Pipe ▶ 175

Accessories		
	MEGA Wrench	
MEGA Double Power Chuck	Model	Order No.
HSK -F63 -MEGA16D/DS	MGR42L	969.462L
-MEGA20D/DS	MGR50L	969.464L
-MEGA25D/DS	MGR62L	969.469L
-MEGA32D/DS	MGR70L	969.470L

## Dyna Test

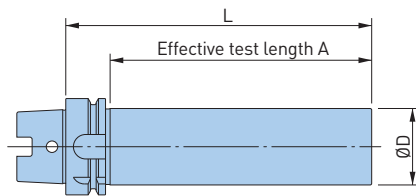
Periodic inspection of machine tools to control production stability.



A.3

### HSK-A Type

DIN 69893-1 & ISO 12164-1

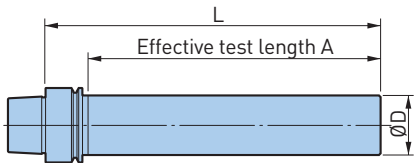


Model	Order No.	L	A	ØD	Weight (Kg)
HSK -A40-32 -L180SD	801.169	180	157	32	1.1
-A50-32 -L240SD	978.198	240	211		1.9
-A63-50 -L350SD	978.222	350	321	50	4.1
-A100-50 -L350SD	801.073	350	318		5.4

1. The drive key slots are symmetrical to allow the HSK form A dyna test bar to be indexed 180 degrees.

### HSK-E Type

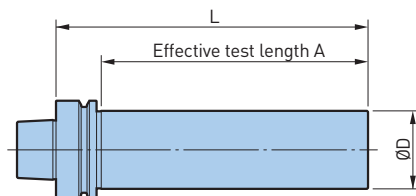
DIN 69893-5



Model	Order No.	L	A	ØD	Weight (Kg)
HSK -E25-20 -L175	978.307	175	163	20	0.45
-E32-20 -L180	802.831	180	158		0.5
-E40-32 -L180	978.178		157	32	1.1
-E50-32 -L240	979.140	240	211		1.6

### HSK-F Type

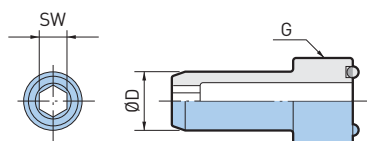
DIN V 69893-6



Model	Order No.	L	A	ØD	Weight (Kg)
HSK -F63-50 -L350	802.832	350	321	50	4.1

## Coolant Pipes Form A/E

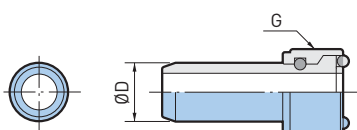
### Integral type



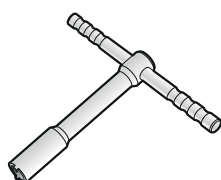
Model	Order No.	ØD	G	SW
HSK 25 -CP	978.921	5	M8 x P1	2.5
32 -CP	978.909	6	M10 x P1	3
40 -CP	978.913	8	M12 x P1	4
50 -CP	801.071	10	M16 x P1	5
63 -CP	969.475	12	M18 x P1	6
80 -CP	802.828	14	M20 x P1.5	8
100 -CP	802.351	16	M24 x P1.5	8
125 -CP	805.684	18	M30 x P1.5	10

A.3

### 1° swing type (DIN)

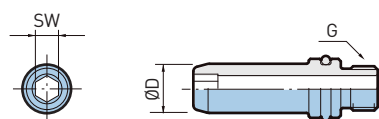


Model	Order No.	ØD	G
HSK 40 -CPM	978.907	8	M12 x P1
50 -CPM	801.690	10	M16 x P1
63 -CPM	978.910	12	M18 x P1
80 -CPM	802.827	14	M20 x P1.5
100 -CPM	802.314	16	M24 x P1.5



Clamping Wrench	Order No.
CPW-40	802.825
CPW-50	802.315
CPW-63	978.911
CPW-80	802.824
CPW-100	802.316

## Coolant Pipe Form F



Model	Order No.	ØD	G	SW
HSK F63-CP	801.280	10	M9xP0.751	5

1. This model can be used for BIG KAISER Original Tool Holder only

### Caution

For machines capable of supplying coolant through spindle, the coolant pipe should be fitted to all HSK holders to protect against accidental selection of coolant.



## Tool Holders BIG CAPTO

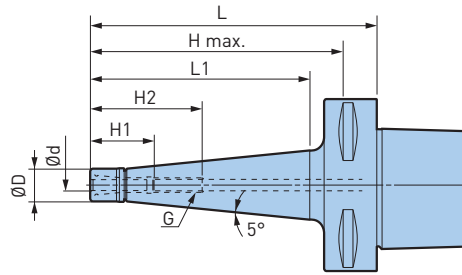
<b>MEGA Micro Chuck</b>	<b>178</b>
<b>MEGA New Baby Chuck</b>	<b>179 - 181</b>
<b>MEGA E Chuck</b>	<b>182</b>
<b>MEGA Double Power Chuck</b>	<b>183 - 184</b>
<b>New Hi-Power Milling Chuck</b>	<b>185</b>
<b>Hydraulic Chucks</b>	<b>186</b>
<b>MEGA Synchro Tapping Holder</b>	<b>187</b>
<b>Side Lock Holders</b>	<b>188</b>
<b>ABS Shanks / Side Cutter Arbors / Morse Taper Holders</b>	<b>189</b>
<b>Face Mill Arbors FMH</b>	<b>190</b>
<b>Extensions / Reductions</b>	<b>191</b>
<b>CK Shanks</b>	<b>192</b>
<b>Dyna Test</b>	<b>193</b>





## MEGA Micro Chuck Type T

Taper-off design minimizes interference and maximizes rigidity.



Ø 0.45 - 6.05 mm

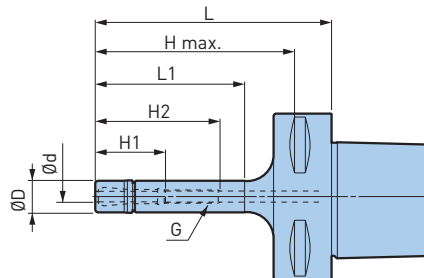
A.4

Model	Order No.	Ød	ØD	L	L1	H1	H2	H max.	G	Collet Model	Weight (kg)
C4 -MEGA3S - 60T	973.954	0.45 - 3.25	10	60	35	22	38	54	M4 P0.7	NBC3S-	0.3
-MEGA6S - 60T	973.955	0.45 - 6.05	14							90	65
- 90T	805.194			0.45 - 6.05	14	105	79	28.5	49		
C5 -MEGA6S - 105T	973.203	0.45 - 6.05	14							120	94
- 120T	800.746			0.45 - 6.05	14	120	94	28.5	49		
C6 -MEGA3S - 120T	973.204	0.45 - 3.25	10							120	92
-MEGA4S - 120T	973.205	0.45 - 4.05	12	135	107	26.5	47	111	M5 P0.8		
- 135T	800.557									0.45 - 6.05	14
-MEGA6S - 120T	973.206	0.45 - 6.05	14	135	107	28.5	49	111	M7 P0.75		
- 135T	978.134										

1. MEGA nut is included.

## MEGA Micro Chuck Type S

Micro diameter design is ideal for high speed applications in tight areas.



Ø 0.45 - 6.05 mm

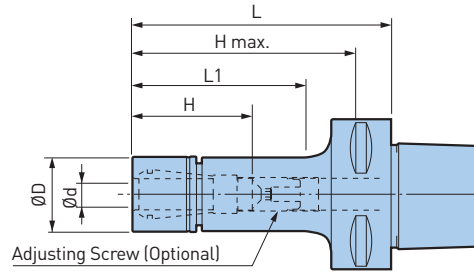
Model	Order No.	Ød	ØD	L	L1	H1	H2	H max.	G	Collet Model	Weight (kg)				
C5 -MEGA4S - 75	973.208	0.45 - 4.05	12	75	50	26.5	47	68	M5 P0.8	NBC4S	0.4				
-MEGA6S - 75	973.209	0.45 - 6.05	14							90	58	26.5	47	81	M7 P0.75
C6 -MEGA3S - 90	973.210	0.45 - 3.25	10	90	58	22.5	38	81	M4 P0.7						NBC3S
-MEGA4S - 90	973.211	0.45 - 4.05	12							26.5	47	81	M5 P0.8	NBC4S	1.2
-MEGA6S - 90	973.212	0.45 - 6.05	14											28.5	49

1. MEGA nut is included.

Spare Parts			Accessories							
	MEGA Nut		MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		α Taper Cleaner	
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-	MGN6S-PS	NBB6S	961.498	SC-NBC6S	961.280

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



Ø 0.25 - 20 mm

A.4

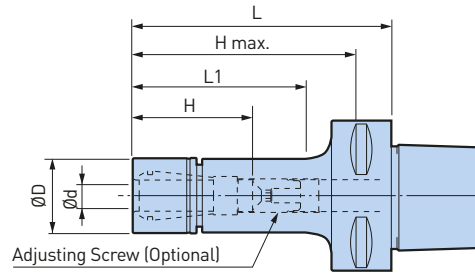
Model	Order No.	Ød	ØD	L	L1	H	H max.	Collet Model	Weight (kg)
C4 -MEGA6N - 75	978.196	0.25 - 6	20	75	48	23 - 43	69	NBC6-	0.4
-MEGA8N - 75	978.201	0.5 - 8	25		49	26 - 45	69	NBC8-	0.5
-MEGA10N- 75	978.202	1.5 - 10	30		52	38 - 48	69	NBC10-	0.6
-MEGA13N- 75	978.197	2.5 - 13	35		54	64	64	NBC13-	0.7
-MEGA16N- 55*	978.203	2.5 - 16	42	55	-	48	48	NBC16-	0.7
-MEGA20N- 60*	978.204	2.5 - 20	46	60	-	53	53	NBC20-	0.8
C5 -MEGA6N - 60	973.213	0.25 - 6	20	60	34	23 - 36	53	NBC6-	0.5
- 75	973.214			75	49	23 - 43	68		0.5
- 90	973.215			90	62	83	0.5		
-MEGA8N - 60	973.218	0.50 - 8	25	60	33	26 - 36	53	NBC8-	0.5
- 75	973.219			75	49	26 - 45	68		0.6
- 90	973.220			90	64	83	0.6		
-MEGA10N- 55*	973.223	1.50 - 10	30	55	31	48	48	NBC10-	0.5
- 75	973.224			75	49	38 - 48	68		0.6
- 90	973.225			90	64	83	0.7		
-MEGA13N- 55*	973.229	2.50 - 13	35	55	31	48	48	NBC13-	0.6
- 75	973.230			75	49	44 - 48	68		0.7
- 90	973.231			90	64	44 - 63	83		0.8
-MEGA16N- 60*	973.235	2.50 - 16	42	60	38	53	53	NBC16-	0.7
- 75	973.236			75	53	68	68		0.9
- 90	973.237			90	69	48 - 63	83		1.0
-MEGA20N- 60*	973.241	2.50 - 20	46	60	39	51	51	NBC20-	0.8
- 75*	973.242			75	54	66	66		1.0
- 90	973.243			90	69	51 - 60	83		1.1

- MEGA nut is included.
- "H" indicates the adjustment length with an adjusting screw.
- \* Adjusting screw cannot be used.
- Nut-less model available up on request.

Spare Parts			Accessories									
	MEGA Nut 		MEGA Wrench 		NBC Collet 		MEGA Perfect Seal 		Adjusting Screw 		Rubber 	
<b>MEGA New Baby Chuck</b>	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B	
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-	MPS6-	NBA6B	961.527	M7	12	2	
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-	MPS8-	NBA8B	961.550	M9	13	2.5	
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-	MPS10-	NBA10B	961.572	M11	16	3	
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-	MPS13-	NBA13B	961.598	M14	20	4	
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-	MPS16-	NBA16B	961.632	M18	20	4	
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-	MPS20-	NBA20B	961.680	M21	20	4	

# MEGA New Baby Chuck

Ideal ultra precision collet holders for high speed machining. Wide range of lengths and a variety of collet series covers all machining applications.



A.4

Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD	L	L1	H	H max.	Collet Model	Weight (kg)
C6 -MEGA6N - 60	973.247	0.25 - 6	20	60	30	23 - 33	51	NBC6-	1.2
	973.248			75	43	23 - 43	66		1.2
	973.249			90	58		81		1.2
	973.250			105	73		96		1.3
	973.251			120	88		111		1.3
	973.252			135	103		126		1.3
	973.253			165	128		156		1.4
	973.254			-MEGA8N - 60	0.5 - 8		25		60
973.255	75	43	26 - 45	66		1.3			
973.256	90	58		81		1.3			
973.257	105	73		96		1.4			
973.258	120	88		111		1.4			
973.259	135	103		126		1.5			
973.260	165	133		156		1.6			
973.261	-MEGA10N- 60 *	1.5 - 10		30		60		32	51
973.262	75		43		38 - 45	66	1.4		
973.263	90		58		38 - 48	81	1.4		
973.264	105		73			96	1.5		
973.265	120		88			111	1.6		
973.266	135		103			126	1.6		
973.267	165		133			156	1.8		
973.269	-MEGA13N- 60 *		2.5 - 13			35	60	32	51
973.270	75	45		66	66		1.4		
973.271	90	60		44 - 55	81		1.5		
973.272	105	73		44 - 63	96		1.6		
973.273	120	90			111		1.7		
973.274	135	103			126		1.8		
973.275	165	133			156		2.0		
973.277	-MEGA16N- 65 *	2.5 - 16			42		65	37	56
973.278	75		47	66		66	1.6		
973.279	90		60	48 - 57		81	1.7		
973.280	105		75	48 - 68		96	1.8		
973.281	120		90			111	2.0		
973.282	135		105			126	2.1		
973.283	165		135			156	2.4		
973.285	-MEGA20N- 65 *		2.5 - 20			46	65	37	51
973.286	75	47		65	65		1.6		
973.287	90	62		51 - 56	76		1.8		
973.288	105	77		51 - 68	91		2.0		
973.289	120	92			104		2.1		
973.290	135	107			111		2.3		
973.291	165	137			111		2.6		
973.292	200	172					2.9		

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. \* Adjusting screw cannot be used.
4. Nut-less model available upon request.

Ø 0.25 - 20 mm

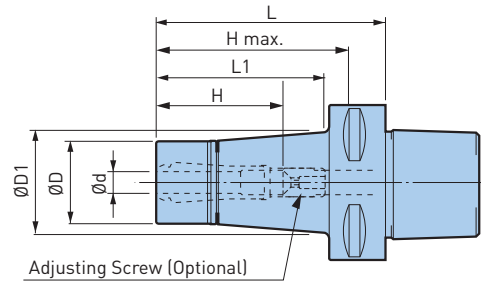
Model	Order No.	Ød	ØD	L	L1	H	H max.	Collet Model	Weight (kg)
C8 -MEGA6N - 90	973.293	0.25 - 6	20	90	45	23 - 43	90	NBC6-	2.4
-120	973.295			120	75		120		2.6
-165	973.297			165	120		165		2.7
-MEGA8N - 90	973.298	0.5 - 8	25	90	46	26 - 45	90	NBC8-	2.6
-120	973.300			120	75		120		2.7
-165	973.302			165	120		165		2.8
-MEGA10N- 90	973.304	1.5 - 10	30	90	45	38 - 48	90	NBC10-	2.7
-120	973.306			120	75		120		2.8
-165	973.308			165	120		165		3.0
-MEGA13N- 90	973.311	2.5 - 13	35	90	50	44 - 63	90	NBC13-	2.8
-120	973.313			120	80		120		2.9
-165	973.315			165	120		165		3.2
-200	973.316			200	155		200		3.5
-MEGA16N- 90	973.318	2.5 - 16	42	90	50	48 - 66	90	NBC16-	2.9
-120	973.320			120	80	48 - 68	120		3.2
-165	973.322			165	125	165	3.6		
-MEGA20N- 90	973.325	2.5 - 20	46	90	50	51 - 68	83	NBC20-	3.0
-120	973.327			120	80		113		3.3
-165	973.329			165	125		113		3.8
-200	973.330			200	160		113		4.1

1. MEGA nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. \* Adjusting screw cannot be used.
4. Nut-less model available upon request.

Spare Parts			Accessories									
	MEGA Nut 		MEGA Wrench 		NBC Collet 		MEGA Perfect Seal 		Adjusting Screw 		Rubber 	
<b>MEGA New Baby Chuck</b>	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B	
MEGA6N	MGN6	969.483	MGR20	969.454	NBC6-	MPS6-	NBA6B	961.527	M7	12	2	
MEGA8N	MGN8	969.484	MGR25	969.456	NBC8-	MPS8-	NBA8B	961.550	M9	13	2.5	
MEGA10N	MGN10	969.485	MGR30	969.458	NBC10-	MPS10-	NBA10B	961.572	M11	16	3	
MEGA13N	MGN13	969.486	MGR35	969.460	NBC13-	MPS13-	NBA13B	961.598	M14	20	4	
MEGA16N	MGN16	969.487	MGR42	969.462	NBC16-	MPS16-	NBA16B	961.632	M18	20	4	
MEGA20N	MGN20	969.488	MGR46	969.465	NBC20-	MPS20-	NBA20B	961.680	M21	20	4	

# MEGA E Chuck

Collet chuck designed exclusively for endmilling with high concentricity and rigidity.



A.4

Ø 3 - 12 mm

Model	Order No.	Ød	ØD	ØD1	L	L1	H	H max.	Collet Model	Weight (kg)
C4 -MEGA13E - 60*	800.678	3 - 12	42	-	60	-	50	50	MEC13-	0.6
C5 -MEGA13E - 60 *	973.347	3 - 12	42	44.4	60	39	50	50	MEC13-	0.8
- 75 *	973.348			75	54	68	68	0.9		
- 90 *	973.349			90	69	50 - 60	83	1.1		
C6 -MEGA6E - 75 *	973.354	3 - 6	25	29.5	75	48	37 - 45	66	MEC6-	1.3
- 90	973.355			32.1	90	63		81		1.4
-105	973.356			34.7	105	78		96		1.5
-120	973.357			37.3	120	93		111		1.6
-MEGA8E - 75	973.361			34.2	75	48		42 - 46		66
- 90	973.362	36.7	90	63	81	1.5				
-105	973.363	39.5	105	78	42 - 51	96	1.7			
-120	973.364	42.1	120	93	111	1.8				
-MEGA10E - 75 *	973.368	3 - 10	35	39.1	75	48	66	66	MEC10-	1.5
- 90	973.369			41.6	90	63	81	1.6		
-105	973.370			44.4	105	78	48 - 58	96		1.8
-120	973.371			47.0	120	93	111	2.0		
-MEGA13E - 65 *	973.374			3 - 12	42	45.1	65	39		56
- 90	973.376	49.0	90			66	81	1.8		
-105	973.377	51.4	105			80	50 - 55	96	2.1	
-120	973.378	54.2	120			96	111	2.3		
-135	973.379	56.8	135			112	50 - 60	126	2.6	
-165	973.380	62.3	165			141	156	3.2		
C8 -MEGA6E - 90	973.382	3 - 6	25			30.7	90	55	37 - 45	90
-135	973.385	38.5	135	100	135	100	135	135	MEC6-	3.0
-MEGA8E - 90	973.388	3 - 8	30	35.4	90	55	42 - 51	90	MEC8-	2.7
-120	973.391			43.3	135	100		135		3.2
-MEGA10E - 90	973.394	3 - 10	35	40.3	90	55	48 - 58	90	MEC10-	2.8
-120	973.396			45.6	120	85		120		3.2
-135	973.397			48.2	135	100		135		3.4
-MEGA13E - 90	973.400	3 - 12	42	47.0	90	55	50 - 60	90	MEC13-	3.0
-120	973.402			52.3	120	85		120		3.4
-135	973.403			54.9	135	100		135		3.7
-165	973.404			60.1	165	130		165		4.3

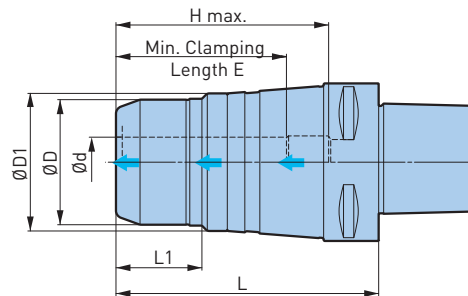
1. MEGA E nut is included.
2. "H" indicates the adjustment length with an adjusting screw.
3. \* Adjusting screw cannot be used.
4. Nut-less model available upon request.

Spare Parts			Accessories								
	MEGA E Nut		MEGA Wrench		MEGA E Collet		MEGA E Perfect Seal		Adjusting Screw		
MEGA E Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
MEGA6E	MEN6	968.461	MGR25	969.456	MEC6-	EPS6-	NBA6B	961.527	M7	12	2
MEGA8E	MEN8	968.462	MGR30	969.458	MEC8-	EPS8-	NBA8B	961.550	M9	13	2.5
MEGA10E	MEN10	968.463	MGR35	969.460	MEC10-	EPS10-	NBA10B	961.572	M11	16	3
MEGA13E	MEN13	968.464	MGR42	969.462	MEC13-	EPS13-	NBA13B	961.598	M14	20	4



## MEGA Double Power Chuck Type D

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. Two types are available, type D for use with/without coolant-through the tool and Type DS to feed coolant to cutting tool periphery.



Ø 3 - 32 mm

A.4

Model	Order No.	Ød	ØD	ØD1	L	L1	H max.	E	Weight (kg)
C4 -MEGA16D - 70	800.679	16	46	46.7	70	-	64	50	0.8
-MEGA20D - 65 *	800.681	20	50	50.7	65	-	59	51	0.8
C6 -MEGA20D - 75A	803.182	20	50	55	75	34	66	56	2.0
- 90A	803.123				90		81		2.2
-105A	803.110				105		85		2.5
-135A	803.164				135				3.1
-MEGA25D - 75A *	804.904	25	62	62.7	75	39	66	57	2.1
-105A	803.126				105		85		2.8
-135A	803.194				135				3.3
-MEGA32D - 90A	803.127	32	70	70.7	90	33	81	64	2.5
-135A	803.120				135		90		3.4
C8 -MEGA16D - 70	973.427	16	46	55	70	23.5	71	50	2.8
-105	973.428				105				
-MEGA20D - 75	973.431	20	60	69	75	25.5	75	56	3.3
-105	973.432				105		85		4.2
-135	973.433				135				5.0
-MEGA25D - 75	973.435	25	70	77	75	32	75	65	3.4
-105	801.666				105		90		4.5
-165	973.438				165				6.4
-MEGA32D - 90	973.436	32	80	86	90	39.5	90	71	4.3
-105	973.440				105		100		4.8
-135	973.441				135		105		6.0

- \* Only the straight collet (C20, OCA20-) can be used.
- Wrench is to be ordered separately.
- "H" is max. tool shank length that can be inserted into the holder.

For Straight Collet ▶ 272

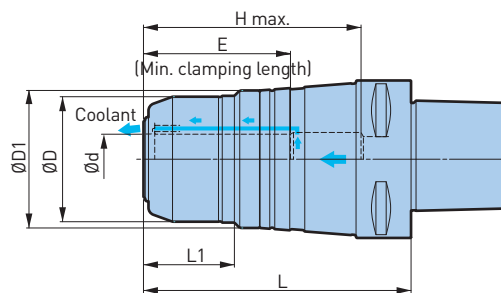
## MEGA Wrench



MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.
C4 -MEGA16D	MGR46L	969.465L	C6 -MEGA16DS	MGR42L	969.462L	C8 -MEGA16D/DS	MGR46L	969.465L
-MEGA20D	MGR50L	969.464L	-MEGA20D/DS	MGR50L	969.464L	-MEGA20D/DS	MGR60L	969.468L
C5 -MEGA16DS	MGR42L	969.462L	-MEGA25D/DS	MGR62L	969.469L	-MEGA25D/DS	MGR70L	969.470L
-MEGA20DS	MGR50L	969.464L	-MEGA32D/DS	MGR70L	969.470L	-MEGA32D/DS	MGR80L	969.471L
-MEGA25DS	MGR62L	969.469L						

## MEGA Double Power Chuck Type DS

Close to integral rigidity and precision of a solid tool holder. Flange contacting nut assures highest rigidity. Unique coolant supply design ensures efficient coolant supply to the cutting tool periphery.



Ø 3 - 32 mm

A.4

Model	Order No.	Ød	ØD	ØD1	L	L1	H	E	Weight (kg)	
C5 -MEGA16DS - 65A	803.141	16	42	52.6	67	27	60	57	0.8	
	803.144				92		73		1.3	
	-MEGA20DS - 75A	803.108	20	50	55	77	36	70	1.1	
		803.183				92		85	1.4	
	-MEGA25DS - 75A	803.147	25	62	62.7	77	41	70	1.4	
		803.179				92		85	1.7	
C6 -MEGA16DS - 70A	803.145	16	42	52.6	72	27	63	57	1.6	
	803.206				92		83		2.0	
	803.184				107		73		2.3	
	803.112				137		73		2.9	
	-MEGA20DS - 75A	803.185	20	50	55	77	36	68	58	1.9
		803.125				92		83		2.1
		803.113				107		87		2.4
		803.166				137		87		3.0
	-MEGA25DS - 75A **	803.114	25	62	62.7	77	41	68	59	2.1
		803.177				92		83		2.4
		803.128				107		87		2.8
		803.195				137		87		3.3
-MEGA32DS - 90A	803.129	32	70	70.7	92	35	83	66	2.5	
	803.167				107		92		2.9	
	803.121				137		92		3.4	
C8 -MEGA16DS - 70	973.465	16	46	55	72.5	26	73	52	2.8	
	973.466				107.5		73		3.5	
-MEGA20DS - 75	973.469	20	60	69	77.5	28	73	58	3.3	
	973.471				137.5		87		5.0	
-MEGA25DS - 75	973.473	25	70	77	77.5	34	77	67	3.4	
	973.475				137.5		92		5.4	
	973.476				167.5		92		6.4	
-MEGA32DS - 90	973.477	32	80	86	92.5	42	92	73	4.3	
	973.478				107.5		102		4.8	
	973.480				167.5		107		7.3	

- \*\* Only the straight collet (C25-) can be used.
- Wrench is to be ordered separately.
- "H" is max. tool shank length that can be inserted into the holder.
- \* Axial length adjusting screw can be used.
- \*\*\* Commercially available hex socket head screws (M8) can be used as a back stop.

For Straight Collet ▶ 272

### MEGA Wrench

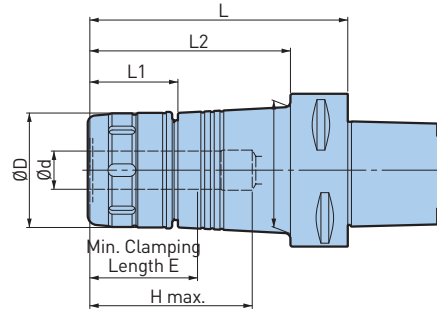


MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.	MEGA Double Power Chuck	Model	Order No.
C4 -MEGA16D	MGR46L	969.465L	C6 -MEGA16DS	MGR42L	969.462L	C8 -MEGA16D/DS	MGR46L	969.465L
-MEGA20D	MGR50L	969.464L	-MEGA20D/DS	MGR50L	969.464L	-MEGA20D/DS	MGR60L	969.468L
C5 -MEGA16DS	MGR42L	969.462L	-MEGA25D/DS	MGR62L	969.469L	-MEGA25D/DS	MGR70L	969.470L
-MEGA20DS	MGR50L	969.464L	-MEGA32D/DS	MGR70L	969.470L	-MEGA32D/DS	MGR80L	969.471L
-MEGA25DS	MGR62L	969.469L						



## New Hi-Power Milling Chuck

The original design of slit structure assures heavy and finish end milling with high power and precision.



Ø 3 - 32 mm

A.4

Model	Order No.	Ød	ØD	L	L1	L2	H max.	E	Weight (kg)
C5 -HMC16S - 65	800.734	16	43	65	44	45	58	55	0.8
-HMC20S - 105	800.735	20	50	105		-	85	56	1.4
-HMC25S - 105	803.041	25	55			47	-	87	57
-HMC32S - 85	803.043	32	62	85		56	-	78	58
C6 -HMC16S - 70	800.842	16	43	70	44	48	61	55	1.5
-HMC20S - 75	800.845	20	50	75	44	53	85	56	1.7
- 105	800.843			105		83			2.3
- 120 *	800.844			120		98	2.5		
-HMC25S - 75 **	800.848	25	59	75	45	53	87	57	2.0
- 105	800.846			105		81			2.5
- 135 *	800.847			135		133	3.1		
-HMC32S - 90	800.851	32	68	90	54	-	90	64	2.4
- 105	800.849			105		-			2.7
- 135 *	800.850			135		-	3.3		
C8 -HMC20 - 80	973.680	20	60	80	46	50	85	56	3.3
- 135 *	973.682			135		105			4.7
-HMC25 - 85	973.684	25	62	85	55	-	90	65	3.5
- 135 *	973.686			135		105			4.7
-HMC32 - 95	973.688	32	80	95	63	-	105	71	4.5
- 135	973.690			135		-			5.8

1. Wrench is to be ordered separately.
2. \* Axial length adjusting screw can be used.
3. \*\* Only the straight collet (C25- ) can be used.

For Straight Collet ▶ 272

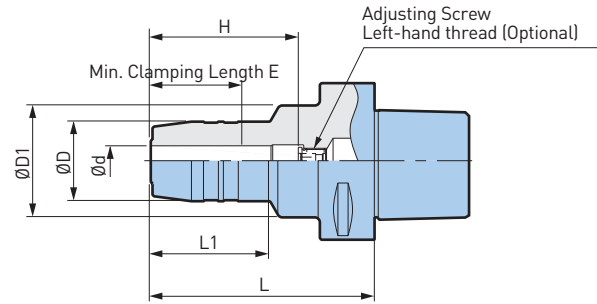
### Wrench



New Hi-Power Milling Chuck	Model	Order No.	New Hi-Power Milling Chuck	Model	Order No.	New Hi-Power Milling Chuck	Model	Order No.
C5 -HMC16S	FK45-50L	801.037	C6 -HMC16S	FK45-50L	801.037	C8 -HMC20	FK58-62	962.291
-HMC20S			-HMC20S			-HMC25		
-HMC25S	FK52-55	962.294	-HMC25S	FK58-62L	801.038	-HMC32	FK80-90	962.292
-HMC32S	FK58-62L	801.038	-HMC32S	FK68-75L	801.039			

# Hydraulic Chuck

For high precision machining in Automotive, Aerospace, Medical and Die & Mold.



Ø 3 - 32 mm

A.4

Model	Order No.	Ød	ØD	ØD1	L	L1	E	H	Adjusting Screw	Weight (kg)	
C5 -HDC6 - 90	800.726	6	26	45	90	45	28	33 - 50	HDA 6-05020	1.0	
-HDC8 - 90	800.731	8	28				33	43 - 55	HDA 8-06020	1.1	
-HDC10 - 90	800.703	10	30				38	53 - 60	HDA10-08015	1.1	
-HDC12 - 90	800.708	12	32				48	83	-	1.2	
-HDC14 - 90	800.712	14	34			43	83	-	1.2		
-HDC16 - 90 *	800.717	16	38			50	52	83	-	1.7	
-HDC20 - 90 *	800.722	20	42			63	-	-	-	1.7	
-HDC25 - 90 *	800.723	25	55			63	-	-	-	1.7	
C6 -HDC6 - 90	800.831	6	26	45	90	45	28	33 - 50	HDA 6-05020	1.5	
-HDC8 - 90	800.838	8	28				33	43 - 55	HDA 8-06020	1.6	
-HDC10 - 90	800.795	10	30				38	48 - 60	HDA10-08015	1.6	
-HDC12 - 90	800.802	12	32				48	81	-	1.7	
- 120	800.799	-	-			120	90	-	2.0		
-HDC14 - 120	800.806	14	34			120	48	38	38 - 60	HDA10-08032	1.9
-HDC16 - 90 *	800.815	16	38			47	90	43	81	-	1.7
- 120	800.812	-	-			48	120	43	43 - 70	HDA16-12037	2.0
-HDC18 - 120	800.816	18	40		49	120	43	72	-	1.8	
-HDC20 - 90 *	800.822	20	42		50	90	43	43 - 70	HDA16-12037	2.1	
- 120	800.819	-	-		50	120	43	72	-	1.8	
-HDC25 - 90 *	800.825	25	55		63	90	46	80	-	2.2	
- 120	800.823	-	-		63	120	51	52	67 - 79	HDA20-16015	2.8
-HDC32 - 120	800.826	32	63		-	120	-	56	66 - 78	HDA20-16015	3.0

1. "H" indicates the adjustment length with an adjusting screw.
2. \* Adjusting screw cannot be used.

For Straight Collet ▶ 272

For Inner Bore Cleaner ▶ 286

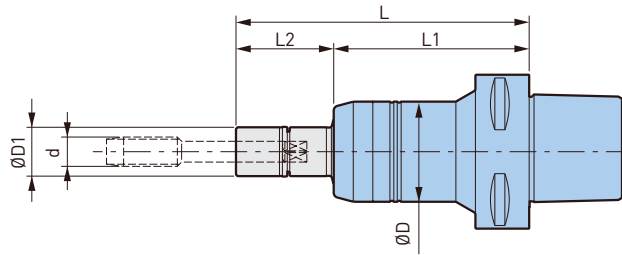
For Adjusting Screw ▶ 282

### Caution

- Use only cutting tools that have a shank tolerance within h6.
- Roughing endmills are not recommended for use with hydraulic chucks.
- Do not use with cutting tools made with a flat on the shank. (ie: Weldon type shank)
- Do not tighten the clamping screw without first inserting a cutting tool into the hydraulic chuck.
- Always insert the cutting tool into the hydraulic chuck beyond min. clamping length E.

# MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



M3 - M20

A.4

Model	Order No.	Tap Holder Model	Tapping Range d	ØD	ØD1	L	L1	L2	Weight (kg)
C5 -MGT6 - 75	800.767	MGT6 -d - 30	M3 - M8	36	16	105	75	30	0.8
		- 70				145		70	
		-100				175		100	
-MGT12 - 75	800.765	MGT12 -d - 30	M5 - M12 P1/8	41	20	105	75	30	0.9
		- 70				145		70	
		-100				175		100	
-MGT20 - 100	800.766	MGT20 -d - 35	M10 - M20 P1/4 - P1/2	54	30	135	100	35	1.4
		- 85				185		85	
		-115				215		115	
C6 -MGT6 - 80	973.754	MGT6 -d - 30	M3 - M8	36	16	110	80	30	1.1
		- 70				150		70	
		-100				180		100	
-MGT12 - 80	973.755	MGT12 -d - 30	M5 - M12 P1/8	41	20	110	80	30	1.2
		- 70				150		70	
		-100				180		100	
-MGT20 - 100	973.756	MGT20 -d - 35	M10 - M20 P1/4 - P1/2	54	30	135	100	35	1.8
		- 85				185		85	
		-115				215		115	
C8 -MGT6 - 80	800.935	MGT6 -d - 30	M3 - M8	36	16	110	80	30	2.1
		- 70				150		70	
		-100				180		100	
-MGT12 - 80	800.933	MGT12 -d - 30	M5 - M12 P1/8	41	20	110	80	30	2.2
		- 70				150		70	
		-100				180		100	
-MGT20 - 95	800.934	MGT20 -d - 35	M10 - M20 P1/4 - P1/2	54	30	130	95	35	2.6
		- 85				180		85	
		-115				210		115	

1. Tap holder and wrench are to be ordered separately.
2. Rigid tapping function is required on the machine tool.

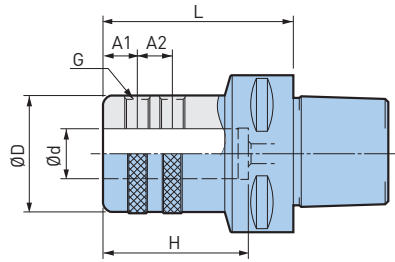


For Tap Holder ▶ 276  
 For MEGA Wrench ▶ 281  
 For Accessories ▶ 280

### Tapping range for DIN & ISO standard

MGT Size	DIN Standard			ISO Standard	
	DIN371	DIN376	DIN353	ISO529	ISO2284
MGT6	M3 - M6	M5 - M8	-	M3 - M5	-
MGT12	M5 - M8	M8 - M12	1/8	M6, M8, M12	1/8
MGT20	M10	M12 - M20	1/4 - 1/2	M10 - M20	1/4 - 3/8

Side Lock Holders for Drills



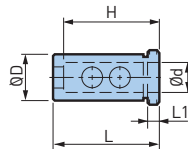
A.4

Ø 16 - 40 mm

Model	Order No.	Ød	ØD	L	A1	A2	H	G	Weight (kg)	
C4 -TSL16 -56	800.687	16	48	56	14	14	48	M10 P1.25	0.8	
	800.688	20		60			50		0.7	
	800.689	25		77			56		0.8	
C5 -TSL16 -60	973.115	16	48	60	14	14	48	M10 P1.25	0.8	
	973.116	20					50		0.9	
	973.117	25		75	15	20	56	M16 P1.5	0.9	
	800.775	32					60		1.6	
C6 -TSL16 -70	973.119	16	48	70	14	14	48	M10 P1.25	1.7	
	973.120	20					50		1.7	
	973.121	25					56		1.6	
	973.122	32		63	75	15	20	60	M16 P1.5	2.0
	973.123	40		68	85		25	70		2.2
C8 -TSL16 -80	973.124	16	48	80	14	14	48	M10 P1.25	3.1	
	973.125	20					50		3.1	
	973.126	25		85	15	20	56	M16 P1.5	3.0	
	973.127	32					60		3.5	
	973.128	40					68		95	25

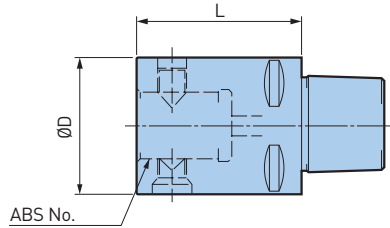
1. "H" is the max. tool shank length that can be inserted into the holder.
2. Not compatible with Weldon DIN 1835B.

SL Sleeve for TSL Side Lock Holder



Model	Order No.	Ød	ØD	L	L1	H
OSL25 -16	962.596	16	25	62	5.5	48
	962.597	20				50
OSL32 -16	962.586	16	32	66	5.5	48
	962.598	20				50
	962.599	25				56
OSL40 -16	804.678	16	40	76	5.5	48
	804.679	20				50
	962.581	25				56
	962.582	32				60

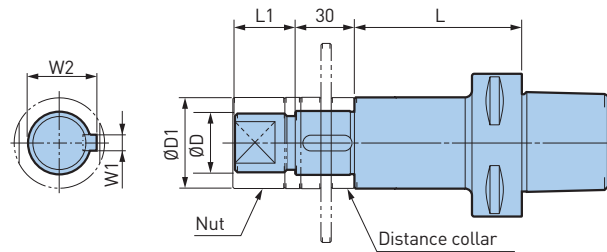
### ABS Shanks



Model	Order No.	ABS No.	ØD	L	Weight (kg)
C5 -ABS50 -50	978.140	50	50	50	0.7
C6 -ABS50 -50	978.032	50	50	50	1.4
-ABS63 -60	978.042	63	63	60	1.8
C8 -ABS50 -50	978.054	50	50	50	2.6
-ABS63 -60	978.103	63	63	60	2.9
-ABS80 -80	978.033	80	80	80	3.7

A.4

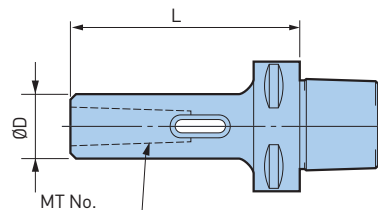
### Side Cutter Arbors



Model	Order No.	ØD	ØD1	L	L1	W1	W2	Weight (kg)
C6 -SCA25.4 -75	800.887	25.4	40	75	25	6.35	27.78	2.0
-SCA31.75 -75	800.888	31.75	46		30	7.92	34.92	2.4
C8 -SCA25.4 -90	800.940	25.4	40	90	25	6.35	27.78	3.3
-SCA31.75 -90	800.942	31.75	46		30	7.92	34.92	3.7

1. Nut is included.
2. Distance collars of 5 mm, 8 mm, 10 mm and 12 mm are included.

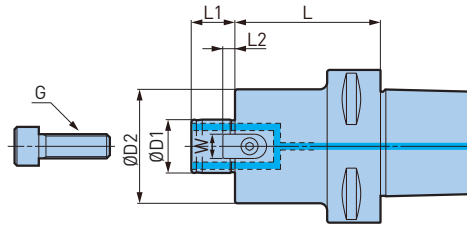
### Morse Taper Holders



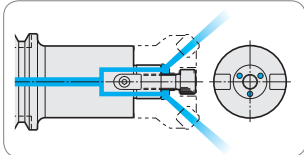
Model	Order No.	MT No.	ØD	L	Weight (kg)
C5 -MTA1 - 95	973.572	1	25	95	0.6
-MTA2 -110	973.573	2	32	110	0.8
-MTA3 -130	973.574	3	40	130	1.2
C6 -MTA1 - 95	973.575	1	25	95	1.3
-MTA2 -110	973.576	2	32	110	1.5
-MTA3 -130	973.577	3	40	130	1.9
C8 -MTA1 -105	973.578	1	25	105	2.6
-MTA2 -120	973.579	2	32	120	2.8
-MTA3 -140	973.580	3	40	140	3.2

# Face Mill Arbors Type FMH

For cutters that require a coolant hole through the pilot.



A.4

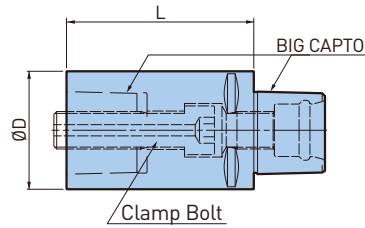


Model	Order No.	ØD1	ØD2	L	L1	L2	W	G	Weight (kg)	
C5 -FMH22 - 47 - 60	973.718	22	47	60	18	5	10	M10	1.2	
	800.695			90					1.6	
	-FMH22 - 60 - 60	973.720	27	60	60	20	6	12	M12	1.4
	-FMH27 - 60 - 60	800.698								1.5
C6 -FMH22 - 47 - 45	973.721	22	47	45	18	5	10	M10	1.5	
	- 60			973.722					60	1.8
	- 90			973.723					90	2.2
	-150			800.783					150	3.0
	-FMH22 - 60 - 45	973.724	27	60	45	20	6	12	M12	1.8
	- 60	973.725			60					2.1
	- 90	973.726			90					2.8
	-FMH27 - 60 - 45	800.788	27	60	45	20	6	12	M12	1.9
	- 60	800.789			60					2.2
	- 90	800.790			90					2.8
-150	800.787	150			4.2					
C8 -FMH22 - 47 - 60	973.727	22	47	60	18	5	10	M10	2.9	
	-105			973.728					105	3.5
	-150			973.729					150	4.1
	-FMH22 - 60 - 60			973.730					27	60
	-105	973.731	105	4.2						
	-150	973.732	150	5.2						
	-FMH27 - 60 - 105	800.903	27	60	105	20	6	12	M12	4.3
	-150	800.904			150					5.3
	-FMH32 - 96 - 105	800.910	32	96	105	22	7	14	M16	6.1
	-150	800.911			150					7.8

1. By utilizing a clamping bolt with a hole through, coolant is supplied through the bolt.
2. Hexagon socket head cap screw is included.

For Clamp Bolt ▶ 282

### Extensions

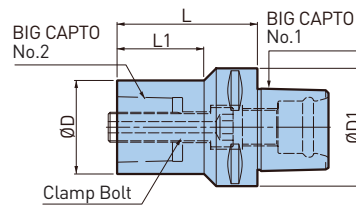


Model	Order No.	BIG CAPTO	ØD	L	Clamp Bolt			Weight (kg)
					Thread Size	Hex.	Tightening Torque	
C6-C6-100	803.738	C6	63	100	M20xP2	14 mm	170N·m	1.2
C8-C8-100	803.740	C8	80					1.7

1. Clamp bolt is included.

A.4

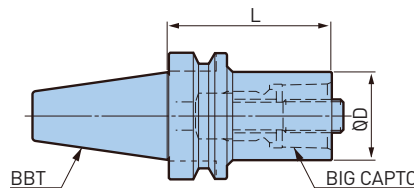
### Reductions



Model	Order No.	BIG CAPTO No. 1	BIG CAPTO No. 2	ØD	ØD1	L	L1	Clamp Bolt			Weight (kg)
								Thread Size	Hex.	Tightening Torque	
C6-C5-75	803.737	C6	C5	50	63	75	46	M16xP1.5	10 mm	95N·m	0.5
C8-C6-85	803.739	C8	C6	63	80	85	50	M20xP2	14 mm	170N·m	0.8

1. Clamp bolt is included.

### BIG CAPTO Basic Holders



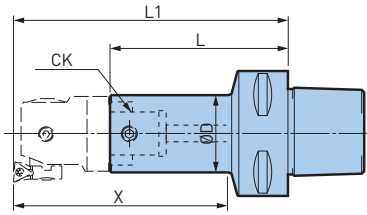
Model	Order No.	BIG CAPTO	ØD	L	Weight (kg)
BBT40 -C3-30	973.598	C3	32	30	1.0
-C4-40	802.350	C4	40	40	1.1
-C5-50	973.600	C5	50	50	1.2
-C6-75	973.601	C6	63	75	1.7
BBT50 -C3-40	973.602	C3	32	40	3.6
-C4-40	973.603	C4	40		3.6
-C5-40	973.604	C5	50		3.5
-C6-50	973.605	C6	63		3.5
-C8-70	803.736	C8	80	70	4.0

1. Clamp bolt is included.



## CKB/CKN Shanks with Center Through Coolant

Basic Holder for rough and finish boring heads of the proven BIG KAISER Boring System.



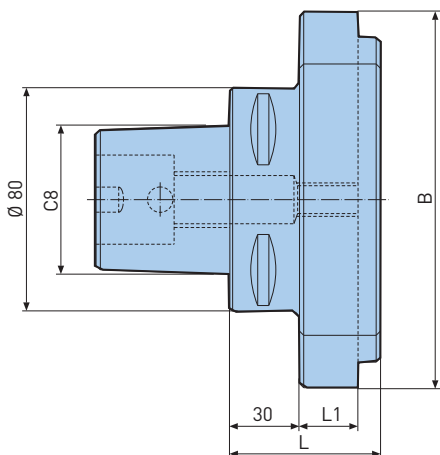
A.4

Taper Size	Order No.	CK	ØD	L	L1	X	Weight (Kg)
C4 -CKB1 - 48	806.698	CKB1	19	48	80	55	0.4
	806.699	CKB2	24	45			0.4
	806.700	CKB3	31	40		57	0.5
	806.701	CKB4	39	33		62	0.5
C5	806.702	CKB1	19	72.5	105	80	0.5
	328.273	CKB2	24	84.5	120	96	0.6
	328.223	CKB3	31	55	95	70	0.6
	328.224	CKB4	39	48	95		0.6
	328.226	CKB5	50	50	107	-	0.6
	328.037N	CKN6	63.5	50	121	-	1.0
	C6	328.321	CKB1	19	77.5	110	83
328.322		CKB2	24	89.5	125	98	1.3
328.036		CKB3	31	65	105	78	1.3
328.035		CKB4	39	58			1.3
328.034		CKB5	50	48		79	1.3
328.033N		CKN6	63.5	59	130	-	1.6
C8		806.703	CKB4	39	118	165	130
	806.704	178			225	190	3.0
	806.705	CKB5	50	108	165	130	2.7
	806.706			183	240	205	3.8
	328.053N	CKN6	63.5	74	145	110	2.5
	806.707	CKB6		169	240	206	4.8
	328.032N	CKN7	90	73	190 (160)	-	3.1
	806.708	CKB7		123	240 (210)	-	5.6

1. L1 and X dimensions in the table are the reference values when EWN/EWE head is attached.

For Boring Heads ▶ Chapter B

### Flange for Large Diameter Boring: Ø 200 - 620 mm

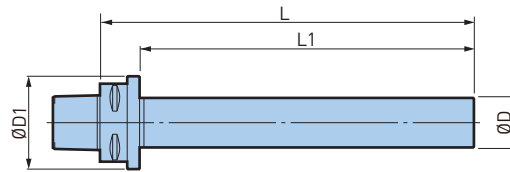


Model	Order No.	Boring Tool Series	B	L	L1	Weight (Kg)
C8-FL135-318	328.210	318	Ø135	55	55	3.7
C8-FL135-318-90	328.211					
C8-FL135-317	328.086	317	Ø135	55	22	3.8
C8-FL135-317-90	328.162					

For Large Boring Tools ▶ 366

## Dyna Test

Periodic inspection of machine tools to control production stability.



A.4

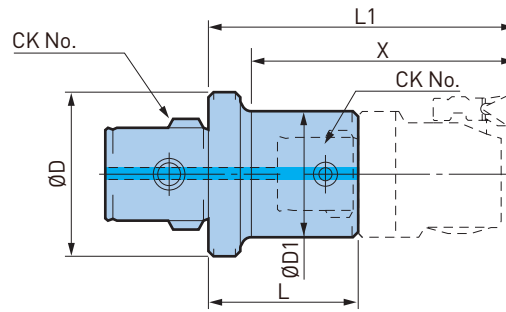
Model	Order No.	ØD	ØD1	L	L1	Weight (kg)
C5 -40 -L250	800.045	40	63	280	250	2.8
C6 -40 -L200	973.737		75	232	200	2.8
-L320	973.738		352	320	3.8	
C8 -40 -L320	973.740		85	360	320	4.9



## Tool Holders and Components CK

CKB/CKN Reductions Steel	196
CKB/CKN Extensions Steel / Smart Damper Extensions	197
CKN Components	198 - 199
Tool Holders	200 - 201
ER Collet Chucks / ER Collet Adapters	202
Tapping Holders	203
DIN 2080 / Morse Taper Shanks	204
WTO Quickflex Adapters	205

CKB/CKN Reductions Steel



A.5

Model	Order No.	CK	ØD	CK	ØD1	L	L1	X	Weight (kg)
CKB2-CKB1 - 36	332.210	CKB1	24	CKB1	19	36	68.5	55	0.09
CKB3-CKB1 - 41	332.310	CKB3	31	CKB1	19	40.5	73	60	0.15
-CKB2 - 35	332.320			CKB2	24	34.5	70	60	0.16
CK4 -CKB1 - 58	332.410	CK4	39	CKB1	19	57.5	90	75	0.23
CKB4-CKB2 - 52	332.420	CKB4	39	CKB2	24	51.5	87	75	0.25
-CKB3 - 47	332.430			CKB3	31	47	87	75	0.30
CK5 -CKB1 - 58	332.511	CK5	50	CKB1	19	57.5	90	70	0.44
- 88	332.510					87.5	120	100	0.44
-CKB2 - 52	332.521			CKB2	24	51.5	87	70	0.42
- 82	332.520					81.5	117	100	0.55
CKB5-CKB3 - 47	332.531	CKB5	50	CKB3	31	47	87	70	0.44
- 77	332.530					77	117	100	0.67
-CKB4 - 40	332.541			CKB4	39	40	87	70	0.54
- 70	332.545					70	117	100	0.70
CK6 -CKB1 - 67	332.611	CK6	63.5	CKB1	19	66.5	99	65	0.79
- 102	332.610					101.5	134	100	0.91
-CKB2 - 61	332.621			CKB2	24	60.5	96	80	0.70
- 96	332.620					95.5	131	115	0.80
-CKB3 - 56	332.631			CKB3	31	56	96	80	0.75
- 91	332.630					91	131	115	0.96
- 136	332.632	136	176			160	1.2		
CKB6-CKB4 - 49	332.641	CKB6	63.5	CKB4	39	49	96	80	0.8
- 84	332.645					84	131	115	1.1
- 129	332.642					129	176	160	1.5
-CKB5 - 39	332.651			CKB5	50	39	96	80	0.8
- 74	332.655					74	131	115	1.2
- 119	332.652					119	176	160	2.0
CKB7-CKB4 - 70	332.741	CKB7	90	CKB4	39	70	117	100	1.5
- 100	332.745					100	147	130	1.7
-CKB5 - 60	332.751			CKB5	50	60	117	100	1.7
- 90	332.755					90	147	130	2.0
- 120	332.750					120	177	160	2.5
-CKB6 - 76	332.765			CKB6	63.5	76	147	130	2.3
- 106	332.766					106	177	160	2.9
CKN7-CKN6 - 76	332.765N <sup>1</sup>	CKN7	90	CKN6	63.5	76	147	160	2.3

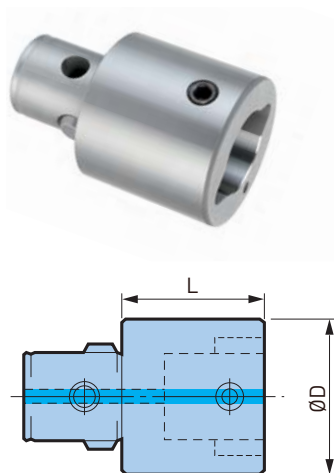
1. L1 and X dimensions in the table are the reference values when EWN/EWE head is attached.

For Boring Heads ▶ Chapter B

For Spare Parts ▶ 418

X = Boring depth, including length of corresponding boring head.

## CKB/CKN Extensions Steel



Model	Order No.	CK	ØD	L	Weight (kg)
CKB1-CKB1	- 20	CKB1	19	20	0.05
	- 30			30	0.07
CKB2-CKB2	- 30	CKB2	24	30	0.10
	- 45			45	0.15
CKB3-CKB3	- 30	CKB3	31	30	0.16
	- 45			45	0.25
CKB4-CKB4	- 40	CKB4	39	40	0.35
	- 60			60	0.47
CKB5-CKB5	- 60	CKB5	50	60	0.85
	- 90			90	1.2
CKB6-CKB6	- 60	CKB6	63.5	60	1.4
	- 100			100	2.2
CKB7-CKB7	- 100	CKB7	90	100	4.4
	- 160			160	7.3
CKN6-CKN6	- 60	CKN6	63.5	60	1.4
	- 100			100	2.2
CKN7-CKN7	- 100	CKN7	90	100	4.4
	- 160			160	7.3

1. \* Two pieces of CK-screws are included.

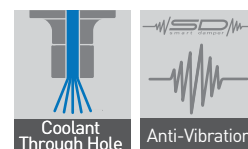
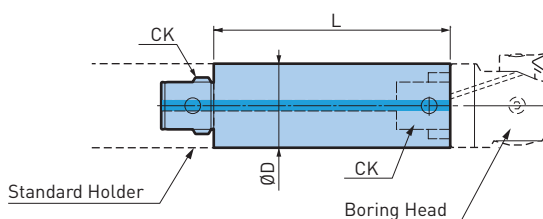
For Boring Heads ▶ Chapter B

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A.5

## Smart Damper Extensions

Extension with integrated damping system for highly efficient deep hole finish boring.

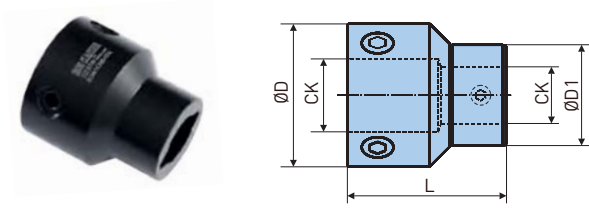


Model	Order No.	CK	ØD	L	Weight (kg)
CKB44DP - 120	389.365	CKB4	39	120	1.3
CKB55DP - 150	389.366	CKB5	50	150	2.6
CKB66DP - 180	389.367	CKB6	64	180	5.3

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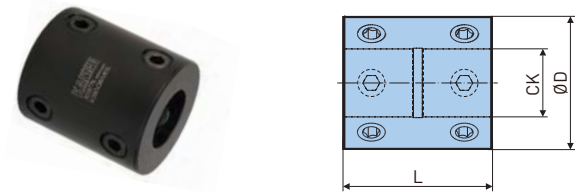
## CKN Reductions and Extensions System



Model	Order No.	CK	CK	ØD	ØD1	L	Weight (kg)
CKN7-CKB6-100	332.870N	CKN7	CKB6	90	63.5	100	1.1

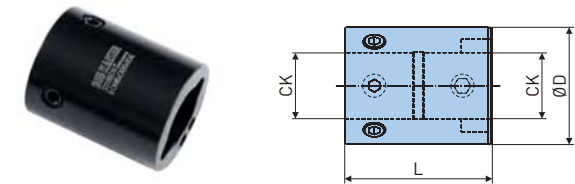
### CKN Extensions Aluminium

A.5



Model	Order No.	CK	ØD	L	Weight (kg)
T-CKN6-CKN6- 80	331.867N	CKN6	63.5	80	0.52
-120	331.868N			120	0.82
T-CKN7-CKN7-100	331.877N	CKN7	90	100	1.5
-150	331.879N			150	2.3
-200	331.878N			200	3.0

### CKN - CKB Extensions Aluminium



Model	Order No.	CK	CK	ØD	L	Weight (kg)
T-CKN6-CKB6- 80	331.860N	CKN6	CKB6	63.5	80	0.55
-120	331.861N				120	0.80
T-CKN7-CKB7-100	331.870N	CKN7	CKB7	90	100	1.4
-150	331.871N				150	2.2

### CKN Double Connector Couplings



Fig. 1

Model	Order No.	Fig.	CK	ØD	L	Weight (kg)
DC-CKN6-CKN6- 0	331.864N	1	CKN6	63.5	0	0.45
-20	331.865N	2			20	0.95
DC-CKN7-CKN7- 0	331.874N	1	CKN7	90	0	0.95
-25	331.875N	2			25	1.5
-50	331.876N				50	2.7

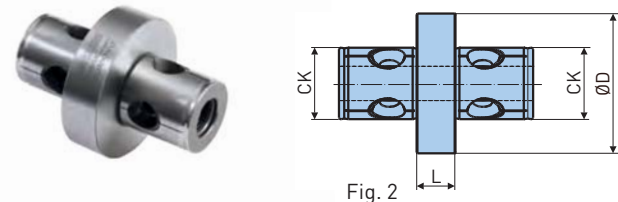
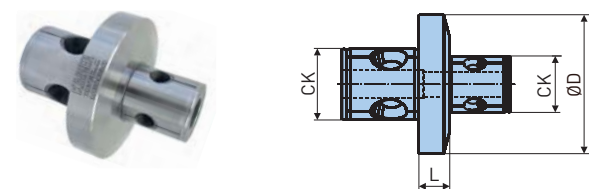


Fig. 2

### CKN7 - CKN6 Double Connector Reductions



Model	Order No.	CK	CK	ØD	L	Weight (kg)
DC-CKN7-CKN6-20	332.875N	CKN7	CKN6	90	20	1.7

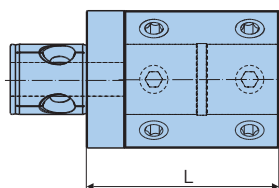
For Boring Heads ▶ Chapter B

For Spare Parts ▶ 419



Combination Example of Extensions and Reduction

CKN-CKN Extensions

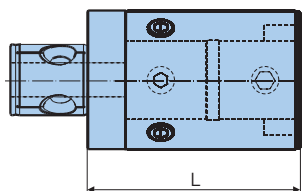


CK	CK	L	Double Connector	Extension	Weight (Kg)
CKN6	CKN6	80	331.864N	331.867N	0.97
		100	331.865N		1.5
		120	331.864N	331.868N	1.3
		140	331.865N		1.8
CKN7	CKN7	100	331.874N	331.877N	2.5
		125	331.875N		3.1
		150	331.874N	331.879N	3.2
		150	331.876N		4.2
		175	331.875N	331.879N	3.8
		200	331.874N		4.0
		200	331.876N	331.879N	5.0
		225	331.875N		4.5
		250	331.876N	331.878N	5.7

1. L and weight shown are as a combination of the double connector and extension.

A.5

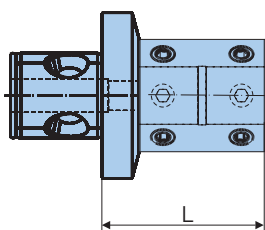
CKN-CKB Extensions



CK	CK	L	Double Connector	Extension	Weight (Kg)
CKN6	CKB6	80	331.864N	331.860N	1.0
		100	331.865N		1.5
		120	331.864N	331.861N	1.3
		140	331.865N		1.8
CKN7	CKB7	100	331.874N	331.870N	2.4
		125	331.875N		4.0
		150	331.874N	331.871N	3.2
		150	331.876N		4.1
		175	331.875N	331.871N	3.7
		200	331.876N		4.9

1. L and weight shown are as a combination of the double connector and extension.

CKN-CKN Reductions



CK	CK	L	Double Connector	Extension	Weight (Kg)
CKN7	CKN6	100	332.875N	331.867N	2.2
		140		331.868N	2.5

1. L and weight shown are as a combination of the double connector and extension.

CKN-CKB Reductions

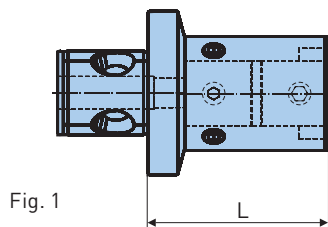


Fig. 1

CK	CK	Fig.	L	Double Connector	Extension/Reduction	Weight (Kg)
CKN7	CKN6	1	100	332.875N	331.860N	2.1
			140	332.875N	331.861N	2.2
		2	100	331.874N	332.870N	3.3
			125	331.875N	332.870N	2.5
			150	331.875N	332.870N	3.8

1. L and weight shown are as a combination of the double connector and extension.

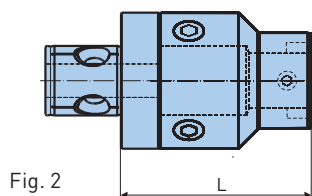
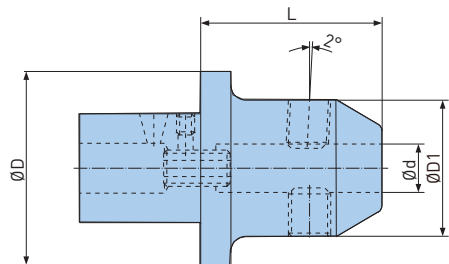


Fig. 2

## End Mill Holders

For end mills with cylindrical shank and clamping surface according to DIN 1835B (Weldon system) and to DIN 1835E (Whistle notch system).



A.5

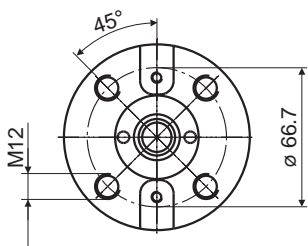
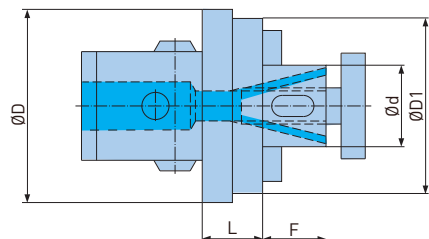
Model	Order No.	CK	Ød	ØD	ØD1	L	Weight (kg)		
CKB4-MC6	335.230	CKB4	6	39	24	50	0.23		
-MC8	335.231		8		26	50	0.30		
-MC10	335.232		10		32	55	0.39		
-MC12	335.233		12		39	60	0.55		
CKB5-MC6	335.234	CKB5	6	50	24	50	0.41		
-MC8	335.235		8		26	50	0.43		
-MC10	335.236		10		32	55	0.54		
-MC12	335.237		12		38	60	0.67		
-MC14	335.238		14		40	60	0.69		
-MC16	335.239		16		45	62	0.79		
-MC20	335.249		20		48	60	0.80		
CKB6-MC6	335.240		CKB6		6	63.5	24	45	0.61
-MC8	335.241	8		26	45		0.63		
-MC10	335.242	10		32	45		0.69		
-MC12	335.243	12		38	50		0.82		
-MC14	335.244	14		40	50		0.84		
-MC16	335.245	16		45	50		0.90		
-MC18	335.246	18		47	50		0.92		
-MC20	335.247	20		48	55		1.1		
-MC25	335.248	25		63.5	65		1.7		
-MC32	335.250 *	CKB7		32	90		72	78	2.9
-MC40	335.251 *			40			80	90	3.4

1. \* Only DIN 1835B (Weldon system).

For Spare Parts ▶ 440

## Milling Cutter Arbors

For milling cutters with longitudinal or transverse key ways according to DIN 841, 842, 1880 and cutter heads according to DIN 1830.



Face mill arbor 335.438N with hole circle (pitch circle)

Model	Order No.	CK	Ød	ØD	ØD1	L	F	Weight (kg)
CKB4-CMA16	335.420	CKB4	16	39	37	18	17	0.27
-CMA22	335.421		22		42		19	0.35
CKB5-CMA16	335.423	CKB5	16	50	40	20	17	0.42
-CMA22	335.424		22		47		19	0.51
-CMA27	335.425		27		53		21	0.64
CKB6-CMA16	335.430	CKB6	16	63.5	40	20	17	0.70
-CMA22	335.431		22		50		19	0.77
-CMA27	335.432		27		58		21	0.93
-CMA32	335.433		32		70		24	1.3
-CMA40	335.434		40		80		27	1.8
CKN6-CMA16	335.430N *		CKN6		16		63.5	40
-CMA22	335.431N *	22		50	19	0.77		
-CMA32	335.433N *	32		70	24	1.3		
-CMA40	335.434N *	40		80	27	1.8		
CKB7-CMA32	335.435	CKB7	32	90	83	28	24	2.1
-CMA40	335.436		40		93		27	2.5
CKN7-CMA32	335.437N * <sup>1)</sup>	CKN7	32	90	83	28	24	1.9
-CMA40	335.438N *		40		93		27	2.4

- <sup>1)</sup> Face mill arbor without longitudinal key way.
- \* As long as stock lasts.

For Spare Parts ▶ 440

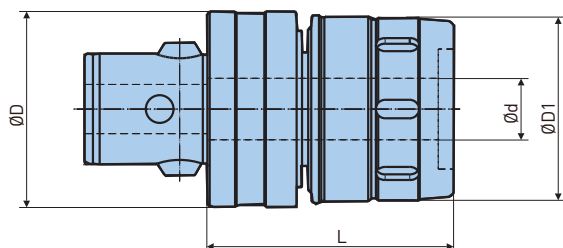
## Milling Chucks

With needle-bearing chucking nut for maximum clamping force and high concentricity.



Model	Order No.	CK	Ød	ØD	ØD1	L	Wrench		Weight (kg)
							Model	Order No.	
CKB6-HMC20	335.066	CKB6	20	63.5	60	80	FK58-62	962.291	2.0
CKB7-HMC32	335.077	CKB7	32	90	80	112	FK80-90	962.292	4.8

For Straight Collet ▶ 272



A.5

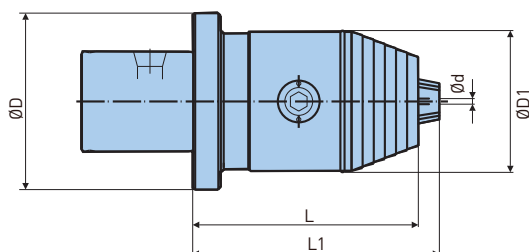
## Universal Drill Chucks

With strong clamping force and high runout accuracy. Quick and simple clamping over a bevel gear.



Model	Order No.	CK	Ød	ØD	ØD1	L	L1	Wrench Order No.	Weight (kg)
CK6-DC13	335.042	CK6	1 -13	63.5	50	81	90	690.817	1.4
-DC16	335.044		3 -16		57	86	92		1.5

For Spare Parts ▶ 440



## ER Collet Chucks

For double-taper collets slitted on both sides with extraction groove.



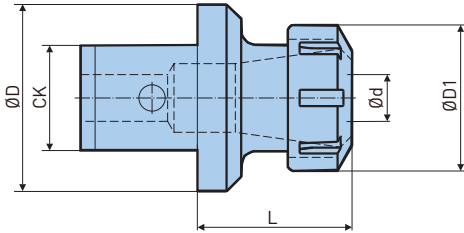
Model	Order No.	CK	Ød	Collet	ØD	ØD1	L	Nut Order No.	Wrench Order No.	Weight (kg)
CKB4-ER25	335.140	CK4	1 - 16	ER25	39	42	47	951.076	951.077	0.59
CKB5-ER25	335.142	CK5	2 - 20	ER25	50	42	47	951.076	951.077	0.74
CKB6-ER32	335.164	CK6	2 - 25	ER32	64	50	53	951.065	951.009	1.2
-ER40	335.165			ER40				63	65	951.060

1. Nut is included.
2. ER collets are to be ordered separately.

For ER Collets ▶ 266

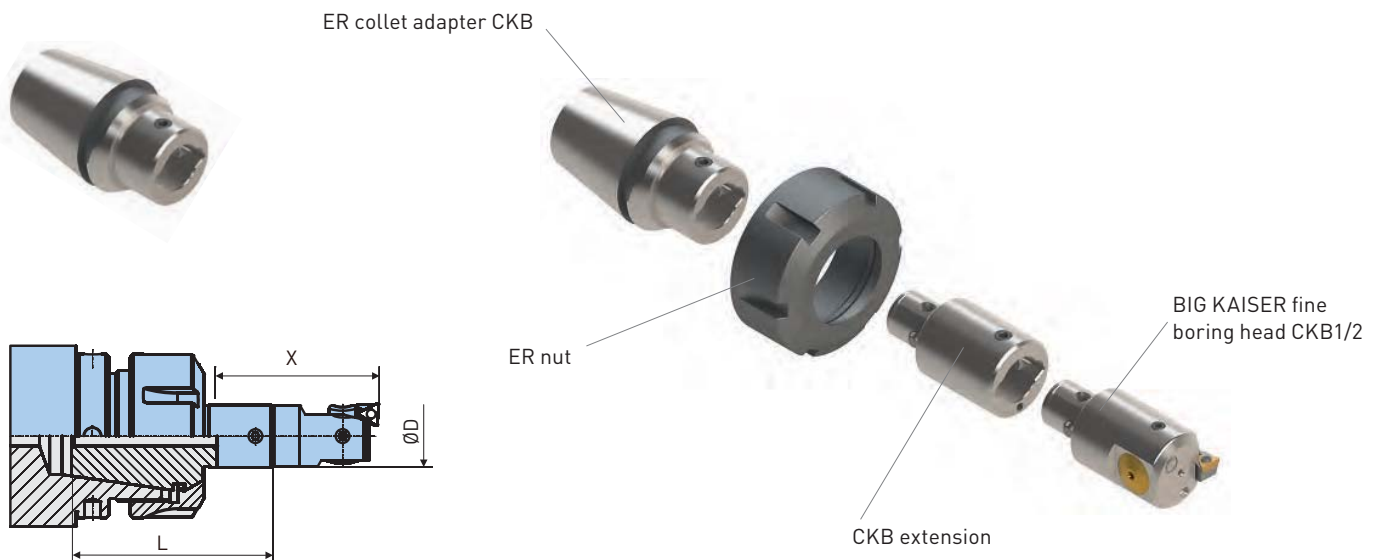
For ER Nut ▶ 268

A.5



## ER Collet Adapters

Enable the use of all BIG KAISER fine and rough boring heads of corresponding sizes on ER collet chucks.



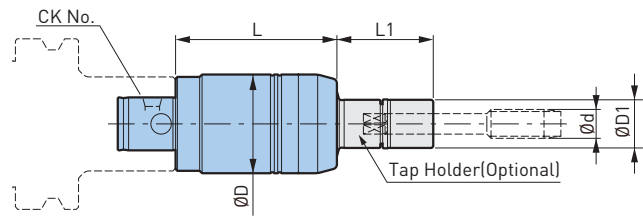
Model	Order No.	CK	ØD	L	X
ER25-CKB1-50	335.130	CKB1	19	55	50
ER32-CKB1-50	335.131	CKB1	19	61	50
-CKB2-50	335.132	CKB2	24	58	50

For ER Nut ▶ 268

For Boring Head ▶ Chapter B

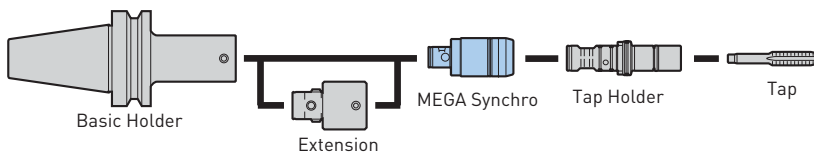
## MEGA Synchro Tapping Holders

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



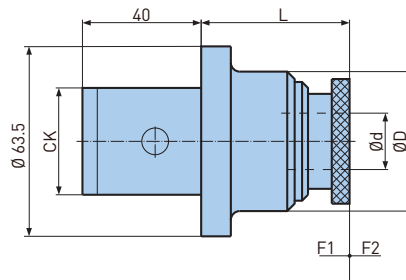
Model	Order No.	CK	Ød	ØD	ØD1	L	L1	Tap Holder	Weight (kg)
CKB4-MGT6 - 62	335.764	CKB4	M2 - M6	36	16	62	30-200	MGT 6	0.5
-MGT12 - 67	335.768		M6 - M12	41	20	67	30-200	MGT12	0.6
CKB5-MGT20- 87	335.769	CKB5	M12 - M20	54	30	87	35-150	MGT20	1.2
CKB7-MGT36-137	800.949	CKB7	M20 - M36	94	32-52	137	65	MGT36	6.8

A.5



For Tap Holder ▶ 276  
 For Accessories ▶ 280  
 For MEGA Wrench ▶ 281

## Tapping Holders

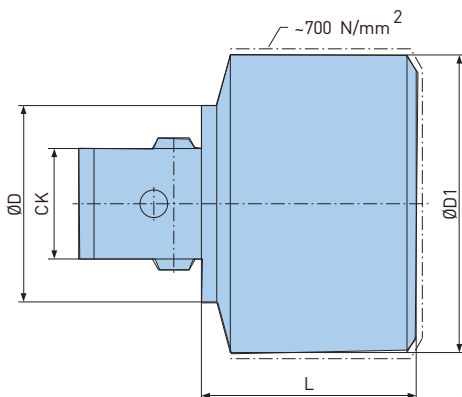


Model	Order No.	CK	Range	ØD	Ød	L	F1	F2	Weight (kg)
CK6-ATE12E	335.762	CK6	M4 - M12	47	19	50	5	10	0.87
-ATE24E	335.763		M10 - M24	64	31	80	7	14	1.6

1. F1 = length compensation compression.
2. F2 = length compensation extension.
3. Please contact BIG KAISER agent for tap collet.

## Blanks

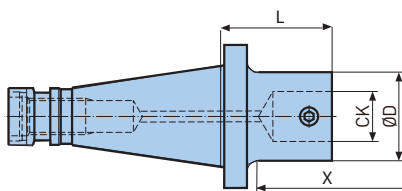
The CK connector is hardened and ground. In the marked areas (---) the blanks are unhardened and unground.



Model	Order No.	CK	ØD	ØD1	L
CKB3 -31 - 65	335.531	CKB3	31	31	65
-42 - 50	335.532		42	50	
CKB4 -39 - 80	335.541	CKB4	39	39	80
-54 - 50	335.542		54	50	
CKB5 -50 -100	335.551	CKB5	50	50	100
-70 - 60	335.552		70	60	
CKB6 -64 -120	335.561	CKB6	64	64	120
-64 -220	335.563			64	220
-97 - 70	335.562			97	70
CKB7 -90 -180	335.571	CKB7	90	90	180

## DIN 2080 Tool Holders

For manual tool change.



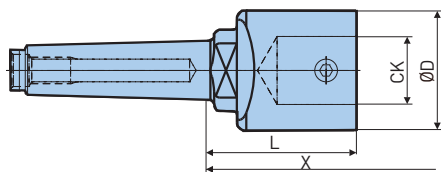
Model	Order No.	CK	ØD	L	X	Weight (kg)
DV40-DIN2080 -CKB5-39	321.451	CKB5	50	39	80	2.2
-CKB6-45	321.462	CKB6	63.5	45	100	2.4
DV50-DIN2080 -CKB6-49	323.780 *	CKB6	63.5	49	100	5.1
-CKB7-63	323.781 *	CKB7	90	63	160 [130] <sup>1</sup>	7.2

1. \* Shanks DV50 without OTT ring groove.

A.5

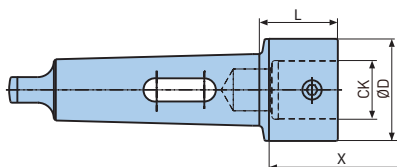
## Morse Taper Shanks

With thread (SIP / Hauser)

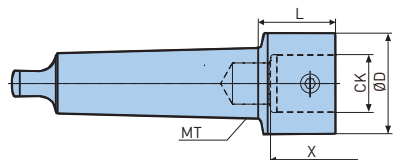


Model	Order No.	CK	ØD	L	X	Weight (kg)
MK4-CKB6-81	322.563	CKB6	63.5	81	130	1.6

With tang



Model	Order No.	CK	ØD	L	X	Weight (kg)
MK5-CKB6-55	323.563	CKB6	63.5	55	115	2.5



Model	Order No.	CK	ØD	L	X	Weight (kg)
MT3 -CKB1 -47	806.671	CKB1	19	47	80	0.34
-CKB2 -68	806.712	CKB2	24	67.5	103	0.46
-CKB3 -64	806.713	CKB3	31	64	104	0.56
-CKB5 -48	806.714	CKB5	50	48	105	0.74
MT4 -CKB1 -52	806.715	CKB1	19	51.5	84	0.65
-CKB2 -74	806.716	CKB2	24	74	110	0.78
-CKB3 -66	806.717	CKB3	31	65.5	106	0.86
-CKB4 -60	806.718	CKB4	39	59.5	107	0.97
-CKB5 -50	806.719	CKB5	50	49.5	107	1.1
-CKB6 -61	806.720	CKB6	64	60.5	132	1.6
MT5 -CKB4 -86	806.721	CKB4	39	85.5	133	2.2
-CKB5 -75	806.722	CKB5	50	74.5	132	2.4
-CKB6 -61	806.723	CKB6	64	60.5	132	2.5
MT6 -CKB6 -61	806.724	CKB6	64	60.5	132	5.1

1. In case the cutter slot is necessary, machine specifications need to be informed.

## WTO QuickFlex® Adapter with CK Connection

For the WTO quick change tooling system QuickFlex®, there are adapters for BIG KAISER rough- and fine boring heads available. This offers the possibility for precise and fast machining of cross holes in the diameter range from 0.4 – 74 mm on turning machines.

Model	QuickFlex® Adapter						Spare Parts	
	Order No.	CK	F1	F2	L1	L2	Screw	Wrench
ER25QF-CKB1	470.721	CKB1	49	19	15.5	8.5	690.431	690.801
-CKB3	470.723	CKB3	49	31	19.5	12.5	690.433	690.803
ER32QF-CKB1	470.731	CKB1	58	19	15.5	8.5	690.431	690.801
-CKB3	470.733	CKB3	58	31	19.5	12.5	690.433	690.803
ER40QF-CKB2	470.742	CKB2	71	24	18	10	690.432	690.802
-CKB4	470.744	CKB4	71	39	23	15	690.434	690.804
ER50QF-CKB2	470.752	CKB2	82	24	19	10	690.432	690.802
-CKB4	470.754	CKB4	82	39	24	15	690.434	690.804

A.5







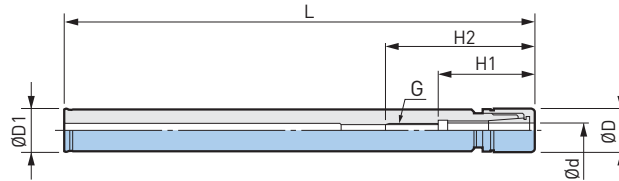
## Tool Holders Cylindrical Shank

<b>MEGA Micro Chuck</b>	<b>208</b>
<b>New Baby Chuck</b>	<b>209</b>
<b>Hydraulic Chucks</b>	<b>210</b>
<b>New Hi-Power Milling Chuck</b>	<b>211</b>
<b>Shrink Chucks</b>	<b>212 - 213</b>
<b>CK Shanks</b>	<b>214</b>
<b>MEGA Synchro Tapping Holder</b>	<b>215</b>
<b>Other Products</b>	<b>216</b>

A.6

# MEGA Micro Chuck

Ultra small diameter ( $\varnothing 10 - \varnothing 18$ ) to avoid interference. High precision is maintained by combination with MEGA New Baby Chuck.



$\varnothing 0.45 - 8.05 \text{ mm}$

A.6

Model	Order No.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	L	H1	H2	G	Collet Model	Nut Model	Weight (kg)
ST10 -MEGA3S -120	961.777	0.45 - 3.25	10	10	120	22	38	M4 P0.7	NBC3S-	MGN3S	0.06
ST12 -MEGA4S -130	961.773	0.45 - 4.05	12	12	130	26.5	47	M5 P0.8	NBC4S-	MGN4S	0.11
					160						0.13
ST14 -MEGA6S -160	961.774	0.45 - 6.05	14	14	160	28.5	49	M7 P0.75	NBC6S-	MGN6S	0.18
					200						0.21
ST16 -MEGA8S -160	803.596	2.95 - 8.05	18	16	160	31	50.5	M9 P0.75	NBC8S-	MGN8S	0.23
					200						0.25

1. MEGA nut is included.

Spare Parts			Accessories							
	MEGA Nut		MEGA Wrench		Micro Collet	Micro Seal Nut	Micro Collet Protective Case		$\alpha$ Taper Cleaner	
					▶ 247	▶ 249				
MEGA Micro Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	Model	Order No.
MEGA3S	MGN3S	969.480	MGR10	969.449	NBC3S-	-	NBB3S	968.330	SC-NBC3S	961.278
MEGA4S	MGN4S	969.481	MGR12	969.450	NBC4S-	-	NBB4S	968.364	SC-NBC4S	961.279
MEGA6S	MGN6S	969.482	MGR14	969.452	NBC6S-	MGN6S-PS	NBB6S	961.498	SC-NBC6S	961.280
MEGA8S	MGN8S	804.108	MGR18	801.705	NBC8S-	MGN8S-PS	NBB8S	805.802	SC-NBC8S	805.827

## MEGA Micro Chuck Set

Including convenient storage case.



Set Model	Order No.
SST12-MEGA4S-130	961.775

Set Model	Order No.
SST14-MEGA6S-160	961.776

Set Model	Order No.
SST16-MEGA8S-160	805.412

### Contents

- Body / ST12 - MEGA4S - 130 (with MGN4S nut)
- Collet / NBC4S - 3.0 & 4.0 (2 pcs.)
- Wrench / MGR12

### Contents

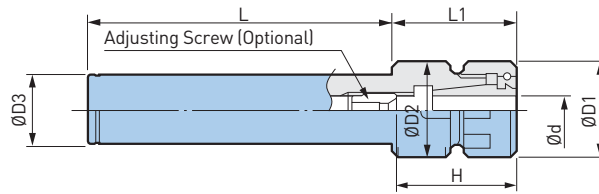
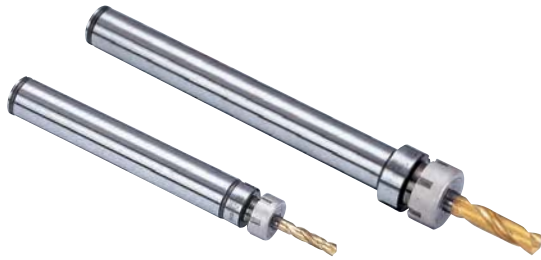
- Body / ST14 - MEGA6S - 160 (with MGN6S nut)
- Collet / NBC6S - 3.0,4.0,5.0 & 6.0 (4 pcs.)
- Wrench / MGR14

### Contents

- Body / ST16 - MEGA8S - 160 (with MGN8S nut)
- Collet / NBC8S - 3.0,4.0,6.0 & 8.0 (4 pcs.)
- Wrench / MGR18

## New Baby Chuck

Avoids interference when used in combination with BIG KAISER  
New Hi-Power Milling Chuck.



Ø 0.25 - 20 mm

Model	Order No.	Ød	ØD1	ØD2	ØD3	L	L1	H	Weight (kg)					
ST20 -NBS6	-100	0.25 - 6	20	19.5	20	100	24	20 - 40	0.27					
	-150					150			0.39					
	-250					250			0.64					
	-NBS8	-100	0.5 - 8	25		24.5	100	26	23 - 43	0.29				
		-150					150			0.41				
		-250					250			0.66				
	-NBS10	-100	1.5 - 10	30		29.5	100	28	35 - 45	0.32				
		-150					150			0.44				
		-250					250			0.69				
-350 *		350			0.93									
ST25 -NBS8	-150	0.5 - 8	25	24.5	25	150	26	23 - 42	0.62					
	-200					200			0.81					
	-250					250			1.00					
	-NBS10	-150	1.5 - 10	30		29.5	150	28	35 - 45	0.65				
		-200					200			0.84				
		-250					250			1.03				
	-NBS13	-150	2.5 - 13	35		34.5	150	34	41 - 60	0.67				
		-200					200			0.86				
		-250					250			1.05				
ST32	-NBS8 -150	0.5 - 8	25	24.5	32	150	26	23 - 42	0.99					
	-NBS10 -150					1.5 - 10			30	29.5	200	28	35 - 45	1.02
	-200										250			1.33
	-250										350			1.64
	-350 *										150			1.95
	-NBS13 -150	2.5 - 13	35	34.5			200	34			41 - 60			1.04
	-200					250	1.35							
	-250					300	1.67							
	-300					300	2.30							
	-NBS16 -150					2.5 - 16	42		41.5	150		34	45 - 65	1.05
	-200	200	1.37											
	-300	300	2.00											
	-NBS20 -150	2.5 - 20	46	45.5		150	34	48 - 65	1.05					
						-200			200	1.37				
						-300			300	2.00				

1. New baby nut is included.
2. \* Coolant through hole is not available.
3. "H" indicates the adjustment length with an adjustment screw.

Spare Parts			Accessories										
New Baby Nut			Wrench		NBC Collet		Baby Perfect Seal		Adjusting Screw				
New Baby Chuck			Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B
NBS6	NBN6	961.526	NBK6	961.525	NBC6-	BPS6-	NBA6B	961.527	M7	12	2		
NBS8	NBN8	961.549	NBK8	961.548	NBC8-	BPS8-	NBA8B	961.550	M9	13	2.5		
NBS10	NBN10	961.571	NBK10	961.570	NBC10-	BPS10-	NBA10B	961.572	M11	16	3		
NBS13	NBN13	961.597	NBK13	961.596	NBC13-	BPS13-	NBA13B	961.598	M14	20	4		
NBS16	NBN16	961.631	NBK16	961.630	NBC16-	BPS16-	NBA16B	961.632	M18	20	4		
NBS20	NBN20	961.679	NBK20	961.678	NBC20-	BPS20-	NBA20B	961.680	M21	20	4		

# Hydraulic Chuck Super Slim

Ultra precise Hydraulic Chuck with cylindrical body eliminates any interface problem.

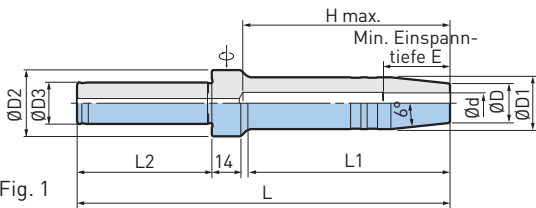


Fig. 1

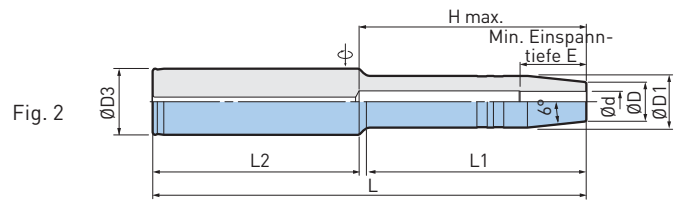


Fig. 2

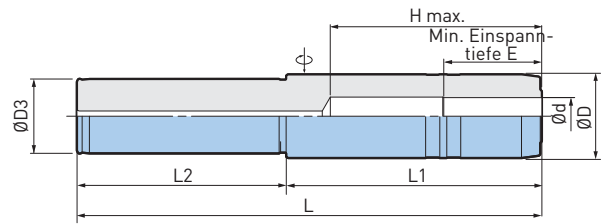


Fig. 3

Ø 4 - 20 mm

Model	Order No.	Fig.	Ød	ØD	ØD1	ØD2	ØD3	L	L1	L2	E	H max.	Weight (kg)
ST20 -HDC4S -180	805.835	1	4	14	18	32	20	180	94	65	19	-	0.40
-HDC6S -180	805.836		6		20				25		101		
-HDC8S -180	805.837		8	17	23				31			100	
-HDC10S -180	805.838		10	19	25				33				
-HDC12S -180	805.839		12	21	28				36				
ST32 -HDC10S -210	805.595	2	10	19	25	-	32	210	106	100	33	110	0.98
-HDC12S -210	805.560		12	21	28				36		109	1.06	
-HDC16 -200	805.840	3	16	36	-			200	110	90	43	91	1.27
-HDC20 -200	805.841		20	38	-						90	1.28	

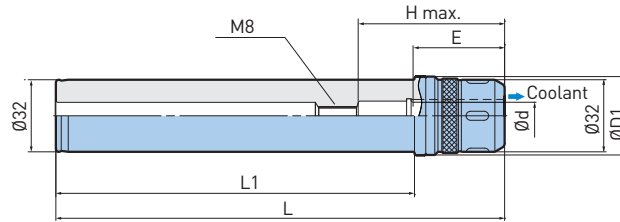
1. Adjusting screw cannot be used.

For Inner Bore Cleaner ▶ 286

For Straight Collet ▶ 272

# New Hi-Power Milling Chuck HMC12J

Extremely slim and rigid design with jet through coolant



A.6

Ø 6 - 12 mm

Model	Order No.	Ød	ØD1	L	L1	H max.	E	Wrench	Weight (kg)
ST32 -HMC12J -120	805.842	12	35	120	80	65	43	FK31-33	0.7
-160	805.843			160	120				0.9
-200	805.844			200	160				1.1

1. Wrench is to be ordered separately.

For Straight Collet ▶ 272

For Wrench ▶ 275

# Shrink Chuck Super Slim

Extremley slim design avoids interference with the side wall and draft of the mold.

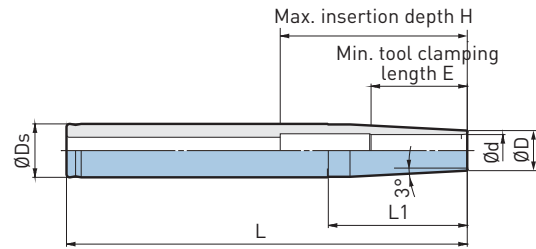


Fig. 2

A.6

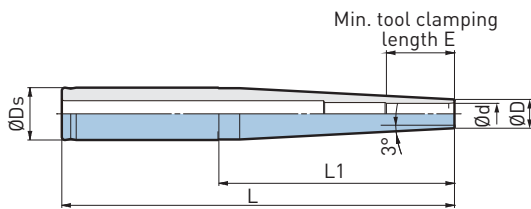


Fig. 1

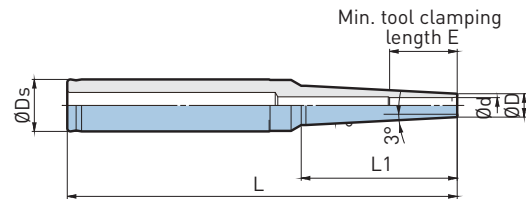


Fig. 3

Ø 4 - 12 mm

Model	Order No.	Fig.	Ød	ØD	ØDS	L	L1	H max.	E	Weight (kg)
ST12 -SRC4SS -120	802.189	1	4	7	12	120	51	-	16	0.10
-SRC6SS -120	802.190	2	6	9			32	52	26	0.10
ST20 -SRC4SS -150-K40	802.205	3	4	7	20	150	40	-	16	0.25
-SRC6SS -150-K60	802.209					60	-	26	0.25	
-200	802.210	1	6	9	20	200	110	-	26	0.30
-200-K60	802.211	3				60	0.30			
-250	802.212	1				110	0.35			
-250-K60	802.213	3				60	0.40			
-SRC8SS -150	802.217	1	8	11	20	150	90	-	26	0.25
-200	802.218					200				0.30
-250	802.219					250				0.40
-SRC10SS -150	802.197	2	10	13	20	150	71	60	32	0.25
-200	802.198					200				0.35
-250	802.199					250				0.40
-SRC12SS -150	802.200	2	12	15	20	150	52	70	36	0.25
-200	802.201					200				0.35
-250	802.202					250				0.45

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.



# Shrink Chuck Slim

Slim design avoids interference with the workpiece.

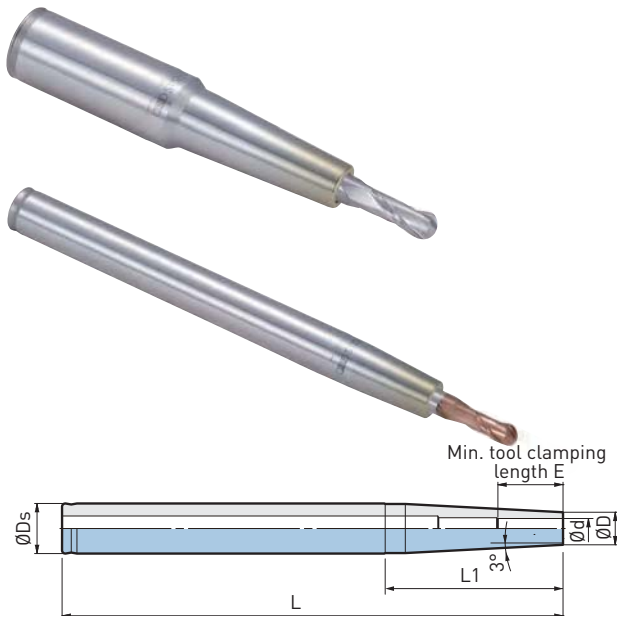


Fig. 1

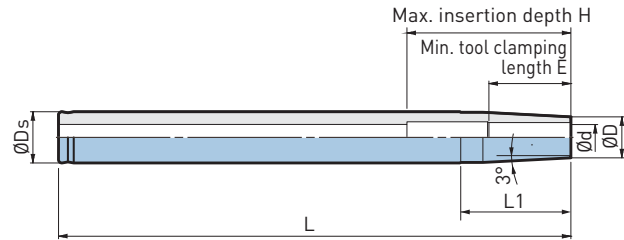


Fig. 2

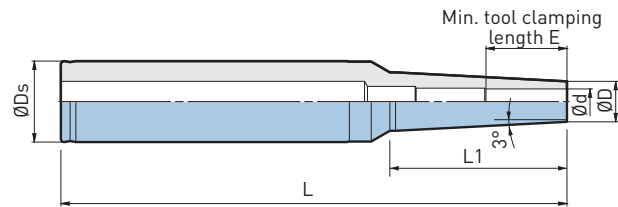


Fig. 3

A.6

Ø 8 - 20 mm

Model	Order No.	Fig.	Ød	ØD	ØDS	L	L1	H max.	E	Weight (kg)	
ST20 -SRC8S -150	802.214	1	8	13	20	150	71	-	26	0.25	
	200					0.35					
	250					0.45					
-SRC10S -150	802.194	2	10	16	20	150	43	60	32	0.25	
	200					0.35					
	250					0.45					
ST32 -SRC10S -150-K70	802.232	3	10	16	32	150	70	-	32	0.50	
	200					0.75					
	300					1.20					
-SRC12S -150-K70	802.238	3	12	19	32	150	70	-	36	0.55	
	200					0.80					
	300					1.20					
-SRC16S -150	802.241	1	16	24	32	150	129	-	38	1.20	
	802.245	2				200				70	0.60
	802.246	3				300				83	0.85
-SRC20S -150	802.247	2	20	28	32	150	50	80	38	1.30	
	802.248					200				0.60	
	802.249					300				0.85	
-SRC16S -300	802.245									1.30	
-SRC20S -300	802.250									1.30	

1. Use carbide cutter within a tolerance of h6.

For Inner Bore Cleaner ▶ 286

Please refer to the operation manual of heating / cooling equipment, as some equipment may not be compatible.

CK Shanks

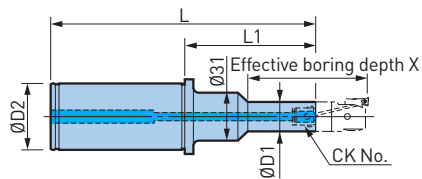


Fig. 1

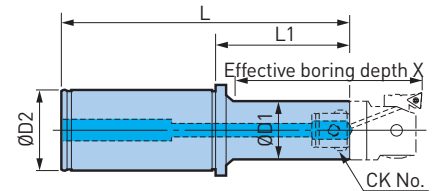


Fig. 2

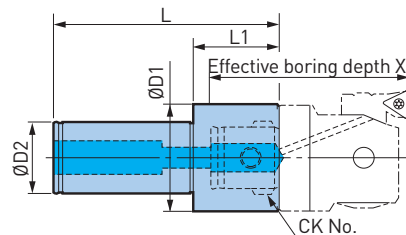


Fig. 3

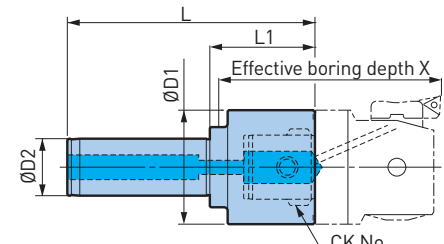


Fig. 4

A.6

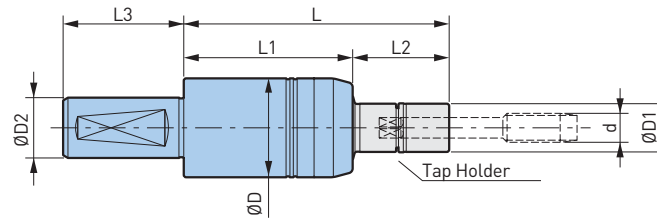
Model	Order No.	Fig.	CK	ØD1	ØD2	L	L1	X	Weight (kg)
ST32 -CKB1 -77	806.725	1	CKB1	19	32	157	77	73	0.7
-CKB2 -73	978.413	2	CKB2	24		152.5	72.5	100	0.7
-CKB3 -69	806.726		CKB3	31		149	69		0.8
-CKB4 -58	978.406	3	CKB4	39		138	58		0.9
-CKB5 -48	806.727	4	CKB5	50		128	48		0.9
-CKB6 -59	978.357		CKB6	64		139	59	125	1.5
ST42 -CKB1 -77	806.728	1	CKB1	19	42	157	77	73	1.0
-CKB2 -73	806.729	2	CKB2	24		152.5	72.5	100	1.0
-CKB3 -69	806.730		CKB3	31		149	69		1.1
-CKB4 -63	806.731	3	CKB4	39		143	63		1.2
-CKB5 -48	806.732	4	CKB5	50		128	48		1.3
-CKB6 -59	806.733		CKB6	64		139	59	125	1.8

1. Boring head and insert are to be ordered separately.

For Boring Head ▶ Chapter B

# MEGA Synchro Tapping Holder

Compensates for synchronization errors during rigid tapping. Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



M3 - M20

Model	Order No.	Tap Holder Model	d	ØD	ØD1	ØD2	L	L1	L2	L3	Weight (kg)
ST20 -MGT6 - 65	963.601	MGT6-d - 30	M3 - M8	36	16	20	95	65	30	40	0.5
		- 70					135		70		
		-100					165		100		
ST25 -MGT12 - 70	963.602	MGT12-d - 30	M5 - M12 P1/8	41	20	25	100	70	30	50	0.8
		- 70					140		70		
		-100					170		100		
ST32 -MGT20 - 90	963.603	MGT20-d - 35	M10 - M20 P1/4 - P1/2	54	30	32	125	90	35	55	1.5
		- 85					175		85		
		-115					205		115		

1. Tap holder and wrench are to be ordered separately.
2. Rigid tapping function is required on the machine tool.
3. Side lock holder model TSL is recommended as a basic holder.

For Tap Holders ▶ 276

For Accessories ▶ 280

For Side Lock Holder BBT ▶ 68

For Side Lock Holder BDV ▶ 109

For Side Lock Holder BIG CAPTO ▶ 188

A.6

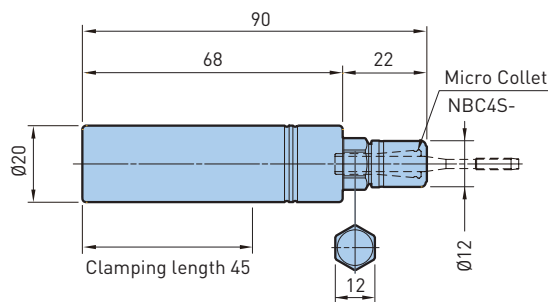
## For small Tap MGT3



M1 - M3

Model	Order No.
ST20-MGT3-90	978.356

For Collet ▶ 281



1. Nut is included. MEGA Wrench (MGR12) and collet are to be ordered separately.
2. 12 mm common spanner is also required to hold the body when clamping/unclamping the tap.
3. Rigid tapping function is required on the machine tool.
4. Not capable of supplying coolant through the holder body.

## Other products with cylindrical shank



▶ 498

**Point Master**

- Touch probe and edge finder
- High precision stroke and interchangeable stylus for measuring different applications



▶ 503

**Accu Center**

- Edge finder
- Simple and precise edge finder offering repeatability within 3 µm



▶ 450

**Fullcut Mill**

- Indexable insert endmill
- Shoulder and slot milling cutter with both high radial and axial rake angle

## A.6



▶ 476

**C-Cutter Mini**

- Ultra high feed chamfer mill
- 4 inserts and small tool diameter minimize cutting speed



▶ 482

**C-Cutter**

- Wide range chamfer mill
- Reduced number of tools and tool change time



▶ 488

**R-Cutter**

- Corner rounding mill
- Front & back chamfering
- 4 inserts multiply feed rate



▶ 496

**BF-Cutter**

- Back spot facing tool for cap screw hole
- Selected spot facing diameters suitable for cap screws



▶ 492

**Center Boy**

- Center and chamfer in one
- Accurate centering and chamfering can be obtained in a single operation



▶ 296

**MW Rough Boring Head**

- Twin-cutter boring head
- Fast and efficient roughing of small bores  
Ø 16 - 21 mm



▶ 487

**C-Centering Cutter**

- Centering and chamfer with insert
- Stable and long life time operation with insert

## Modular Turning / Lathe Tools

<b>HSK-T SERIES</b>	
<b>Selection Guide</b>	<b>218 - 219</b>
<b>Modular Turning Tools</b>	<b>220 - 227</b>
<b>BIG CAPTO SERIES</b>	
<b>Selection Guide</b>	<b>228 - 229</b>
<b>Modular Turning Tools</b>	<b>230 - 236</b>
<b>N/C LATHE TOOLING</b>	
<b>Smart Damper Turning</b>	<b>237</b>
<b>Collet Chucks</b>	<b>238 - 242</b>
<b>Centering Tool</b>	<b>243</b>

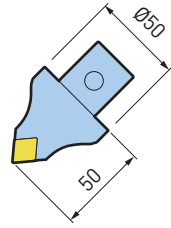
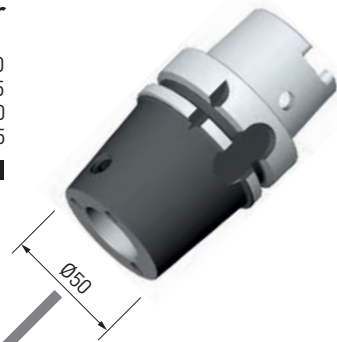


45°

**S50**  
Type S basic holder

HSK-T 63-S50 - 60  
- 75  
-100  
HSK-T100-S50 -115

▶ 220



Type S cartridge ▶ 221

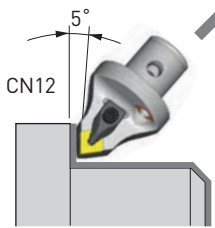
No. 1

No. 2

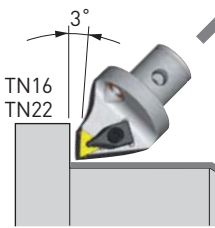
No. 3

No. 4

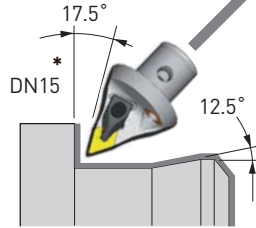
No. 5



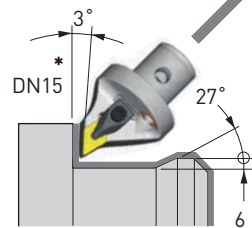
S50-DCLNN-00050-12



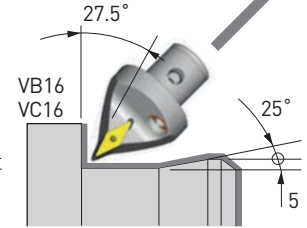
S50-DTJNR-00050-16(22)  
-DTJNL-00050-16(22)



S50-DDHNN-00050-15



S50-DDJNR-00050-15  
-DDJNL-00050-15



S50-SVQBN-00050-16

\* In case of DN1506 insert (thickness of 6.35mm), please replace the standard Carbide Shim by DNS1506 (option).

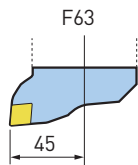
A.7

90°

**F63**  
Type F  
basic holder

HSK-T 63-F63  
HSK-T100-F63

▶ 222



**S63**  
Type S  
basic holder

▶ 220



Type S cartridge

▶ 221

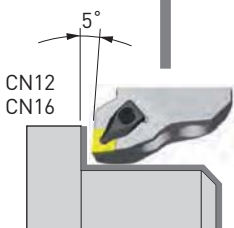
No. 1  
No. 3  
No. 5  
No. 8

Type F cartridge ▶ 223

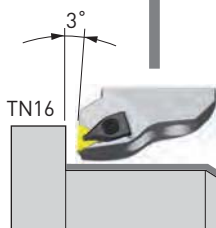
No. 10

No. 12

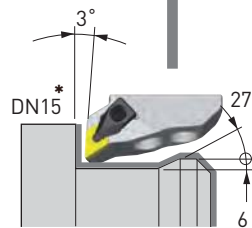
No. 13



F63-DCLNR-45035-12(16)  
-DCLNL-45035-12(16)

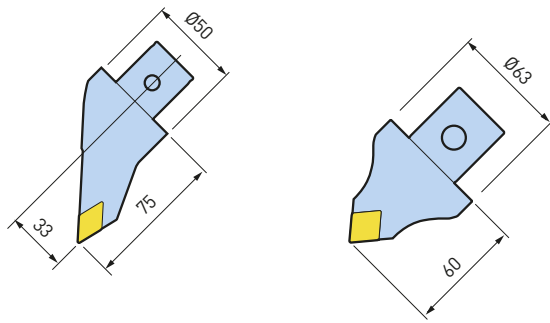


F63-DTJNR-45035-16  
-DTJNL-45035-16



F63-DDJNR-45035-15  
-DDJNL-45035-15

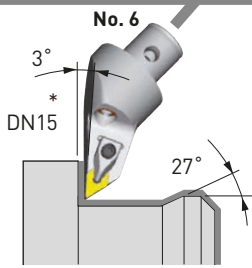
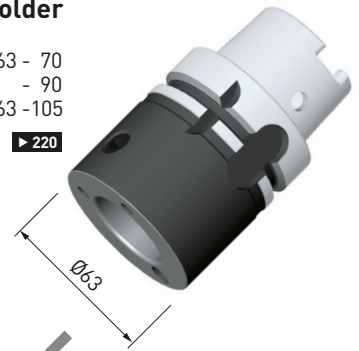
\* In case of DN1506 insert (thickness of 6.35mm), please replace the standard Carbide Shim by DNS1506 (option).



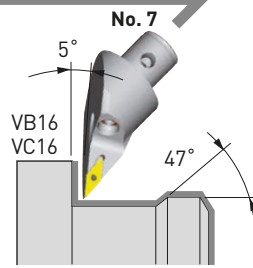
**S63**  
Type S basic holder

HSK-T 63-S63 - 70  
- 90  
HSK-T100-S63 -105

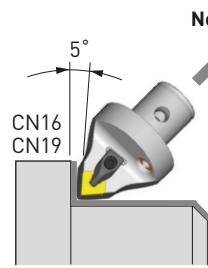
▶ 220



S50-DDJNR-33075-15  
-DDJNL-33075-15



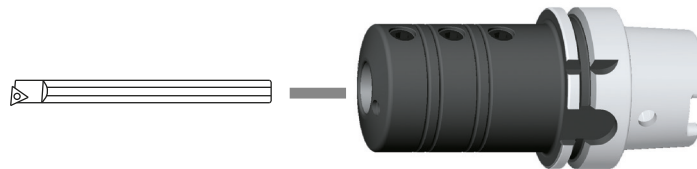
S50-SVLBR-33075-16  
-SVLBL-33075-16



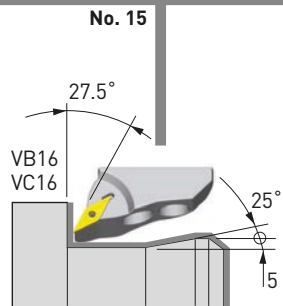
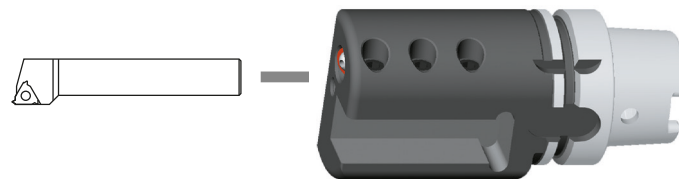
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-DCLNN-00060-19

A.7

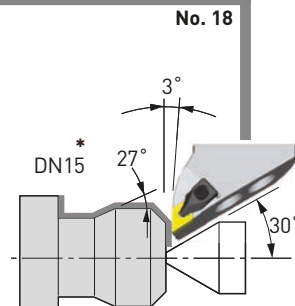
**Boring bar holder** ▶ 226



**Square tool holder 180°** ▶ 225



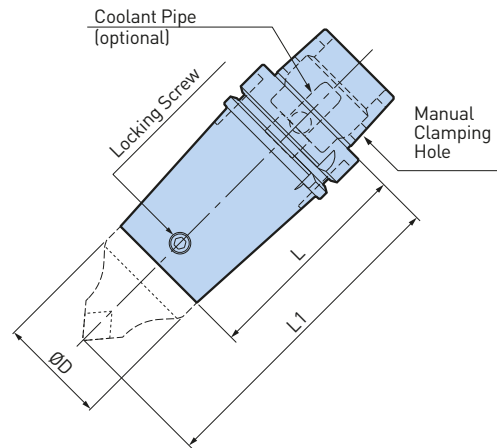
F63-SVQBR-45035-16  
-SVQBL-45035-16



F63-DDJNR-45055-15  
-DDJNL-45055-15



# 45° Basic Holders Type S



A.7

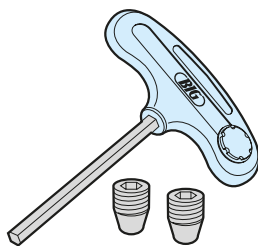
Type	Model	Order No.	ØD	L	L1	Locking Screw	Weight (kg)
S50	HSK-T63 -S50 - 60	801.303	50	60	110	CK5S	1.1
	- 75	974.006		75	125		1.4
	-100	801.302		100	150		1.8
S63	-S63 - 70	805.874	63	70	130	CK6S	1.4
	- 90	805.875		90	150		1.9
S50	HSK-T100 -S50 -115	805.876	50	115	165	CK5S	3.7
S63	-S63 -105	805.877	63	105	165	CK6S	4.0

1. Basic holders include a locking screw.
2. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

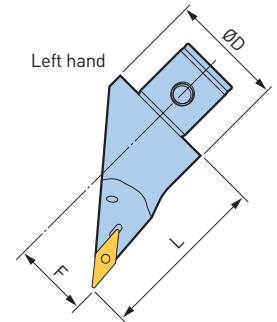
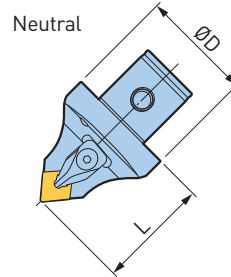
## Locking screw set (option)

For type S basic holder



Type	Set-Model	Order No.	Screw (2p)	T-Wrench (1p)
S50	CK5S	805.891	M10 x P1.0	CK-T5
S63	CK6S	805.892	M12 x P1.0	CK-T6

# 45° Cartridges Type S



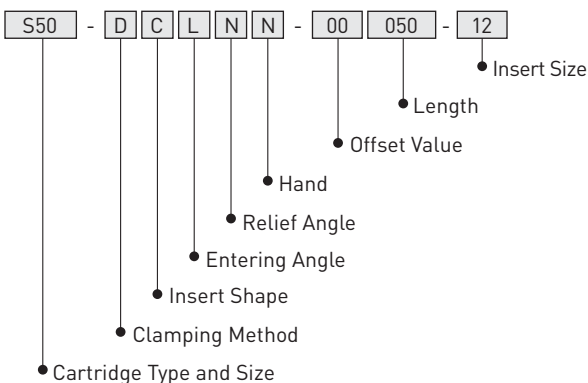
Entering Angle	No.	Hand	Model	Order No.	Insert	F	L	ØD	Clamp Piece
95°	1	N	S50 -DCLNN -00050-12	973.014	CN1204 Rhombic 80°	0	50	50	CP2
95°	8	N	S63 -DCLNN -00060-16	973.025	CN1606 Rhombic 80°	0	60	63	CP3
			-00060-19	805.724	CN1906 Rhombic 80°				CP5
93°	2 - 1	R	S50 -DTJNR -00050-16	973.015	TN1604 Triangle 60°	0	50	50	CP1
		L	-DTJNL -00050-16	973.016					
93°	2 - 2	R	S50 -DTJNR -00050-22	802.130	TN2204 Triangle 60°	0	50	50	CP2
		L	-DTJNL -00050-22	802.129					
93°	4	R	S50 -DDJNR -00050-15	973.017	DN1504 * (DN1506) Rhombic 55°	0	50	50	CP2
		L	-DDJNL -00050-15	973.018					
93°	6	R	S50 -DDJNR -33075-15	973.019		33	75		
		L	-DDJNL -33075-15	973.020					
107.5°	3	N	S50 -DDHNN -00050-15	973.021		0	50		
95°	7	R	S50 -SVLBR -33075-16	973.022		VB1604 **	33		
		L	-SVLBL -33075-16	973.023	VC1604 **				
117.5°	5	N	S50 -SVQBN -00050-16	973.024	Rhombic 35°	0	50		

A.7

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. \* Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim with DNS1506 (option).
4. \*\* VB1604 and VC1604 inserts are suitable.
5. \*\*\* M3.5 is screw-on type.

For Spare Parts ▶ 227

## Coding system for cartridge



Clamping Method	
D	Double-Clamp
S	Screw-On

Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°

Relief Angle	
N	0° Negative
B	5° Positive

Hand	
R	Right Hand
L	Left Hand
N	Neutral

# 90° Basic Holders Type F

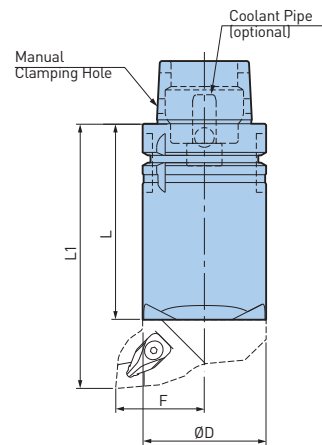


Fig. 1

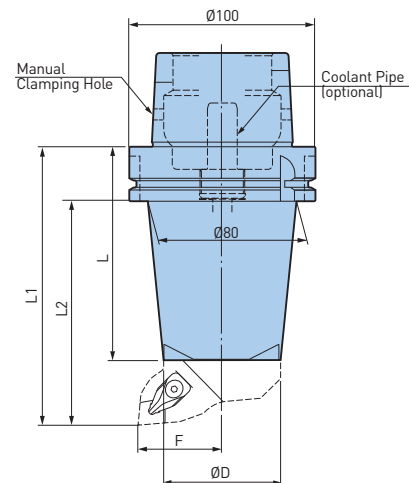


Fig. 2

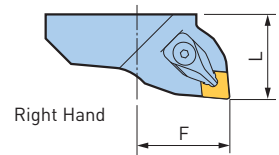
A.7

Type	Model	Order No.	Fig.	ØD	L	L1	L2	F	Weight (kg)
F63	HSK-T63 -F63 - 50	801.301	1	63	50	85	-	45	1.2
	- 75	974.056			75	110			1.8
	-100	974.057			100	135			2.4
	-130	801.299			130	165			3.1
	-170	801.300			170	205			4.1
F63	HSK-T100 -F63 -100	805.878	2	63	100	135	105	45	4.2
	-150	805.879			150	185	155		6.1

1. Basic holders include M10x22L and M10x25L screws for clamping cartridges.
2. Hexagon wrench is required to clamp cartridge (not included).
3. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

# 90° Cartridges Type F63



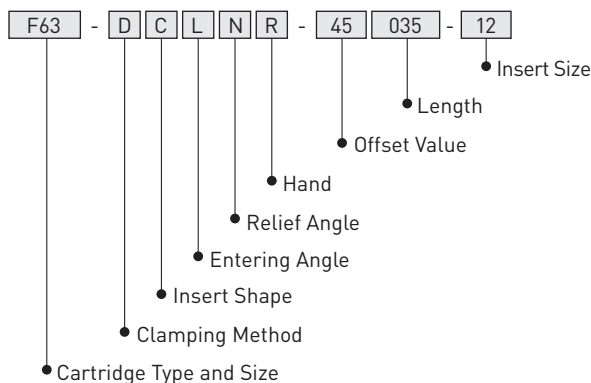
Entering Angle	No.	Hand	Model	Order No.	Insert	F	L	Clamp Piece
95°	10 - 1	R	F63 -DCLNR -45035-12	973.076	CN1204 Rhombic 80°	45	35	CP2
		L	-DCLNL -45035-12	973.077				
95°	10 - 2	R	F63 -DCLNR -45035-16	973.078	CN1606 Rhombic 80°	45	35	CP3
		L	-DCLNL -45035-16	973.079				
93°	12	R	F63 -DTJNR -45035-16	973.080	TN1604 Triangle 60°	45	35	CP1
		L	-DTJNL -45035-16	973.081				
93°	13	R	F63 -DDJNR -45035-15	973.082	DN1504 * (DN1506) Rhombic 55°	45	35	CP2
		L	-DDJNL -45035-15	973.083				
93°	18	R	F63 -DDJNR -45055-15	973.084	Rhombic 55°	45	55	CP2
		L	-DDJNL -45055-15	973.085				
117.5°	15	R	F63 -SVQBR -45035-16	973.086	VB1604 ** VC1604 ** Rhombic 35°	45	35	M3.5 ***
		L	-SVQBL -45035-16	973.087				

A.7

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. \* Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim with DNS1506 [option].
4. \*\* VB1604 and VC1604 inserts are suitable.
5. \*\*\* M3.5 is screw-on type.

For Spare Parts ▶ 227

## Coding system for cartridge



Clamping Method	
D	Double-Clamp
S	Screw-On

Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°
U	93°

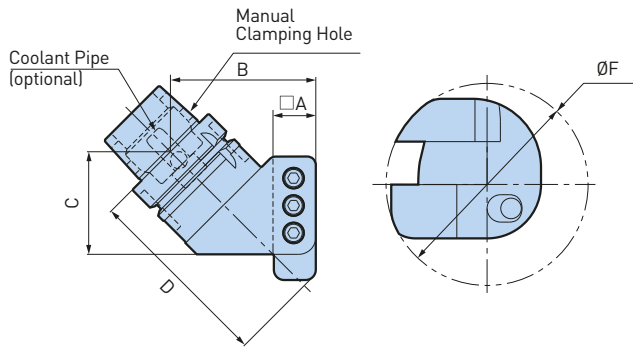
Relief Angle	
N	0° Negative
B	5° Positive

Hand	
R	Right Hand
L	Left Hand
N	Neutral

### Square Tool Holders



45 Type



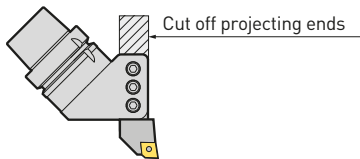
Hand	Model	Order No.	□ A	B	C	D	ØF	Weight (kg)
R	HSK-T63 -45 -BH25R -110	974.028	25	85	60	110	118	2.7
L	-BH25L -110	801.294						

A.7

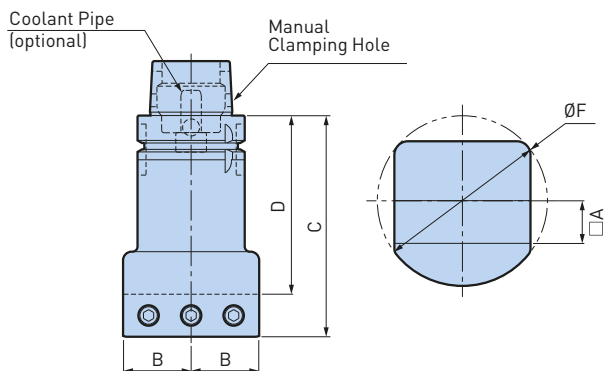
For Coolant Pipe ▶ 175

**Caution**

The excess length of a turning tool must be cut off to avoid interference with an ATC arm.



90 Type

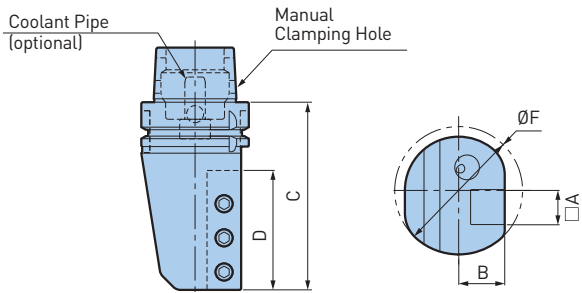


Hand	Model	Order No.	□ A	B	C	D	ØF	Weight (kg)
N	HSK-T63 -90 -BH20N - 85	806.246	20	32	85	65	80	2.2
	-BH25N -100	801.296	25	40	100	75	100	3.3
	-BH25N -130	801.297			130	105		4.0
N	HSK-T100-90-BH25N-150	805.537	25	55	150	125	128	6.7

For Coolant Pipe ▶ 175



180 Type

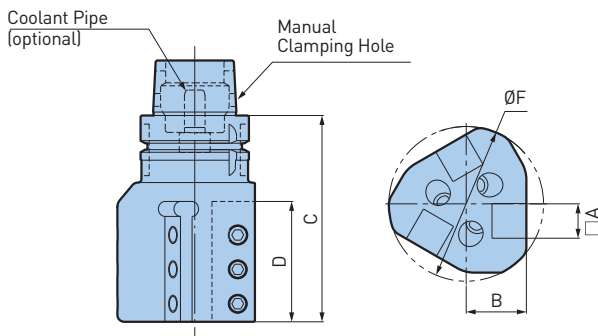


Hand	Model	Order No.	□A	B	C	D	ØF	Weight (kg)
R	HSK-T63 -180-BH20R-120	806.248	20	27	120	70	75	2.7
L	-BH20L-120	806.247						
R	HSK-T63 -180-BH25R-125	806.250	25	29.5	127	80	90	3.2
L	-BH25L-125	806.249						
R	HSK-T100-180-BH25R-140	805.306	25	50	140	90	7.5	
L	-BH25L-140	805.305						
R	-BH25R-180	805.536			180	90	120	9.7
L	-BH25L-180	805.535						

For Coolant Pipe ▶ 175

A.7

180 Multi Type



Hand	Model	Order No.	□A	B	C	D	ØF	Weight (kg)
R	HSK-T63-180-3BH20R-120	801.290	20	35	120	70	90	3.3
L	-3BH20L-120	801.289						
R	HSK-T63-180-3BH25R-125	806.252	25	45	127	80	110	5.0
L	-3BH25L-125	806.255						

For Coolant Pipe ▶ 175

Caution

60 degree indexing is required to the machine tool spindle.

# Boring Bar Holders

Application: boring and thread cutting

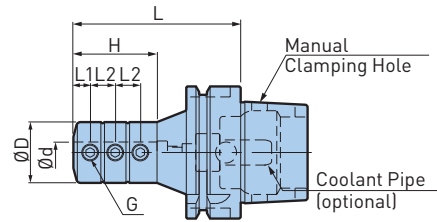


Fig. 1

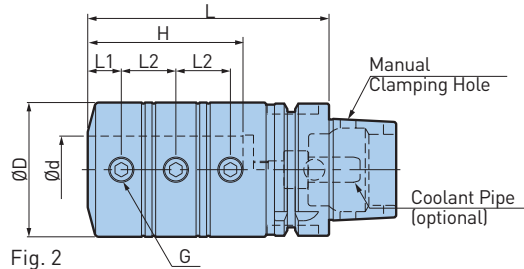


Fig. 2

Ø 6 - 40 mm

A.7

Model	Order No.	Fig.	Ød	ØD	L	L1	L2	H	G	Weight (kg)
HSK-T63 -BSL6 - 70	979.198	1	6	23	70	5	8	24	M5 P0.8	0.9
-BSL8 - 75	801.298		8	25	75	6	10	32	M6 P1.0	0.9
-BSL10 - 80	979.199		10	29	80	8	12	40	M8 P1.0	0.9
-BSL12 - 85	974.100		12	34	85		16	45		1.1
-BSL16 -100	978.135		16	40	100	10	21	60	M10 P1.25	1.3
-BSL20 -100	974.102	20	50	12		20	60	M10 P1.25	1.6	
-BSL25 -110	806.243	2	25	55	110	14	23	67	M12 P1.5	1.8
-BSL32 -125	806.244		32	64	125	16	26	74		2.6
-BSL40 -145	806.245		40	80	145	18	32	91		M16 P1.5
HSK-T100-BSL16 -105	805.880	1	16	40	105	10	21	60	M10 P1.25	2.7
-BSL20 -110	805.881		20	50	110	12	20		3.2	
-BSL25 -120	805.538		25	55	120	14	23	67	M12 P1.5	3.5
-BSL32 -125	805.539		32	64	125	16	26	74		4.0
-BSL40 -135	805.540		40	80	135	18	32	90		M16 P1.5

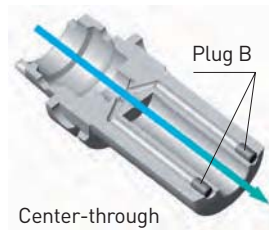
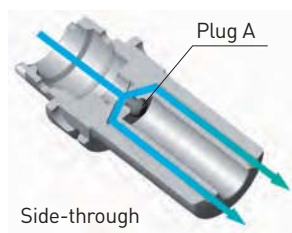
- Coolant pipe is to be ordered separately.
- Reduction sleeve (BSL sleeve) is available.

For Coolant Pipe ▶ 175

For BSL Sleeve ▶ 282

Interchangeable between center-through and side-through coolant supply by using plugs.

Adjustment for either right hand or left hand is also possible.

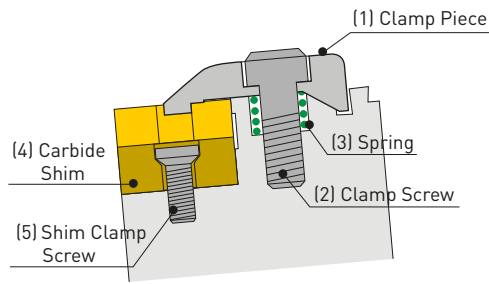


Chuck Model	Plug A	Plug B	
BSL 6	M5 P0.8	M4 P0.7	
8	M6 P1.0		
10		M5 P0.8	
12		M6 P1.0	
16	M6 P1.0		
20			M6 P1.0 *
25			M8 P1.25 *
32			
40			

- Both plugs are included as standard.
- \* Button-head bolt.



## Spare Parts for Carbide



Clamp Piece Set

Set Model	Order No.	(1) Clamp Piece	(2) Clamp Screw	(3) Spring	Compatible Insert
SCP1	973.181	CP1	M5 x 20	Ø8 x 10	TN16
SCP2	973.182	CP2			CN12, TN22 DN15
SCP3	973.183	CP3			CN16
SCP5	802.133	CP5			CN19

- 1 pce. each of the clamp piece, clamp screw and spring are included in the set.
- The tightening wrench is a 4mm hex wrench. T-type hex wrench is sold as Model T-4.

Carbide Shim Set

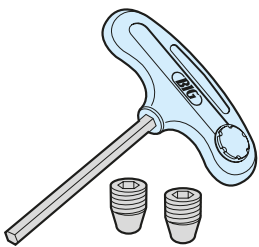
Compatible Insert	Set Model	Order No.	(4) Carbide Shim	(5) Shim Clamp Screw	Torx size
TN1604	STNS1604	973.184	TNS1604	M3 x 7	T10
TN2204	STNS2204	804.821	TNS2204	M4 x 8	T15
DN1504	SDNS1504	973.186	DNS1504	M4 x 8	T15
DN1506	SDNS1506	973.187	DNS1506	M4 x 8	T15
CN1204	SCNS1204	973.185	CNS1204	M4 x 8	T15
CN1606	SCNS1606	973.188	CNS1606	M5 x 12	T20
CN1906	SCNS1906	802.131	CNS1906	M5 x 12	T20

- 1 pce. each of the carbide shim and shim clamp screw are included in the set.
- The tightening wrench is a torx wrench. Driver-type torx wrench is sold as models DA-T10, DA-T15, and DA-T20.

A.7

## For S Type (Tilt Type) Basic Holders

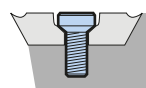
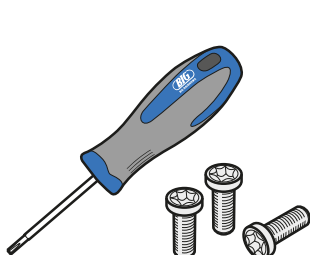
### Clamping Screw Set



Type	Set-Model	Order No.	Screw (2p)	T-Wrench (1p)
S50	CK5S	805.891	M10 x P1.0	CK-T5
S63	CK6S	805.892	M12 x P1.0	CK-T6

### Insert Clamping Screw Set

For VB16, VC16 Insert



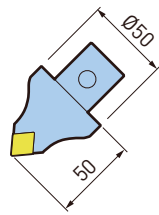
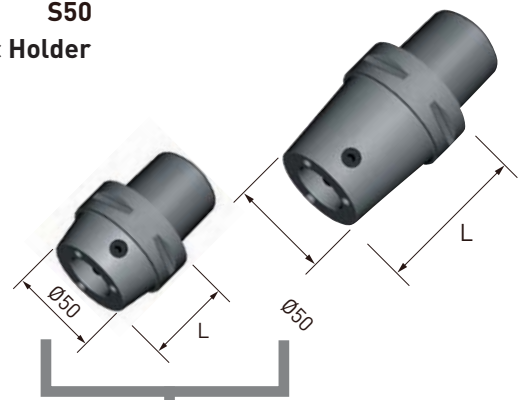
Set Model	Order No.
S3508DS	966.273

1. Set content M3.5 screw (10 pcs)
2. Driver-type wrench...DA-T15 (1 pc)

45°

**S50**  
**Type S Basic Holder**

- L
- C5-S50- 40
  - 55
  - 75
  - 100
  - C6-S50- 45
  - 75
  - 100
  - C8-S50-100
  - 135
- ▶ 230



**Type S Cartridge** ▶ 231

No. 1

S50-DCLNN-00050-12

No. 2

S50-DTJNR-00050-16  
-DTJNL-00050-16  
S50-DTJNR-00050-22  
-DTJNL-00050-22

No. 3

S50-DDHNN-00050-15

No. 4

S50-DDJNR-00050-15  
-DDJNL-00050-15

No. 5

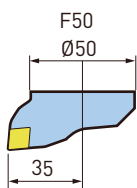
S50-SVQBN-00050-16

\* In case of DN1506 insert (thickness of 6.35 mm), please replace the standard Carbide Shim by DNS1506 (option).

90°

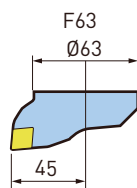
**F50**  
**Type F**  
**basic holder**

- C5-F50- 25
  - 50
  - 85
  - 125
- ▶ 232



**F63**  
**Type F**  
**basic holder**

- C6-F63- 30
  - 75
  - 100
  - 130
  - 170
  - C8-F63- 45
  - 100
  - 130
  - 170
- ▶ 232



**S50/S63**  
**Type S**  
**basic holder**

▶ 230



**Type S cartridge**

▶ 231

- No. 1
- No. 3
- No. 5
- No. 8

**Type F cartridge** ▶ 232/233

No. 10

F50-DCLNR-35035-12(16)  
-DCLNL-35035-12(16)  
F63-DCLNR-45035-12(16)  
-DCLNL-45035-12(16)

No. 12

F50-DTJNR-35035-16  
-DTJNL-35035-16  
F63-DTJNR-45035-16  
-DTJNL-45035-16

No. 13

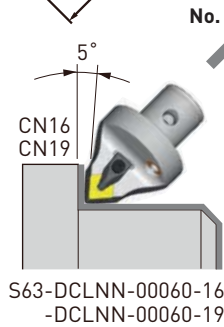
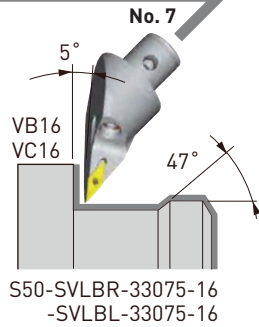
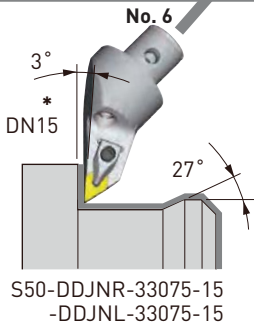
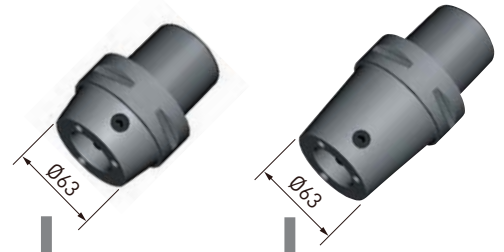
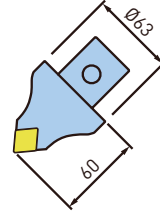
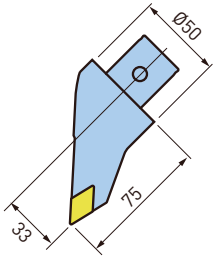
F50-DDJNR-35035-15  
-DDJNL-35035-15  
F63-DDJNR-45035-15  
-DDJNL-45035-15

\* In case of DN1506 insert (thickness of 6.35 mm), please replace the standard Carbide Shim by DNS1506 (option).

**S63**  
**Type S basic holder**

C6-S63- 90  
C8-S63-125

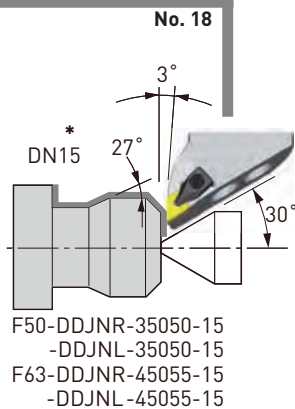
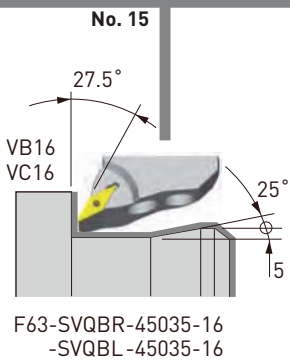
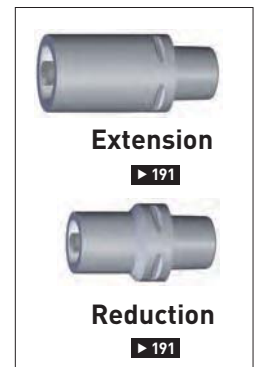
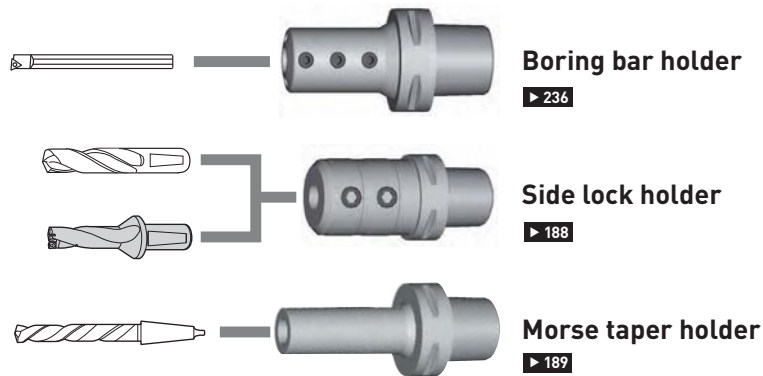
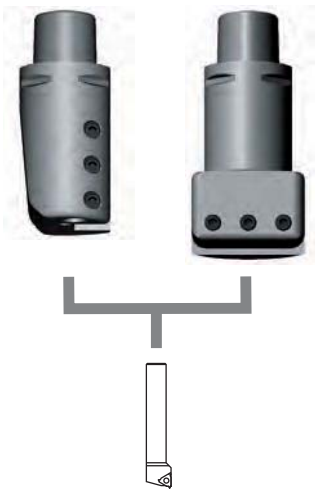
▶ 230



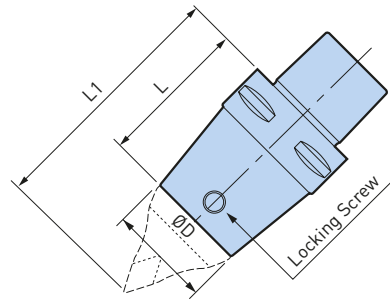
A.7

**Square tool holder**

▶ 234



### 45° Basic Holders Type S



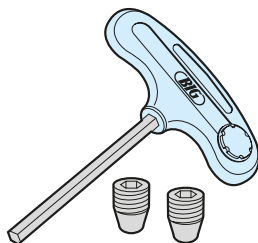
A.7

Type	Model	Order No.	ØD	L	L1	Locking Screw	Weight (kg)
S50	C5 -S50 - 40	973.001	50	40	90	CK5S	0.6
	- 55	973.002		55	105		0.8
	- 75	973.003		75	125		1.1
S50	C6 -S50 - 75	973.006	50	75	125	CK5S	1.5
	-100	973.007		100	150		2.0
S63	-S63 - 90	805.530	63	90	150	CK6S	2.1
S50	C8 -S50 -135	973.011	50	135	185	CK5S	4.0
S63	-S63 -125	973.013	63	125	185	CK6S	4.2

1. Basic holders include a locking screw.

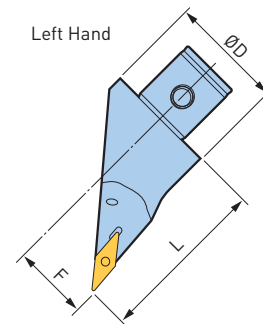
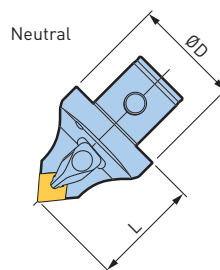
#### Locking Screw Set (option)

For type S basic holder



Type	Set-Model	Order No.	Screw (2p)	T-Wrench (1p)
S50	CK5S	805.891	M10 x P1.0	CK-T5
S63	CK6S	805.892	M12 x P1.0	CK-T6

# 45° Cartridges Type S



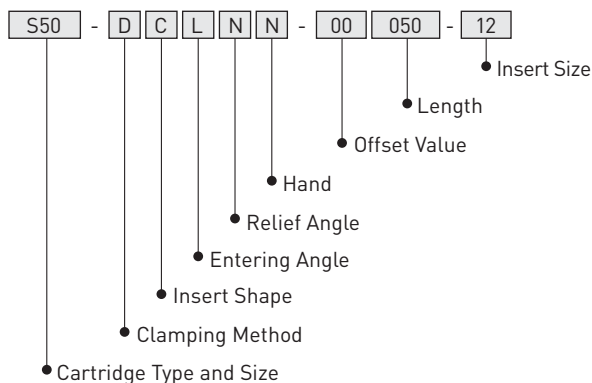
Entering Angle	No.	Hand	Model	Order No.	Insert	F	L	ØD	Clamp Piece
95°	1	N	S50 -DCLNN -00050-12	973.014	CN1204 Rhombic 80°	0	50	50	CP2
95°	8	N	S63 -DCLNN -00060-16	973.025	CN1606 Rhombic 80°	0	60	63	CP3
			-00060-19	805.724	CN1906 Rhombic 80°				CP5
93°	2 - 1	R	S50 -DTJNR -00050-16	973.015	TN1604 Triangle 60°	0	50	50	CP1
		L	-DTJNL -00050-16	973.016					
93°	2 - 2	R	S50 -DTJNR -00050-22	802.130	TN2204 Triangle 60°	0	50	50	CP2
		L	-DTJNL -00050-22	802.129					
93°	4	R	S50 -DDJNR -00050-15	973.017	DN1504 * (DN1506) Rhombic 55°	0	50	50	CP2
		L	-DDJNL -00050-15	973.018					
93°	6	R	S50 -DDJNR -33075-15	973.019		33	75		
		L	-DDJNL -33075-15	973.020					
107.5°	3	N	S50 -DDHNN -00050-15	973.021		0	50		
95°	7	R	S50 -SVLBR -33075-16	973.022		VB1604 **	33		
		L	-SVLBL -33075-16	973.023	VC1604 **				
117.5°	5	N	S50 -SVQBN -00050-16	973.024	Rhombic 35°	0	50		

A.7

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. \* Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim with DNS1506 (option).
4. \*\* Both VB1604 and VC1604 inserts are suitable.

For Spare Parts ▶ 227

## Coding system for cartridge



Clamping Method	
D	Double-Clamp
S	Screw-On

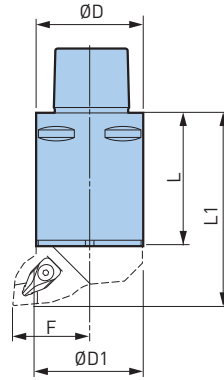
Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°

Relief Angle	
N	0° Negative
B	5° Positive

Hand	
R	Right Hand
L	Left Hand
N	Neutral

### 90° Basic Holders Type F

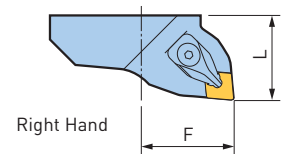


A.7

Type	Model	Order No.	ØD	ØD1	L	L1	F	Weight (kg)
F50	C5 -F50 - 25	801.657	50	50	25	60	35	0.5
	- 50	973.052			50	85		0.9
	- 85	973.053			85	120		1.4
	-125	973.054			125	160		2.0
F63	C6 -F63 - 30	973.055	63	63	30	65	45	0.9
	- 75	973.056			75	110		2.0
	-100	973.057			100	135		2.6
	-130	973.058			130	165		3.3
	-170	973.059			170	205		4.2
F63	C8 -F63 - 45	973.060	80	63	45	80	45	2.1
	-100	973.061			100	135		3.7
	-130	973.062			130	165		4.5
	-170	973.063			170	205		5.6

1. Basic holders include M10x22L and M10x25L screws for clamping cartridges.
2. Hexagon wrench is required to clamp cartridge (not included).

### 90° Cartridges Type F50

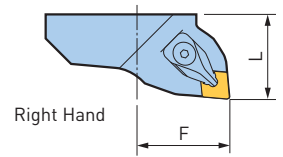


Entering Angle	No.	Hand	Model	Order No.	Insert	F	L	Clamp Piece
95°	10 - 1	R	F50 -DCLNR -35035-12	973.064	CN1204 Rhombic 80°	35	35	CP2
		L	-DCLNL -35035-12	973.065				
95°	10 - 2	R	F50 -DCLNR -35035-16	973.066	CN1606 Rhombic 80°	35	35	CP3
		L	-DCLNL -35035-16	973.067				
93°	12 - 1	R	F50 -DTJNR -35035-16	973.068	TN1604 Triangle 60°	35	35	CP1
		L	-DTJNL -35035-16	973.069				
95°	13	R	F50 -DDJNR -35035-15	973.070	DN1504 * [DN1506]	35	35	CP2
		L	-DDJNL -35035-15	973.071				
95°	18	R	F50 -DDJNR -35050-15	973.072	Rhombic 55°	35	50	CP2
		L	-DDJNL -35050-15	973.073				

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. \* Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim DNS1506 with (option).
4. \*\* Both VB1604 and VC1604 inserts are suitable.
5. \*\*\* M3.5 is screw-on type.

For Spare Parts ▶ 227

# 90° Cartridges Type F63



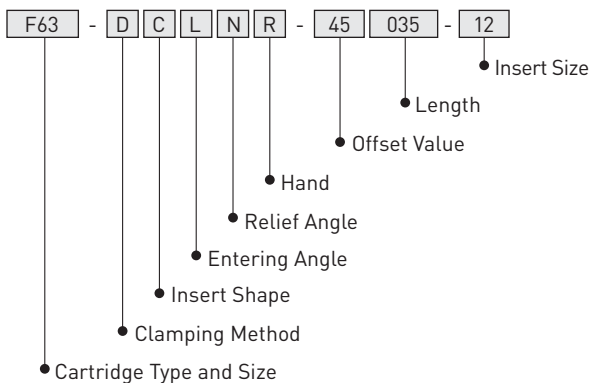
Entering Angle	No.	Hand	Model	Order No.	Insert	F	L	Clamp Piece
95°	10 - 1	R	F63 -DCLNR -45035-12	973.076	CN1204 Rhombic 80°	45	35	CP2
		L	-DCLNL -45035-12	973.077				
95°	10 - 2	R	F63 -DCLNR -45035-16	973.078	CN1606 Rhombic 80°	45	35	CP3
		L	-DCLNL -45035-16	973.079				
93°	12	R	F63 -DTJNR -45035-16	973.080	TN1604 Triangle 60°	45	35	CP1
		L	-DTJNL -45035-16	973.081				
93°	13	R	F63 -DDJNR -45035-15	973.082	DN1504 * (DN1506)	45	35	CP2
		L	-DDJNL -45035-15	973.083				
93°	18	R	F63 -DDJNR -45055-15	973.084	Rhombic 55°	45	55	CP2
		L	-DDJNL -45055-15	973.085				
117.5°	15	R	F63 -SVQBR -45035-16	973.086	VB1604 ** VC1604 **	45	35	M3.5 ***
		L	-SVQBL -45035-16	973.087				

A.7

1. Wrench is to be ordered separately.
2. Inserts are not included. The standard ISO inserts are to be adapted.
3. \* Carbide shim for 4.76 mm thick DN1504 insert is included as standard. In case of DN1506 insert (thickness of 6.35 mm), please replace the standard carbide shim by with DNS1506 (option).
4. \*\* Both VB1604 and VC1604 inserts are suitable.
5. \*\*\* M3.5 is screw-on type.

For Spare Parts ▶ 227

## Coding system for cartridge



Clamping Method	
D	Double-Clamp
S	Screw-On

Insert Shape	
C	Rhombic 80°
T	Triangle 60°
D	Rhombic 55°
V	Rhombic 35°

Entering Angle	
J	93°
L	95°
H	107.5°
Q	117.5°
U	93°

Relief Angle	
N	0° Negative
B	5° Positive

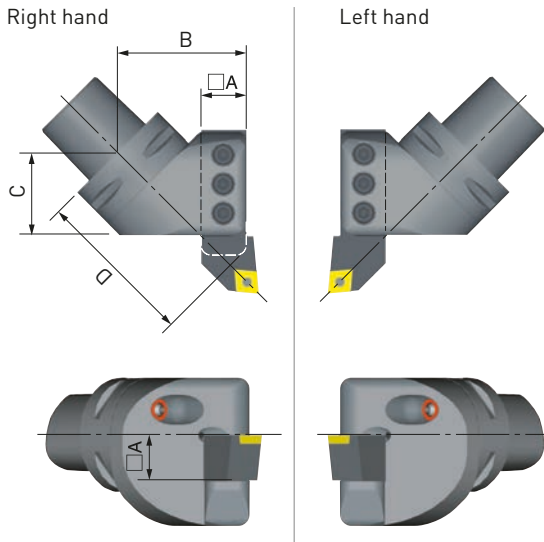
Hand	
R	Right Hand
L	Left Hand
N	Neutral



# Square Tool Holders



45 Type

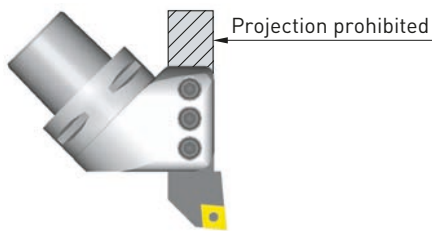


Hand	Model	Order No.	□A	B	C	D	∅F	Weight (kg)
R	C5-45-BH20R-5838	973.026	20	58	38	73	94	1.2
L	-BH20L-5838	973.027						1.2
R	C6-45-BH25R-7752	973.028	25	77	52	100	118	2.5
L	-BH25L-7752	800.776						2.5
R	C8-45-BH32R-85109	973.030	32	85	109	145	135	7.3
L	-BH32L-85109	973.031						7.3

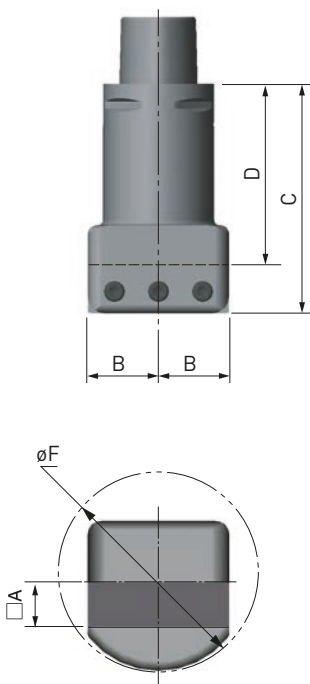
A.7

**Caution**

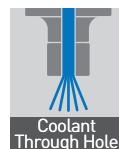
The excess length of a turning tool must be cut off to avoid interference with an ATC arm.



90 Type



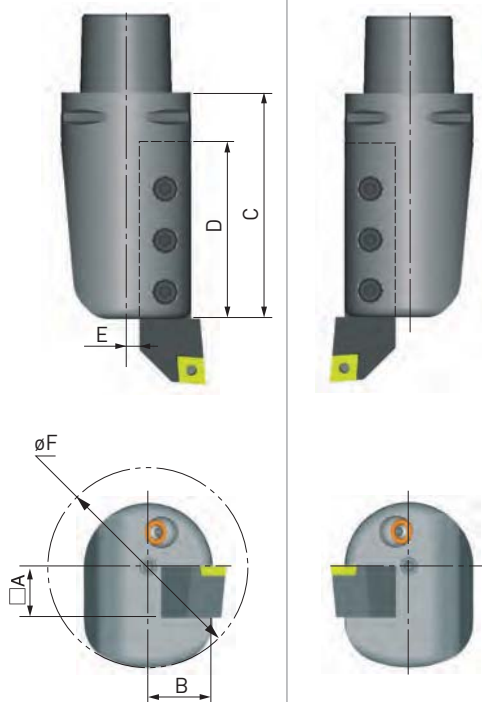
Hand	Model	Order No.	□A	B	C	D	∅F	Weight (kg)
N	C5-90-BH20N-32058	978.476	20	32	58	38	80	0.9
	-32105	801.653			105	85		2.2
N	C6-90-BH20N-32060	800.777	20	32	60	40	80	2.4
	-32115	800.778			115	95		3.4
	-BH25N-40071	800.779	25	40	71	46	100	3.3
-40130	801.664	130			105	4.2		
N	C8-90-BH32N-51085	800.889	32	51	85	53	128	6.0
	-51165	801.665			165	133		8.7



180 Type

Right hand

Left hand



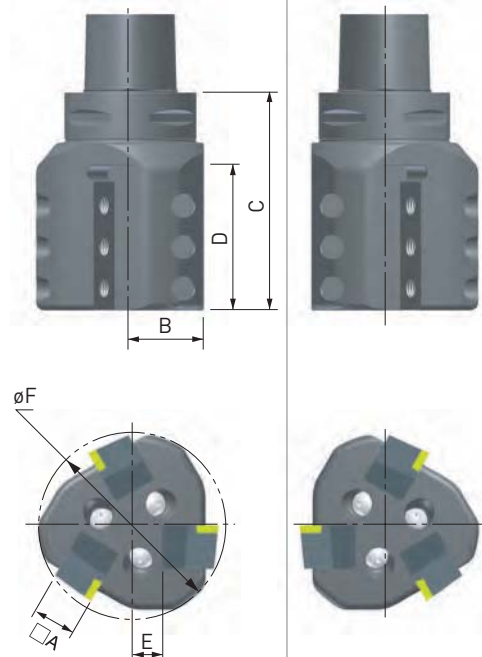
Hand	Model	Order No.	A	B	C	D	E	ØF	Weight (kg)
R	C5-180 -BH20R -2590	973.032	20	25	90	65	5	80	1.6
L	-BH20L -2590	973.033							
R	C6-180 -BH20R -32100	973.753	20	31.5	100	65	11.5	80	2.6
L	-BH20L -32100	801.663							
R	-BH25R -32120S	973.034	25	29.5	120	80	4.5	90	3.1
L	-BH25L -32120S	973.035							
R	C8-180 -BH32R -40125	973.038	32	40	125	85	8	128	6.0
L	-BH32L -40125	973.039							

A.7

180 Multi Type

Right hand

Left hand



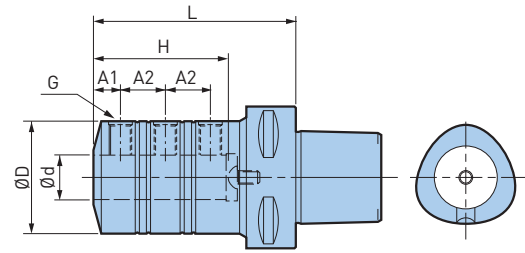
Hand	Model	Order No.	A	B	C	D	E	ØF	Weight (kg)
R	C5-180 -3BH20R -100	973.040	20	35	100	70	15	90	2.6
L	-3BH20L -100	973.041							
R	C6-180 -3BH20R -110	806.254	20	35	110	70	15	90	3.3
L	-3BH20L -110	806.253							
R	-3BH25R -125	806.256	25	45	125	80	20	110	5.0
L	-3BH25L -125	973.045							
R	C8-180 -3BH25R -130	973.046	25	45	130	90	20	110	6.1
L	-3BH25L -130	973.047							

Caution

60 degree indexing is required to the machine tool spindle.

# Boring Bar Holders

Application: boring and thread cutting



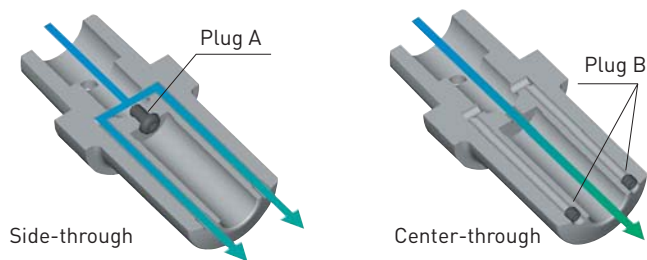
Ø 6 - 40 mm

A.7

Model	Order No.	Ød	ØD	L	A1	A2	H	G	Weight (kg)
C5 -BSL 6 - 70	973.088	6	23	70	5	8	41	M5 P0.8	0.6
-BSL 8 - 70	973.089	8	25		6	10	41	M6 P1.0	0.6
-BSL10 - 70	973.090	10	29		8	12	42	M8 P1.0	0.6
-BSL12 - 80	973.091	12	34	80	8	16	53	M8 P1.0	0.8
-BSL16 - 90	973.092	16	40			21	65		1.0
-BSL20 - 90	973.093	20	50	90	12	20	60	M10 P1.25	1.3
-BSL25 -100	973.094	25	55		14	23	70	M12 P1.5	1.6
-BSL32 -110	973.095	32	64	110	16	26	78	M12 P1.5	2.1
-BSL40 -130	973.096	40	80	130	18	32	93	M16 P1.5	3.7
C6 -BSL 6 - 70	973.097	6	23	70	5	8	41	M5 P0.8	1.4
-BSL 8 - 70	973.098	8	25		6	10	41	M6 P1.0	1.3
-BSL10 - 70	973.099	10	29		8	12	42	M8 P1.0	1.3
-BSL12 - 80	973.100	12	34	80	8	16	53	M8 P1.0	1.5
-BSL16 - 90	973.101	16	40			21	65		1.7
-BSL20 - 90	973.102	20	50	90	12	22	60	M10 P1.25	2.0
-BSL25 -100	973.103	25	55		14	26	70	M12 P1.5	2.3
-BSL32 -110	973.104	32	64	110	16	30	78	M12 P1.5	2.8
-BSL40 -130	973.105	40	80	130	18	32	93	M16 P1.5	4.3
C8 -BSL16 - 90	973.110	16	40	90	10	21	65	M10 P1.25	2.9
-BSL20 -100	973.111	20	50	100	12	22	70		3.3
-BSL25 -110	973.112	25	55	110	14	26	80	M12 P1.5	3.6
-BSL32 -120	973.113	32	64	120	16	30	88		4.1
-BSL40 -130	973.114	40	80	130	18	32	93	M16 P1.5	5.3

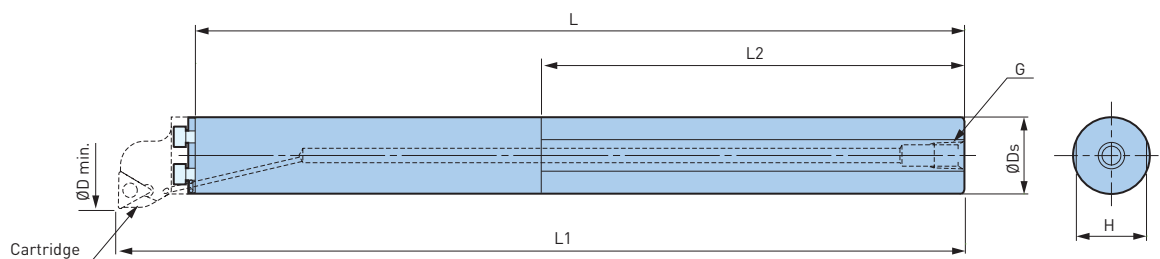
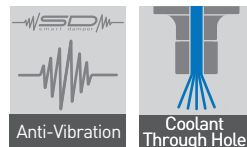
1. For sealing purpose, please use plugs according to drawing below. Both, plug A and B are included as standard.

For BSL Sleeve ▶ 282



Chuck Model	Plug A	Plug B
BSL 6	M8P1.25	M4 P0.7
8	M10P1.0	
10	M12P1.5	M5 P0.8
12	M14P1.5	
16	M18P1.5 (C5:M6P1.0)	M6 P1.0
20	M18P1.5 (C5:M6P1.0)	
25	M6P1.0 *	
32	M6P1.0 *	
40	M8P1.25 *	
40	M8P1.25 *	

## Smart Damper Turning



A.7

Model	Order No.	Cartridge	ØD min	ØDs	L	L1	L2	H	G	Weight (kg)
ST32-SDB40DP-320	806.422	B32	40	32	320	352	176	30	PT1/4	2.3
ST40-SDB50DP-410	806.423	B40	50	40	410	442	240	37	PT3/8	4.5

1. Clamp bolts (3 pcs.) and o-rings (2 pcs.) are included.
2. Cartridge is to be ordered separately.

## Cartridges

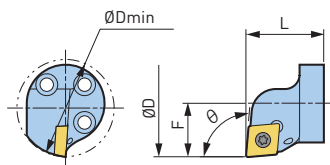


Fig. 1

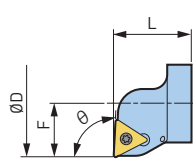


Fig. 2

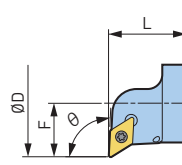


Fig. 3

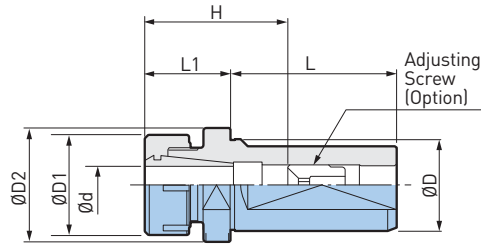
Model	Order No.	Type	Fig.	Insert	Hand	ØD min.	F	L	Entering Angle
B32 -SCLCR -22032 -12	806.424	B32	1	CC1204	R	40	22	32	95°
-STUCR -22032 -11	806.802		2	TC1102					93°
-STUPR -22032 -16	806.425		3	TP1604					
-SDUCR -22032 -11	806.426		3	DC11T3					
B40 -SCLCR -27032 -12	806.427	B40	1	CC1204	R	50	27	32	95°
-STUCR -27032 -11	806.803		2	TC1102					93°
-STUPR -27032 -16	806.428		3	TP1604					
-SDUCR -27032 -11	806.429		3	DC11T3					

1. An insert clamping wrench is included in each cartridge.
2. Insert must be ordered separately (ISO standard insert can be used.)

For TC11 Insert ▶ 409

## New Baby Chuck Stopper

Flange as a stopper enables presetting of the tool away from machine and minimizes downtime. Shank is designed to be directly mounted into the drill holder of turret.



Ø 2.5 - 20 mm

Model	Order No.	Ød	ØD	ØD1	ØD2	L	L1	H
SLS25 -NBS13	- 30	2.5 - 13	25	35	32	54	30	41 - 60
	- 60						60	
SLS32 -NBS13	- 30	2.5 - 13	32	35	39.5	58	30	41 - 60
	- 60						60	
	-100						100	
	-NBS20 - 30						30	
- 60	60							
-100	100							
SLS40 -NBS13	- 30	2.5 - 13	40	35	49.5	68	30	41 - 60
	- 60						60	
	-100						100	
	-NBS20 - 30						30	
- 60	60							
-100	100							

A.7

1. New baby nut is included.
2. Designed to be capable of supplying coolant through the body.
3. "H" indicates the adjustment length with an adjusting screw.

Spare Parts			Accessories									
	New Baby Nut		Wrench		NBC Collet		Baby Perfect Seal		Adjusting Screw		Rubber	
					▶ 250	▶ 262						
New Baby Chuck	Model	Order No.	Model	Order No.	Model	Model	Model	Order No.	G	L	B	
NBS6	NBN6	961.526	NBK6	961.525	NBC6-	BPS6-	NBA6B	961.527	M7	12	2	
NBS8	NBN8	961.549	NBK8	961.548	NBC8-	BPS8-	NBA8B	961.550	M9	13	2.5	
NBS10	NBN10	961.571	NBK10	961.570	NBC10-	BPS10-	NBA10B	961.572	M11	16	3	
NBS13	NBN13	961.597	NBK13	961.596	NBC13-	BPS13-	NBA13B	961.598	M14	20	4	
NBS16	NBN16	961.631	NBK16	961.630	NBC16-	BPS16-	NBA16B	961.632	M18	20	4	
NBS20	NBN20	961.679	NBK20	961.678	NBC20-	BPS20-	NBA20B	961.680	M21	20	4	

# New Baby Chuck Standard

Versatile as a basic holder for drills, taps, reamers and small tool bits.

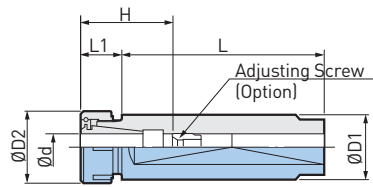


Fig. 1

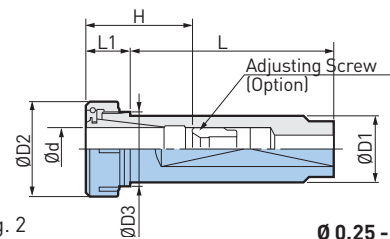


Fig. 2

Ø 0.25 - 20 mm

Model	Order No.	Fig.	Ød	ØD1	ØD2	ØD3	L	L1	H	
SL16 -NBS6 - 40	802.154	1	0.25 - 6	16	20	-	40	15	20 - 40	
	802.155						80			
	-NBS8 - 40						40			
	SL16 -NBS8 - 40	802.156	1	0.5 - 8	16	25	-	40	16.5	23 - 42
		802.157						80		
		-NBS10 - 40						40		
SL16 -NBS10 - 40		802.152	2	1.5 - 10	16	30	21	40	37	35 - 45
		802.153						80		
		-NBS13 - 40						40		
	SL20 -NBS6 - 40	802.162	1	0.25 - 6	20	20	-	40	15	20 - 40
		802.163						80		
		-NBS8 - 40						40		
SL20 -NBS8 - 40		802.164	1	0.5 - 8	20	25	-	40	16.5	23 - 42
		802.165						80		
		-NBS10 - 40						40		
	SL20 -NBS10 - 40	802.158	2	1.5 - 10	20	30	21	40	18	35 - 45
		802.159						80		
		-NBS13 - 40						40		
SL20 -NBS13 - 40		802.160	2	2.5 - 13	20	35	26	40	43	41 - 60
		802.161						80		
		-NBS16 - 40						40		
	SL22 -NBS6 - 40	804.271	1	0.25 - 6	22	20	-	40	15	20 - 40
		804.272						80		
		-NBS8 - 40						40		
SL22 -NBS8 - 40		804.273	1	0.5 - 8	22	25	-	40	16.5	23 - 42
		804.274						80		
		-NBS10 - 40						40		
	SL22 -NBS10 - 40	804.267	2	1.5 - 10	22	30	-	40	18	35 - 45
		804.268						80		
		-NBS13 - 40						40		
SL22 -NBS13 - 40		804.269	2	2.5 - 13	22	35	26	40	21.5	41 - 47
		804.270						80		
		-NBS16 - 40						40		
	SL25 -NBS6 - 80	802.173	1	0.25 - 6	25	20	-	80	15	20 - 40
		802.172						120		
		-NBS8 - 80						80		
SL25 -NBS8 - 80		802.175	1	0.5 - 8	25	25	-	80	16.5	23 - 42
		802.174						120		
		-NBS10 - 80						80		
	SL25 -NBS10 - 80	802.167	2	1.5 - 10	25	30	-	80	18	35 - 45
		802.166						120		
		-NBS13 - 80						80		
SL25 -NBS13 - 80		802.169	2	2.5 - 13	25	35	26	80	21.5	41 - 60
		802.168						120		
		-NBS16 - 80						80		
	SL25 -NBS16 - 80	802.171	2	2.5 - 16	25	42	32	80	48	45 - 65
		802.170						120		
		-NBS20 - 80						80		
SL25.4 -NBS6 - 80		804.282	1	0.25 - 6	25.4	20	-	80	15	20 - 40
		804.281						120		
		-NBS8 - 80						80		
	SL25.4 -NBS8 - 80	804.284	1	0.5 - 8	25.4	25	-	80	16.5	23 - 42
		804.283						120		
		-NBS10 - 80						80		
SL25.4 -NBS10 - 80		804.276	2	1.5 - 10	25.4	30	-	80	18	35 - 45
		804.275						120		
		-NBS13 - 80						80		
	SL25.4 -NBS13 - 80	804.278	2	2.5 - 13	25.4	35	26	80	21.5	41 - 50
		804.277						120		
		-NBS16 - 80						80		
SL25.4 -NBS16 - 80		804.280	2	2.5 - 16	25.4	42	32	80	48	45 - 65
		804.279						120		
		-NBS20 - 80						80		
	SL32 -NBS13 - 100	802.176	1	2.5 - 13	32	35	-	100	21.5	41 - 60
		802.177						150		
		-NBS16 - 100						100		
SL32 -NBS16 - 100		802.178	2	2.5 - 16	32	42	-	100	21.5	45 - 65
		802.179						150		
		-NBS20 - 100						100		
	SL32 -NBS20 - 100	802.180	2	2.5 - 20	32	46	36	100	21.5	48 - 65
		802.181						150		

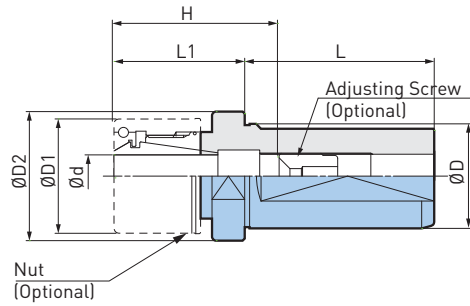
1. New baby nut is included.
2. "H" indicates the adjustment length with an adjusting screw.

For New Baby Collet ▶ 250

A.7

# MEGA ER Grip Stopper

High precision components outperform standard ER collet system.



Ø 2.75 - 20 mm

A.7

Model	Order No.	$\varnothing d$	$\varnothing D$	$\varnothing D1$	$\varnothing D2$	L	L1	H	Adjusting Screw
SLS25-MEGA ER20 -45/NL	803.571	2.75 - 13	25	35	32	54	45	42 - 62	NBA13B
-75/NL	803.572						75		
SLS32-MEGA ER20 -45/NL	803.573	2.75 - 13	32	35	39.5	58	45	42 - 62	NBA13B
-75/NL	803.574						75		
-MEGA ER32 -45/NL	803.575	2.75 - 20		50	50		45	47 - 68	NBA20B
-75/NL	803.576			75	50 - 68				
SLS40-MEGA ER20 -45/NL	803.577	2.75 - 13	40	35	49.5	68	45	42 - 62	NBA13B
-75/NL	803.578						75		
-MEGA ER32 -45/NL	803.579	2.75 - 20		50	50		45	50 - 68	NBA20B
-75/NL	803.580			75					

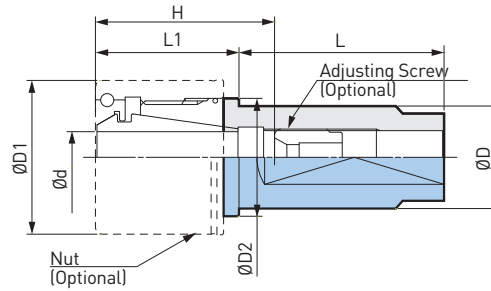
1. Nut is not included. Refer to the "accessories" table on the next page and select the suitable nut according to applications.
2. "H" indicates the adjustment length with an adjusting screw.

For ER Collet ▶ 266



# MEGA ER Grip Standard

Flat is provided on the shank to be mounted in the tool post of the NC lathe directly.



Ø 1.9 - 16 mm

Model	Order No.	Ød	ØD	ØD1	ØD2	L	L1	H	Adjusting Screw
SL16 -MEGA ER11 - 40/NL	803.554	2.75 - 6	16	19	-	40	19	23 - 40	NBA6B
- 80/NL	803.555					80			
SL20 -MEGA ER11 - 40/NL	803.560	2.75 - 6	20	19	-	40	19	23 - 40	NBA6B
- 80/NL	803.561					80			
-MEGA ER16 - 40/NL	801.714	1.9 - 10	20	30	23	40	28	35 - 47	NBA10B
- 80/NL	803.562					80			
SL25 -MEGA ER11 - 60/NL	803.564	2.75 - 6	25	19	-	60	19	23 - 40	NBA6B
-100/NL	803.563					100			
-MEGA ER16 - 60/NL	803.566	1.9 - 10	25	30	-	60	28	35 - 47	NBA10B
-100/NL	803.565					100			
-MEGA ER20 - 60/NL	803.568	2.75 - 13	25	35	27	60	30	42 - 62	NBA13B
-100/NL	803.567					100			
-MEGA ER25 - 60/NL	803.570	2.75 - 16	25	42	33.5	60	48	44 - 67	NBA16B
-100/NL	803.569					100			
SL19.05-MEGA ER11 - 40/NL	803.556	2.75 - 6	19.05	19	-	40	19	23 - 40	NBA6B
- 80/NL	803.557					80			
-MEGA ER16 - 40/NL	803.558	1.9 - 10	19.05	30	23	40	28	35 - 47	NBA10B
- 80/NL	803.559					80			

1. Nut is not included. Refer to the "accessories" table below and select the suitable nut according to applications.
2. "H" indicates the adjustment length with an adjusting screw.

For ER Collet ▶ 266

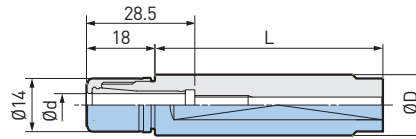
A.7

Accessories														
MEGA ER Grip	Model	Order No.	Model	Model	Order No.	Model	Order No.	Model	Order No.	Model	Order No.	G	L	B
MEGA ER11	-	-	-	-	-	ERN11	803.581	NBK 6	961.525	NBA6B	961.527	M7	12	2
MEGA ER16	MERN16	967.801	MERPS16-	MGR30L	969.448	ERN16	803.582	NBK10	961.570	NBA10B	961.572	M11	16	3
MEGA ER20	MERN20	967.802	MERPS20-	MGR35L	969.460L	ERN20	803.583	NBK13	961.596	NBA13B	961.598	M14	20	4
MEGA ER25	MERN25	967.803	MERPS25-	MGR42L	969.462L	ERN25	803.584	NBK16	961.630	NBA16B	961.632	M18	20	4
MEGA ER32	MERN32	967.804	MERPS32-	MGR50L	969.464L	ERN32	803.585	FK45-50L	801.037	NBA20B	961.680	M21	20	4

1. MEGA wrench is required for MEGA nut and MEGA ER perfect seal.
2. Wrench is for ER nut.

## MEGA Micro Chuck

Smaller nut diameter than body allows installation into toolholder of small lathes from the back side.



Ø 0.45 - 6.05 mm

Model	Order No.	Ød	ØD	L	Collet Model
SL16 -MEGA6S -60	803.594	0.45 - 6.05	16	60	NBC6S-
SL20 -MEGA6S -40	803.595		20	40	
-80	803.602		80		
SL15.875-MEGA6S -60	803.593		15.875	60	

For MEGA Wrench ▶ 271

For Micro Collet ▶ 247

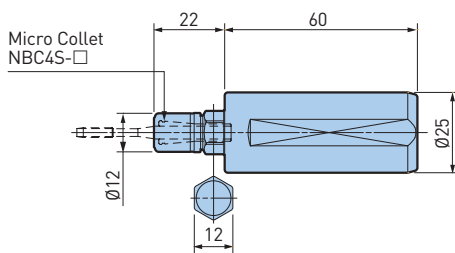
A.7

1. MEGA nut is included.
2. Designed to be capable of supplying coolant through the body.
3. MEGA wrench (MGR14) is to be ordered separately.

## MEGA Synchro Tapping Holder

### Rigid tapping attachment with error compensation

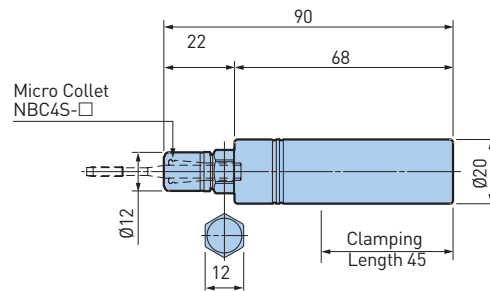
Improves thread quality and tool life by reducing thrust loads caused by synchronization errors up to 90%.



Model	Order No.
SLS25-MGT3-22	804.115

For Accessories ▶ 281

1. MEGA nut is included.
2. MEGA wrench (MGR12) and common spanner (12 mm) are required to clamp/unclamp the tap.



Model	Order No.
ST20-MGT3-90	978.356

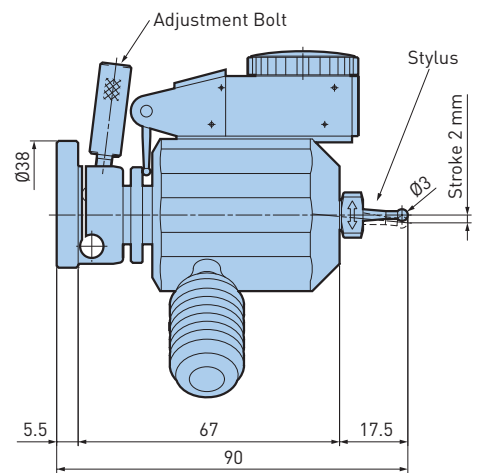
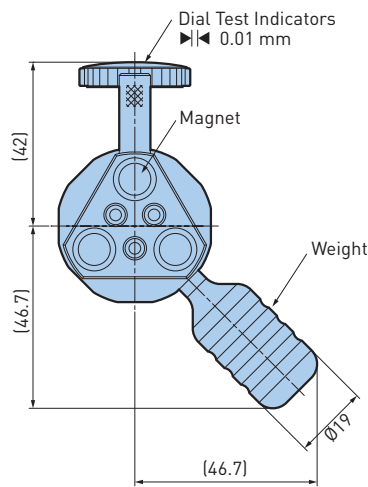
For Accessories ▶ 281

1. MEGA nut is included.
2. MEGA wrench (MGR12) and common spanner (12 mm) are required to clamp/unclamp the tap.
3. There is no flat on the shank.

## Centering Tool for Lathes

### Easy Centering with Static Dial Gauge

- Centering the tool holder while watching the dial gauge is possible, as the dial position is static at front
- Easy setting with fine adjustment mechanism (adjustment amount: 0.01mm)
- Magnet base allows for flexible mounting positions

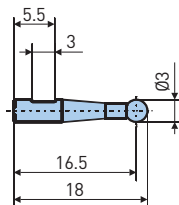


A.7

Model	Order No.	Min. Scale	Max. Spindle Speed	Weight (kg)	Stylus
CTL-90	806.436	0.01 mm	100 U/min	0.4 kg	ST3-CT90

1. Stylus included

### Stylus for CTL-90



Model	Order No.	Material
ST3-CT90	806.437	Rubin

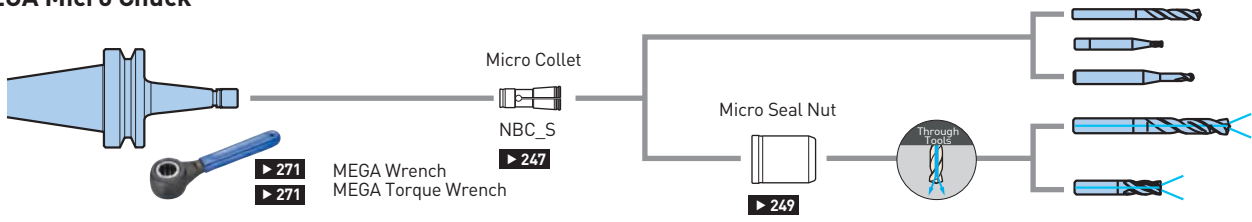
1. Longer stylus is also available upon request. Please contact BIG KAISER dealer.



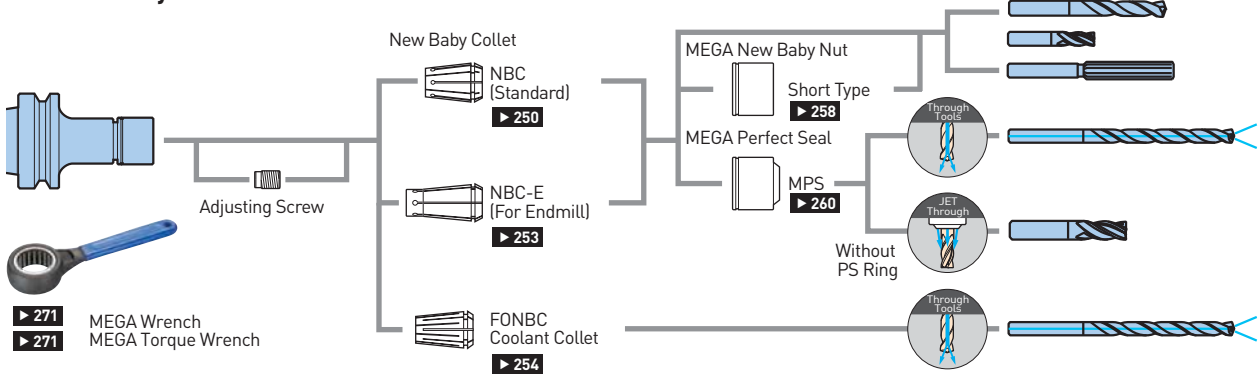
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**MEGA Micro Chuck**

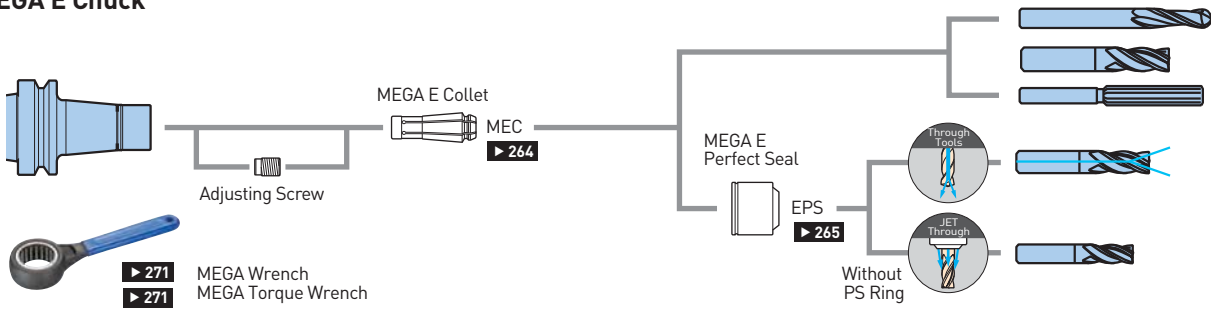


**MEGA New Baby Chuck**

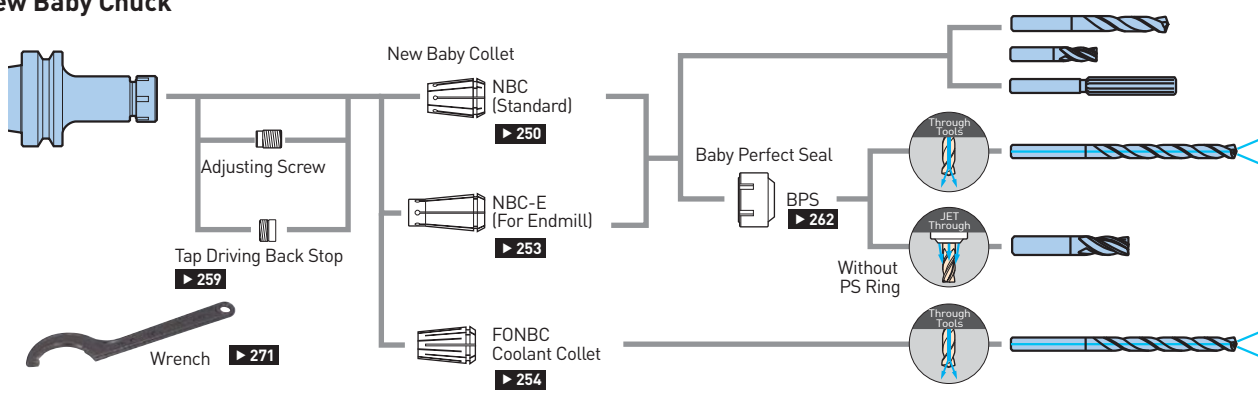


A.8

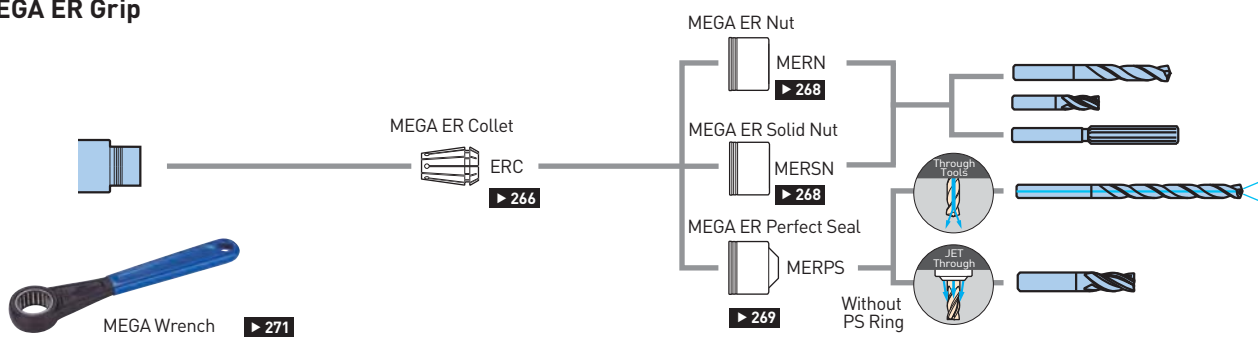
**MEGA E Chuck**



**New Baby Chuck**



**MEGA ER Grip**

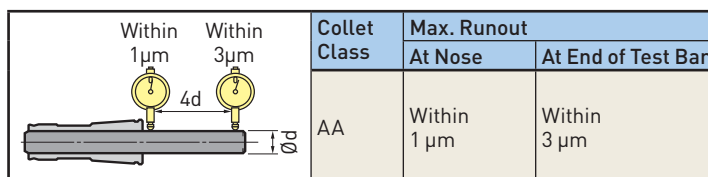
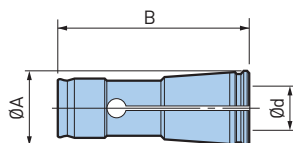


## Micro Collets

### For MEGA Micro Chuck

Available in 0.1 mm diameter increments to suit all the cutting tool shank sizes with maximum accuracy.

Despite their compact size, high clamping force and accuracy are achieved.



Clamping diameter: Ø 0.45 - Ø 3.25

MEGA3S			
Model	Order No.	Clamping Range Ød	
NBC3S -0.5 AA	968.301	0.45 - 0.55	
-0.6 AA	968.302	0.55 - 0.65	
-0.7 AA	968.303	0.65 - 0.75	
-0.8 AA	968.304	0.75 - 0.85	
-0.9 AA	968.305	0.85 - 0.95	
-1.0 AA	968.306	0.95 - 1.05	
-1.1 AA	968.307	1.05 - 1.15	
-1.2 AA	968.308	1.15 - 1.25	
-1.3 AA	968.309	1.25 - 1.35	
-1.4 AA	968.310	1.35 - 1.45	
-1.5 AA	968.311	1.45 - 1.55	
-1.6 AA	968.312	1.55 - 1.65	
-1.7 AA	968.313	1.65 - 1.75	
-1.8 AA	968.314	1.75 - 1.85	
-1.9 AA	968.315	1.85 - 1.95	
-2.0 AA	968.316	1.95 - 2.05	
-2.1 AA	968.317	2.05 - 2.15	
-2.2 AA	968.318	2.15 - 2.25	
-2.3 AA	968.319	2.25 - 2.35	
-2.4 AA	968.320	2.35 - 2.45	
-2.5 AA	968.321	2.45 - 2.55	
-2.6 AA	968.322	2.55 - 2.65	
-2.7 AA	968.323	2.65 - 2.75	
-2.8 AA	968.324	2.75 - 2.85	
-2.9 AA	968.325	2.85 - 2.95	
-3.0 AA	968.326	2.95 - 3.05	
-3.1 AA	968.327	3.05 - 3.15	
-3.175 AA	968.328	3.125 - 3.225	
-3.2 AA	968.329	3.15 - 3.25	

Ø A=6.06 B=18.8

Clamping diameter: Ø 0.45 - Ø 4.05

MEGA4S			
Model	Order No.	Clamping Range Ød	
NBC4S -0.5 AA	968.334	0.45 - 0.55	
-0.6 AA	968.335	0.55 - 0.65	
-0.7 AA	968.336	0.65 - 0.75	
-0.8 AA	968.337	0.75 - 0.85	
-0.9 AA	968.338	0.85 - 0.95	
-1.0 AA	961.462	0.95 - 1.05	
-1.1 AA	968.339	1.05 - 1.15	
-1.2 AA	968.340	1.15 - 1.25	
-1.3 AA	968.341	1.25 - 1.35	
-1.4 AA	968.342	1.35 - 1.45	
-1.5 AA	961.464	1.45 - 1.55	
-1.6 AA	968.343	1.55 - 1.65	
-1.7 AA	968.344	1.65 - 1.75	
-1.8 AA	968.345	1.75 - 1.85	
-1.9 AA	968.346	1.85 - 1.95	
-2.0 AA	961.466	1.95 - 2.05	
-2.1 AA	968.347	2.05 - 2.15	
-2.2 AA	968.348	2.15 - 2.25	
-2.3 AA	968.349	2.25 - 2.35	
-2.4 AA	968.350	2.35 - 2.45	
-2.5 AA	961.468	2.45 - 2.55	
-2.6 AA	968.351	2.55 - 2.65	
-2.7 AA	968.352	2.65 - 2.75	
-2.8 AA	968.353	2.75 - 2.85	
-2.9 AA	968.354	2.85 - 2.95	
-3.0 AA	961.470	2.95 - 3.05	
-3.1 AA	968.355	3.05 - 3.15	
-3.175 AA	968.356	3.125 - 3.225	
-3.2 AA	968.357	3.15 - 3.25	
-3.3 AA	968.358	3.25 - 3.35	
-3.4 AA	968.359	3.35 - 3.45	
-3.5 AA	961.472	3.45 - 3.55	
-3.6 AA	968.360	3.55 - 3.65	
-3.7 AA	968.361	3.65 - 3.75	
-3.8 AA	968.362	3.75 - 3.85	
-3.9 AA	968.363	3.85 - 3.95	
-4.0 AA	961.474	3.95 - 4.05	

Ø A=7.4 B=22.5

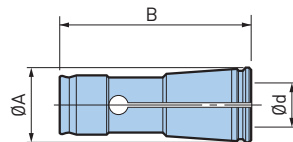
For MEGA6S/8S, refer to the following pages.



# Micro Collets

For MEGA Micro Chuck

Clamping diameter:  $\emptyset$  0.45 -  $\emptyset$  6.05



Clamping diameter:  $\emptyset$  2.95 -  $\emptyset$  8.05

A.8

MEGA6S			
Model	Order No.	Clamping Range $\emptyset d$	
NBC6S -0.5 AA	968.369	0.45 - 0.55	
-0.6 AA	968.370	0.55 - 0.65	
-0.7 AA	968.371	0.65 - 0.75	
-0.8 AA	968.372	0.75 - 0.85	
-0.9 AA	968.373	0.85 - 0.95	
-1.0 AA	961.477	0.95 - 1.05	
-1.1 AA	968.374	1.05 - 1.15	
-1.2 AA	968.375	1.15 - 1.25	
-1.3 AA	968.376	1.25 - 1.35	
-1.4 AA	968.377	1.35 - 1.45	
-1.5 AA	961.479	1.45 - 1.55	
-1.6 AA	968.378	1.55 - 1.65	
-1.7 AA	968.379	1.65 - 1.75	
-1.8 AA	968.380	1.75 - 1.85	
-1.9 AA	968.381	1.85 - 1.95	
-2.0 AA	961.481	1.95 - 2.05	
-2.1 AA	968.382	2.05 - 2.15	
-2.2 AA	968.383	2.15 - 2.25	
-2.3 AA	968.384	2.25 - 2.35	
-2.4 AA	968.385	2.35 - 2.45	
-2.5 AA	961.483	2.45 - 2.55	
-2.6 AA	968.386	2.55 - 2.65	
-2.7 AA	968.387	2.65 - 2.75	
-2.8 AA	968.388	2.75 - 2.85	
-2.9 AA	968.389	2.85 - 2.95	
-3.0 AA	961.485	2.95 - 3.05	
-3.1 AA	968.390	3.05 - 3.15	
-3.175 AA	968.391	3.125 - 3.225	
-3.2 AA	968.392	3.15 - 3.25	
-3.3 AA	968.393	3.25 - 3.35	
-3.4 AA	968.394	3.35 - 3.45	
-3.5 AA	961.487	3.45 - 3.55	
-3.6 AA	968.395	3.55 - 3.65	
-3.7 AA	968.396	3.65 - 3.75	
-3.8 AA	968.397	3.75 - 3.85	
-3.9 AA	968.398	3.85 - 3.95	
-4.0 AA	961.489	3.95 - 4.05	
-4.1 AA	968.399	4.05 - 4.15	
-4.2 AA	968.400	4.15 - 4.25	
-4.3 AA	968.401	4.25 - 4.35	
-4.4 AA	968.402	4.35 - 4.45	
-4.5 AA	961.491	4.45 - 4.55	
-4.6 AA	968.403	4.55 - 4.65	
-4.7 AA	968.404	4.65 - 4.75	
-4.7625 AA	801.743	4.7125 - 4.8125	
-4.8 AA	968.405	4.75 - 4.85	
-4.9 AA	968.406	4.85 - 4.95	
-5.0 AA	961.493	4.95 - 5.05	
-5.1 AA	968.408	5.05 - 5.15	
-5.2 AA	968.409	5.15 - 5.25	
-5.3 AA	968.410	5.25 - 5.35	
-5.4 AA	968.411	5.35 - 5.45	
-5.5 AA	961.495	5.45 - 5.55	
-5.6 AA	968.412	5.55 - 5.65	
-5.7 AA	968.413	5.65 - 5.75	
-5.8 AA	968.414	5.75 - 5.85	
-5.9 AA	968.415	5.85 - 5.95	
-6.0 AA	961.497	5.95 - 6.05	

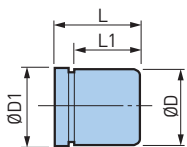
MEGA8S			
Model	Order No.	Clamping Range $\emptyset d$	
NBC8S -3.0 AA	801.709	2.95 - 3.05	
-3.1 AA	804.132	3.05 - 3.15	
-3.2 AA	804.134	3.15 - 3.25	
-3.3 AA	804.135	3.25 - 3.35	
-3.4 AA	804.136	3.35 - 3.45	
-3.5 AA	804.137	3.45 - 3.55	
-3.6 AA	804.138	3.55 - 3.65	
-3.7 AA	804.139	3.65 - 3.75	
-3.8 AA	804.140	3.75 - 3.85	
-3.9 AA	804.141	3.85 - 3.95	
-4.0 AA	801.742	3.95 - 4.05	
-4.1 AA	804.142	4.05 - 4.15	
-4.2 AA	804.143	4.15 - 4.25	
-4.3 AA	804.144	4.25 - 4.35	
-4.4 AA	804.145	4.35 - 4.45	
-4.5 AA	804.146	4.45 - 4.55	
-4.6 AA	804.147	4.55 - 4.65	
-4.7 AA	804.148	4.65 - 4.75	
-4.8 AA	804.149	4.75 - 4.85	
-4.9 AA	804.150	4.85 - 4.95	
-5.0 AA	801.702	4.95 - 5.05	
-5.1 AA	804.151	5.05 - 5.15	
-5.2 AA	804.152	5.15 - 5.25	
-5.3 AA	804.153	5.25 - 5.35	
-5.4 AA	804.154	5.35 - 5.45	
-5.5 AA	804.155	5.45 - 5.55	
-5.6 AA	804.156	5.55 - 5.65	
-5.7 AA	804.157	5.65 - 5.75	
-5.8 AA	804.158	5.75 - 5.85	
-5.9 AA	801.746	5.85 - 5.95	
-6.0 AA	801.703	5.95 - 6.05	
-6.1 AA	804.159	6.05 - 6.15	
-6.2 AA	804.160	6.15 - 6.25	
-6.3 AA	804.161	6.25 - 6.35	
-6.4 AA	804.162	6.35 - 6.45	
-6.5 AA	804.163	6.45 - 6.55	
-6.6 AA	804.164	6.55 - 6.65	
-6.7 AA	804.165	6.65 - 6.75	
-6.8 AA	804.166	6.75 - 6.85	
-6.9 AA	804.167	6.85 - 6.95	
-7.0 AA	804.168	6.95 - 7.05	
-7.1 AA	804.169	7.05 - 7.15	
-7.2 AA	804.170	7.15 - 7.25	
-7.3 AA	804.171	7.25 - 7.35	
-7.4 AA	804.172	7.35 - 7.45	
-7.5 AA	804.173	7.45 - 7.55	
-7.6 AA	804.174	7.55 - 7.65	
-7.7 AA	804.175	7.65 - 7.75	
-7.8 AA	804.176	7.75 - 7.85	
-7.9 AA	804.177	7.85 - 7.95	
-8.0 AA	801.704	7.95 - 8.05	

$\emptyset$  A=12 B=27

$\emptyset$  A=9.4 B=24.5

## MEGA Nut

For MEGA Micro Chuck

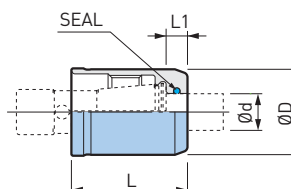


Model	Order No.	MEGA Micro Chuck	D	ØD1	L	L1
MGN3S	969.480	MEGA3S	10	10.3	13.0	11.0
MGN4S	969.481	MEGA4S	12	12.2	14.5	12.0
MGN6S	969.482	MEGA6S	14	14.2	17.0	14.5
MGN8S	804.108	MEGA8S	18	18.3	18.5	15.5

## Micro Seal Nut

For MEGA Micro Chuck

Sealed nut for coolant-through tools.



### MEGA6S

Model	Order No.	Ød	ØD	L	L1
MGN6S-PS3	978.516	3.0	14	19	3.5
-PS4	978.513	4.0			
-PS5	978.517	5.0			
-PS6	978.511	6.0			

### MEGA8S

Model	Order No.	Ød	ØD	L	L1
MGN8S-PS3	804.109	3.0	18	20.2	3.5
-PS4	804.110	4.0			
-PS5	804.111	5.0			
-PS6	804.112	6.0			
-PS7	804.113	7.0			
-PS8	804.114	8.0			

A.8

## Micro Collet Protective Cases

Exclusive case for MEGA Micro Collet.

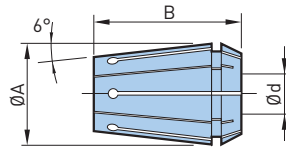


Model	Order No.	Micro Collet	No. of Spot	Size
NBB3S	968.330	NBC3S	50	200 x 170 x 50
NBB4S	968.364	NBC4S		
NBB6S	961.498	NBC6S	60	200 x 170 x 50
NBB8S	805.802	NBC8S		

1. Micro collet is not included.

# New Baby Collets Standard

For MEGA New Baby Chuck and New Baby Chuck



	Collet Class	Max. Runout	
	AA	At Nose	At End of Test Bar
	AA	Within 1 µm	Within 3 µm

Clamping diameter: Ø 0.25 - Ø 6.0

MEGA6N / NBS6				
Model			Order No.	Clamping Range Ød
NBC6	-0.5	AA	961.500	0.25 - 0.50
•	-0.75	AA	961.501	0.50 - 0.75
•	-1	AA	961.502	0.75 - 1.00
•	-1.25	AA	961.503	1.00 - 1.25
•	-1.5	AA	961.504	1.25 - 1.50
•	-1.75	AA	961.505	1.50 - 1.75
•	-2	AA	961.506	1.75 - 2.00
•	-2.25	AA	961.507	2.00 - 2.25
•	-2.5	AA	961.508	2.25 - 2.50
•	-2.75	AA	961.509	2.50 - 2.75
•	-3	AA	961.510	2.75 - 3.00
•	-3.175	AA	801.738	2.925 - 3.175
•	-3.25	AA	961.511	3.00 - 3.25
•	-3.5	AA	961.512	3.25 - 3.50
•	-3.75	AA	961.513	3.50 - 3.75
•	-4	AA	961.514	3.75 - 4.00
•	-4.25	AA	961.515	4.00 - 4.25
•	-4.5	AA	961.516	4.25 - 4.50
•	-4.75	AA	961.517	4.50 - 4.75
•	-5	AA	961.518	4.75 - 5.00
•	-5.25	AA	961.519	5.00 - 5.25
•	-5.5	AA	961.520	5.25 - 5.50
•	-5.75	AA	961.521	5.50 - 5.75
•	-6	AA	961.522	5.75 - 6.00

Ø A=9.5 B=14

Clamping diameter: Ø 0.5 - Ø 8.0

MEGA8N / NBS8				
Model			Order No.	Clamping Range Ød
• NBC8	-0.75	AA	978.507	0.50 - 0.75
•	-1	AA	961.531	0.75 - 1.00
•	-1.25	AA	978.500	1.00 - 1.25
•	-1.5	AA	961.532	1.25 - 1.50
•	-1.75	AA	801.744	1.50 - 1.75
•	-2	AA	961.533	1.75 - 2.00
•	-2.25	AA	978.505	2.00 - 2.25
•	-2.5	AA	961.534	2.25 - 2.50
•	-2.75	AA	978.506	2.50 - 2.75
•	-3	AA	961.535	2.75 - 3.00
•	-3.175	AA	978.499	2.675 - 3.175
•	-3.5	AA	961.536	3.00 - 3.50
•	-4	AA	961.537	3.50 - 4.00
•	-4.5	AA	961.538	4.00 - 4.50
•	-5	AA	961.539	4.50 - 5.00
•	-5.25	AA	801.750	4.75 - 5.25
•	-5.5	AA	961.540	5.00 - 5.50
•	-5.75	AA	801.751	5.25 - 5.75
•	-6	AA	961.541	5.50 - 6.00
•	-6.5	AA	961.542	6.00 - 6.50
•	-7	AA	961.543	6.50 - 7.00
•	-7.5	AA	961.544	7.00 - 7.50
•	-8	AA	961.545	7.50 - 8.00

Ø A=12.5 B=18

Clamping diameter: Ø 1.5 - Ø 10.0

MEGA10N / NBS10				
Model			Order No.	Clamping Range Ød
• NBC10	- 1.75	AA	961.599	1.50 - 1.75
•	- 2	AA	961.551	1.75 - 2.00
•	- 2.25	AA	978.508	2.00 - 2.25
•	- 2.5	AA	961.552	2.25 - 2.50
•	- 2.75	AA	978.509	2.50 - 2.75
•	- 3	AA	961.553	2.75 - 3.00
•	- 3.175	AA	961.120	2.675 - 3.175
•	- 3.25	AA	801.651	2.75 - 3.25
•	- 3.5	AA	961.554	3.00 - 3.50
•	- 3.75	AA	801.652	3.25 - 3.75
•	- 4	AA	961.555	3.50 - 4.00
•	- 4.25	AA	801.655	3.75 - 4.25
•	- 4.5	AA	961.556	4.00 - 4.50
•	- 4.75	AA	801.656	4.25 - 4.75

MEGA10N / NBS10				
Model			Order No.	Clamping Range Ød
• NBC10	- 5	AA	961.557	4.50 - 5.00
•	- 5.25	AA	801.659	4.75 - 5.25
•	- 5.5	AA	961.558	5.00 - 5.50
•	- 5.75	AA	801.660	5.25 - 5.75
•	- 6	AA	961.559	5.50 - 6.00
•	- 6.5	AA	961.560	6.00 - 6.50
•	- 7	AA	961.561	6.50 - 7.00
•	- 7.5	AA	961.562	7.00 - 7.50
•	- 8	AA	961.563	7.50 - 8.00
•	- 8.5	AA	961.564	8.00 - 8.50
•	- 9	AA	961.565	8.50 - 9.00
•	- 9.5	AA	961.566	9.00 - 9.50
•	-10	AA	961.567	9.50 - 10.00

Ø A=16.5 B=27

Clamping diameter:  $\emptyset$  2.5 -  $\emptyset$  13.0

MEGA13N / NBS13				
Model		Order No.	Clamping Range $\emptyset$ d	
• NBC13	- 3 AA	961.573	2.50 - 3.00	
	- 3.175 AA	961.127	2.675 - 3.175	
	- 3.25 AA	801.671	2.75 - 3.25	
•	- 3.5 AA	961.574	3.00 - 3.50	
	- 3.75 AA	801.672	3.25 - 3.75	
•	- 4 AA	961.575	3.50 - 4.00	
	- 4.25 AA	801.675	3.75 - 4.25	
•	- 4.5 AA	961.576	4.00 - 4.50	
	- 4.75 AA	801.676	4.25 - 4.75	
•	- 5 AA	961.577	4.50 - 5.00	
	- 5.25 AA	801.679	4.75 - 5.25	
•	- 5.5 AA	961.578	5.00 - 5.50	
	- 5.75 AA	801.680	5.25 - 5.75	
•	- 6 AA	961.579	5.50 - 6.00	
•	- 6.5 AA	961.580	6.00 - 6.50	
•	- 7 AA	961.581	6.50 - 7.00	
•	- 7.5 AA	961.582	7.00 - 7.50	
•	- 8 AA	961.583	7.50 - 8.00	
•	- 8.5 AA	961.584	8.00 - 8.50	
•	- 9 AA	961.585	8.50 - 9.00	
•	- 9.5 AA	961.586	9.00 - 9.50	
•	-10 AA	961.587	9.50 - 10.00	
•	-10.5 AA	961.588	10.00 - 10.50	
•	-11 AA	961.589	10.50 - 11.00	
•	-11.5 AA	961.590	11.00 - 11.50	
•	-12 AA	961.591	11.50 - 12.00	
•	-12.5 AA	961.592	12.00 - 12.50	
•	-13 AA	961.593	12.50 - 13.00	

 $\emptyset$  A=20.5 B=31Clamping diameter:  $\emptyset$  2.5 -  $\emptyset$  16.0

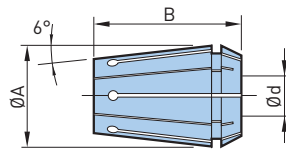
MEGA16N / NBS16				
Model		Order No.	Clamping Range $\emptyset$ d	
• NBC16	- 3 AA	961.601	2.50 - 3.00	
	- 3.25 AA	801.694	2.75 - 3.25	
•	- 3.5 AA	961.602	3.00 - 3.50	
	- 3.75 AA	801.695	3.25 - 3.75	
•	- 4 AA	961.603	3.50 - 4.00	
	- 4.25 AA	801.697	3.75 - 4.25	
•	- 4.5 AA	961.604	4.00 - 4.50	
	- 4.75 AA	801.698	4.25 - 4.75	
•	- 5 AA	961.605	4.50 - 5.00	
	- 5.25 AA	801.700	4.75 - 5.25	
•	- 5.5 AA	961.606	5.00 - 5.50	
	- 5.75 AA	801.701	5.25 - 5.75	
•	- 6 AA	961.607	5.50 - 6.00	
•	- 6.5 AA	961.608	6.00 - 6.50	
•	- 7 AA	961.609	6.50 - 7.00	
•	- 7.5 AA	961.610	7.00 - 7.50	
•	- 8 AA	961.611	7.50 - 8.00	
•	- 8.5 AA	961.612	8.00 - 8.50	
•	- 9 AA	961.613	8.50 - 9.00	
•	- 9.5 AA	961.614	9.00 - 9.50	
•	-10 AA	961.615	9.50 - 10.00	
•	-10.5 AA	961.616	10.00 - 10.50	
•	-11 AA	961.617	10.50 - 11.00	
•	-11.5 AA	961.618	11.00 - 11.50	
•	-12 AA	961.619	11.50 - 12.00	
•	-12.5 AA	961.620	12.00 - 12.50	
•	-13 AA	961.621	12.50 - 13.00	
•	-13.5 AA	961.622	13.00 - 13.50	
•	-14 AA	961.623	13.50 - 14.00	
•	-14.5 AA	961.624	14.00 - 14.50	
•	-15 AA	961.625	14.50 - 15.00	
•	-15.5 AA	961.626	15.00 - 15.50	
•	-16 AA	961.627	15.50 - 16.00	

 $\emptyset$  A=25.5 B=35

A.8

1. • Models are included in new baby collet set ▶ 256.

## New Baby Collets Standard



	Max. Runout	
	At Nose	At End of Test Bar
AA	Within 1 µm	Within 3 µm

Clamping diameter: Ø 2.5 - Ø 20.0

MEGA20N / NBS20				
Model	Order No.	Clamping Range Ød		
• NBC20 - 3 AA	961.641	2.50 - 3.00		
- 3.25 AA	801.718	2.75 - 3.25		
• - 3.5 AA	961.642	3.00 - 3.50		
- 3.75 AA	801.719	3.25 - 3.75		
• - 4 AA	961.643	3.50 - 4.00		
- 4.25 AA	801.722	3.75 - 4.25		
• - 4.5 AA	961.644	4.00 - 4.50		
- 4.75 AA	801.723	4.25 - 4.75		
• - 5 AA	961.645	4.50 - 5.00		
- 5.25 AA	801.726	4.75 - 5.25		
• - 5.5 AA	961.646	5.00 - 5.50		
- 5.75 AA	801.727	5.25 - 5.75		
• - 6 AA	961.647	5.50 - 6.00		
- 6.5 AA	961.648	6.00 - 6.50		
• - 7 AA	961.649	6.50 - 7.00		
- 7.5 AA	961.650	7.00 - 7.50		
• - 8 AA	961.651	7.50 - 8.00		
- 8.5 AA	961.652	8.00 - 8.50		
• - 9 AA	961.653	8.50 - 9.00		
- 9.5 AA	961.654	9.00 - 9.50		
• - 10 AA	961.655	9.50 - 10.00		
- 10.5 AA	961.656	10.00 - 10.50		
• - 11 AA	961.657	10.50 - 11.00		
- 11.5 AA	961.658	11.00 - 11.50		
• - 12 AA	961.659	11.50 - 12.00		
- 12.5 AA	961.660	12.00 - 12.50		
• - 13 AA	961.661	12.50 - 13.00		
- 13.5 AA	961.662	13.00 - 13.50		
• - 14 AA	961.663	13.50 - 14.00		
- 14.5 AA	961.664	14.00 - 14.50		
• - 15 AA	961.665	14.50 - 15.00		
- 15.5 AA	961.666	15.00 - 15.50		
• - 16 AA	961.667	15.50 - 16.00		
- 16.5 AA	961.668	16.00 - 16.50		
• - 17 AA	961.669	16.50 - 17.00		
- 17.5 AA	961.670	17.00 - 17.50		
• - 18 AA	961.671	17.50 - 18.00		
- 18.5 AA	961.672	18.00 - 18.50		
• - 19 AA	961.673	18.50 - 19.00		
- 19.5 AA	961.674	19.00 - 19.50		
• - 20 AA	961.675	19.50 - 20.00		

ØA=28.5 B=38

Clamping diameter: Ø 15.5 - Ø 25.4

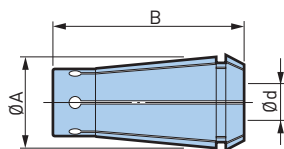
MEGA25N				
Model	Order No.	Clamping Range Ød		
• NBC25 -16 AA	806.390	15.5 - 16.0		
-16.5 AA	806.391	16.0 - 16.5		
• -17 AA	806.392	16.5 - 17.0		
-17.5 AA	806.393	17.0 - 17.5		
• -18 AA	806.394	17.5 - 18.0		
-18.5 AA	806.395	18.0 - 18.5		
• -19 AA	806.396	18.5 - 19.0		
-19.5 AA	806.397	19.0 - 19.5		
• -20 AA	806.398	19.5 - 20.0		
-20.5 AA	806.399	20.0 - 20.5		
• -21 AA	806.400	20.5 - 21.0		
-21.5 AA	806.401	21.0 - 21.5		
• -22 AA	806.402	21.5 - 22.0		
-22.5 AA	806.403	22.0 - 22.5		
• -23 AA	806.404	22.5 - 23.0		
-23.5 AA	806.405	23.0 - 23.5		
• -24 AA	806.406	23.5 - 24.0		
-24.5 AA	806.407	24.0 - 24.5		
• -25 AA	806.408	24.5 - 25.0		
-25.4 AA	806.409	24.9 - 25.4		

ØA=35.5mm B=52mm

1. • Models are included in new baby collet set ▶ 256.

## New Baby Collets for Endmills

For MEGA New Baby Chuck and New Baby Chuck



	Collet Class	Max. Runout	
	AA	At Nose	At End of Test Bar
	AA	Within 1 µm	Within 3 µm

MEGA6N / NBS6			
Model		Order No.	Clamping Range Ød
NBC6	-3E AA	961.148	3
	-4E AA	961.149	4
	-5E AA	961.150	5
	-6E AA	961.151	6

Ø A=9.2 B=17

MEGA8N / NBS8			
Model		Order No.	Clamping Range Ød
NBC8	-3E AA	961.152	3
	-4E AA	961.153	4
	-5E AA	961.154	5
	-6E AA	961.155	6
	-8E AA	961.156	8

Ø A=12 B=20

MEGA10N / NBS10			
Model		Order No.	Clamping Range Ød
NBC10	- 3E AA	801.654	3
	- 4E AA	801.658	4
	- 5E AA	801.662	5
	- 6E AA	961.160	6
	- 8E AA	961.161	8
	-10E AA	961.146	10

Ø A=16 B=32

MEGA13N / NBS13			
Model		Order No.	Clamping Range Ød
NBC13	- 3E AA	801.674	3
	- 4E AA	801.678	4
	- 5E AA	801.682	5
	- 6E AA	961.165	6
	- 8E AA	961.166	8
	-10E AA	961.147	10
	-12E AA	961.167	12

Ø A=20 B=38

MEGA16N / NBS16			
Model		Order No.	Clamping Range Ød
NBC16	- 3E AA	961.168	3
	- 4E AA	961.169	4
	- 5E AA	961.170	5
	- 6E AA	961.171	6
	- 8E AA	961.172	8
	-10E AA	961.173	10
	-12E AA	961.174	12
	-14E AA	961.175	14
	-16E AA	961.176	16

Ø A=25 B=42

MEGA20N / NBS20			
Model		Order No.	Clamping Range Ød
NBC20	- 3E AA	801.721	3
	- 4E AA	801.725	4
	- 5E AA	801.729	5
	- 6E AA	961.180	6
	- 8E AA	801.733	8
	-10E AA	961.182	10
	-12E AA	961.183	12
	-14E AA	961.184	14
	-16E AA	961.185	16
	-20E AA	961.186	20

Ø A=28 B=45

- Use only a cutting tool shank with exactly the same diameter as the collet bore diameter.
- The tolerance of the cutting tool shank must be within h7.

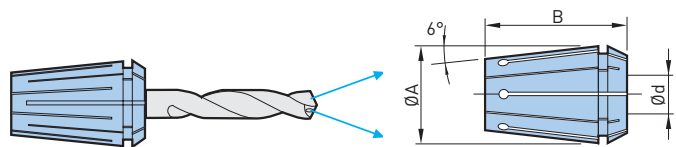
A.8

## FONBC Coolant Collets

For MEGA New Baby Chuck and New Baby Chuck

Optimum collet for center-through coolant applications with coolant-through cutting tools.

- Max. Coolant pressure 7 MPa



Clamping diameter: Ø 3.0 - Ø 6.0

MEGA6N / NBS6		
Model	Order No.	Clamping Range Ød
FONBC6 -3 AA	969.601	3.00 *
-3.25 AA	969.602	3.15 - 3.25
-3.5 AA	969.603	3.40 - 3.50
-3.75 AA	969.604	3.65 - 3.75
-4 AA	969.605	3.90 - 4.00
-4.25 AA	969.606	4.15 - 4.25
-4.5 AA	969.607	4.40 - 4.50
-4.75 AA	969.608	4.65 - 4.75
-5 AA	969.609	4.90 - 5.00
-5.25 AA	969.610	5.15 - 5.25
-5.5 AA	969.611	5.40 - 5.50
-5.75 AA	969.612	5.65 - 5.75
-6 AA	969.613	5.90 - 6.00

Ø A=9.5 B=14

\* No collapsibility

Clamping diameter: Ø 2.9 - Ø 8.0

MEGA8N / NBS8		
Model	Order No.	Clamping Range Ød
FONBC8 -3 AA	969.615	2.90 - 3.00
-3.5 AA	969.616	3.40 - 3.50
-4 AA	969.617	3.90 - 4.00
-4.5 AA	969.618	4.40 - 4.50
-5 AA	969.619	4.90 - 5.00
-5.5 AA	969.620	5.40 - 5.50
-6 AA	969.621	5.90 - 6.00
-6.5 AA	969.622	6.40 - 6.50
-7 AA	969.623	6.90 - 7.00
-7.5 AA	969.624	7.40 - 7.50
-8 AA	969.625	7.90 - 8.00

Ø A=12.5 B=18

Clamping diameter: Ø 2.9 - Ø 10.0

MEGA10N / NBS10		
Model	Order No.	Clamping Range Ød
FONBC10 - 3 AA	969.627	2.90 - 3.00
- 3.5 AA	969.628	3.40 - 3.50
- 4 AA	969.629	3.90 - 4.00
- 4.5 AA	969.630	4.40 - 4.50
- 5 AA	969.631	4.90 - 5.00
- 5.5 AA	969.632	5.40 - 5.50
- 6 AA	969.633	5.90 - 6.00
- 6.5 AA	969.634	6.40 - 6.50
- 7 AA	969.635	6.90 - 7.00
- 7.5 AA	969.636	7.40 - 7.50
- 8 AA	969.637	7.90 - 8.00
- 8.5 AA	969.638	8.40 - 8.50
- 9 AA	969.639	8.90 - 9.00
- 9.5 AA	969.640	9.40 - 9.50
-10 AA	969.641	9.90 - 10.00

Ø A=16.5 B=27

Clamping diameter: Ø 3.0 - Ø 13

MEGA13N / NBS13		
Model	Order No.	Clamping Range Ød
FONBC13 - 3 AA	969.643	3.00 *
- 3.5 AA	969.644	3.40 - 3.50
- 4 AA	969.645	3.90 - 4.00
- 4.5 AA	969.646	4.40 - 4.50
- 5 AA	969.647	4.90 - 5.00
- 5.5 AA	969.648	5.40 - 5.50
- 6 AA	969.649	5.90 - 6.00
- 6.5 AA	969.650	6.40 - 6.50
- 7 AA	969.651	6.90 - 7.00
- 7.5 AA	969.652	7.40 - 7.50
- 8 AA	969.653	7.90 - 8.00
- 8.5 AA	969.654	8.40 - 8.50
- 9 AA	969.655	8.90 - 9.00
- 9.5 AA	969.656	9.40 - 9.50
-10 AA	969.657	9.90 - 10.00
-10.5 AA	969.658	10.40 - 10.50
-11 AA	969.659	10.90 - 11.00
-11.5 AA	969.660	11.40 - 11.50
-12 AA	969.661	11.90 - 12.00
-12.5 AA	969.662	12.40 - 12.50
-13.0 AA	969.663	12.90 - 13.00

Ø A=20.5 B=31

\* No collapsibility

Clamping diameter: Ø 4.9 - Ø 16.0

MEGA16N / NBS16		
Model	Order No.	Clamping Range Ød
FONBC16 - 5 AA	969.669	4.90 - 5.00
- 5.5 AA	969.670	5.40 - 5.50
- 6 AA	969.671	5.90 - 6.00
- 6.5 AA	969.672	6.40 - 6.50
- 7 AA	969.673	6.90 - 7.00
- 7.5 AA	969.674	7.40 - 7.50
- 8 AA	969.675	7.90 - 8.00
- 8.5 AA	969.676	8.40 - 8.50
- 9 AA	969.677	8.90 - 9.00
- 9.5 AA	969.678	9.40 - 9.50
-10 AA	969.679	9.90 - 10.00
-10.5 AA	969.680	10.40 - 10.50
-11 AA	969.681	10.90 - 11.00
-11.5 AA	969.682	11.40 - 11.50
-12 AA	969.683	11.90 - 12.00
-12.5 AA	969.684	12.40 - 12.50
-13 AA	969.685	12.90 - 13.00
-13.5 AA	969.686	13.40 - 13.50
-14 AA	969.687	13.90 - 14.00
-14.5 AA	969.688	14.40 - 14.50
-15 AA	969.689	14.90 - 15.00
-15.5 AA	969.690	15.40 - 15.50
-16 AA	969.691	15.90 - 16.00

Ø A=25.5 B=35

Clamping diameter: Ø 4.9 - Ø 20.0

MEGA20N / NBS20		
Model	Order No.	Clamping Range Ød
FONBC20 - 5 AA	969.697	4.90 - 5.00
- 5.5 AA	969.698	5.40 - 5.50
- 6 AA	969.699	5.90 - 6.00
- 6.5 AA	969.700	6.40 - 6.50
- 7 AA	969.701	6.90 - 7.00
- 7.5 AA	969.702	7.40 - 7.50
- 8 AA	969.703	7.90 - 8.00
- 8.5 AA	969.704	8.40 - 8.50
- 9 AA	969.705	8.90 - 9.00
- 9.5 AA	969.706	9.40 - 9.50
-10 AA	969.707	9.90 - 10.00
-10.5 AA	969.708	10.40 - 10.50
-11 AA	969.709	10.90 - 11.00
-11.5 AA	969.710	11.40 - 11.50
-12 AA	969.711	11.90 - 12.00
-12.5 AA	969.712	12.40 - 12.50
-13 AA	969.713	12.90 - 13.00
-13.5 AA	969.714	13.40 - 13.50
-14 AA	969.715	13.90 - 14.00
-14.5 AA	969.716	14.40 - 14.50
-15 AA	969.717	14.90 - 15.00
-15.5 AA	969.718	15.40 - 15.50
-16 AA	969.719	15.90 - 16.00
-16.5 AA	969.720	16.40 - 16.50
-17 AA	969.721	16.90 - 17.00
-17.5 AA	969.722	17.40 - 17.50
-18 AA	969.723	17.90 - 18.00
-18.5 AA	969.724	18.40 - 18.50
-19 AA	969.725	18.90 - 19.00
-19.5 AA	969.726	19.40 - 19.50
-20 AA	969.727	19.90 - 20.00

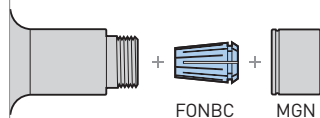
Ø A=28.5 B=38

Clamping diameter: Ø 15.9 - Ø 25.4

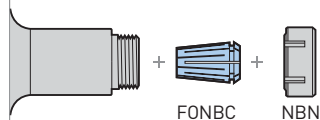
MEGA25N		
Model	Order No.	Clamping Range Ød
FONBC25 -16 AA	806.412	15.9 - 16.0
-17 AA	806.413	16.9 - 17.0
-18 AA	806.414	17.9 - 18.0
-19 AA	806.415	18.9 - 19.0
-20 AA	806.416	19.9 - 20.0
-21 AA	806.417	20.9 - 21.0
-22 AA	806.418	21.9 - 22.0
-23 AA	806.419	22.9 - 23.0
-24 AA	806.420	23.9 - 24.0
-25 AA	806.421	24.9 - 25.0
-25.4 AA	806.739	25.3 - 25.4

Ø A=35.5 B=52

For MEGA New Baby Chuck use the standard MGN nut.



For New Baby Chuck use the standard NBN nut.



**Note**

Collapsibility is different from standard NBC collet.



## New Baby Collet Sets

For MEGA New Baby Chuck and New Baby Chuck

Contains all the major collet models to cover entire clamping range.



Model	Order No.	Capacity	Number of Collet	Case Size (Width x Length)	Corresponding Chuck Model
SNBC6AA -22	802.187	0.5 - 6	22	200 x 170 x 50	MEGA 6N / NBS 6
SNBC8AA -20	802.188	0.5 - 8	20	200 x 170 x 50	MEGA 8N / NBS 8
SNBC10AA -20	802.183	1.5 - 10	20	200 x 170 x 50	MEGA10N / NBS10
SNBC13AA -21	802.184	2.5 - 13	21	245 x 210 x 60	MEGA13N / NBS13
SNBC16AA -27	802.185	2.5 - 16	27	275 x 230 x 65	MEGA16N / NBS16
SNBC20AA -35	961.676	2.5 - 20	35	310 x 260 x 75	MEGA20N / NBS20
SNBC25AA -19	806.656	15.5 - 25	19	310 x 260 x 75	MEGA25N

1. Collets included in a set are shown in ► 250 - 252.

## Cases for New Baby Collets

A.8

Exclusive case to protect and maintain the high precision collets.



Model	Order No.	Number of Holes	Case Size (Width x Length)	Corresponding Collet Model
NBB6	961.524	60	200 x 170 x 50	NBC 6 / FONBC 6
NBB8	961.547	50	200 x 170 x 50	NBC 8 / FONBC 8
NBB10	961.569	40	200 x 170 x 50	NBC10 / FONBC10
NBB13	961.595	35	245 x 210 x 60	NBC13 / FONBC13
NBB16	961.629	35	275 x 230 x 65	NBC16 / FONBC16
NBB20	961.677	45	310 x 260 x 75	NBC20 / FONBC20
NBB25	806.657	28	310 x 260 x 75	NBC25 / FONBC25

1. All cases can not be used with new baby collet for endmill (NBC-E).

## Collet Ejectors

Easily and quickly remove New Baby Collet from MEGA nuts and New Baby Nut.



### For New Baby Collet

Model	Order No.	Nut Model	Collet Model
NBC6 -CE	969.492	MGN6 / NBN6	NBC6 / FONBC6
NBC8 -CE	969.493	MGN8 / NBN8	NBC8 / FONBC8
NBC10 -CE	969.494	MGN10 / NBN10	NBC10 / FONBC10
NBC13 -CE	969.495	MGN13 / NBN13	NBC13 / FONBC13

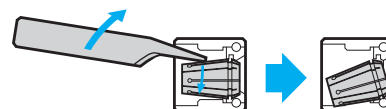
### For New Baby Endmill Collet

Model	Order No.	Nut Model	Collet Model
NBC6E -CE	969.496	MGN6 / NBN6	NBC6E
NBC8E -CE	969.497	MGN8 / NBN8	NBC8E
NBC10E -CE	969.498	MGN10 / NBN10	NBC10E
NBC13E -CE	969.499	MGN13 / NBN13	NBC13E

## Collet Removers

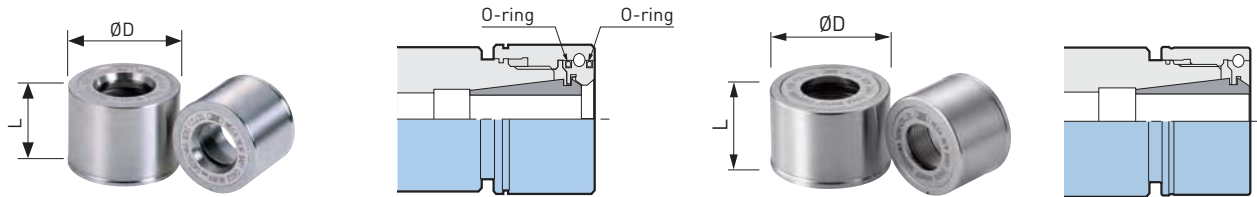
For MEGA New Baby Chuck and New Baby Chuck

Model	Order No.
NBJ	969.491



## MEGA Nut

For MEGA New Baby Chuck



Standard Type

Model	Order No.	ØD	L	Chuck Body
MGN6	969.483	20	20.5	MEGA6N
MGN8	969.484	25	23	MEGA8N
MGN10	969.485	30	24	MEGA10N
MGN13	969.486	35	27	MEGA13N
MGN16	969.487	42	27	MEGA16N
MGN20	969.488	46	27	MEGA20N
MGN25	806.388	60	31	MEGA25N

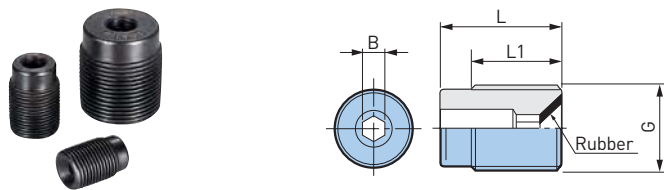
Short Type

Model	Order No.	ØD	L	Chuck Body
MGN6F	805.668	20	18	MEGA6N
MGN8F	805.669	25	20	MEGA8N
MGN10F	805.670	30	21	MEGA10N
MGN13F	805.671	35	24	MEGA13N
MGN16F	805.672	42	24.5	MEGA16N
MGN20F	805.673	46	24.5	MEGA20N

A.8

## Adjusting Screws

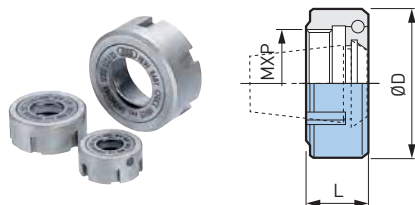
For MEGA New Baby Chuck, MEGA E Chuck, New Baby Chuck and MEGA ER Grip



Model	Order No.	G	L	L1	B	Chuck Body
NBA6B	961.527	M7	12	10	2	MEGA6N / MEGA6E / NBS6
NBA8B	961.550	M9	13	10	2.5	MEGA8N / MEGA8E / NBS8
NBA10B	961.572	M11	16	12	3	MEGA10N / MEGA10E / NBS10 / MEGA ER16
NBA13B	961.598	M14	20	15	4	MEGA13N / MEGA13E / NBS13 / MEGA ER20
NBA16B	961.632	M18	20	15	4	MEGA16N / NBS16 / MEGA ER25
NBA20B	961.680	M21	20	15	4	MEGA20N / NBS20 / MEGA ER32
NBA25B	806.389	M27	20	15	4	MEGA25N

## New Baby Nut

For New Baby Chuck

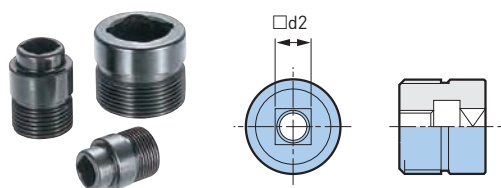


Model	Order No.	ØD	L	M x P	Chuck Body
NBN6	961.526	20	9.5	12 x 1	NBS6
NBN8	961.549	25	11	16 x 1	NBS8
NBN10	961.571	30	12.5	21 x 1	NBS10
NBN13	961.597	35	16	26 x 1	NBS13
NBN16	961.631	42	16	32 x 1	NBS16
NBN20	961.679	46	16	36 x 1	NBS20

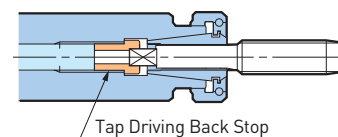
## Tap Driving Back Stops

For New Baby Chuck

To suit synchronized tapping.



The square of the tap is positively located by fitting the tap driving back stop.



Tap Size	Tapping Tool		NBS10		NBS13		NBS16		NBS20	
	Standard	□ d2	Model	Order No.	Model	Order No.	Model	Order No.	Model	Order No.
M8	DIN371	6.2	-	-	NBA13 -M8DD	804.847	-	-	-	-
	JIS	5.0	NBA10 -M8	961.681	NBA13 -M8	961.683	-	-	-	-
M10	DIN371	8.0	-	-	NBA13 -M14M10DD	804.846	NBA16 -M14M10DD	804.852	-	-
	JIS	5.5	NBA10 -M10	804.844	NBA13 -M10	961.684	NBA16 -M10	804.848	-	-
M12	DIN376	7.0	-	-	NBA13 -M12D	961.685	NBA16 -M12D	804.850	NBA20 -M12D	804.855
	JIS	6.5	-	-	NBA13 -M12	804.845	NBA16 -M12	804.849	NBA20 -M12	804.854
M14	DIN376	9.0	-	-	-	-	NBA16 -M14DM16D	804.851	NBA20 -M14DM16D	804.857
	JIS	8.0	-	-	NBA13 -M14M10DD	804.846	NBA16 -M14M10DD	804.852	NBA20 -M14	804.856
M16	DIN376	9.0	-	-	-	-	NBA16 -M14DM16D	804.851	NBA20 -M14DM16D	804.857
	JIS	10.0	-	-	-	-	NBA16 -M16	804.853	NBA20 -M16	804.858
M20	DIN376	12.0	-	-	-	-	-	-	NBA20 -M20M20D	804.860
	JIS	12.0	-	-	-	-	-	-	-	-

1. Rigid tapping function is required on the machine tool.

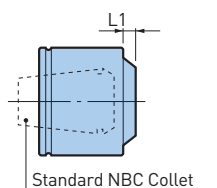
# MEGA Perfect Seal

## For MEGA New Baby Chuck

Unique design increases sealing performance with higher coolant pressure to create a „perfect seal“.

Remove the PS Ring, to supply coolant to the cutting tool periphery.

- Max. Coolant pressure 7 MPa



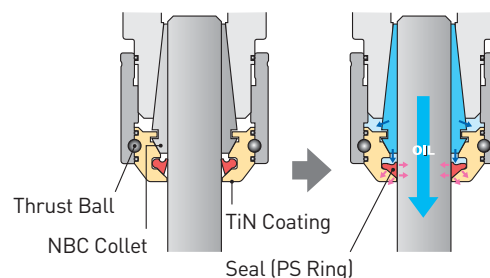
### 2way coolant



Through tools with PS ring



Jet through without PS ring



A.8

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MPS6	-03035	961.401	3 - 3.5	NBC6 -3 - 3.75
	-0304	969.861	3 - 4	
	-04045	961.402	4 - 4.5	
	-0405	969.862	4 - 5	
	-05055	961.403	5 - 5.5	
MPS8	-0506	969.863	5 - 6	NBC8 -3 - 4
	-03035	961.404	3 - 3.5	
	-0304	969.864	3 - 4	
	-04045	961.405	4 - 4.5	
	-0405	969.865	4 - 5	
MPS10	-05055	961.406	5 - 5.5	NBC10 -3 - 4
	-0506	969.866	5 - 6	
	-06065	961.407	6 - 6.5	
	-0607	969.867	6 - 7	
	-07075	961.408	7 - 7.5	
MPS13	-0708	969.868	7 - 8	NBC13 - 3 - 4
	-03035	801.524	3 - 3.5	
	-0304	969.869	3 - 4	
	-04045	801.525	4 - 4.5	
	-0405	969.870	4 - 5	
MPS13	-05055	801.526	5 - 5.5	NBC13 - 3 - 4
	-0506	969.871	5 - 6	
	-06065	979.986	6 - 6.5	
	-0607	969.872	6 - 7	
	-07075	801.527	7 - 7.5	
MPS13	-0708	969.873	7 - 8	NBC13 - 3 - 4
	-08085	979.987	8 - 8.5	
	-0809	969.874	8 - 9	
	-09095	801.528	9 - 9.5	
	-0910	969.875	9 - 10	

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MPS13	-03035	801.529	3 - 3.5	NBC13 - 3 - 4
	-0304	969.876	3 - 4	
	-04045	801.530	4 - 4.5	
	-0405	969.877	4 - 5	
	-05055	801.531	5 - 5.5	
MPS13	-0506	969.878	5 - 6	NBC13 - 3 - 4
	-06065	961.417	6 - 6.5	
	-0607	969.879	6 - 7	
	-07075	801.532	7 - 7.5	
	-0708	969.880	7 - 8	
MPS13	-08085	961.418	8 - 8.5	NBC13 - 3 - 4
	-0809	969.881	8 - 9	
	-09095	801.533	9 - 9.5	
	-0910	969.882	9 - 10	
	-10105	978.518	10 - 10.5	
MPS13	-1011	969.883	10 - 11	NBC13 - 3 - 4
	-11115	801.534	11 - 11.5	
	-1112	969.884	11 - 12	
	-12125	961.420	12 - 12.5	
	-1213	969.885	12 - 13	

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MPS16 -03035	801.535	3 - 3.5	4.0	NBC16 - 3 - 4
-0304	969.886	3 - 4		- 3 - 4.5
-04045	801.536	4 - 4.5		- 4 - 5
-0405	969.887	4 - 5		- 4 - 5.5
-05055	801.537	5 - 5.5		- 5 - 6
-0506	969.888	5 - 6	- 5 - 6.5	
-06065	801.538	6 - 6.5	4.3	- 6 - 7
-0607	969.889	6 - 7		- 6 - 7.5
-07075	801.539	7 - 7.5		- 7 - 8
-0708	969.890	7 - 8		- 7 - 8.5
-08085	801.540	8 - 8.5	4.6	- 8 - 9
-0809	969.891	8 - 9		- 8 - 9.5
-09095	801.541	9 - 9.5		- 9 - 10
-0910	969.892	9 - 10		- 9 - 10.5
-10105	801.542	10 - 10.5	5.1	-10 - 11
-1011	969.893	10 - 11		-10 - 11.5
-11115	801.543	11 - 11.5		-11 - 12
-1112	969.894	11 - 12		-11 - 12.5
-12125	801.544	12 - 12.5	4.1	-12 - 13
-1213	969.895	12 - 13		-12 - 13.5
-1314	969.896	13 - 14		-13 - 14.5
-1415	969.897	14 - 15		-14 - 15.5
-1516	969.898	15 - 16		-15 - 16

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MPS20 -03035	978.504	3 - 3.5	4.0	NBC20 - 3 - 4
-0304	969.899	3 - 4		- 3 - 4.5
-04045	801.545	4 - 4.5		- 4 - 5
-0405	969.900	4 - 5		- 4 - 5.5
-05055	801.546	5 - 5.5		- 5 - 6
-0506	969.901	5 - 6	- 5 - 6.5	
-06065	801.547	6 - 6.5	4.3	- 6 - 7
-0607	969.902	6 - 7		- 6 - 7.5
-07075	801.548	7 - 7.5		- 7 - 8
-0708	969.903	7 - 8		- 7 - 8.5
-08085	801.549	8 - 8.5	4.6	- 8 - 9
-0809	969.904	8 - 9		- 8 - 9.5
-09095	801.550	9 - 9.5		- 9 - 10
-0910	969.905	9 - 10		- 9 - 10.5
-10105	801.551	10 - 10.5	5.1	-10 - 11
-1011	969.906	10 - 11		-10 - 11.5
-11115	801.552	11 - 11.5		-11 - 12
-1112	969.907	11 - 12		-11 - 12.5
-12125	978.512	12 - 12.5	5.2	-12 - 13
-1213	969.908	12 - 13		-12 - 13.5
-1314	969.909	13 - 14		-13 - 14.5
-1415	969.910	14 - 15		-14 - 15.5
-1516	969.911	15 - 16		-15 - 16.5
-1617	969.912	16 - 17	4.6	-16 - 17.5
-1718	969.913	17 - 18		-17 - 18.5
-1819	969.914	18 - 19		-18 - 19.5
-1920	969.915	19 - 20		-19 - 20

- 1 pce. of ps ring is included.
- To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

### PS Rings

Replaceable seal is installed in the MEGA perfect seal.  
Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



Model	Order No.	Corresponding MPS Model
PS -0304	969.981	MPS □ -03035, 0304
-0405	969.982	-04045, 0405
-0506	969.983	-05055, 0506
-0607	969.984	-06065, 0607
-0708	969.985	-07075, 0708
-0809	969.986	-08085, 0809
-0910	969.987	-09095, 0910
-1011	969.988	-10105, 1011
-1112	969.989	-11115, 1112
-1213	969.990	-12125, 1213

Model	Order No.	Corresponding MPS Model
PS -1314	969.991	MPS □ -1314
-1415	969.992	-1415
-1516	969.993	-1516
-1617	969.994	-1617
-1718	969.995	-1718
-1819	969.996	-1819
-1920	969.997	-1920

- 1 package contains 5 pcs. (1 size).

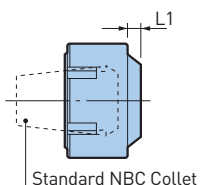
# Baby Perfect Seal

## For New Baby Chuck

Unique design increases sealing performance with higher coolant pressure to create a "perfect seal".

Remove the PS Ring, to supply coolant to the cutting tool periphery.

- Max. Coolant pressure 7 MPa



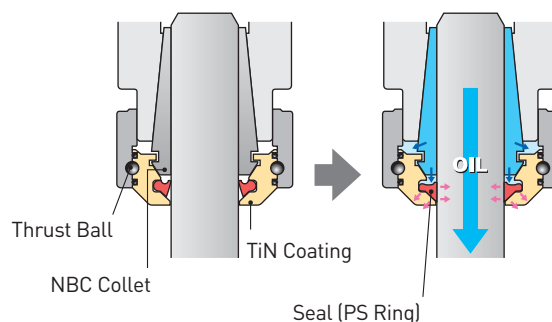
2way coolant



Through tools with PS ring



Jet through without PS ring



A.8

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
BPS6 -03035	961.409	3 - 3.5	2.3	NBC6 -3 - 3.75
	969.921	3 - 4		-3 - 4.25
	961.410	4 - 4.5		-4 - 4.75
	969.922	4 - 5		-4 - 5.25
	961.411	5 - 5.5		-5 - 5.75
-0506	969.923	5 - 6	-5 - 6	
BPS8 -03035	961.412	3 - 3.5	3.9	NBC8 -3 - 4
	969.924	3 - 4		-3 - 4.5
	961.413	4 - 4.5		-4 - 5
	969.925	4 - 5		-4 - 5.5
	961.414	5 - 5.5		-5 - 6
	969.926	5 - 6		-5 - 6.5
	961.415	6 - 6.5		-6 - 7
	969.927	6 - 7		-6 - 7.5
	961.416	7 - 7.5		-7 - 8
	969.928	7 - 8		-7 - 8
BPS10 -03035	800.403	3 - 3.5	3.9	NBC10 -3 - 4
	969.929	3 - 4		-3 - 4.5
	800.404	4 - 4.5		-4 - 5
	969.930	4 - 5		-4 - 5.5
	800.405	5 - 5.5		-5 - 6
	969.931	5 - 6		-5 - 6.5
	800.406	6 - 6.5		-6 - 7
	969.932	6 - 7		-6 - 7.5
	800.407	7 - 7.5		-7 - 8
	969.933	7 - 8		-7 - 8.5
-08085	800.408	8 - 8.5	3.5	-8 - 9
	969.934	8 - 9		-8 - 9.5
	800.409	9 - 9.5		-9 - 10
	969.935	9 - 10		-9 - 10

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
BPS13 -03035	800.410	3 - 3.5	4.3	NBC13 - 3 - 4
	969.936	3 - 4		- 3 - 4.5
	800.411	4 - 4.5		- 4 - 5
	969.937	4 - 5		- 4 - 5.5
	800.412	5 - 5.5		- 5 - 6
	969.938	5 - 6		- 5 - 6.5
-06065	800.413	6 - 6.5	4.6	- 6 - 7
	969.939	6 - 7		- 6 - 7.5
	800.414	7 - 7.5		- 7 - 8
	969.940	7 - 8		- 7 - 8.5
	800.415	8 - 8.5		- 8 - 9
	969.941	8 - 9		- 8 - 9.5
	800.416	9 - 9.5		- 9 - 10
	969.942	9 - 10		- 9 - 10.5
	800.417	10 - 10.5		-10 - 11
	969.943	10 - 11		-10 - 11.5
-11115	800.418	11 - 11.5	4.2	-11 - 12
	969.944	11 - 12		-11 - 12.5
	800.419	12 - 12.5		-12 - 13
	969.945	12 - 13		-12 - 13

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
BPS16 -03035	800.420	3 - 3.5	4.0	NBC16 - 3 - 4
-0304	969.946	3 - 4		- 3 - 4.5
-04045	800.421	4 - 4.5		- 4 - 5
-0405	969.947	4 - 5		- 4 - 5.5
-05055	800.422	5 - 5.5	4.3	- 5 - 6
-0506	969.948	5 - 6		- 5 - 6.5
-06065	800.423	6 - 6.5		- 6 - 7
-0607	969.949	6 - 7		- 6 - 7.5
-07075	800.424	7 - 7.5	4.6	- 7 - 8
-0708	969.950	7 - 8		- 7 - 8.5
-08085	800.425	8 - 8.5		- 8 - 9
-0809	969.951	8 - 9		- 8 - 9.5
-09095	800.426	9 - 9.5	5.1	- 9 - 10
-0910	969.952	9 - 10		- 9 - 10.5
-10105	800.427	10 - 10.5		- 10 - 11
-1011	969.953	10 - 11		- 10 - 11.5
-11115	800.428	11 - 11.5	4.1	- 11 - 12
-1112	969.954	11 - 12		- 11 - 12.5
-12125	800.429	12 - 12.5		- 12 - 13
-1213	969.955	12 - 13		- 12 - 13.5
-1314	969.956	13 - 14	5.2	- 13 - 14.5
-1415	969.957	14 - 15		- 14 - 15.5
-1516	969.958	15 - 16		- 15 - 16

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
BPS20 -03035	800.430	3 - 3.5	4.0	NBC20 - 3 - 4
-0304	969.959	3 - 4		- 3 - 4.5
-04045	800.431	4 - 4.5		- 4 - 5
-0405	969.960	4 - 5		- 4 - 5.5
-05055	800.432	5 - 5.5	4.3	- 5 - 6
-0506	969.961	5 - 6		- 5 - 6.5
-06065	800.433	6 - 6.5		- 6 - 7
-0607	969.962	6 - 7		- 6 - 7.5
-07075	800.434	7 - 7.5	4.6	- 7 - 8
-0708	969.963	7 - 8		- 7 - 8.5
-08085	800.435	8 - 8.5		- 8 - 9
-0809	969.964	8 - 9		- 8 - 9.5
-09095	800.436	9 - 9.5	5.1	- 9 - 10
-0910	969.965	9 - 10		- 9 - 10.5
-10105	800.437	10 - 10.5		- 10 - 11
-1011	969.966	10 - 11		- 10 - 11.5
-11115	800.438	11 - 11.5	4.1	- 11 - 12
-1112	969.967	11 - 12		- 11 - 12.5
-12125	800.439	12 - 12.5		- 12 - 13
-1213	969.968	12 - 13		- 12 - 13.5
-1314	969.969	13 - 14	5.2	- 13 - 14.5
-1415	969.970	14 - 15		- 14 - 15.5
-1516	969.971	15 - 16		- 15 - 16.5
-1617	969.972	16 - 17		- 16 - 17.5
-1718	969.973	17 - 18	4.6	- 17 - 18.5
-1819	969.974	18 - 19		- 18 - 19.5
-1920	969.975	19 - 20		- 19 - 20

- 1 pce. of ps ring is included.
- To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

### PS Rings

Replaceable seal is installed in the baby perfect seal.  
Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



Model	Order No.	Corresponding BPS Model
PS -0304	969.981	BPS □ -03035, 0304
-0405	969.982	-04045, 0405
-0506	969.983	-05055, 0506
-0607	969.984	-06065, 0607
-0708	969.985	-07075, 0708
-0809	969.986	-08085, 0809
-0910	969.987	-09095, 0910
-1011	969.988	-10105, 1011
-1112	969.989	-11115, 1112
-1213	969.990	-12125, 1213

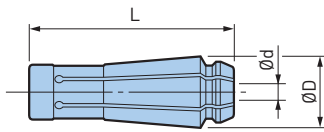
Model	Order No.	Corresponding BPS Model
PS -1314	969.991	BPS □ -1314
-1415	969.992	-1415
-1516	969.993	-1516
-1617	969.994	-1617
-1718	969.995	-1718
-1819	969.996	-1819
-1920	969.997	-1920

- 1 package contains 5 pcs. (1 size).



## MEGA E Collets

For MEGA E Chuck



Collet class	Max. runout	
	At nose	At end of test bar
AA	Within 1 µm	Within 3 µm

MEGA6E				
Model	Order No.	Ød	Min. Clamping Length	
MEC6 -3AA	968.421	3	19	
-4AA	968.423	4	22	
-5AA	968.424	5	25	
-6AA	968.425	6	27	

L=34.9 ØD=11.3

MEGA8E				
Model	Order No.	Ød	Min. Clamping Length	
MEC8 -3AA	968.427	3	19	
-4AA	968.429	4	22	
-5AA	968.430	5	25	
-6AA	968.431	6	28	
-7AA	801.317	7	29	
-8AA	968.433	8	31	

L=39.4 ØD=14.1

A.8

MEGA10E				
Model	Order No.	Ød	Min. Clamping Length	
MEC10 - 3AA	968.434	3	19	
- 4AA	968.436	4	22	
- 5AA	968.437	5	25	
- 6AA	968.438	6	28	
- 7AA	801.313	7	29.5	
- 8AA	968.440	8	31	
- 9AA	801.314	9	33	
-10AA	968.442	10	37	

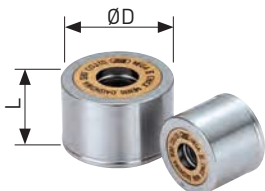
L=45.7 ØD=17.1

MEGA13E				
Model	Order No.	Ød	Min. Clamping Length	
MEC13 - 3AA	968.443	3	19	
- 4AA	968.445	4	22	
- 5AA	968.446	5	25	
- 6AA	968.447	6	28	
- 7AA	968.448	7	29.5	
- 8AA	968.449	8	31	
- 9AA	801.316	9	33	
-10AA	968.451	10	35	
-11AA	801.315	11	37	
-12AA	968.453	12	39	

L=47.9 ØD=20.6

## MEGA E Nut

For MEGA E Chuck

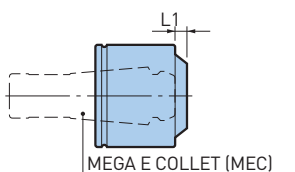


Model	Order No.	ØD	L	MEGA E Chuck
MEN6	968.461	25	20.5	MEGA6E
MEN8	968.462	30	22.0	MEGA8E
MEN10	968.463	35	22.5	MEGA10E
MEN13	968.464	42	24.5	MEGA13E

# MEGA E Perfect Seal

For MEGA E Chuck

- Max. Coolant pressure 7 MPa



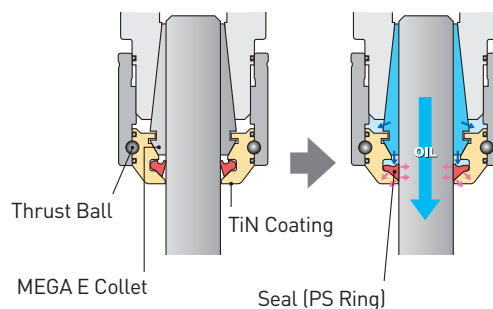
2way coolant



Through tools with PS ring



Jet through without PS ring



A.8

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
EPS6 -03	968.468	3	5.6	MEC6 - 3
-04	968.469	4	5.2	- 4
-05	968.470	5		- 5
-06	968.471	6		- 6
EPS8 -03	968.472	3	6.4	MEC8 - 3
-04	968.473	4	6.0	- 4
-05	968.474	5		- 5
-06	968.475	6		- 6
-07	968.476	7	5.6	- 7
-08	968.477	8		- 8
EPS10 -03	968.478	3	6.4	MEC10 - 3
-04	968.479	4	6.0	- 4
-05	968.480	5		- 5
-06	968.481	6		- 6
-07	968.482	7	6.3	- 7
-08	968.483	8		- 8
-09	968.484	9	5.7	- 9
-10	968.485	10		-10

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
EPS13 -03	968.486	3	6.4	MEC13 - 3
-04	968.487	4	6.0	- 4
-05	968.488	5		- 5
-06	968.489	6		- 6
-07	968.490	7	6.3	- 7
-08	968.491	8		- 8
-09	968.492	9	6.5	- 9
-10	968.493	10		-10
-11	968.494	11		-11
-12	968.495	12	6.2	-12

1. 1 pce. of ps ring is included.
2. To supply coolant to the periphery of the cutting tool, adjusting screw should not be mounted.

## PS Rings

Replaceable seal is installed in the MEGA E perfect seal.  
Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



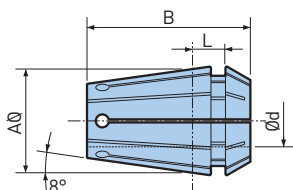
Model	Order No.	Corresponding EPS Model
PS -0304	969.981	EPS □ -03
-0405	969.982	-04
-0506	969.983	-05
-0607	969.984	-06
-0708	969.985	-07
-0809	969.986	-08
-0910	969.987	-09
-1011	969.988	-10
-1112	969.989	-11
		-12

1. 1 package contains 5 pcs. (1 size).

# MEGA ER Collets

## For MEGA ER Grip

All ERC collets are inspected twice to guarantee high runout accuracy.



	Collet class	Max. runout	
	AA	At nose	At end of test bar
	AA	Within 1 µm	Within 3 µm

Clamping diameter: Ø 2.75 - Ø 6.0

MEGA ER 11			
Model		Order No.	Clamping Range Ød
ERC11	-3AA	802.836	2.75 - 3.00
	-3.25AA	802.837	3.00 - 3.25
	-3.5AA	802.838	3.25 - 3.50
	-3.75AA	802.839	3.50 - 3.75
	-4AA	802.840	3.75 - 4.00
	-4.25AA	802.841	4.00 - 4.25
	-4.5AA	802.842	4.25 - 4.50
	-4.75AA	802.843	4.50 - 4.75
	-5AA	802.844	4.75 - 5.00
	-5.25AA	802.845	5.00 - 5.25
	-5.5AA	802.846	5.25 - 5.50
	-5.75AA	802.847	5.50 - 5.75
	-6AA	802.848	5.50 - 6.00

Ø A=11 B=18 L=3.8

Clamping diameter: Ø 2.75 - Ø 13.0

MEGA ER 20			
Model		Order No.	Clamping Range Ød
ERC20	- 3AA	967.532	2.75 - 3.00
	- 3.25AA	967.533	3.00 - 3.25
	- 3.5AA	967.534	3.25 - 3.50
	- 3.75AA	967.535	3.50 - 3.75
	- 4AA	967.536	3.75 - 4.00
	- 4.25AA	967.537	4.00 - 4.25
	- 4.5AA	967.538	4.25 - 4.50
	- 4.75AA	967.539	4.50 - 4.75
	- 5AA	967.540	4.75 - 5.00
	- 5.25AA	967.541	5.00 - 5.25
	- 5.5AA	967.542	5.25 - 5.50
	- 5.75AA	967.543	5.50 - 5.75
	- 6AA	967.544	5.50 - 6.00
	- 6.5AA	967.545	6.00 - 6.50
	- 7AA	967.546	6.50 - 7.00
	- 7.5AA	967.547	7.00 - 7.50
	- 8AA	967.548	7.50 - 8.00
	- 8.5AA	967.549	8.00 - 8.50
	- 9AA	967.550	8.50 - 9.00
	- 9.5AA	967.551	9.00 - 9.50
	-10AA	967.552	9.50 - 10.00
	-10.5AA	967.553	10.00 - 10.50
	-11AA	967.554	10.50 - 11.00
	-11.5AA	967.555	11.00 - 11.50
	-12AA	967.556	11.50 - 12.00
	-12.5AA	967.557	12.00 - 12.50
	-13AA	967.558	12.50 - 13.00

Ø A=20 B=31.5 L=6.36

Clamping diameter: Ø 1.9 - Ø 10.0

MEGA ER 16			
Model		Order No.	Clamping Range Ød
ERC16	- 2AA	967.501	1.90 - 2.00
	- 2.1AA	967.502	2.00 - 2.10
	- 2.2AA	967.503	2.10 - 2.20
	- 2.3AA	967.504	2.20 - 2.30
	- 2.4AA	967.505	2.30 - 2.40
	- 2.5AA	967.506	2.40 - 2.50
	- 2.6AA	967.507	2.50 - 2.60
	- 2.7AA	967.508	2.60 - 2.70
	- 2.8AA	967.509	2.70 - 2.80
	- 2.9AA	967.510	2.80 - 2.90
	- 3AA	967.511	2.75 - 3.00
	- 3.25AA	967.512	3.00 - 3.25
	- 3.5AA	967.513	3.25 - 3.50
	- 3.75AA	967.514	3.50 - 3.75
	- 4AA	967.515	3.75 - 4.00
	- 4.25AA	967.516	4.00 - 4.25
	- 4.5AA	967.517	4.25 - 4.50
	- 4.75AA	967.518	4.50 - 4.75
	- 5AA	967.519	4.75 - 5.00
	- 5.25AA	967.520	5.00 - 5.25
	- 5.5AA	967.521	5.25 - 5.50
	- 5.75AA	967.522	5.50 - 5.75
	- 6AA	967.523	5.50 - 6.00
	- 6.5AA	967.524	6.00 - 6.50
	- 7AA	967.525	6.50 - 7.00
	- 7.5AA	967.526	7.00 - 7.50
	- 8AA	967.527	7.50 - 8.00
	- 8.5AA	967.528	8.00 - 8.50
	- 9AA	967.529	8.50 - 9.00
	- 9.5AA	967.530	9.00 - 9.50
	-10AA	967.531	9.50 - 10.00

Ø A=16 B=27.5 L=6.26

Clamping diameter: Ø 2.75 - Ø 16.0

MEGA ER 25		
Model	Order No.	Clamping Range Ød
ERC25 - 3AA	967.559	2.75 - 3.00
- 3.25AA	967.560	3.00 - 3.25
- 3.5AA	967.561	3.25 - 3.50
- 3.75AA	967.562	3.50 - 3.75
- 4AA	967.563	3.75 - 4.00
- 4.25AA	967.564	4.00 - 4.25
- 4.5AA	967.565	4.25 - 4.50
- 4.75AA	967.566	4.50 - 4.75
- 5AA	967.567	4.75 - 5.00
- 5.25AA	967.568	5.00 - 5.25
- 5.5AA	967.569	5.25 - 5.50
- 5.75AA	967.570	5.50 - 5.75
- 6AA	967.571	5.50 - 6.00
- 6.5AA	967.572	6.00 - 6.50
- 7AA	967.573	6.50 - 7.00
- 7.5AA	967.574	7.00 - 7.50
- 8AA	967.575	7.50 - 8.00
- 8.5AA	967.576	8.00 - 8.50
- 9AA	967.577	8.50 - 9.00
- 9.5AA	967.578	9.00 - 9.50
-10AA	967.579	9.50 - 10.00
-10.5AA	967.580	10.00 - 10.50
-11AA	967.581	10.50 - 11.00
-11.5AA	967.582	11.00 - 11.50
-12AA	967.583	11.50 - 12.00
-12.5AA	967.584	12.00 - 12.50
-13AA	967.585	12.50 - 13.00
-13.5AA	967.586	13.00 - 13.50
-14AA	967.587	13.50 - 14.00
-14.5AA	967.588	14.00 - 14.50
-15AA	967.589	14.50 - 15.00
-15.5AA	967.590	15.00 - 15.50
-16AA	967.591	15.50 - 16.00

Ø A=25 B=34 L =6.66

Clamping diameter: Ø 2.75 - Ø 20.0

MEGA ER 32		
Model	Order No.	Clamping Range Ød
ERC32 - 3AA	967.592	2.75 - 3.00
- 3.25AA	967.593	3.00 - 3.25
- 3.5AA	967.594	3.25 - 3.50
- 3.75AA	967.595	3.50 - 3.75
- 4AA	967.596	3.75 - 4.00
- 4.25AA	967.597	4.00 - 4.25
- 4.5AA	967.598	4.25 - 4.50
- 4.75AA	967.599	4.50 - 4.75
- 5AA	967.600	4.75 - 5.00
- 5.25AA	967.601	5.00 - 5.25
- 5.5AA	967.602	5.25 - 5.50
- 5.75AA	967.603	5.50 - 5.75
- 6AA	967.604	5.50 - 6.00
- 6.5AA	967.605	6.00 - 6.50
- 7AA	967.606	6.50 - 7.00
- 7.5AA	967.607	7.00 - 7.50
- 8AA	967.608	7.50 - 8.00
- 8.5AA	967.609	8.00 - 8.50
- 9AA	967.610	8.50 - 9.00
- 9.5AA	967.611	9.00 - 9.50
-10AA	967.612	9.50 - 10.00
-10.5AA	967.613	10.00 - 10.50
-11AA	967.614	10.50 - 11.00
-11.5AA	967.615	11.00 - 11.50
-12AA	967.616	11.50 - 12.00
-12.5AA	967.617	12.00 - 12.50
-13AA	967.618	12.50 - 13.00
-13.5AA	967.619	13.00 - 13.50
-14AA	967.620	13.50 - 14.00
-14.5AA	967.621	14.00 - 14.50
-15AA	967.622	14.50 - 15.00
-15.5AA	967.623	15.00 - 15.50
-16AA	967.624	15.50 - 16.00
-16.5AA	967.625	16.00 - 16.50
-17AA	801.013	16.50 - 17.00
-17.5AA	967.627	17.00 - 17.50
-18AA	967.628	17.50 - 18.00
-18.5AA	967.629	18.00 - 18.50
-19AA	967.630	18.50 - 19.00
-19.5AA	967.631	19.00 - 19.50
-20AA	967.632	19.50 - 20.00

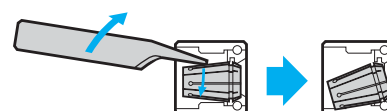
Ø A=32 B=40 L =7.16

A.8

## Collet Remover

Collet Remover eases removal of the collet from the nut.

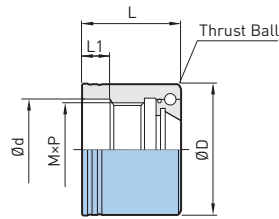
Model	Order No.
NBJ	969.491



## MEGA ER Nut

### For MEGA ER Grip

High precision nut with ball bearing ensure outstanding runout repeatability.



Model	Order No.	ØD	L	M x P	Ød	L1	Wrench Type	Body Type
MERN16	967.801	30	25.0	M22 x P1.5	23.0	7.5	MGR30L	MEGA ER 16
MERN20	967.802	35	26.5	M25 x P1.5	27.0	7.5	MGR35L	MEGA ER 20
MERN25	967.803	42	27.5	M32 x P1.5	33.5	7.5	MGR42L	MEGA ER 25
MERN32	967.804	50	30.2	M40 x P1.5	41.0	7.7	MGR50L	MEGA ER 32

1. MEGA ER nut can not be used with some of conventional ER chuck. Please check dimensions carefully in that case.
2. To maximize the cutting performance, using with MEGA ER grip is recommended.

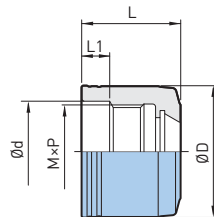
Wrench ▶ 271

## MEGA ER Solid Nut

A.8

### For MEGA ER Grip

Free-notch design nut for high speed machining.



Model	Order No.	ØD	L	M x P	Ød	L1	Wrench Type	Body Type
MER16SN	805.663	30	25.0	M22 x P1.5	23.0	7.5	MGR30L	MEGA ER 16
MER20SN	805.664	35	26.5	M25 x P1.5	27.0	7.5	MGR35L	MEGA ER 20
MER25SN	805.665	42	27.5	M32 x P1.5	33.5	7.5	MGR42L	MEGA ER 25
MER32SN	805.666	50	30.2	M40 x P1.5	41.0	7.7	MGR50L	MEGA ER 32

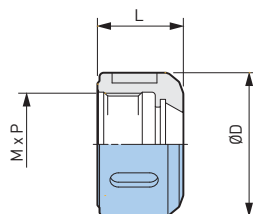
1. MEGA ER solid nut can not be used with some of conventional ER chuck. Please check dimensions carefully in that case.
2. To maximize the cutting performance, using with MEGA ER grip is recommended.

Wrench ▶ 271

## ER Nut

### For MEGA ER Grip

Conventional ER Nut



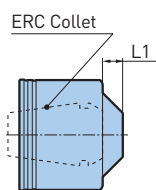
Model	Order No.	ØD	L	M x P	Wrench Type	Body Type
ERN11	803.581	19	12.3	M14 x 0.75	NBK6	ER11
ERN16	803.582	30	19	M22 x P1.5	NBK10	ER16
ERN20	803.583	35	20.5	M25 x P1.5	NBK13	ER20
ERN25	803.584	42	21.5	M32 x P1.5	NBK16	ER25
ERN32	803.585	50	24	M40 x P1.5	FK45-50L	ER32

Wrench ▶ 271

# MEGA ER Perfect Seal

For MEGA ER Grip

- Max. Coolant pressure 7 MPa



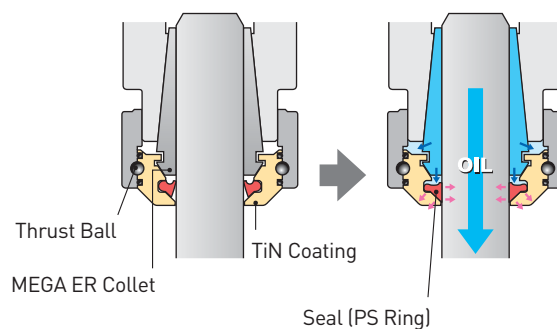
2way coolant



Through tools with PS ring



Jet through without PS ring



A.8

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MERPS16-030035	967.850	3.0 - 3.5	6.4	ERC16-3 - 3.75
-035040	967.851	3.5 - 4.0		- 3.5 - 4.25
-040045	967.852	4.0 - 4.5		- 4 - 4.75
-045050	967.853	4.5 - 5.0		- 4.5 - 5.25
-050055	967.854	5.0 - 5.5		- 5 - 6
-055060	967.855	5.5 - 6.0		- 5.5 - 6.5
-060065	967.856	6.0 - 6.5	6.8	- 6 - 7
-065070	967.857	6.5 - 7.0		- 6.5 - 7.5
-070075	967.858	7.0 - 7.5		- 7 - 8
-075080	967.859	7.5 - 8.0		- 7.5 - 8.5
-080085	967.861	8.0 - 8.5	6.1	- 8 - 9
-085090	967.862	8.5 - 9.0		- 8.5 - 9.5
-090095	967.863	9.0 - 9.5		- 9 - 10
-095100	967.864	9.5 - 10.0		- 9.5 - 10

1. 1 pce. of ps ring is included.

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MERPS20-030035	967.865	3.0 - 3.5	6.4	ERC20-3 - 3.75
-035040	967.866	3.5 - 4.0		- 3.5 - 4.25
-040045	967.867	4.0 - 4.5		- 4 - 4.75
-045050	967.868	4.5 - 5.0		- 4.5 - 5.25
-050055	967.869	5.0 - 5.5		- 5 - 6
-055060	967.870	5.5 - 6.0		- 5.5 - 6.5
-060065	967.871	6.0 - 6.5	6.8	- 6 - 7
-065070	967.872	6.5 - 7.0		- 6.5 - 7.5
-070075	967.873	7.0 - 7.5		- 7 - 8
-075080	967.874	7.5 - 8.0		- 7.5 - 8.5
-080085	967.875	8.0 - 8.5	6.9	- 8 - 9
-085090	967.876	8.5 - 9.0		- 8.5 - 9.5
-090095	967.877	9.0 - 9.5		- 9 - 10
-095100	967.878	9.5 - 10.0		- 9.5 - 10.5
-100105	967.879	10.0 - 10.5		- 10 - 11
-105110	967.880	10.5 - 11.0	6.6	- 10.5 - 11.5
-110115	967.881	11.0 - 11.5		- 11 - 12
-115120	967.882	11.5 - 12.0		- 11.5 - 12.5
-120125	967.883	12.0 - 12.5		- 12 - 13
-125130	967.884	12.5 - 13.0		- 12.5 - 13

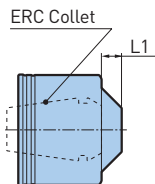
1. 1 pce. of ps ring is included.

For MERS25/32, refer to the following pages.

# MEGA ER Perfect Seal

For MEGA ER Grip

- Max. Coolant pressure 7 MPa



2way coolant



Through tools with PS ring



Jet through without PS ring

A.8

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MERPS25-030035	967.885	3.0 - 3.5	6.3	ERC25 - 3 - 3.75
-035040	967.886	3.5 - 4.0		- 3.5 - 4.25
-040045	967.887	4.0 - 4.5		- 4 - 4.75
-045050	967.888	4.5 - 5.0		- 4.5 - 5.25
-050055	967.889	5.0 - 5.5		- 5 - 6
-055060	967.890	5.5 - 6.0		- 5.5 - 6.5
-060065	967.891	6.0 - 6.5	6.7	- 6 - 7
-065070	967.892	6.5 - 7.0		- 6.5 - 7.5
-070075	967.893	7.0 - 7.5		- 7 - 8
-075080	967.894	7.5 - 8.0		- 7.5 - 8.5
-080085	967.895	8.0 - 8.5	6.8	- 8 - 9
-085090	967.896	8.5 - 9.0		- 8.5 - 9.5
-090095	967.897	9.0 - 9.5		- 9 - 10
-095100	967.898	9.5 - 10.0		- 9.5 - 10.5
-100105	967.899	10.0 - 10.5		- 10 - 11
-105110	967.900	10.5 - 11.0		- 10.5 - 11.5
-110115	967.901	11.0 - 11.5	7.3	- 11 - 12
-115120	967.902	11.5 - 12.0		- 11.5 - 12.5
-120125	967.903	12.0 - 12.5		- 12 - 13
-125130	967.904	12.5 - 13.0		- 12.5 - 13
-130140	967.905	13.0 - 14.0		- 13 - 14.5
-140150	967.906	14.0 - 15.0		- 14 - 15.5
-150160	801.318	15.0 - 16.0	6.6	- 15 - 16

1. 1 pce. of ps ring is included.

Model	Order No.	Cutter Shank Dia.	L1	Collet Model
MERPS32-030035	967.908	3.0 - 3.5	6.2	ERC32 - 3 - 3.75
-035040	967.909	3.5 - 4.0		- 3.5 - 4.25
-040045	967.910	4.0 - 4.5		- 4 - 4.75
-045050	967.911	4.5 - 5.0		- 4.5 - 5.25
-050055	967.912	5.0 - 5.5		- 5 - 6
-055060	967.913	5.5 - 6.0		- 5.5 - 6.5
-060065	967.914	6.0 - 6.5	6.6	- 6 - 7
-065070	967.915	6.5 - 7.0		- 6.5 - 7.5
-070075	967.916	7.0 - 7.5		- 7 - 8
-075080	967.917	7.5 - 8.0		- 7.5 - 8.5
-080085	967.918	8.0 - 8.5	6.7	- 8 - 9
-085090	967.919	8.5 - 9.0		- 8.5 - 9.5
-090095	967.920	9.0 - 9.5		- 9 - 10
-095100	967.921	9.5 - 10.0		- 9.5 - 10.5
-100105	967.922	10.0 - 10.5		- 10 - 11
-105110	967.923	10.5 - 11.0		- 10.5 - 11.5
-110115	967.924	11.0 - 11.5	7.2	- 11 - 12
-115120	967.925	11.5 - 12.0		- 11.5 - 12.5
-120125	967.926	12.0 - 12.5		- 12 - 13
-125130	967.927	12.5 - 13.0		- 12.5 - 13
-130140	967.928	13.0 - 14.0		- 13 - 14.5
-140150	967.929	14.0 - 15.0		- 14 - 15.5
-150160	967.930	15.0 - 16.0	7.3	- 15 - 16.5
-160170	967.931	16.0 - 17.0		- 16 - 17.5
-170180	967.932	17.0 - 18.0		- 17 - 18.5
-180190	967.933	18.0 - 19.0		- 18 - 19.5
-190200	967.934	19.0 - 20.0		- 19 - 20

1. 1 pce. of ps ring is included.

## PS Rings

Replaceable seal is installed in the MEGA ER Perfect Seal. Replacement seal is recommended when coolant leaks due to damage of the PS Ring.



Model	Order No.	Corresponding MERPS Model
PS -0304	969.981	MERPS □ -030035, 035040
-0405	969.982	-040045, 045050
-0506	969.983	-050055, 055060
-0607	969.984	-060065, 065070
-0708	969.985	-070075, 075080

1. 1 package contains 5 pcs. (1 size).

Model	Order No.	Corresponding MERPS Model
PS -0809	969.986	MERPS □ -080085, 085090
-0910	969.987	-090095, 095100
-1011	969.988	-100105, 105110
-1112	969.989	-110115, 115120
-1213	969.990	-120125, 125130
-1314	969.991	-130140
-1415	969.992	-140150
-1516	969.993	-150160
-1617	969.994	-160170
-1718	969.995	-170180
-1819	969.996	-180190
-1920	969.997	-190200

## MEGA Wrench for Collet Chucks

For MEGA Micro Chuck, MEGA New Baby Chuck, MEGA E Chuck and MEGA ER Grip



Model	Order No.	Ød	Applicable Tool Models			
			MEGA Micro Chuck	MEGA New Baby Chuck	MEGA E Chuck	MEGA ER Grip
MGR10	969.449	10	MEGA3S			
MGR12	969.450	12	MEGA4S			
MGR14	969.452	14	MEGA6S			
MGR18	801.705	18	MEGA8S			
MGR20	969.454	20		MEGA6N		
MGR25	969.456	25		MEGA8N	MEGA6E	
MGR30	969.458	30		MEGA10N	MEGA8E	
MGR30L	969.448					MEGA ER16
MGR35	969.460	35		MEGA13N	MEGA10E	
MGR35L	969.460L					MEGA ER20
MGR42	969.462	42		MEGA16N	MEGA13E	
MGR42L	969.462L					MEGA ER25
MGR46	969.465	46		MEGA20N		
MGR50L	969.464L	50				MEGA ER32
MGR60L	969.468L	60		MEGA25N		

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## MEGA Torque Wrench

For MEGA Micro Chuck, MEGA New Baby Chuck and MEGA E Chuck

With torque limiter.



Model	Order No.	Ød	Applicable Tool Models		
			MEGA Micro Chuck	MEGA New Baby Chuck	MEGA E Chuck
MGR10TL	805.460	10	MEGA3S		
MGR12TL	969.451	12	MEGA4S		
MGR12TLS	804.117				
MGR14TL	969.453	14	MEGA6S		
MGR14TLS	978.379				
MGR18TL	805.553	18	MEGA8S		
MGR20TL	969.455	20		MEGA6N	
MGR20TLS	804.119				
MGR25TL	969.457	25		MEGA8N	MEGA6E
MGR25TLS	804.121				
MGR30TL	969.459	30		MEGA10N	MEGA8E
MGR35TL	969.461	35		MEGA13N	MEGA10E
MGR42TL	969.463	42		MEGA16N	MEGA13E
MGR46TL	969.466	46		MEGA20N	

1. TLS models are recommended to tighten 3 mm or smaller inner diameter collets.

## New Baby Wrench

For New Baby Chuck and MEGA ER Grip



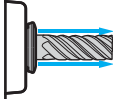
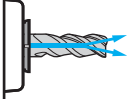
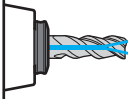
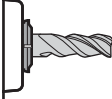
Model	Order No.	L	Applicable Nut
NBK6	961.525	65	NBN6/BPS6/ERN11
NBK8	961.548	94	NBN8/BPS8
NBK10	961.570	104	NBN10/BPS10/ERN16
NBK13	961.596	113	NBN13/BPS13/ERN20
NBK16	961.630	122	NBN16/BPS16/ERN25
NBK20	961.678	131	NBN20/BPS20



## Straight Collets

For MEGA Double Power Chuck, New Hi-Power Milling Chuck and Hydraulic Chuck

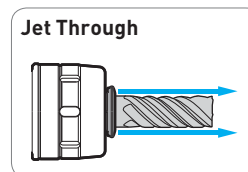
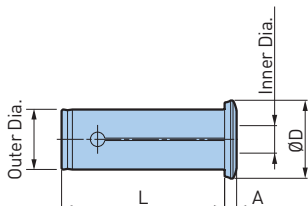
### Straight Collet Selection Guide

	PJC Collet	OCA Collet	PSC Collet	C Collet
				
	Periferical Coolant Supply	Through Tool Coolant Supply	Through Tool Coolant Supply	W/O Center Coolant
MEGA-D MEGA Double Power Chuck	○	○	○	○
MEGA-DS MEGA Double Power Chuck	○		○	○
HMC New Hi-Power Milling Chuck	○	○	○	○
HDC Hydraulic Chuck	○		○	

A.8

### PJC Collets for MEGA-D/DS, HMC and HDC

For coolant to cutting tool periphery.



Regardless of the type of chucks, coolant is supplied to cutting tool periphery.

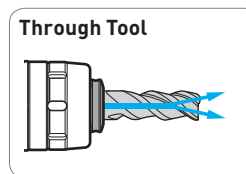
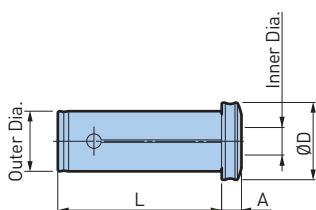
Model	Order No.	A	ØD	L
PJC12 - 6	805.882	5.4	20.4	40
- 8	805.883			
-10	805.884			
PJC16 - 6	962.468	6.0	23	54
- 8	962.469	6.3		
-10	962.470			
-12	962.471			
PJC20 - 3	962.472	5.2	27	61
- 4	962.473			
- 5	962.474	5.7		
- 6	962.475			
- 7	962.476			
- 8	962.477	6.4		
- 9	962.478			
-10	962.479			
-11	962.480	6.8		
-12	962.481			
-13	804.834			
-14	962.488	7.3		
-15	804.835			
-16	962.483			

Model	Order No.	A	ØD	L
PJC25 - 6	962.484	5.0	32.5	68
- 8	962.485			
-10	962.486			
-12	962.487			
-16	962.489	5.4	39	74
-18	801.685	5.8		
-20	962.491	6.5		
PJC32 - 6	962.492	5.0	39	74
- 8	962.493			
-10	962.494			
-12	962.495			
-14	962.496			
-16	962.497			
-20	962.499	5.4	50.5	83
-25	962.500			
PJC42 -16	801.982	5.0	50.5	83
-20	801.983			
-25	801.984			
-32	801.985			

1. Model name indicates its outer dia. and inner dia. (e.g) PJC12-6: outer dia. 12 mm / inner dia. 6 mm.
2. Replacement O-ring for PJC and PSC collet are available (PJC□OR). Please contact BIG KAISER agent.
3. PJC 12 can not be used for Hydraulic Chuck (HDC12).

### PSC Collets for MEGA-D/DS, HMC and HDC

For coolant-through tools.



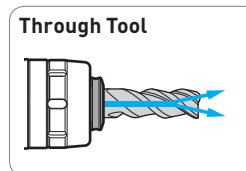
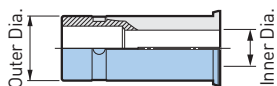
Regardless of the type of chucks, coolant is supplied through cutting tool.

Model	Order No.	A	ØD	L
PSC20 - 3	962.437	7.7	27	61
- 4	962.438	7.5		
- 5	962.439			
- 6	962.440			
- 7	962.441			
- 8	962.442			
- 9	962.443	8.2		
-10	962.444			
-11	962.445			
-12	962.446	8.7		
-13	804.827			
-14	962.447			
-15	804.828			
-16	962.448			
			28	

Model	Order No.	A	ØD	L
PSC32 - 6	962.457	7.5	38	74
- 7	804.829	8.2		
- 8	962.458			
- 9	804.830			
-10	962.459			
-11	804.831			
-12	962.460	8.7		
-13	804.832			
-14	962.461			
-15	804.833			
-16	962.462	9.2		
-18	962.463			
-19	802.063			
-20	962.464			
-21	802.064			
-22	802.065	9.5		
-23	802.066			
-24	802.067			
-25	962.465			

1. Model name indicates its outer dia. and inner dia. [e.g] PSC20-3: outer dia. 20 mm / inner dia. 3 mm
2. Replacement O-ring for PJC and PSC collet are available (PJC□OR). Please contact BIG KAISER agent.

### OCA Collets for MEGA-D and HMC



Model	Order No.	Chuck Model
OCA16 - 6	805.156	MEGA16D HMC16(S)
- 8	805.157	
-10	805.158	
-12	805.159	
OCA20 - 6	962.401	MEGA20D HMC20(S)
- 8	962.402	
-10	962.403	
-12	962.404	
-14	978.501	
-16	962.405	
OCA25 - 6	801.747	MEGA25D HMC25(S)
- 8	801.748	
-10	805.413	
-12	801.752	
-14	805.244	
-16	962.406	
-18	805.245	
-20	962.407	

Model	Order No.	Chuck Model
OCA32 - 6	962.408	MEGA32D HMC32(S)
- 8	962.409	
-10	962.410	
-12	962.411	
-13	962.412	
-14	962.413	
-15	962.414	
-16	962.415	
-17	962.416	
-18	962.417	
-19	962.418	
-20	962.419	
-21	962.420	
-22	962.421	
-23	962.422	
-24	962.423	
-25	962.424	
-27	806.442	
-28	805.356	
-29	806.443	

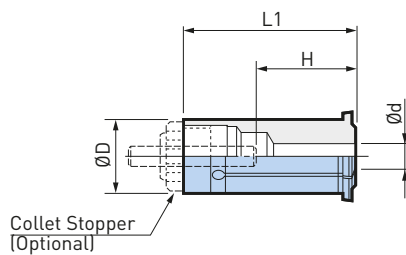
Model	Order No.	Chuck Model
OCA42 - 6	801.774	MEGA42D HMC42
- 8	801.775	
-10	801.764	
-12	801.765	
-16	801.767	
-19	801.768	
-20	801.769	
-24	801.770	
-25	801.771	
-31	801.772	
-32	801.773	

1. Model name indicates its outer dia. and inner dia. [e.g] OCA16-6: outer dia. 16 mm / inner dia. 6 mm.
2. For coolant-through tools.
3. PJC or PSC collet is recommended for MEGA-D/DS.

## Straight Collets

### C Collets for MEGA-D/DS and HMC

Tool projection adjustable straight collet.



A.8

Model	Order No.	Ød	ØD	L1	H	
					Min.	Max.
C16 - 6	806.465	6	16	52	30	47
	806.466	8			32	
	806.467	10			37	
	806.468	12				
C20 - 6	962.260	6	20	60	30	48
	962.262	8			32	
	962.263	10			37	
	962.264	12			40	
	962.265	14			46	
	962.266	16			50	
	800.664	18			50	
	962.205	16			46	
C25 - 6	962.271	6	25	68.5	30	58
	962.272	8			32	
	962.273	10			37	
	962.274	12			45	
	806.478	14			46	
	962.276	16			48	
	806.477	18			52	
	962.278	20			52	

Model	Order No.	Ød	ØD	L1	H					
					Min.	Max.				
C32 - 6	962.281	6	32	74	30	62				
	962.282	8			32					
	962.283	10			37					
	962.284	12			40					
	962.285	14			46					
	962.286	16			50					
	962.287	18			50					
	962.248	19			52					
	962.288	20			52					
	962.249	22			55					
C32 - 8	962.250	24		55						
	962.289	25		55						
	806.476	30	65	60	-	-				
C42 - 6	800.674	6	42	89	30	77				
	800.675	8			34					
	800.665	10			40					
	800.666	12			46					
	800.668	16			52					
	800.670	20			57					
	800.671	25			62					
	800.672	31			62					
	800.673	32			62					
	C42 - 8	806.198			40			79	77	-

1. Model name indicates its outer dia. and inner dia. (e.g) C16-6: outer dia. 16 mm / inner dia. 6 mm.
2. \* Collet Stopper cannot be used.
3. AC20-16 includes Collet Stopper.

### Collet Stoppers for C Collet

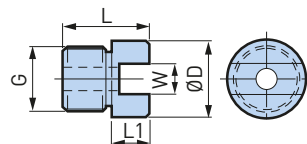


C Collet Model	Model	Order No.	L2
C16 -	AC16CS	806.197	6
C20 -	AC20CS	972.321	8
C25 -	AC25CS	804.772	8

C Collet Model	Model	Order No.	L2
C32 -	AC32CS	972.322	10
C42 -	AC42CS	804.773	10

## Adjusting Screws

For MEGA Double Power Chuck and New Hi-Power Milling Chuck



Model	Order No.	ØD	L	L1	G	W	Body	
							MEGA Double Power Chuck	New Hi-Power Milling Chuck
HMA-M16	962.311	19	27	6	M16P1.5	8	MEGA 20D/DS MEGA25D/DS	HMC20S/HMC20 HMC25S/HMC25
HMA-M16S	962.312	19	27	6	M16P1.5	10	MEGA32D/DS (BBT30/40)	HMC32S
HMA-M24	962.313	30	36	9.5	M24P1.5		MEGA32D/DS (BBT50)	HMC32
							MEGA42D/DS (BBT50)	HMC42S
						MEGA50D/DS (BBT50)	HMC42	

1. For MEGA16D/DS and HMC16S a commercially available hex socket head screw with M8 can be used.

## MEGA Wrench for Milling Chuck

For MEGA Double Power Chuck and MEGA Perfect Grip

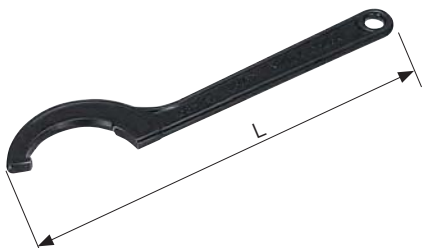


Model	Order No.	Ød	Applicable Tool Models	
			MEGA Double Power Chuck	MEGA Perfect Grip
MGR42L	969.462L	42	MEGA16D/DS-□A(BBT40, HSK-A63/F63)	
MGR46L	969.465L	46	MEGA16D/DS (BBT30/50, HSK-A40/A50/A100)	MEGA16DPG
MGR50L	969.464L	50	MEGA20D/DS (BBT30/40, HSK-A50/A63/F63)	
MGR60L	969.468L	60	MEGA20D/DS (BBT50, HSK-A100)	MEGA20DPG
MGR62L	969.469L	62	MEGA25D/DS-□A(BBT40, HSK-A63/F63)	
MGR70L	969.470L	70	MEGA25D/DS (BBT50, HSK-A100) MEGA32D/DS (BBT40, HSK-A63/F63)	MEGA25DPG
MGR80L	969.471L	80	MEGA32D/DS (BBT50, HSK-A100)	MEGA32DPG
MGR99L	969.472L	99	MEGA42D/DS	

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## FK Wrench

For New Hi-Power Milling Chuck and MEGA ER Grip

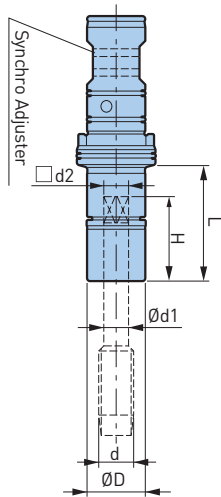


Model	Order No.	L	Clamping Range	Applicable Tool Models
FK31-33	806.462	153	31 - 33	HMC12J
FK45- 50L	801.037	242	43 - 50	HMC16S/HMC20S ERN32
FK52- 55	962.294	220	52 - 55	HMC25S (BBT30)
FK58- 62	962.291	240	58 - 62	HMC20/HMC25 (BBT50)
FK58- 62L	801.038	293		HMC25S (BBT40/50) HMC32S (BBT30)
FK68- 75L	801.039	319	68 - 75	HMC32S (BBT40/50)
FK80- 90	962.292	280	80 - 90	HMC32 (BBT50)
FK80- 90L	804.771	390		HMC42S
FK92- 100	962.293	280	92 - 100	HMC42

# Tap Holders for MEGA Synchro Tapping Holder

Available in short, long and extra long length (150 mm, 200 mm) to meet all production requirements.

**MGT6** (Tap size **DIN**: M3 - M8; **ISO**: M3 - M5)



Model	Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
		DIN371	DIN376	ISO529						
MGT6 -031025 - 30	963.611			M3	3.15	2.5	20	30	16	0.12
- 70	963.612							70		0.18
-100	963.613							100		0.23
-150	963.614							150		0.31
-035027 - 30	963.615	M3	M5		3.5	2.7	21	30	16	0.12
- 70	963.616							70		0.18
-100	963.617							100		0.23
-150	963.618							150		0.31
-040032 - 30	963.619			M4	4.0	3.15	21	30	16	0.12
- 70	963.620							70		0.18
-100	963.621							100		0.23
-150	963.622							150		0.31
-045034 - 30	963.623	M4	M6		4.5	3.4	21	30	16	0.12
- 70	963.624							70		0.18
-100	963.625							100		0.22
-150	963.626							150		0.30
-050040 - 30	963.627			M5	5.0	4.0	25	30	16	0.12
- 70	963.628							70		0.18
-100	963.629							100		0.22
-150	963.630							150		0.30
-200	963.631							200		0.37
-060049 - 30	963.632	M5, M6	M8		6.0	4.9	26	30	16	0.12
- 70	963.633							70		0.17
-100	963.634							100		0.22
-150	963.635							150		0.30
-200	963.636							200		0.37

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

**MGT12** (Tap size **DIN**: M5 - M12; **ISO**: M6 - M12)

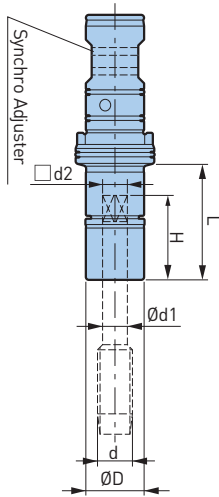
Model	Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
		DIN371	DIN376	ISO529						
MGT12 -060049 - 30	963.637	M5, M6	M8		6.0	4.9	28	30	20	0.19
- 70	963.638							70		0.29
-100	963.639							100		0.36
-150	963.640							150		0.48
-200	963.641							200		0.60
-063050 - 30	963.642			M6	6.3	5.0	28	30	20	0.19
- 70	963.643							70		0.29
-100	963.644							100		0.36
-150	963.645							150		0.48
-200	963.646							200		0.60
-070055 - 30	963.647		M10		7.0	5.5	28	30	20	0.19
- 70	963.648							70		0.28
-100	963.649							100		0.35
-150	963.650							150		0.47
-200	963.651							200		0.59
-080063 - 30	963.652	M8		M8	8.0	6.3	29	30	20	0.18
- 70	963.653							70		0.28
-100	963.654							100		0.35
-150	963.655							150		0.46
-200	963.656							200		0.58
-090071 - 30	963.657		M12	M12	9.0	7.1	30	30	20	0.18
- 70	963.658							70		0.27
-100	963.659							100		0.34
-150	963.660							150		0.46
-200	963.661							200		0.58

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

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**MGT20** (Tap size **DIN**: M10 - M20; **ISO**: M10 - M20)

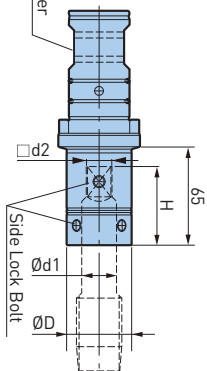


Model	Order No.	Tap Size d			Ød1	□ d2	H	L	ØD	Weight (kg)
		DIN371	DIN376	ISO529						
MGT20-090071 - 35	963.662		M12	M12	9.0	7.1	30	35	30	0.55
- 85	963.663							85		0.82
-115	963.664							115		0.98
-150	963.665							150		1.17
-100080 - 35	963.666	M10		M10	10.0	8.0	33	35	30	0.54
- 85	963.667							85		0.80
-115	963.668							115		0.96
-150	963.669							150		1.15
-110090 - 35	963.670		M14		11.0	9.0	34	35	30	0.53
- 85	963.671							85		0.79
-115	963.672							115		0.95
-150	963.673							150		1.14
-112090 - 35	963.674			M14	11.2	9.0	34	35	30	0.53
- 85	963.675							85		0.79
-115	963.676							115		0.95
-150	963.677							150		1.14
-120090 - 35	963.678			M16	12.0	9.0	34	35	30	0.52
- 85	963.679							85		0.78
-115	963.680							115		0.94
-150	963.681							150		1.13
-125100 - 35	963.682			M16	12.5	10.0	35	35	30	0.52
- 85	963.683							85		0.77
-115	963.684							115		0.93
-150	963.685							150		1.11
-140110 - 35	963.686			M18	14.0	11.0	36	35	30	0.51
- 85	963.687							85		0.76
-115	963.688							115		0.92
-150	963.689							150		1.10
-140112 - 35	963.690			M18, M20	14.0	11.2	36	35	30	0.51
- 85	963.691							85		0.76
-115	963.692							115		0.92
-150	963.693							150		1.10
-160120 - 35	805.173			M20	16.0	12.0	37	35	30	0.51
-150	805.172							150		1.10

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

**MGT36** (Tap size **DIN**: M22 - M36)



Tap Holder Model	Order No.	Tap size		Ød1	□ d2	H	ØD	Weight (kg)
		DIN376	DIN353					
MGT36-180145-65	805.240	M22, 24	P5/8	18	14.5	45	38	1.4
-200160-65	805.241	M27	P3/4	20	16	51	40	1.4
-220180-65	805.238	M30	P7/8	22	18	53	42	1.5
-250200-65	805.242	M33	P1	25	20	58	49	1.6
-280220-65	805.239	M36	-	28	22	62	52	1.6

1. Wrench is not required.

For Accessories ▶ 280

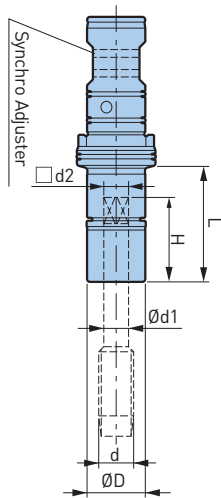
**Caution**

Tap shank (Ød1) and square (□ d2) must be matched. Please carefully check before order.

# Tap Holders for MEGA Synchro Tapping Holder

Available in short, long and extra long length (150 mm, 200 mm) to meet all production requirements.

## MGT6 (Tap size JIS: M2 - M6)



Model	Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
		Metric	Pipe	Unify						
MGT6 -M2	- 30	963.400	M2	No. 3 No. 4	3	2.5	19	30	16	0.12
	- 70	801.481						70		0.18
	-100	801.479						100		0.23
-M3	-150	801.480	M3	No. 5 No. 6	4	3.2	21	150	0.31	
	- 30	801.484						30	0.12	
	- 70	801.485						70	0.18	
-M4	-100	801.482	M4	No. 8	5	4	25	100	0.22	
	-150	801.483						150	0.31	
	-200	801.488						200	0.37	
-M5	- 30	801.494	M5	No. 10 No. 12	5.5	4.5	25	30	0.12	
	- 70	801.495						70	0.18	
	-100	801.491						100	0.22	
-M6, U1/4	-150	801.492	M6	U1/4	6	4.5	25	150	0.30	
	-200	801.493						200	0.37	
	- 30	801.499						30	0.12	
- 70	801.500	M6	U1/4	6	4.5	25	70	0.17		
	-100						801.496	100	0.22	
	-150						801.497	150	0.30	
-200	801.498	200	0.37							

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

## MGT12 (Tap size JIS: M6 - M12)

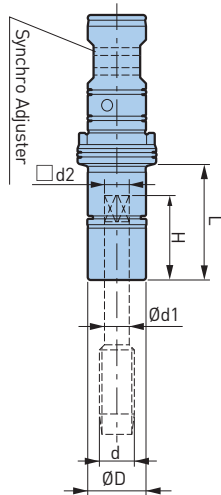
Model	Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
		Metric	Pipe	Unify						
MGT12-M6, U1/4	- 30	978.286	M6	U1/4	6	4.5	27	30	20	0.19
	- 70	801.415						70		0.29
	-100	801.412						100		0.36
	-150	801.413						150		0.48
	-200	801.414						200		0.60
-U5/16	- 30	801.424	M8	U5/16	6.1	5	28	30	0.19	
	- 70	801.425						70	0.29	
	-100	801.421						100	0.36	
	-150	801.422						150	0.48	
	-200	801.423						200	0.60	
-M8	- 30	978.287	M8	U7/16	8	6	29	30	0.18	
	- 70	801.419						70	0.28	
	-100	801.416						100	0.35	
	-150	801.417						150	0.46	
	-200	801.418						200	0.58	
-M10, U3/8	- 30	978.288	M10	U3/8	7	5.5	28	30	0.19	
	- 70	801.408						70	0.28	
	-100	801.405						100	0.35	
	-150	801.406						150	0.47	
	-200	801.407						200	0.59	
-U7/16, P1/8	- 30	801.429	M12	P1/8	8.5	6.5	29	30	0.18	
	- 70	801.430						70	0.27	
	-100	801.426						100	0.34	
	-150	801.427						150	0.46	
	-200	801.428						200	0.58	
-M12	- 30	978.289	M12	U7/16	8	6	29	30	0.18	
	- 70	801.411						70	0.27	
	-100	801.409						100	0.34	
	-150	963.399						150	0.46	
-200	801.410	200	0.58							

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

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MGT20 (Tap size JIS: M12 - M20)

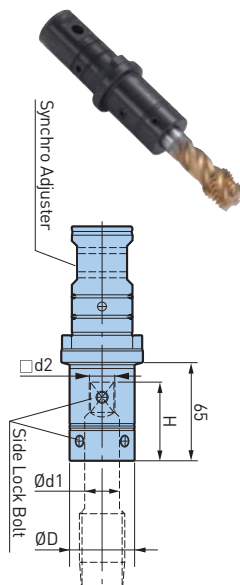


Model	Order No.	Tap Size d			Ød1	□d2	H	L	ØD	Weight (kg)
		Metric	Pipe	Unify						
MGT20-M12	- 35	801.433	M12		8.5	6.5	29	35	30	0.55
	- 85	801.434						85		0.82
	-115	801.431						115		0.98
	-150	801.432						150		1.17
-U1/2	- 35	801.460	U1/2		9	7	30	35	30	0.55
	- 85	801.461						85		0.82
	-115	804.130						115		0.98
	-150	804.128						150		1.17
-M14, U9/16	- 35	801.437	M14	U9/16	10.5	8	33	35	30	0.53
	- 85	801.438						85		0.79
	-115	801.435						115		0.95
	-150	801.436						150		1.14
-P1/4	- 35	801.454	P1/4		11	9	31	35	30	0.53
	- 85	801.455						85		0.79
	-115	801.452						115		0.95
	-150	801.453						150		1.14
-U5/8	- 35	801.462	U5/8		12	9	34	35	30	0.52
	- 85	801.463						85		0.78
	-115	804.131						115		0.94
	-150	804.129						150		1.13
-M16	- 35	801.441	M16		12.5	10	35	35	30	0.52
	- 85	801.442						85		0.77
	-115	801.439						115		0.93
	-150	801.440						150		1.11
-M18, U3/4	- 35	801.445	M18	U3/4	14	11	36	35	30	0.51
	- 85	801.446						85		0.76
	-115	801.443						115		0.92
	-150	801.444						150		1.10
-P3/8	- 35	801.458	P3/8		14	11	33	35	30	0.51
	- 85	801.459						85		0.76
	-115	801.456						115		0.92
	-150	801.457						150		1.10
-M20	- 35	801.449	M20		15	12	37	35	30	0.49
	- 85	801.450						85		0.74
	-115	801.447						115		0.89
	-150	801.448						150		1.06

1. Nut is included. Wrench is to be ordered separately.

For Accessories ▶ 280

MGT36 (Tap size JIS: M20 - M36; P1/4, P3/4, P1)



Tap Holder Model	Order No.	Tap size		Ød1	□d2	H	ØD	Weight (kg)
		Size	l					
MGT36 -M20 -65	801.465	M20	65 - 68	15	12	40	32	1.2
-M22 -65	801.466	M22	71 - 74	17	13	44	34	1.3
-M24 -65	978.330	M24	74 - 77	19	15	50	40	1.4
-M27 -65	801.467	M27	80 - 83	20				
-M30 -65	801.468	M30	83 - 86	23	17	52	43	1.5
-M33 -65	801.469	M33	88 - 91	25	19	57	49	1.6
-M36 -65	978.331	M36	94 - 97	28	21	61	52	1.6
-P1/2 -65	801.471	P1/2	38 - 41	18	14	42	35	1.3
-P3/4 -65	801.473	P3/4		23	17	47	43	1.5
-P1 -65	801.472	P1	49 - 52	26	21	46	50	1.7

1. Wrench is not required.

For Accessories ▶ 280

Caution

Tap shank (Ød1) and square (□d2) must be matched. Please carefully check before order.

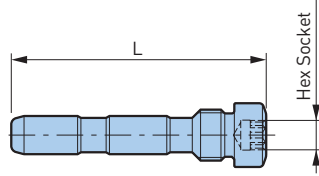


## Spare Parts for MEGA Synchro Tapping Holder

### MGT Set Screw

For MGT6, MGT12, MGT20, MGT36

Made of high-strength material. Secures the tap holder into body.



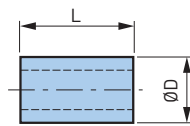
Model	Order No.	Hex Socket size	L	Body
MGT6SS	963.711	4	35	MGT 6
MGT12SS	963.432	4	40	MGT12
MGT20SS	963.713	5	53	MGT20
MGT36SS	801.478	8	92	MGT36

### Synchro Adjuster

For MGT6, MGT12, MGT20, MGT36

Made of special material. Replaceable bushing in tap holder.

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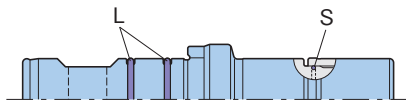
Model	Order No.	ØD	L	Tap Holder
MGT6SA	963.721	9	11	MGT 6-d-
MGT12SA	963.722	10	15	MGT12-d-
MGT20SA	963.723	14	24	MGT20-d-
MGT36SA	801.474	20	32	MGT36-d-

1. Set includes 5 pieces.

### O-Ring Set

For MGT6, MGT12, MGT20

Set includes 1 small, 2 large size.

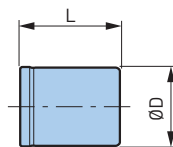


Model	Order No.	Nut. Dia	Tap Holder
MGT6 OR	801.501	Ø 16	MGT 6-d-
MGT12 OR	801.420	Ø 20	MGT12-d-
MGT20 OR	801.451	Ø 30	MGT20-d-
MGT36 OR	801.470	-	MGT36-d-

### MGT Nut

For MGT6, MGT12, MGT20

Exclusive nut for MEGA synchro tapping holder.

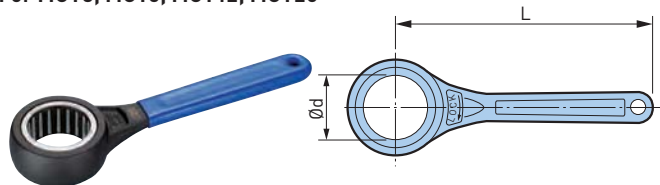


Model	Order No.	ØD	L	Tap Holder
MGN6T	963.700	16	19	MGT 6-d-
MGN12T	963.702	20	21	MGT12-d-
MGN20T	963.703	30	24	MGT20-d-

## Accessories for MEGA Synchro Tapping Holder

### MEGA Wrench

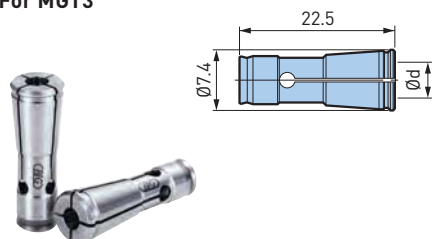
For MGT3, MGT6, MGT12, MGT20



Model	Order No.	Ød	L	Tap Holder
MGR12	969.450	12	90	MGT 3
MGR16	969.446	16	90	MGT 6-d-
MGR20L	969.447	20	160	MGT12-d-
MGR30L	969.448	30	220	MGT20-d-

### Micro Collet

For MGT3



Model	Order No.	Tapping Range d			Tap Shank
		DIN371	ISO529	JIS	Ød
NBC4S-2.5AA	961.468	M1 - M1.8	M2	-	2.5
-2.8AA	968.353	M2 - M2.6	M2.2, M2.5	-	2.8
-3.0AA	961.470	-	-	M1 - M2.6	3.0
-3.1AA	968.355	-	M3	-	3.15
-3.5AA	961.472	M3	-	-	3.5
-4.0AA	961.474	-	-	M3	4.0

1. Other sizes available. Please refer to micro collet.

For Micro Collet ▶ 247

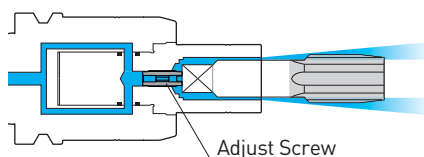
A.8

### Adjusting Screw for MGT36

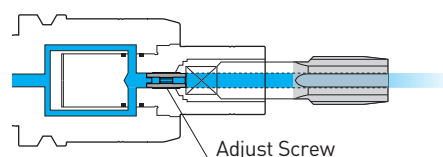
Adjustment of tap projection length (Adjustable amount: 3 mm). Coolant supply is also adjustable in 2 ways by reversing the adjust screw.

Model	Order No.
MGT36AJ	801.464

Tap without hole



Tap with hole



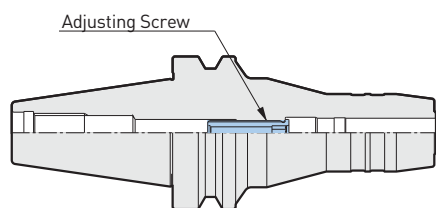
### Side Lock Bolt Set for MGT36

Spare locking screw to clamp a tap.

Set Model	Order No.	Tap Holder Model		Bolt size
		DIN	JIS	
MGT36SL6	801.476	-	MGT36 -M20 -65	M6 x 8L (x4)
		-	-M22 -65	+
		-	-P1/2 -65	M6 x 10L (x2)
MGT36SL8	801.477	MGT36 -180145-65	-M24 -65	M8 x 10L (x4)
		-200160-65	-M27 -65	+
		-220180-65	-M30 -65	M8 x 12L (x2)
		-	-P3/4 -65	
MGT36SL10	801.475	MGT36 -250200-65	MGT36 -M33 -65	M10 x 12L (x4)
		-280220-65	-M36 -65	+
		-	-P1 -65	M10 x 14L (x2)

## Adjusting Screws

For Hydraulic Chuck



One Side Hexagon Socket Type		Both Side Hexagon Socket Type	
Model	Order No.	Model	Order No.
HDA6 -05020	803.742	HDA6 -05020W	802.393
-05032	803.743	-05032W	802.394
-20010	802.390	-	-
HDA8 -06020	803.745	HDA8 -06020W	803.759
-06032	803.746	-06032W	803.760
HDA10 -08015	803.747	HDA10 -08015W	803.761
-08032	803.748	-08032W	803.762
HDA12 -10010	803.749	-	-
-10025	803.750	HDA12 -10025W	803.763
-10032	803.751	-10032W	802.383
HDA16 -12015	803.752	HDA16 -12015W	802.384
-12030	802.337	-12030W	802.385
-12037	803.754	-16037W	802.386
HDA20 -12047	802.391	-	-
HDA20 -16015	803.755	HDA20 -16015W	802.387
HDA25 -16039	803.757	HDA25 -16039W	802.389
HDA16 -12015	803.752	HDA16 -12015W	802.384
HDA20 -16015	803.755	HDA20 -16015W	802.387

1. One side hexagon socket type can be clamped only from chuck side.

A.8

## Clamp Bolts

For Face Mill Arbor FMH and Smart Damper FMH type

Clamp Bolt		Clamp Bolt with Coolant Hole						
Model	Order No.	Model	Order No.	ØD	ØD1	L	L1	G
MBA -M12	802.757	TMBA -M12	802.767	33	23	10	2	12
-M12H	802.758	-	-		-			
-M16	802.759	-M16	802.768	40	23	10	6	16
-M16H	802.760	-	-		-			
-M20	802.761	-M20	802.769	50	27	14	6	20
-M20H	802.762	-	-		-			

## Sleeve for BSL Side Lock Holder

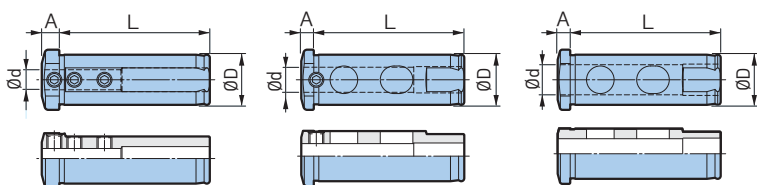


Fig. 1

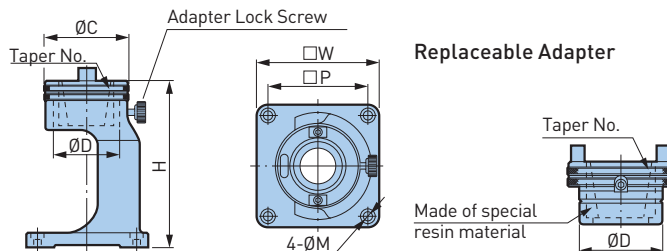
Fig. 2

Fig. 3

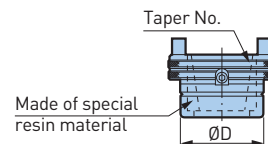
Model	Order No.	Fig.	Ød	ØD	L	A
BSLA20 - 6	805.728	1	6	20	60	5
- 8	805.733		8			7
-10	805.734	2	10			5
-12	805.735		12			
-16	805.736	3	16			
BSLA32 -10	805.737	1	10			32
-12	805.738		12	6		
-16	805.739	2	16			
-20	805.740		20			

## Tooling Mate

For BBT (BT) and BDV (DV)



Replaceable Adapter



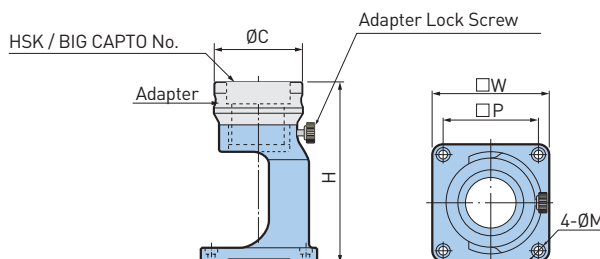
Model	Order No.	Taper No.	ØC	ØD	H	W	P	ØM	Weight (kg)	Adapter Model
TMS40 -20	805.489	BT20	76	60	150	110	90	7 (for M6)	2.6	TMA40 -20
-30	961.270	BT30							2.6	-30
-40	961.271	BT40/DV40							2.4	-40
TMS50 -40	961.272	BT40/DV40	105	88	190	160	130	9 (for M8)	7.0	TMA50 -40
-50	961.273	BT50/DV50							6.0	-50

- 1 pce. of adapter is included.
- Adapter can be ordered individually.

For Adapter ▶ 284

For HSK and BIG CAPTO

Innovative "Two-way clutch needle roller clamping system" assures secure clamping at the tool flange periphery.



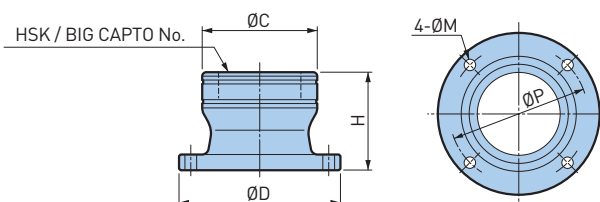
Model	Order No.	HSK / BIG CAPTO No.	ØC	H	W	P	ØM	Weight (kg)	Adapter Model
TMS40 - 32R	961.339	32/C3	76	165	110	90	7 (for M6)	3.2	TMA40 - 32R
- 40R	961.342	40/C4						3.0	- 40R
- 50R	961.346	50/C5						2.7	- 50R
- 63R	961.338	63/C6						2.7	- 63R
TMS50 - 80R	802.308	80/C8	114	215	160	130	9 (for M8)	7.1	TMA50 - 80R
-100R	802.307	100	124	219				6.5	-100R

- 1 pce. of adapter is included.
- Adapter can be ordered individually.

For Adapter ▶ 284

## Kombi Grip

For HSK and BIG CAPTO



Model	Order No.	HSK No.	BIG CAPTO No.	ØC	ØD	H	ØP	ØM
KG 25R	961.291	25	-	48	79	65	62	7 (for M6)
32R	961.292	32	C3	55	85		69	
40R	961.293	40	C4	63	93		77	
50R	961.294	50	C5	75	105	89		
63R	961.295	63	C6	88	123.5	75	105.5	9 (for M8)
80R	961.296	80	C8	107	142	90	124	
100R	961.297	100	-	127	162	100	144	

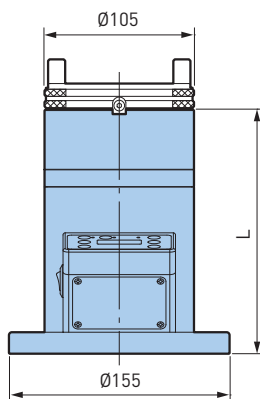
- 4 pcs. of cap bolts to mount on the table are not included.

## Torque Fit

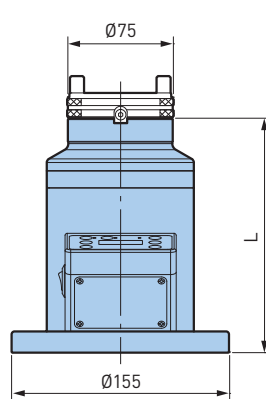
Tooling Fixture with Tightening Torque Indicate function



TF-50



TF-40

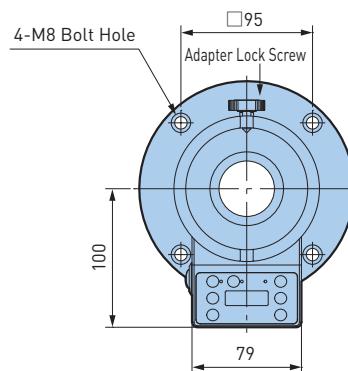


- Torque values of all BIG KAISER collet chucks are presetted.
- Notification by buzzer near the correct torque.
- USER-Mode allows setting of desired torque value.

A.8

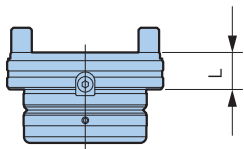
Model	Order No.	Torque Setting Range	L	Adapter	Input Voltage	Weight (kg)
TF-40	806.737	4 - 80 Nm	167	TMA40-	100 - 240V	8.0
TF-50	806.738		172	TMA50-		

1. Adapter is to be ordered seperately.



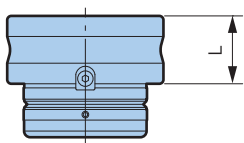
### Adapter (optional)

For BT/DV



Model	Order No.	Body Model	Taper No.	L	Weight (kg)
TMA40 - 20	805.894	TF-40	ISO20	18	0.8
- 30	802.944		BT30		0.8
- 40	802.945		BT/DV40		0.6
TMA50 - 40	802.942	TF-50	BT/DV40		2.3
- 50	802.943		BT/DV50		1.3

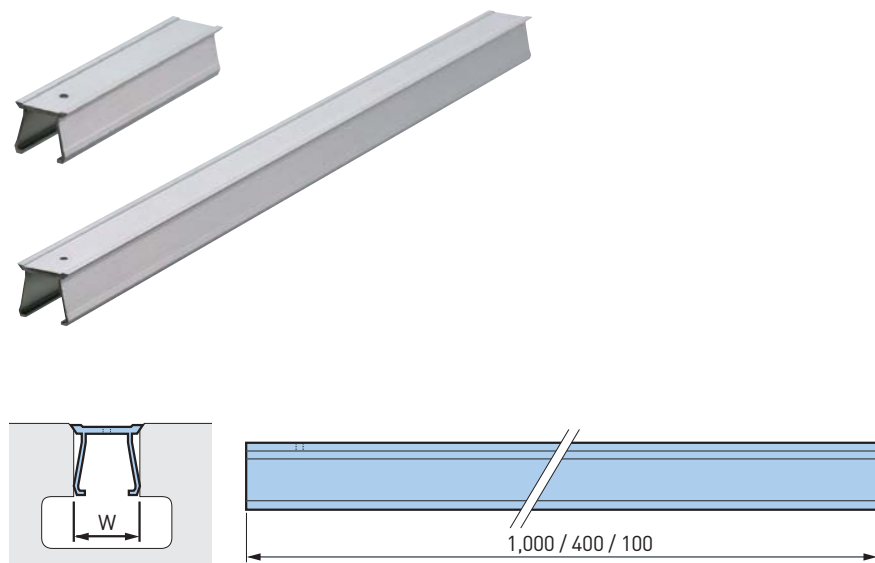
For HSK/BIG CAPTO



Model	Order No.	Body Model	HSK No.	BIG Capto No.	L	Weight (kg)
TMA40 - 32R	802.948	TF-40	32	-	33	1.4
- 40R	802.949		40	C4		1.2
- 50R	802.950		50	C5	0.9	
- 63R	972.331		63	C6	40	0.9
TMA50 - 80R	802.946	TF-50	80	C8	43	2.5
- 100R	802.947		100	-	47	1.8

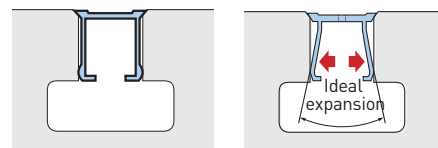
## T-Slot Clean

Improve efficiency of table cleaning. Save you from cleaning T-slots packed with swarf. Quick discharge of swarf out of a machine.



Before

After



Other manufacturer

BIG KAISER

Due to the uniquely angled shape of the table T-shot contact part, slipout is prevented and chips are completely shut out.

A.8

### Standard Set

Set Model	Order No.	W	Contents of Set
TS14-S	961.252	14	400 mm x 4 pieces
TS18-S	961.253	18	100 mm x 4 pieces
TS22-S	961.254	22	Removal pin x 1 piece

### 400 mm Set

Set Model	Order No.	W	Contents of Set
TS14-400L-100P	961.255	14	400 mm x 100 pieces Removal pin x 10 piece
TS18-400L-100P	961.256	18	
TS22-400L-100P	961.257	22	

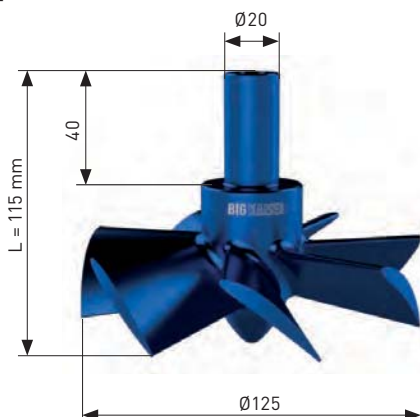
### 1000 mm Set

#### For large machines

1000 mm (1 m) long version is available.

Set Model	Order No.	W	Contents of Set
TS18-1000L-10P	802.785	18	1000 mm x 10 pieces
TS22-1000L-10P	802.787	22	Removal pin x 1 piece

## Chip Fan

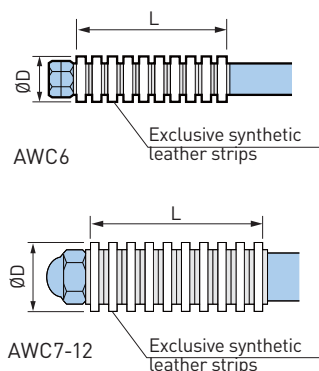
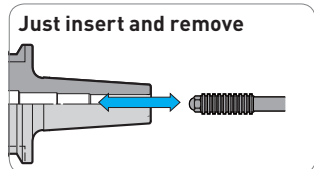


Set Model	Order No.	No. of Wings
ST20-CF125	335.625	7

## α Wiper Cleaners, Ø6 - 12

Perfect for Hydraulic Chuck and Shrink Fit Holder

Easy cleaning by simply inserting and removing.



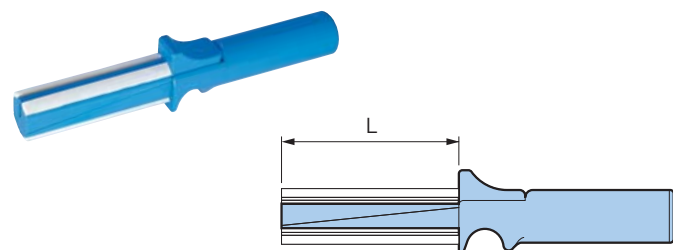
Model	Order No.	ØD	L
AWC6	978.901	6	20
AWC7	802.781	7	
AWC8	978.902	8	
AWC9	802.782	9	26
AWC10	978.903	10	
AWC11	802.783	11	31
AWC12	978.904	12	

## TK Cleaners, Ø14 - 42

Perfect for Hydraulic Chuck and Milling Chuck Holder

Absolute cleaning of clamping bore by unique "slide" feature.

A.8

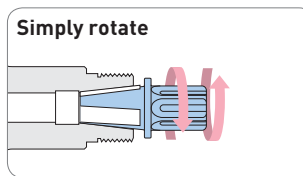
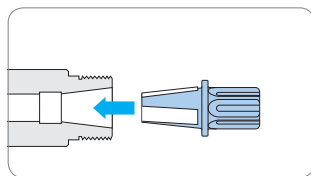


Model	Order No.	Bore Diameter (Ø)	L	Leather Strips Qty.
TKC 14	802.805	14	60	2
16	802.807	16	70	
18	802.808	18		
20	802.809	20		
25	802.810	25	80	3
32	802.811	32	100	4
40	802.812	40	105	
42	978.905	42		

## α Taper Cleaners

For internal collet taper

Maintain accuracy of high precision collet chucks.



For MEGA Micro Chuck

Model	Order No.	Suitable Model
SC-NBC3S	961.278	MEGA3S
SC-NBC4S	961.279	MEGA4S
SC-NBC6S	961.280	MEGA6S
SC-NBC8S	805.827	MEGA8S

For MEGA E Chuck

Model	Order No.	Suitable Model
SC-MEC6	961.287	MEGA6E
SC-MEC8	961.288	MEGA8E
SC-MEC10	961.289	MEGA10E
SC-MEC13	961.290	MEGA13E

For MEGA New Baby Chuck and New Baby Chuck

Model	Order No.	Suitable Model
SC-NBC6	961.281	MEGA6N NBS6
SC-NBC8	961.282	MEGA8N NBS8
SC-NBC10	961.283	MEGA10N NBS10
SC-NBC13	961.284	MEGA13N NBS13
SC-NBC16	961.285	MEGA16N NBS16
SC-NBC20	961.286	MEGA20N NBS20

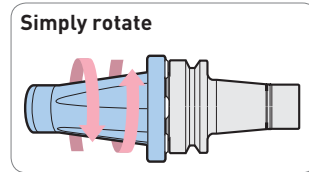
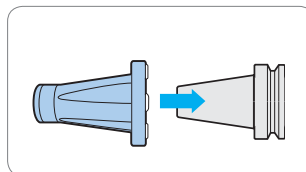
For ER Collet Chuck

Model	Order No.	Suitable Model
SC-MER11	967.810	ER11
SC-MER16	967.811	ER16
SC-MER20	967.812	ER20
SC-MER25	967.813	ER25
SC-MER32	967.814	ER32

## α Tooling Cleaners

### For tool shank taper and flange

Particles and oil on both taper and flange of 7/24 taper holder are easily removed.



Model	Order No.	Shank Size
SCE-30	961.276	No. 30
SCE-40	961.277	No. 40

## Spindle Cleaners

### For machine spindle

Easy cleaning of oil or particles from the machine spindle.



A.8

### For ISO taper spindle

Model	Order No.	Taper Size
SC20	804.945	No. 20
SC30	802.791	No. 30
SC40	802.793	No. 40
SC45	802.794	No. 45
SC50	802.796	No. 50

### For Morse taper spindle

Model	Order No.	Taper Size
SC1	802.788	MT1
SC2	802.789	MT2
SC3	802.790	MT3
SC4	802.792	MT4
SC5	802.795	MT5
SC6	802.797	MT6

### For HSK spindle

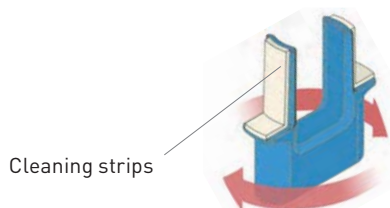
Model	Order No.	Taper Size
SC-HSK 32	802.799	HSK-A32
40	979.997	HSK-A40
50	802.800	HSK-A50
63	802.802	HSK-A63
80	802.803	HSK-A80
100	802.798	HSK-A100

Model	Order No.	Taper Size
SC-HSK25E	979.995	HSK-E25
32E	979.996	HSK-E32
40E	979.998	HSK-E40
50E	802.801	HSK-E50

## Spindle Cleaners

### For BIG CAPTO

Easy cleaning of BIG CAPTO polygon taper.



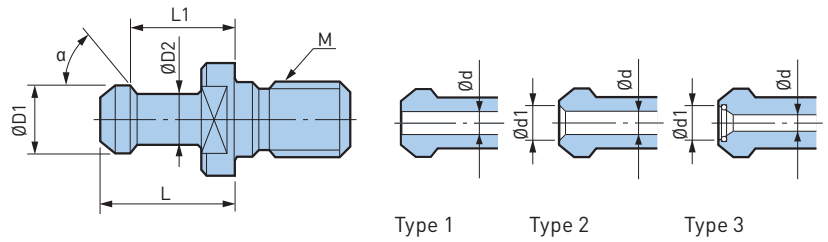
Model	Order No.	BIG CAPTO No.
SC -C3	973.194	C3
-C4	973.195	C4
-C5	973.196	C5
-C6	973.197	C6
-C8	973.198	C8



## Pullstud Bolts

### Before ordering

Ensure to check the dimensions of the required pullstud bolt by referring to the specification sheet of the machine tool. In the case of machines with coolant-through-spindle capability especially, provide us a copy of the pullstud bolt drawing, as sealing method may vary even among machines with the same model number.



A.8

Spindle	Model	Order No.	Standard	ØD1	ØD2	L	L1	α	Ød	Ød1	Hole Type	Specification / Feature					
30 (M12)	30PMG	978.956	JIS	12	8	23.4	18.4	75	None	-	-	JIS BT30					
	30PMGH	978.972							4.0	-	1	JIS BT30 with hole					
	30PMGH2	800.450							2.5	5.5	3	YASDA					
	P30T-1MG	978.978	MAS-I	11	7	23	18	45	None	-	-	MAS-1 BT30					
	P30T-1MGH	978.953							2.5	-	1	MAS-1 BT30 with hole					
	P30T-2MG	978.979	MAS-II	11	7	23	18	60	None	-	-	MAS-2 BT30					
	P30T-2MGH	801.785							2.5	-	1	MAS-2 BT30 with hole					
	30P-1MGH	978.951	Original	11	8	23	18	45	4.0	-	1	FANUC					
	P30T-2MGH3	801.787							11	7.5	23	18	60	2.5	-	1	BROTHER
PMO30MG	802.001	11							7	23	18	45	2.5	6.5	3	DMG MORI	
40 (M16)	40PMG	800.463	JIS	19	14	29	23	75	None	-	-	JIS BT40					
	40PMGH	978.954							7.0	-	1	JIS BT40 with hole					
	40PMGH2	800.464							7.0	-	1	MAKINO (Face G) *					
	40PMGH7	978.958							4.0	5.0	2	OKUMA (Face G) *					
	40PMGH4A	978.955							7.0	-	1	YASDA Ø3 side hole					
	40PMGH11	978.977							7.0	10.0	3	YASDA					
	40PMGH12	805.885	5.0	-	1	MITSUI											
	P40T-1MG	801.807	MAS-I	15	10	35	28	45	None	-	-	MAS-1 BT40					
	P40T-1MGHA	801.814							3.0	-	1	MAS-1 BT40 with hole					
	P40T-1MGH1	801.808							3.5	5.5	2						
	P40T-1MGH4	801.810							3.0	7.0	3	OKUMA					
	P40T-1MGH7	801.812							4.0	-	1	MAKINO (Face G) *					
	P40T-1MGH8A	801.813							3.0	7.0	3	JTEKT					
	P40T-2MG	801.831	MAS-II	15	10	35	28	60	None	-	-	MAS-2 BT40					
	P40T-2MGHA	801.834							3.0	-	1	MAS-2 BT40 with hole					
	P40T-2MGH8	801.833							3.5	5.5	2						
	P40T-2MGH1	801.832							3.0	7.0	3	OKUMA					
	PVD40MG	978.975							DIN	19	14	26	20	75	7.0	-	1
	MP40MG	801.507	Original	15	10	25	18	90	None	-	-	MITSUI					
	POM40MG	802.023							15	10	35	28	90	None	-	-	DMG MORI w/o hole
	PMO40MG	978.971							19	14	29	23	75	7.0	10.0	3	DMG MORI with hole
PYN40MG	802.112	18.8							12.45	19.11	14.03	45	7.0	-	1	MAZAK	

1. Machine tool builders have used many various shapes and sizes of pull stud bolts.
2. The use of the incorrect bolts may result in injury or property damage for your machining center.
3. \* End face was ground for the sealing.
4. \*\* End face has O-ring for the sealing.
5. Other sizes are also available. Contact BIG KAISER agent for pullstud bolts.

### MEGA Pullstud Bolt

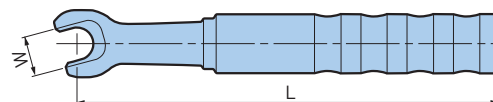
MG in the model numbers stand for MEGA Pullstud Bolt. Tensile strength is improved by utilizing tool steel. Especially recommended for the BIG-PLUS dual contact applications. (Material: X40CrMOV51)

Spindle	Model	Order No.	Standard	ØD1	ØD2	L	L1	α	Ød	Ød1	Hole Type	Specification / Feature									
50 (M24)	50PH	978.965	JIS	28	21	34	25	75	10.0	-	1	JIS 50 with hole									
	50PMGH	800.472										MAKINO (Face G) *									
	50PH2	800.468																			
	P50T-1	961.331	MAS-I	23	17	45	35	45	None	-	-	MAS-1 BT50									
	P50T-1MG	801.883																			
	P50T-1H	801.860																			
	P50T-1MGH	801.885																			
	P50T-1H1	801.861																			
	P50T-1H4	801.873																			
	P50T-1H5	961.332																			
	P50T-1H8	801.867																			
	P50T-1MGH25	801.889																			
	P50T-1H19	801.868																			
	P50T-2	801.898										MAS-II	23	17	45	35	60	None	-	-	MAS-2 BT50
	P50T-2MG	801.942																			
	P50T-2H	801.925																			
	P50T-2MGH25	801.948																			
	P50T-2H4	801.938																			
	P50T-2H14	801.929																			
	P50T-2MGH14	801.944																			
	P50T-2H11	801.927																			
	P50T-2H15	801.930																			
	P50T-2H16	801.931																			
	PVD50	978.966	DIN	28	21	34	25	75	11.5	-	1										DIN 69872 from A
	MP50	801.509	Original	24	18	31	23	90	None	-	-										-
	MP50H1	801.517										MITSUI with hole									
	POM50	978.967		23	17	45	35	90	None	-	-	-	DMG MORI								
	POM50H	961.336											DMG MORI with hole								
	POM50H1	961.333		23	17	45	35	90	8.0	-	-	1									
	POM50H8	802.046											OKK (Face O) **								
PYN50-5	802.120	28.96		20.83	25.2	17.58	45	10.0	-	-	1	MAZAK (Face G) *									

1. Machine tool builders have used many various shapes and sizes of pull stud bolts.
2. The use of the incorrect bolts may result in injury or property damage for your machining center.
3. \* End face was ground for the sealing.
4. \*\* End face has O-ring for the sealing.
5. Other sizes are also available. Contact BIG KAISER agent for pullstud bolts.

A.8

## Pullstud Wrenches



Taper Size	Model	Order No.	W	L	Suitable pullstud specification
BBT30 BT30	PLW30	805.544	13	140	JIS, MAS-I, MAS-II, 30P-1MGH, P30T-2MGH3, PMO30MG
BBT40 BT40	PLW-40P	805.886	19	200	JIS
	PLW-P40T	805.887			MAS-I, MAS-II, POM40MG
	PLW-PMO40	805.888			PMO40MG
	PLW-PYN40	805.889			PYN40MG

1. If appearance shape is the same, the specification other than above is also usable.

## Set Up Information



### Preparing the Stop Block

The Angle Head utilizes a Locating Pin that engages with the Stop Block, which is mounted to the machine spindle to prevent radial movement of the Angle Head during operation. Therefore, it is necessary to use a Stop Block with the proper dimensions to match the Locating Pin of the Angle Head.

## 1. Standard Setup of the Locating Pin

### "S" Dimension

The distance from the centerline of the Angle Head spindle to the centerline of the Locating Pin.

### Fixed Length "A" and "H"

The axial distance from the gauge line to the top of the Locating Pin, when the Locating Pin is properly engaged in the Stop Block.

Fixed Length "A" for Angle Head (Fig.1)

This is not adjustable by the customer. If the standard dimensional values shown below are not suitable for your machine, please contact us.

Fixed Length "H" for Air Turbine spindle and High Spindle (Fig.2)

We will deliver a set at the standard 6 mm. Otherwise, This dimension is adjustable by the customer. Four (4) Locating Pin models are available, please contact us.

A.8

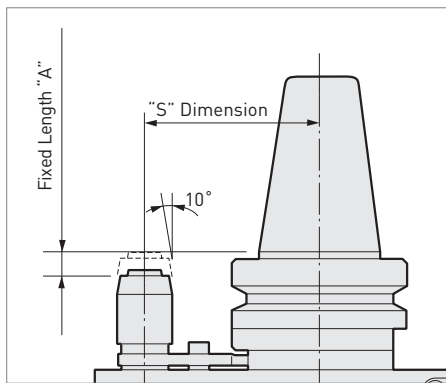


Fig. 1

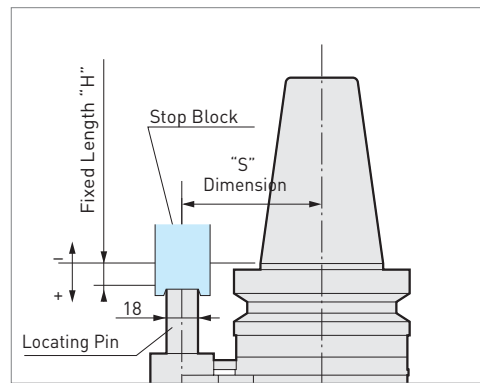


Fig. 2

Standard Dimension	Angle Head Fig. 1		Air Turbine and High Spindle Fig. 2	
	"S"	"A"	"S"	"H"
BDV40 / BBT40 / HSK-A63	65	8	65	6
BDV50 / BBT50 / HSK-A100	80	8	80	6
	110	6		

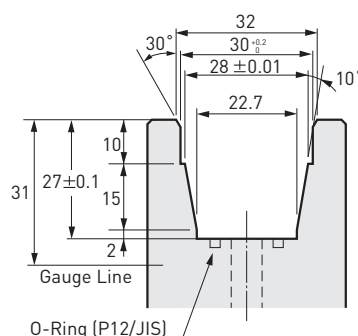
## 2. Stop Block Dimensions

Please order a Stop Block from the machine tool builder. Refer to the following diagrams for the proper Stop Block groove dimensions.

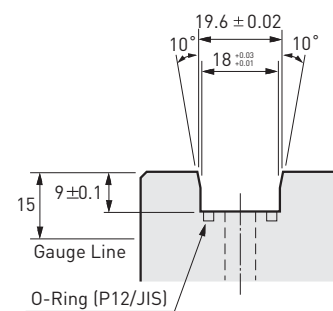


Stop Block

### For "S" = 110 Angle Head



### Others



### 3. Semi-Finished Stop Block

A semi-finished Stop Block has the proper groove form for use with the Angle Head, as well as additional material to allow the user to machine the block to the correct height.

If a pre-made Stop Block is unobtainable from the machine tool builder, a semi-finished Stop Block can be used. Please consult with the machine tool builder for selection, machining, and mounting of a semi-finished Stop Block.

Fig. 1

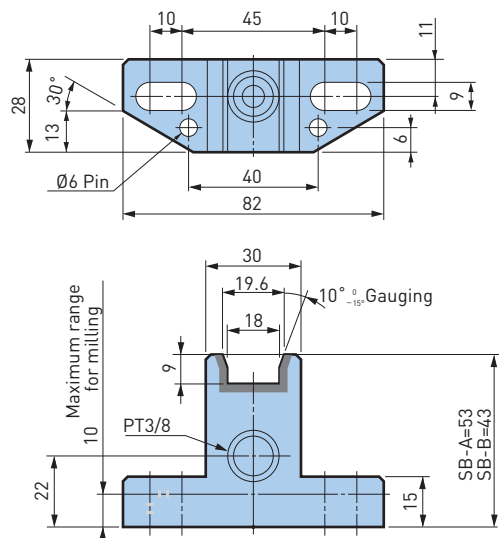


Fig. 2

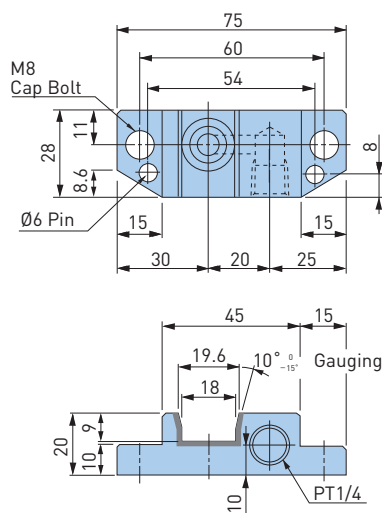
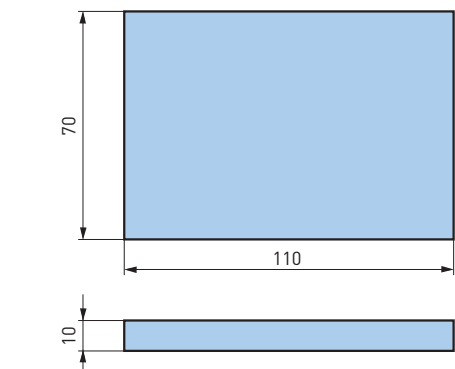
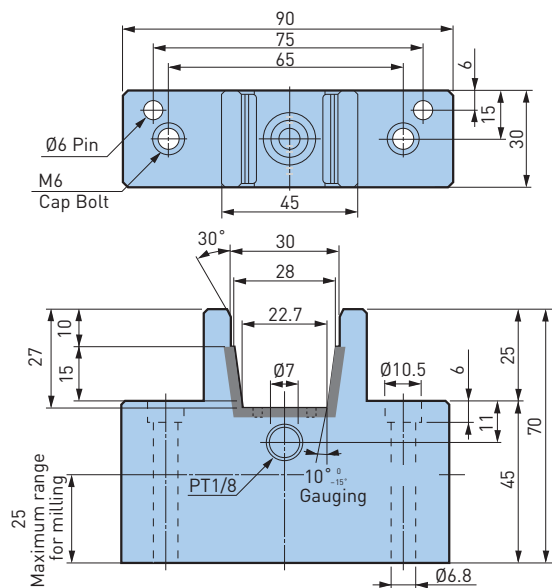


Fig. 3



**Note**

The sketch indicates heat treatment (HRC45-50), all other surfaces can be milled.

Model	Order No.	Fig.	For "S"
SB - A	962.571	1	65 / 80
SB - B	962.572		
SB - F	962.574	2	
SB - G/E	802.329	3	110

- SB-F is not height-adjustable.
- "S" is corresponding to page 290.



## Rough Boring Heads

<b>Overview</b>	<b>294</b>
<b>Application Examples for SW</b>	<b>295</b>
<b>MW Rough Boring Heads</b>	<b>296</b>
<b>SW Rough Boring Heads</b>	<b>297</b>
<b>SW-AL Rough Boring Heads</b>	<b>298</b>
<b>SW Smart Damper Rough Boring Heads</b>	<b>299</b>
<b>Insert Holders for SW</b>	<b>300 - 304</b>
<b>Face Grooving Holders for SW</b>	<b>305</b>
<b>TWN Rough Boring Heads</b>	<b>306</b>
<b>Guidelines &amp; Troubleshooting</b>	<b>307 - 308</b>



## MW Rough Boring Head

Small and powerful rough boring head: The MW comes with cylindrical shank and permits extremely fast roughing of small holes.

Ø 16 - 21 mm, ST20

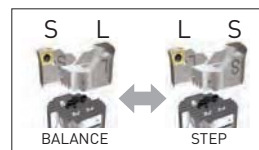
► 296



## SW Rough Boring Head

Super-versatile rough boring head for highest cutting performance: Thanks to its clever design, the SW can be used for stepped and balances roughing by simply switching the insert holders. Various accessories are available for chamfering, back boring and face grooving.

Ø 20 - 203 mm, CKB1-CKB7 and CKN6-CKN7



► 297

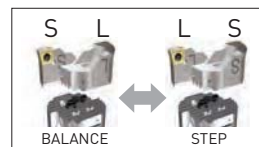
B.1



## SW-AL Rough Boring Head

The fastest solution for deep roughing: SW-AL, built of high quality aluminum, fits perfectly on CKN components. Long tool combinations are therefore up to 50% lighter than similar tools built of steel which enhances the productivity drastically.

Ø 68 - 203 mm, CKN6-CKN7



► 298



## SW Smart Damper Rough Boring Head

The solution for vibration-free rough boring. Its built-in patented Smart Damper technology is located close to the cutting edge and lifts the performance of rough boring on a new level.

Ø 41 - 100 mm, CKB4-CKB6



► 299



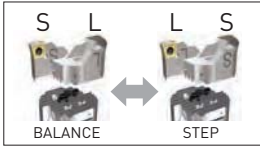
## TWN Rough Boring Head

The TWN rough boring heads have been developed for economical rough boring.

Ø 20 - 153 mm, CKB1-CKB7

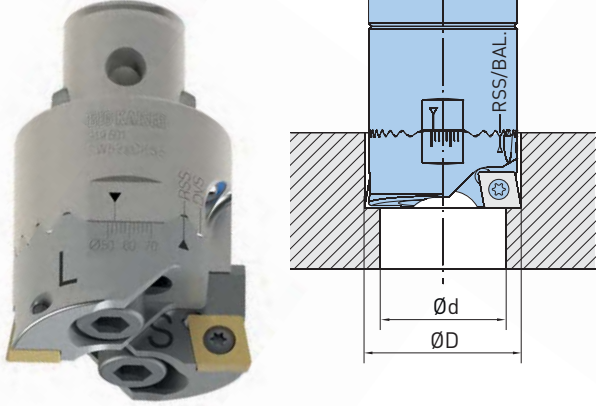
► 306

Application Examples for SW



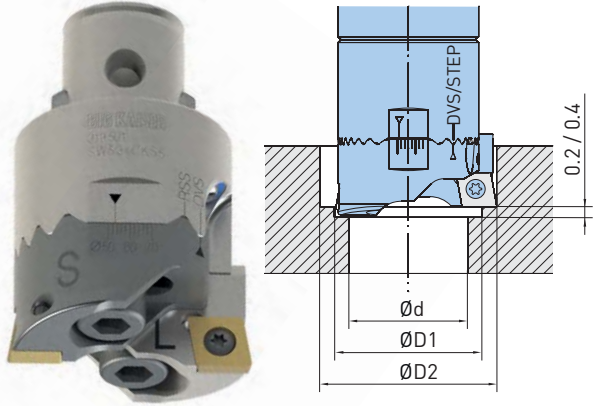
Rough Boring Balance

Insert Holders: Type CC/SP/SC  
 Ø 20 - 203 mm  
 High feed rates



Rough Boring Step

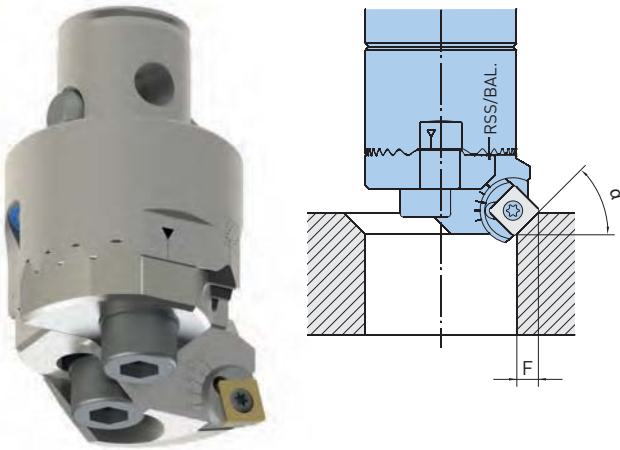
Insert Holders: Type CC  
 Ø 20 - 203 mm  
 Double stock removal, half the feed rate



B.1

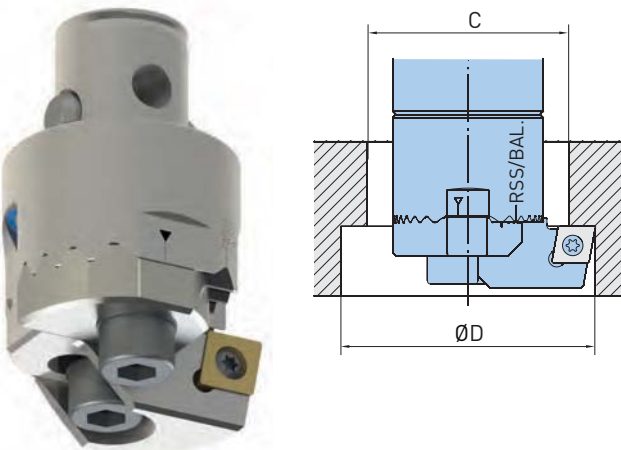
Chamfering

Ø 30 - 210 mm  
 Adjustable chamfer angle 15° - 75°



Back Boring

Ø 44 - 211 mm  
 Lead angle 90°





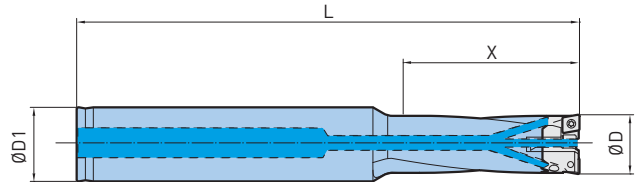
## MW Rough Boring Heads, Ø 16 - 21

The MW rough boring heads permit extremely fast roughing of small holes (Ø 16-21 mm).



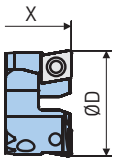
Blind holes

Through holes



Model	Order No.	ØD	ØD1	L	X	Weight (kg)
ST20-MW1619-64	472.051	16 - 19	20	150	64	0.26
ST20-MW1821-72	472.061	18 - 21	20	155	72	0.28

## Insert Holders

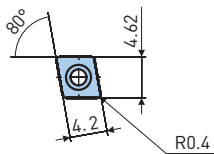


B.1

Model	Order No.	ØD	X	
MW16-19-SET	472.052	16 - 19	64	MW 04
MW18-21-SET	472.062	18 - 21	72	

1. Consisting of two insert holders.

Insert						Work Piece Material						Machining						
Insert Shape	Model	Order No.	Radius [mm]	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel ≤ 56 HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



	MW0404-Z30P	655.942	0.4	P30	C (TiAlN-ALCrN)	+	++	++						++	+	+		
	MW0404-Z30K	655.941	0.4	K30	C (TiAlN-ALCrN)				++	++				++	+	+		
	MW0404-D15N	655.940	0.4	N15	C (DLC)						++			++	+	+		

Model	Order No.
Torx T6 M1.6x4.2	694.105

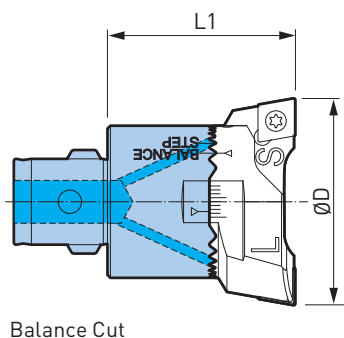
Model	Order No.
Torx T6	694.181

Clamping screw (10 screws and 1 wrench)  
Inserts are sold in packages of 10 pieces.

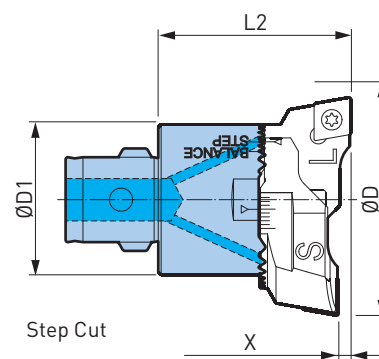
	= less suitable
+	= suitable
++	= first choice

## SW Rough Boring Heads, Ø 20 - 203

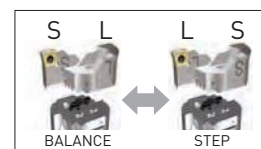
The short and compact design of the components combined with a positive and friction locked connection between the tool body and insert holders provide maximum rigidity and highest cutting performance.



Balance Cut



Step Cut



Model	Order No.	CK	ØD	ØD1	L1	L2	X	Weight (kg)
SW20-31CKB1	319.101	CKB1	20 - 31	19	32.5	32.6	0.2	0.05
SW25-40CKB2	319.201	CKB2	25 - 40	24	35.5	35.6		0.11
SW32-51CKB3	319.301	CKB3	32 - 51	31	40	40.1		0.19
SW41-66CKB4	319.401	CKB4	41 - 66	39	47	47.2		0.36
SW53-86CKB5	319.501	CKB5	53 - 86	50	57	57.2		0.66
SW68-110CKB6	319.601	CKB6	68 - 110	63.5	71	71.2		1.18
SW68-110CKN6	319.601N	CKN6					1.18	
SW98-153CKB6	319.602	CKB6	98 - 153	90	71	71.2	1.90	
SW98-153CKN6	319.602N	CKN6					1.90	
SW148-203CKB6	319.603	CKB6	148 - 203	140	71	71.2	2.52	
SW148-203CKN6	319.603N	CKN6					2.52	
SW98-153CKB7-87	319.701	CKB7	98 - 153	90	87	87.2	3.10	
SW98-153CKN7-87	319.701N	CKN7					3.10	
SW98-153CKB7-117	319.702	CKB7	98 - 153	90	117	117.2	4.50	
SW98-153CKN7-117	319.702N	CKN7					4.50	
SW148-203CKB7	319.703	CKB7	148 - 203	140	117	117.2	5.60	
SW148-203CKN7	319.703N	CKN7					5.60	

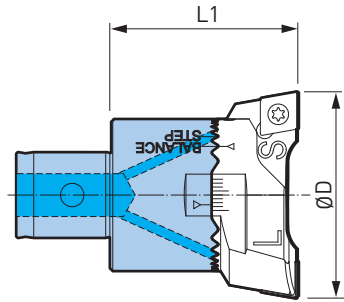
1. X = difference length of insert holders for DVS step rough boring
2. For information on CKN and CKB connections, kindly see introduction pages.

For Spare Parts ▶ 421  
 Insert Holders ▶ 300 - 305

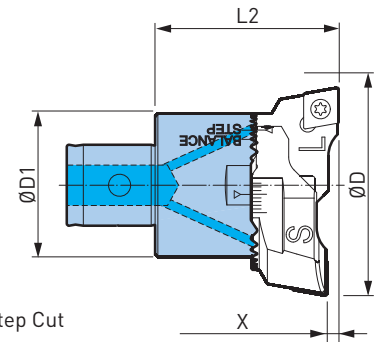
B.1

## SW-AL Rough Boring Heads, Ø 68 - 203

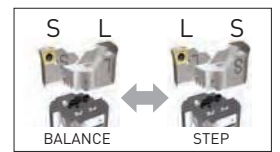
Tool body made of high strength aluminium with CKN connection.



Balance Cut



Step Cut



Model	Order No.	CK	ØD	ØD1	L1	L2	X	Weight (kg)
SW68-110CKN6AL	319.604N	CKN6	68 - 110	63.5	71	71.2	0.4	0.5
SW98-153CKN6AL	319.605N	CKN6	98 - 153	90	71	71.2		0.9
SW148-203CKN6AL	319.607N	CKN6	148 - 203	140	71	71.2		1.1
SW98-153CKN7-87AL	319.705N	CKN7	98 - 153	90	87	87.2		1.3
SW98-153CKN7-117AL	319.706N	CKN7	98 - 153	90	117	117.2		1.9
SW148-203CKN7AL	319.707N	CKN7	148 - 203	140	117	117.2		2.3

B.1

1. X = difference length of insert holders for DVS step rough boring.

For Spare Parts ▶ 421

For Insert Holder ▶ 300 / 301

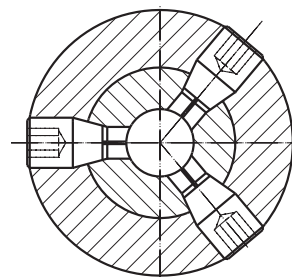
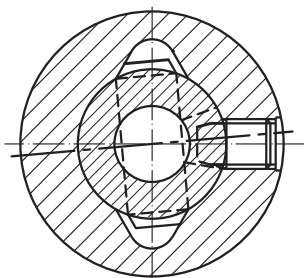
Especially made to fit on CKN components



### Difference CKB and CKN Connection

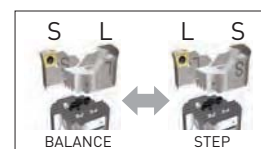
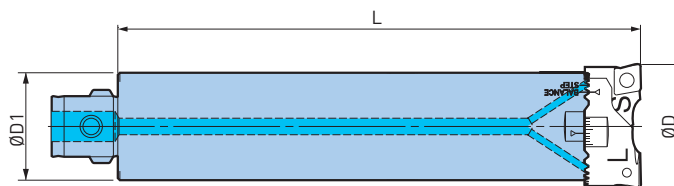
**CKB:** The most common CK connection with single clamping CK screw. Ideal for simple, efficient operations. High interchange accuracy, less than 0.002 mm radial change error, is guaranteed.

**CKN:** The most powerful CK connection with triple clamping CK screw. Ideal for long tool combinations and challenging operations.



## SW Smart Damper Rough Boring Heads, Ø 41 - 100

The well established dynamic damper eliminates chatter in high work loads.



Model	Order No.	CK	ØD	ØD1	L	Weight (kg)
SW41-66CKB4-200DP	389.405	CKB4	41 - 66	39	200	2.4
SW53-86CKB5-225DP	389.406	CKB5	53 - 86	50	220	4.5
SW68-110CKB6-260DP	389.407	CKB6	68 - 110	64	260	8.3

For Spare Parts ▶ 421

For Insert Holder ▶ 300 / 301

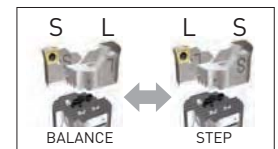
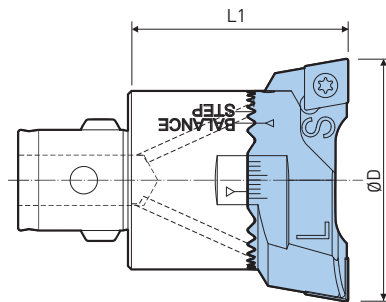


Horizontal Machine	
Smart Damper	SW41-66CKB4-200DP
Holder	BBT50-CKB4-178
Cutting Speed	200 m/min
D.O.C	Ø 4 mm
Feed	0.35 mm/rev
Coolant	Emulsion
Material	C55

## Insert Holders Type CC

Standard insert holders for CC- type inserts with 90° lead angle.

Suitable for through and blind holes, as well as for rotationally-symmetrical- and double-offset-roughing.



For Boring Head	Model	Order No.	ØD	L1	
SW20	IH1SW20C	639.413	20 - 26	32.5	CC 06
	IH2SW20C	639.417	25 - 31	32.5	
SW25	IH1SW25C	639.423	25 - 33	35.5	
	IH2SW25C	639.427	32 - 40	35.5	
SW32	IH1SW32C	639.433	32 - 42	40	CC 09
	IH2SW32C	639.437	41 - 51	40	
SW41	IH1SW41C	639.443	41 - 54	47	CC 12
	IH2SW41C	639.447	53 - 66	47	
SW53	IH1SW53C	639.453	53 - 70	57	CC 12
	IH2SW53C	639.457	69 - 86	57	
SW68	IH1SW68C	639.463	68 - 90	71	CC 12
	IH1SW68C	639.467	88 - 110	71	
SW98	IH1SW98C	639.473	98 - 126	71 / 87 / 117 *	CC 12
	IH2SW98C	639.477	125 - 153	71 / 87 / 117 *	
SW148	IH1SW148C	639.483	148 - 176	71 / 117 *	CC 12
	IH2SW148C	639.487	175 - 203	71 / 117 *	
SW68	IH1SW68C16	639.563	68 - 90	71	CC 16
	IH2SW68C16	639.567	88 - 110	71	
SW98	IH1SW98C16	639.573	98 - 126	71 / 87 / 117 *	CC 16
	IH2SW98C16	639.577	125 - 153	71 / 87 / 117 *	
SW148	IH1SW148C16	639.583	148 - 176	71 / 117 *	CC 16
	IH2SW148C16	639.587	175 - 203	71 / 117 *	

1. Consisting of two insert holders with different lengths, type S (short) and L (long).  
The insert holders are also available by the piece as spare parts.
2. \* L1 depends on the length of the boring head.

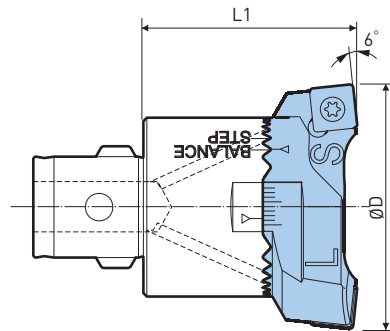
For Spare Parts ▶ 422


For Insert ▶ 393 - 396

B.1

## Insert Holders Type SC/SP

Inserts inclined 6° for improved entry stability under unfavourable conditions (rolled or scaled surfaces, stacked plates etc.). Only for rotationally-symmetrical application (RSS).



For Boring Head	Model	Order No.	ØD	L1	
SW20	IH1SW20S	639.113	20 - 26	32.5	SP 06
SW25	IH1SW25S	639.123	25 - 33	35.5	
SW32	IH1SW32S	639.133	32 - 42	40	SC 09
	IH2SW32S	639.137	41 - 51	40	
SW41	IH1SW41S	639.143	41 - 54	47	
	IH2SW41S	639.147	53 - 66	47	
SW53	IH1SW53S	639.153	53 - 70	57	SC 12
	IH2SW53S	639.157	69 - 86	57	
SW68	IH1SW68S	639.163	68 - 90	71	
	IH2SW68S	639.167	88 - 110	71	
SW98	IH1SW98S	639.173	98 - 126	71 / 87 / 117 *	
	IH2SW98S	639.177	125 - 153	71 / 87 / 117 *	
SW148	IH1SW148S	639.183	148 - 176	71 / 117 *	
	IH2SW148S	639.187	175 - 203	71 / 117 *	

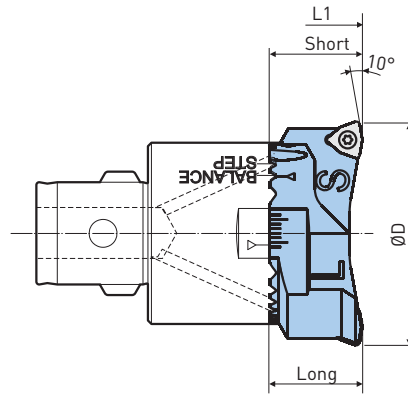
- Set consisting of two insert holders with different lengths, type S (short) and L (long).  
The insert holders are also available by the piece as spare parts.
- \* L1 depends on the length of the boring head.


For Spare Parts ▶ 422

For Insert ▶ 397 - 399

## Insert Holders Type WC

Full profile roughing permits boring with large stock allowances (30 mm and more in Ø) in a single operation with relatively low drive power.



For Boring Head	Model	Order No.	ØD	L1	
SW41	IH1SW41W	639.243	49 - 62	47	WC 04
SW53	IH1SW53W	639.253	59 - 76	57	WC 05
	IH2SW53W	639.257 *	69 - 86	57	
SW68	IH1SW68W	639.263	73 - 95	71	WC 06
	IH2SW68W	639.267	90 - 112	71	
SW98	IH1SW98W	639.273	106 - 134	71 / 87 / 117 **	
	IH2SW98W	639.277	131 - 159	71 / 87 / 117 **	
SW148	IH1SW148W	639.283	156 - 184	71 / 117 **	
	IH2SW148W	639.287	191 - 209	71 / 117 **	

1. Consisting of two insert holders with different lengths, type S (short) and L (long).
2. \* Set consisting of two insert holders with different lengths, Type S (short) and L (long) and for different boring ranges (639.255: Ø 69 - 86 mm, 639.252: Ø 59 - 76 mm). For full-profile-roughing only. Insert holders available by the piece also.
3. \*\* L1 depends on the length of the boring head.

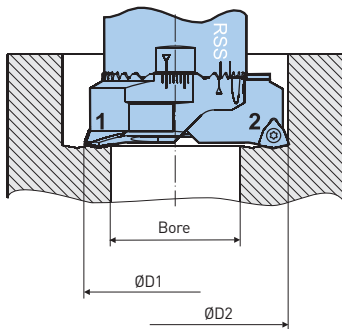
For Spare Parts ▶ 422

For Insert ▶ 403 - 404

B.1

### Adjustment Instructions

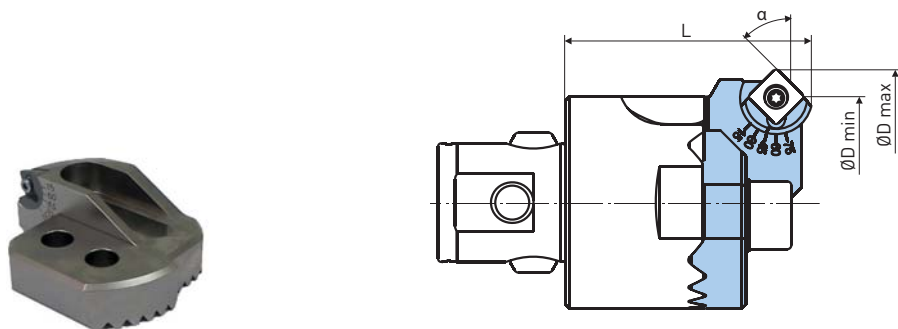
- Mount the insert holders on mark «RSS/BALANCE»
- Set cutting edge 2 to the final bore diameter (ØD2)
- Set cutting edge 1 corresponding to the starting bore diameter, according to the table (column ØD1).




For Boring Head	Insert Holder Order No.	Starting Bore Ø	ØD1	ØD2
SW41	639.243	35 - 37.9	49	51 - 62
		38 - 41	52	54 - 62
SW53	639.253	41 - 44.9	59	61 - 76
		45 - 50	63	65 - 76
	639.257	51 - 54.9	69	76 - 86
		55 - 60	73	81 - 86
SW68	639.263	50 - 55.9	73	75 - 93
		56 - 61.9	79	81 - 93
		62 - 67	85	87 - 93
	639.267	67 - 72.9	90	92 - 110
		73 - 78.9	96	98 - 110
		79 - 85	102	104 - 110
SW98	639.273	84 - 89.9	107	109 - 129
		90 - 95.9	113	115 - 133
		96 - 102.9	119	121 - 133
		103 - 109	126	128 - 133
	639.277	108 - 114.9	131	133 - 154
		115 - 121.9	138	140 - 159
		122 - 128.9	145	147 - 159
SW148	639.283	129 - 135	152	154 - 159
		134 - 139.9	157	159 - 179
		140 - 145.9	163	165 - 183
		146 - 152.9	169	171 - 183
	639.287	153 - 159	176	178 - 183
		158 - 164.9	181	183 - 204
		165 - 171.9	188	190 - 209
		172 - 178.9	195	197 - 209
		179 - 185	202	204 - 209

## Insert Holders Chamfering for SW

These insert holders with step-less adjustable chamfer angle from 15° to 75° are made for front chamfering and, with limitations also for back chamfering, on the rough heads for roughing SW 41 to SW 148.



For Boring Head	Model	Order No.		Diameter Range ØD					L
				15° min - max	30° min - max	45° min - max	60° min - max	75° min - max	
SW41	IH1SW41CF	639.104	SC 09	33 - 60	36 - 62	39 - 63	43 - 63	45 - 62	51
SW53	IH1SW53CF	639.105		45 - 76	48 - 78	51 - 79	55 - 79	57 - 78	58
SW68	IH1SW68CF	639.106		61 - 97	64 - 99	67 - 100	71 - 100	73 - 99	68
SW98	IH1SW98CF	639.107	SC 12	77 - 126	81 - 128	86 - 129	90 - 128	94 - 127	73
	IH2SW98CF	639.108		104 - 153	108 - 155	113 - 156	117 - 155	121 - 154	
SW148	IH1SW148CF	639.109		131 - 180	135 - 182	140 - 183	144 - 182	148 - 181	73
	IH2SW148CF	639.110		158 - 207	162 - 209	167 - 210	171 - 209	175 - 208	
SW98	IH1SW98CF	639.107	SC 12	77 - 126	81 - 128	86 - 129	90 - 128	94 - 127	89 / 119
	IH2SW98CF	639.108		104 - 153	108 - 155	113 - 156	117 - 155	121 - 154	
SW148	IH1SW148CF	639.109		131 - 180	135 - 182	140 - 183	144 - 182	148 - 181	119
	IH2SW148CF	639.110		158 - 207	162 - 209	167 - 210	171 - 209	175 - 208	

1. Insert holders must be set for balance cut.
2. L in chart indicates max. tool length with 45° chamfer angle.


For Spare Parts ▶ 423

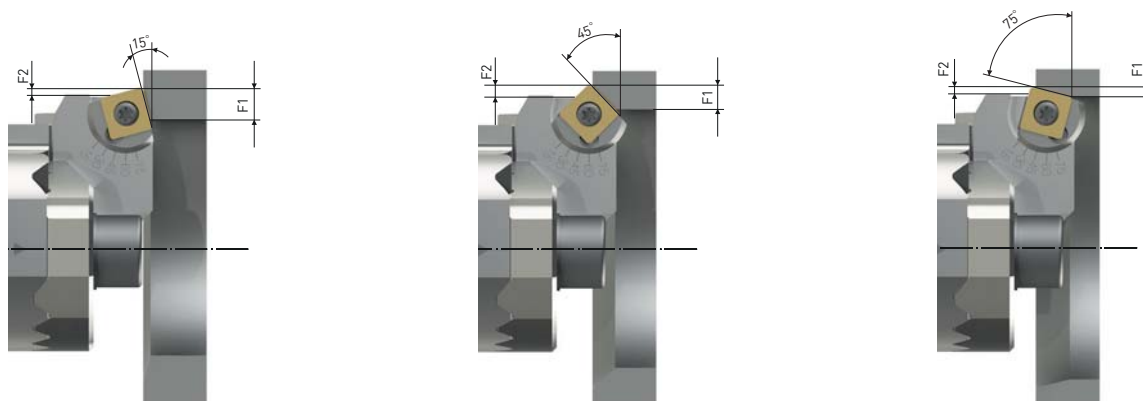
For Insert ▶ 398 - 399

B.1

### Max. radial chamfer length for front and back chamfering

Applicable for inserts with nose radius 0.4 mm

For Boring Head		Chamfer Angle									
		15°		30°		45°		60°		75°	
		F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
SW41	SC 09										
SW53		7.7	0.7	6.9	1.4	5.7	1.8	4.0	1.7	2.1	1.2
SW68											
SW98	SC 12										
SW148		10.6	1.2	9.5	2.2	7.8	2.6	5.5	2.5	2.8	1.8

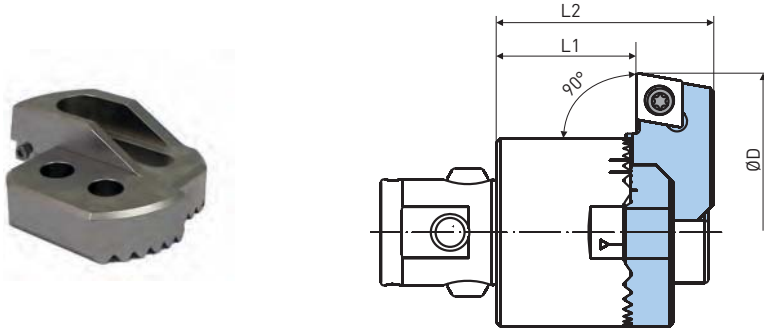





## Insert Holders Back Boring for SW

These insert holders are made for back boring with the rough boring heads for roughing SW 32 to SW 148 and cover the diameter range from Ø 44 - 211 mm.

Insert holder with dead piece are available as set or as individual components.



For Boring Head	Model	Order No.		ØD	ØD1	B	L1 *	L2 *
SW32	IH1SW32BB	639.403	CC 09	44 - 54	31	ØD-17 / min. 31	24	38
SW41	IH1SW41BB	639.404		53 - 66	39	ØD-21 / min. 39	29	44
SW53	IH1SW53BB	639.405		65 - 82	50	ØD-28 / min. 50	34	55
SW68	IH1SW68BB	639.406		81 - 103	63.5	ØD-27 / min. 63.5	41	66
SW98	IH1SW98BB	639.407	CC 12	102 - 130	90	90	38	69
	IH2SW98BB	639.408		129 - 157				
SW148	IH1SW148BB	639.409		156 - 184	140	140	38	69
	IH2SW148BB	639.410		183 - 211				
SW98	IH1SW98BB	639.407		102 - 130	90	90	47 / 77	78 / 108
	IH2SW98BB	639.408		129 - 157				
SW148	IH1SW148BB	639.409		156 - 184	140	140	77	108
	IH2SW148BB	639.410		183 - 211				

1. \* Insert holders must be set for balance cut.

For Spare Parts ▶ 423

For Insert ▶ 394 - 395

B.1

### Back boring

The back bore diameter «ØD» the diameter of the entry bore «C», the diameter of the interfering edge «B», respectively of the tool body «ØD1» are related to each other. In order to check the feasibility of the back boring operation and to select the best possible tool combination, these values can be calculated as follows:

Minimum entry bore diameter «C»:

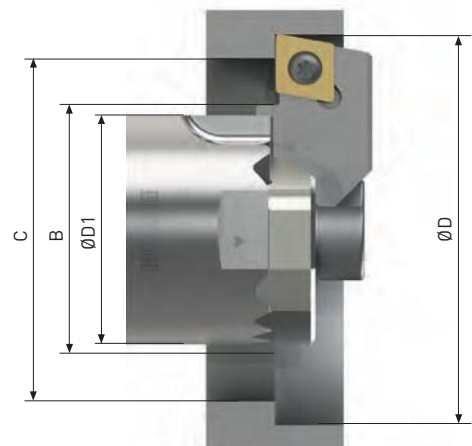
$$C = \frac{\text{ØD} + B}{2} + 0.5$$

Max. diameter of the interfering edge «B»:

$$B = 2 (C - 0.5) - \text{ØD}$$

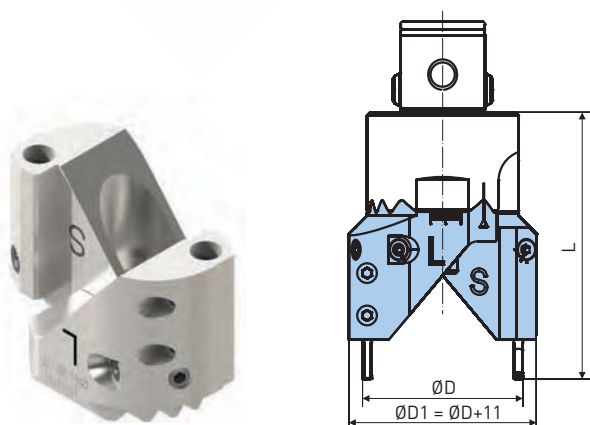
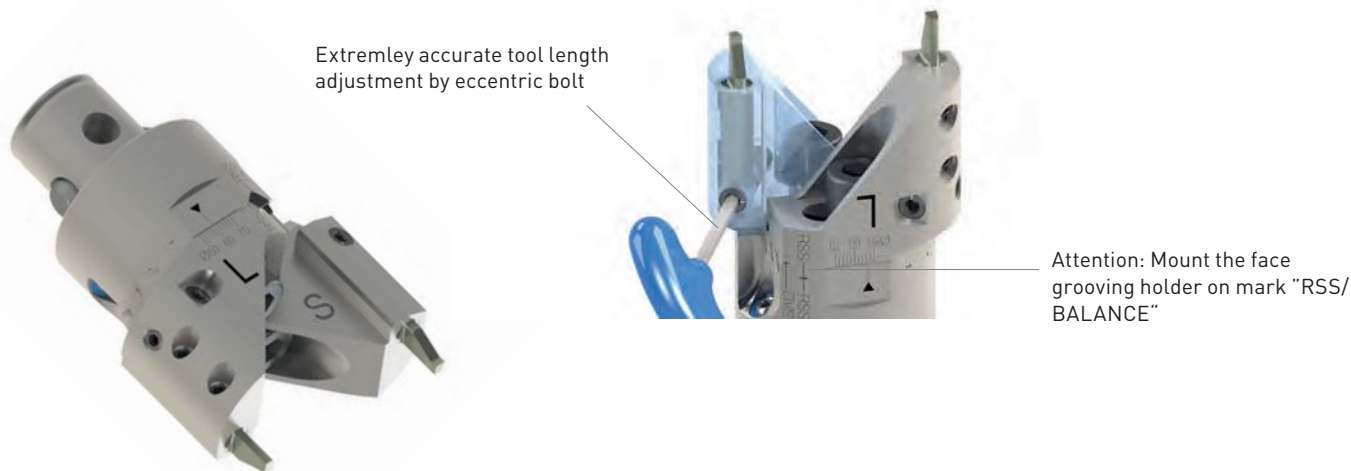
Clearance:

0.5 mm

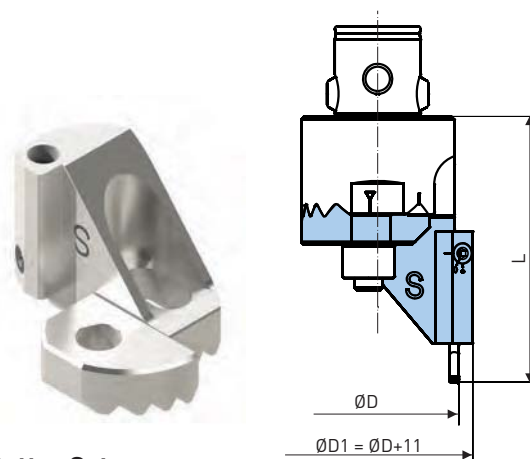


## Face Grooving Holders for SW

Upgrade your existing rough boring heads SW: the face grooving holder provide the possibility to manufacture grooves in the diameter range from Ø 53 to 203 mm.



Twin Cutter Set



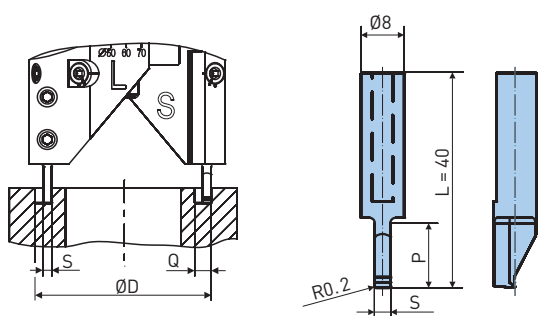
Single Cutter Set

B.1

For Boring Head	Model	Order No.	ØD	L
SW53	IH1SW53FG	639.653	53 - 70	88
SW68	IH1SW68FG	639.663	68 - 90	95
	IH2SW68FG	639.667	88 - 110	95
SW98	IH1SW98FG	639.673	98 - 126	113
	IH2SW98FG	639.677	125 - 153	113
SW148	IH1SW148FG	639.683	148 - 176	143
	IH2SW148FG	639.687	175 - 203	143

For Boring Head	Model	Order No.	ØD	L
SW53	IH1SW53FG-S	639.654	53 - 70	88
SW68	IH1SW68FG-S	639.664	68 - 90	95
	IH2SW68FG-S	639.668	88 - 110	95
SW98	IH1SW98FG-S	639.674	98 - 126	113
	IH2SW98FG-S	639.678	125 - 153	113
SW148	IH1SW148FG-S	639.684	148 - 176	143
	IH2SW148FG-S	639.688	175 - 203	143

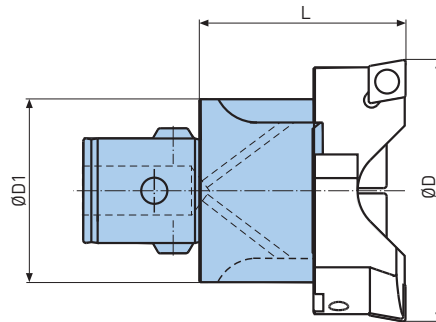
### Cutters



Model	Order No.	Width Cutter S	Max. Groove Width Double Cutters Q	Cutting Edge	Max. Groove Depth P
FG2-ST8-40K40	958.601	2	3.5	uncoated K40	12
FG3-ST8-40K40	958.602	3	5.5		
FG4-ST8-40K40	958.603	4	7.5		
FG5-ST8-40K40	958.604	5	9.5	coated P40C	
FG2-ST8-40K40C	958.611	2	3.5		
FG3-ST8-40K40C	958.612	3	5.5		
FG4-ST8-40K40C	958.613	4	7.5		
FG5-ST8-40K40C	958.614	5	9.5		

## TWN Rough Boring Heads, Ø 20 - 203

The heads of the TWN series have been developed for economical heavy duty rough boring.



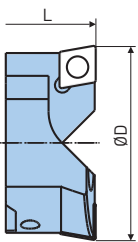
Model	Order No.	CK	ØD	ØD1	L	Weight (kg)
TWN20-31CKB1	315.101	CKB1	20 - 31	18.5	32.5	0.05
TWN25-40CKB2	315.201	CKB2	25 - 40	23.4	35.5	0.10
TWN32-51CKB3	315.301	CKB3	32 - 51	30	40	0.17
TWN41-66CKB4	315.401	CKB4	41 - 66	39	47	0.34
TWN53-86CKB5	315.501	CKB5	53 - 86	49	57	0.64
TWN68-110CKB6	315.601	CKB6	68 - 110	63	71	1.29
TWN98-153CKB6	315.602	CKB6	98 - 153	90	71	1.85
TWN98-153CKB7	315.701	CKB7	98 - 153	90	87	3.10


For Spare Parts ▶ 424

B.1

## Insert Holders Type CC (Sold in Pairs)

Standard insert holders for CC- type inserts with 90° lead angle. For through- and blind holes. Symmetrical and double offset cutting edge arrangement possible.



For Boring Head	Model	Order No.	ØD	L	
TW20	IH1TW20C	638.411	20 - 26	32.5	CC 06
	IH2TW20C	638.412	25 - 31	32.5	
TW25	IH1TW25C	638.421	25 - 33	35.5	
	IH2TW25C	638.422	32 - 40	35.5	
TW32	IH1TW32C	638.431	32 - 42	40	CC 09
	IH2TW32C	638.432	41 - 51	40	
TW41	IH1TW41C	638.441	41 - 54	47	CC 12
	IH2TW41C	638.442	53 - 66	47	
TW53	IH1TW53C	638.451	53 - 70	57	
	IH2TW53C	638.452	69 - 86	57	
TW68	IH1TW68C	638.461	68 - 90	71	
	IH2TW68C	638.462	88 - 110	71	
TW98	IH1TW98C	638.471	98 - 126	117	
	IH2TW98C	638.472	125 - 153	117	
TW148	IH1TW148C	638.471	148 - 176	71	
	IH2TW148C	638.472	175 - 203	71	

For Spare Parts ▶ 424

For Insert ▶ 393 - 395

## Guidelines

### Insert Selection & Stock Allowance

BIG KAISER indexable inserts outlined in the Insert selection & cutting data tables have been selected to give optimum results. Grades and geometry do not have to be specified at time of order.

#### Insert radius is based upon 2 major factors:

1. Length/diameter ratio of tool
2. Depth of cut or material allowance
  - Select the largest nose radius available for cutting edge strength & higher feeds
  - Use small nose radius for light depth of cut & extreme L/D ratio

Insert Radius	Minimum D.O.C.	Maximum D.O.C.	L/D Ratio
0.2	0.25	1.5	>6:1
0.4	0.50	3.0	≤5:1
0.8	1.00	5.0	≤4:1
1.2	1.50	8.0	≤4:1

- D.O.C. is stock allowance/side (radius)

### Feed

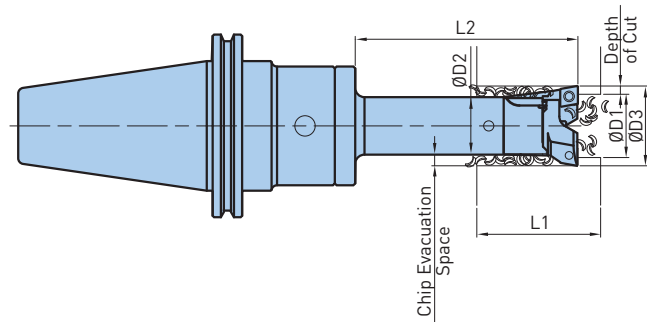
1. Feed: based on effective number of inserts, depending on roughing method
  - Balanced cutting: 2 effective inserts
  - Stepped cutting: 1 effective insert
  - Full profile cutting: 1 effective insert
2. Under normal rough boring operations, the effective feed rate is about 50% of nose radius

Insert Radius	Feed (mm/rev)	
	Balanced Cutting	Stepped Cutting
0.2	0.2 - 0.3	0.1 - 0.15
0.4	0.3 - 0.4	0.15 - 0.2
0.8	0.4 - 0.5	0.3 - 0.4
1.2	0.5 - 0.7	0.3 - 0.5

B.1

### General Rule:

Boring bar should always be smaller than original hole size.



### Caution

- It is very important to allow for clearance between boring bar and rough bore diameter.

## Troubleshooting

Under certain conditions, it may be necessary to modify or adapt recommended cutting data and/or tooling configurations of the application. Below are general solutions to common problems.

Problem	Possible Cause	Remedy
Poor Chip Control	Feed rate too low	Increase feed rate
	Width of chip excessive (D.O.C.)	Preset tool for stepped cutting method
	Excessive stock allowance	Consult cutting data tables
Chatter & Vibration	Excessive speed	Reduce Vc, check cutting data tables
	Extreme length/diameter ratio	Shorten tool to increase stiffness
		Increase boring bar diameter to larger size
		Change boring bar to carbide or heavy metal
	Insert radius too large	Reduce nose radius of insert
Unstable workpiece	Improve fixture and clamping support	
Inserts Chipping or Breaking	Lead angle on insert holders	Change to 90 degree insert holders (type CC)
	Wrong insert	Change to tougher grade of carbide insert
	Severe interruption	Use larger radius if available
	Chips packing and re-cutting	Increase speed, decrease feed
Poor Tool Life	Check for boring bar/bore diameter clearance	Improve chip control, increase feed
	Wrong insert	Change to higher wear resistant grade
	Excessive cutting speed	Reduce speed
	Inserts chipping	Check stock allowance and feed rate
	Coolant pressure too low	Increase through tool coolant pressure
Chips Not Evacuating	Adjust coolant ports of head if available	
	Boring bar diameter too large	Reduce to smaller head and extended range holder
	Excessive stock allowance	Re-set tool for stepped cutting
	Inadequate space below bore	Elevate workpiece from table more
Insufficient Machine Power	Poor chip control	See above problem
	Excessive feed rate	Reduce feed; minimum 25% of insert radius
	Stock allowance excessive	Reset tool for stepped cutting method
	Low machine torque	RPM in area of low spindle torque; increase speed
		RPM in area of gear change; adjust RPM
Change insert to higher rake angle		
Excessive Exit Burr	Reduce depth of cut	
Excessive Exit Burr	Excessive feed rate	Reduce feed rate
	CC type insert holders	Use square insert holders with 6 degree lead
	Cutting forces too high	Reduce depth of cut
		Reduce insert radius

B.1

## Fine Boring Heads with Centric Cutting Edge

Overview	310
EWE 2-152 Digital Fine Boring Head	312
EWN 2-152 Fine Boring Head	313
Accessories EWE / EWN 2-152	314 - 330
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EWN 04-12 / 04-24 / 12-36 Fine Boring Heads	345
EWN 04-7 Fine Boring Head	346

B.2



## EWE 2-152 Digital Fine Boring Head

Wireless communication for easy readout with the BIG KAISER app: The brandnew EWE fine boring head revolutionates fine boring process. Less operator mistakes, easier setup and a huge diameter range of  $\varnothing$  2 - 152 mm. Also available as integral solution with HSK-A63. Accessories of EWD and EWN are fully compatible.

$\varnothing$  2 - 152 mm, CK6/HSK-A63

► 312



## EWN 2-152 Fine Boring Head

Fine boring head with centric boring bars in modular and integral execution for accurate, high performance operations. The head comes with variable length adjustment of the boring bar and large dial disc for parallax-free readout.

$\varnothing$  2 - 152 mm, CK6/DV40/HSK-A63/BIG CAPTO C6

► 313



## EWE 2-32 Digital Fine Boring Head

Smallest digital fine boring head with wireless communication to the BIG KAISER app and centric boring bar. Especially manufactured for the use on small machine tools. Accessories of EWN and EWD are fully compatible.

$\varnothing$  2 - 32 mm, CK5

► 332



## EWN 2-32 Fine Boring Head

Fine boring head with centric boring bar in integral, modular and screw-on execution for precise machining. Developed for the use on machine tools with spindles 30 taper, HSK-A50 and bigger, as well as on lathe machines with driven tools.

$\varnothing$  2 - 32 mm, CK5/DV30/ES32

► 333



## EWN 04-15 Fine Boring Head

Machining of small bores with high speeds on machine tools with spindles DV20, HSK-E32 and bigger.

$\varnothing$  0.4 - 15 mm, CK3/ST16

► 344



## EWN 04-7 Fine Boring Head

World's smallest fine boring head: Thanks to its body diameter of only  $\varnothing$  18.5 mm, the EWN 04-7 is the perfect solution for micro machining applications.

$\varnothing$  0.4 - 7 mm, CK1/ST6/ST10

► 346



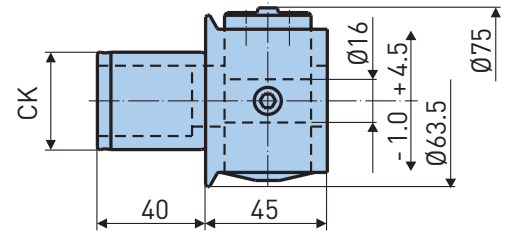
B.2





## EWE 2-152 Digital Fine Boring Head, Ø 2 - 152

Digital fine boring head in modular and integral execution for accurate, high performance boring operations. With wireless communication to the BIG KAISER app.



EWE2-152HSK-A63  
112.126



Model	Order No.
EWE2-152CK6	112.110

## BIG KAISER App

B.2

Enhances user friendliness while assembling and running our boring tools. The app helps operators to determine optimal cutting parameters, manuals and provides a history of all adjustments made with an EWE boring head.



Cutting data



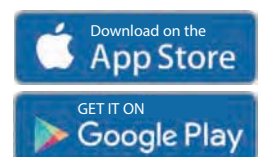
Send your data to...



History (made automatically)

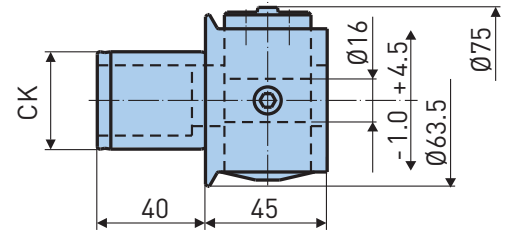
**This is how the app is going to support your daily challenges**

1. Choose your tool
2. Type in your application values
3. Calculate cutting data
4. Adjust machine and make a measuring bore
5. Infeed tool with the diameter of the measuring bore
6. Make the bore



## EWN 2-152 Fine Boring Head, Ø 2 - 152

Fine boring heads in modular and integral execution for accurate, high performance boring operations on machine tools with spindles ISO 40, HSK-A63, BIG CAPTO C6 and bigger.



Model	Order No.
EWN2-152CK6	112.108

### Other executions

EWN2-152DV40  
112.121



EWN2-152BT40  
112.122



EWB2-50CK6  
112.107



Balanceable

EWN2-152HSK-A63  
112.123



EWN2-152C6  
470.108



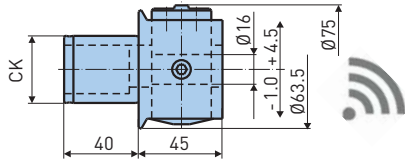
B.2

## Boring Head

## Order No.

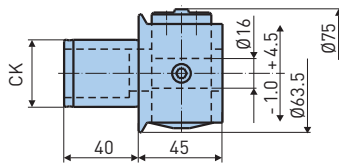
EWE2-152CK6

112.110



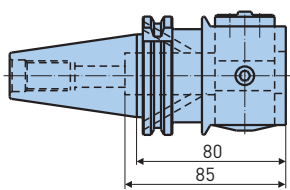
EWN2-152CK6

112.108



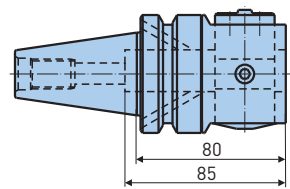
EWN2-152DV40

112.121



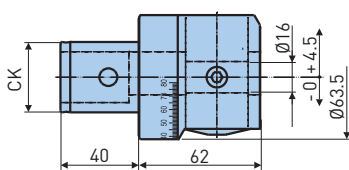
EWN2-152BT40

112.122

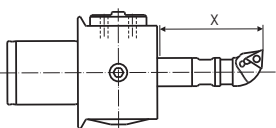


EWB2-50CK6

112.107




X = Boring depth




ØD

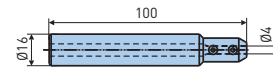
Boring range for the fine boring head EWN 2-152. Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø

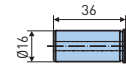
 Carbide tool holders


 Recommended for EWB 2-50

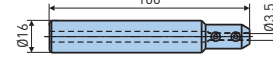
RB16-4-100  
613.424 



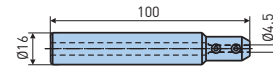
RB16-4  
613.404




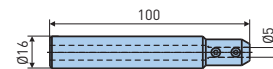
RB16-3.5-100  
613.422 



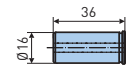
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613.423 




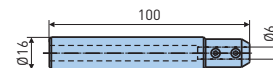
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613.425 



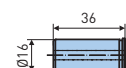
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613.405




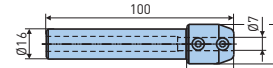
RB16-6-100  
613.426 



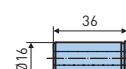
RB16-6  
613.406




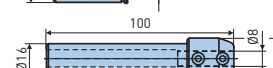
RB16-7-100  
613.427 



RB16-7  
613.407




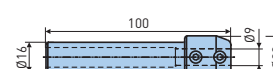
RB16-8-100  
613.428 



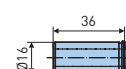
RB16-8  
613.408




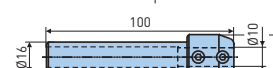
RB16-9-100  
613.429 



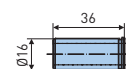
RB16-9  
613.409



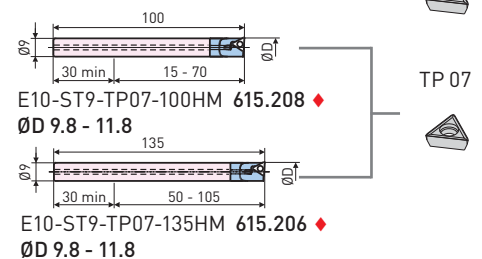
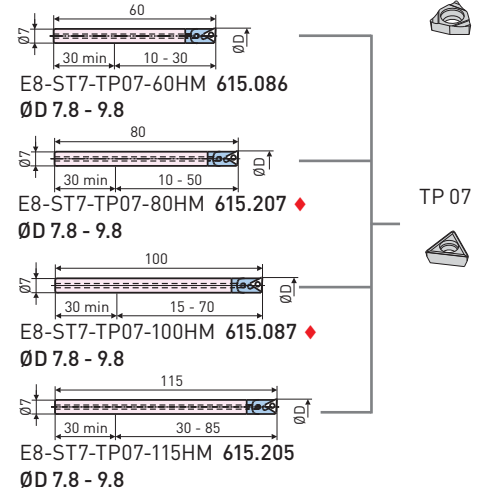
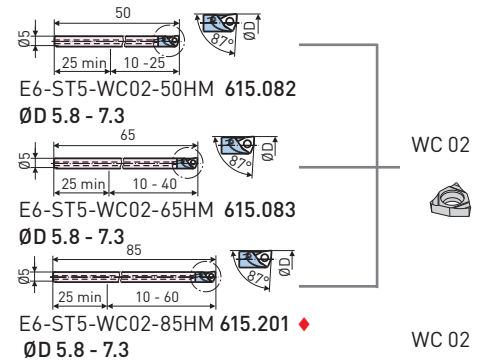
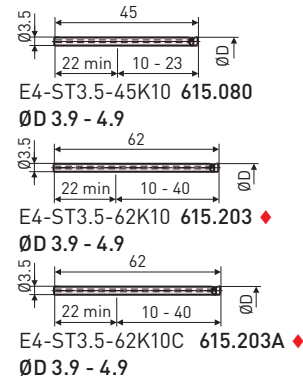
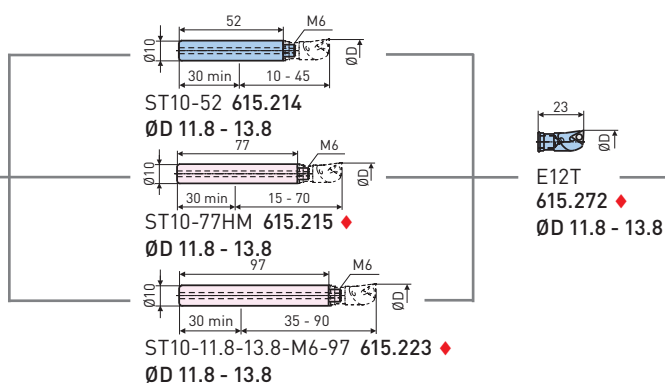
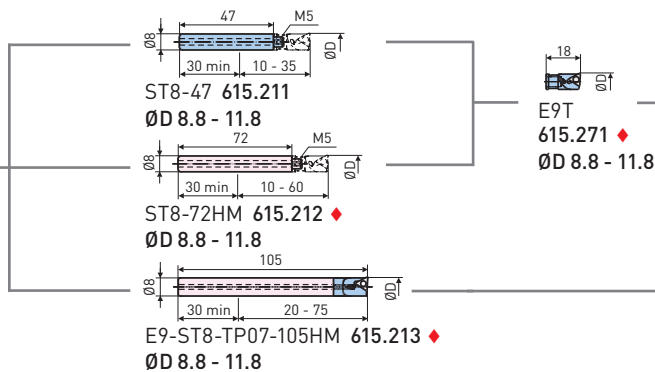
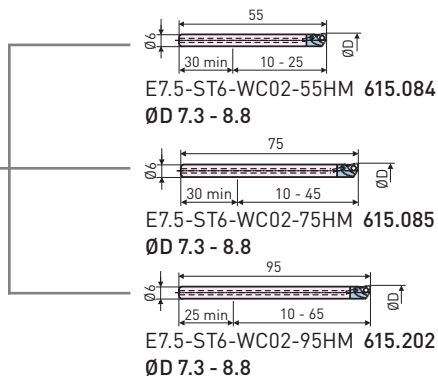
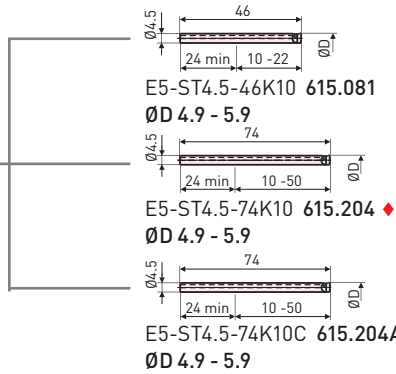
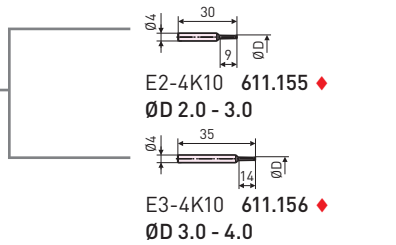
RB16-10-100  
613.430 



RB16-10  
613.410



Fixed Tool Holder



WC 02

WC 02



B.2

TP 07



TP 07



TP 07



TP 07

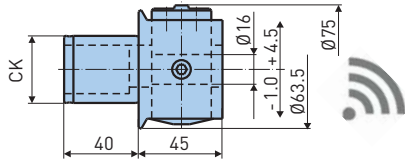


## Boring Head

## Order No.

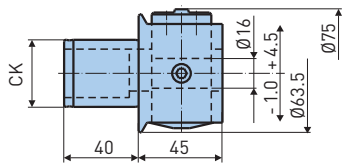
EWE2-152CK6

112.110



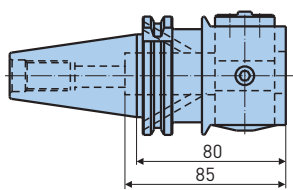
EWN2-152CK6

112.108



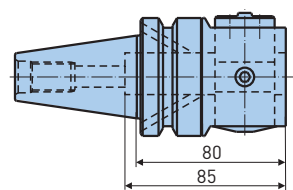
EWN2-152DV40

112.121



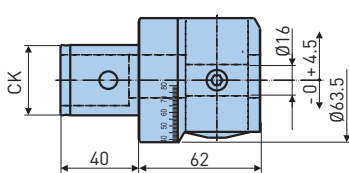
EWN2-152BBT40

112.122

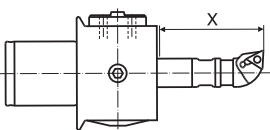


EWB2-50CK6

112.107



X = Boring depth




### ØD

Boring range for the fine boring head EWN 2-152.

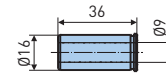
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø

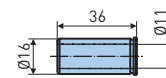
 Carbide tool holders

 Recommended for EWB 2-50

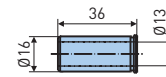
RB16-9  
613.409



RB16-11  
613.411



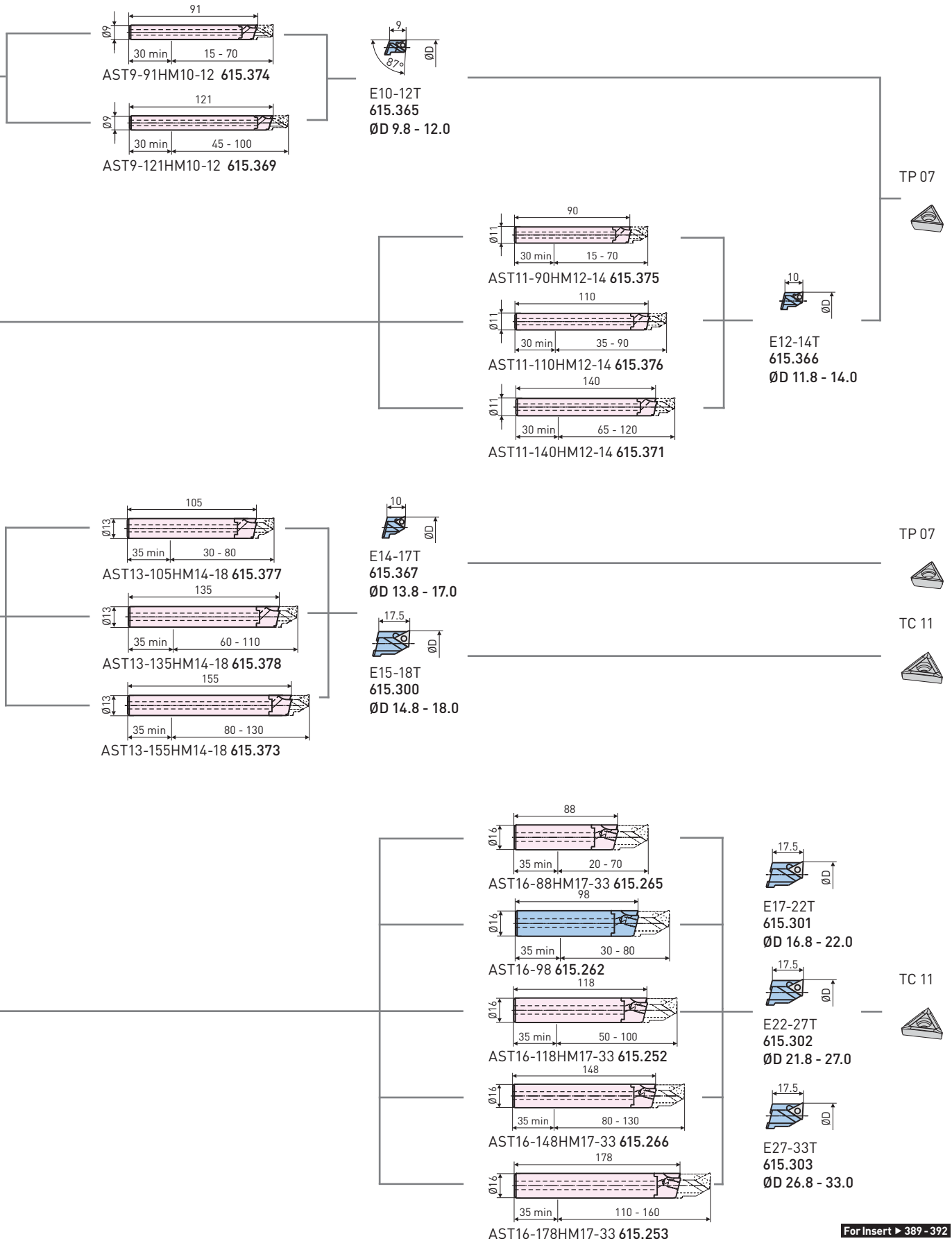
RB16-13  
613.413



B.2

Adjustable Tool Holder

The adjustable tool holder allows the coarse diameter setting on the insert holder. This leads to the possibility to machine bores from  $\varnothing 9.8 - 54$  mm with the tool holder in the centre position and as a result, with the best possible balancing of the tool combination.



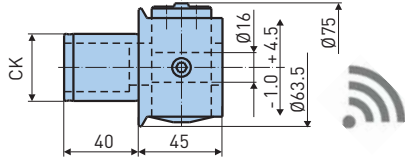
B.2

## Boring Head

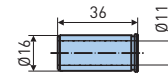
## Order No.

EWE2-152CK6

112.110

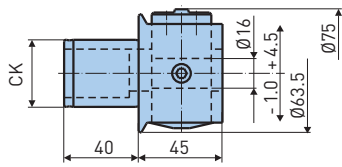


RB16-11  
613.411 ♦

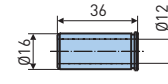


EWN2-152CK6

112.108

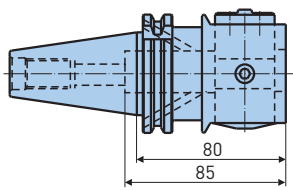


RB16-12  
613.412 ♦



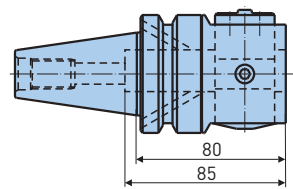
EWN2-152DV40

112.121

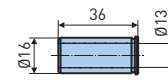


EWN2-152BBT40

112.122

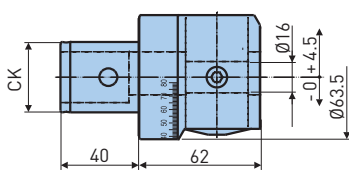


RB16-13  
613.413 ♦

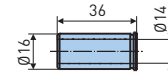


EWB2-50CK6

112.107

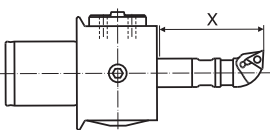


RB16-14  
613.414 ♦



B.2

X = Boring depth



### ØD

Boring range for the fine boring head EWN 2-152.

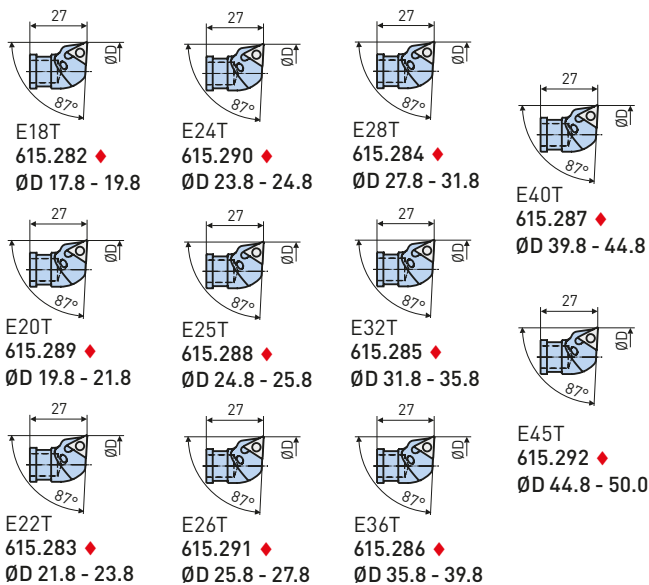
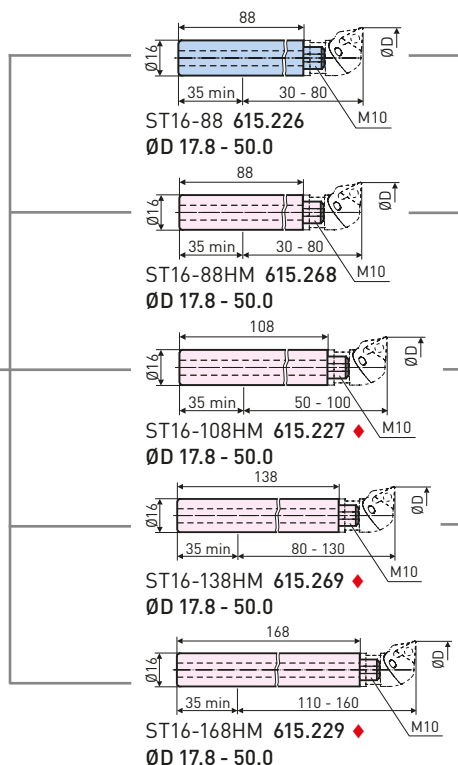
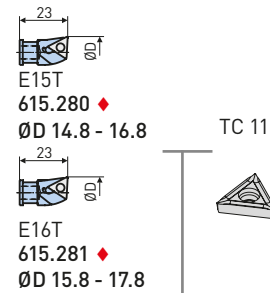
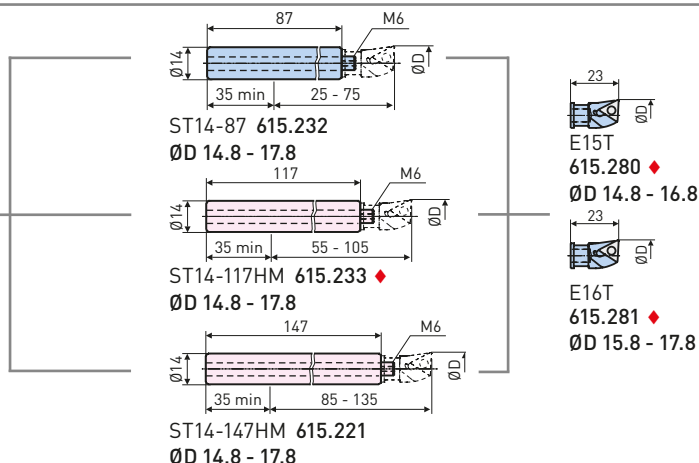
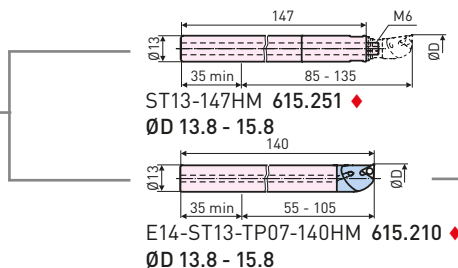
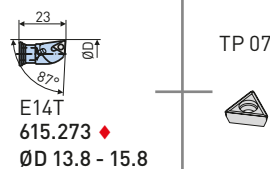
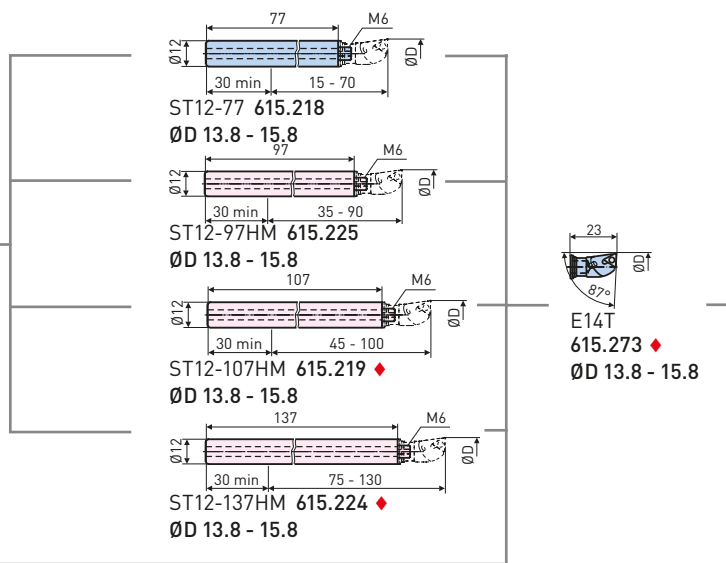
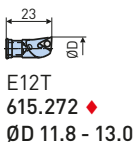
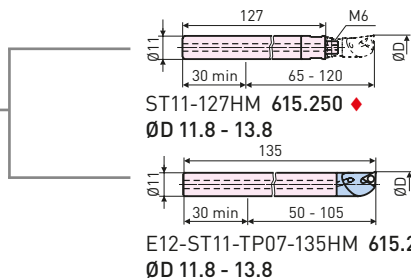
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø

 Carbide tool holders

♦ Recommended for EWB 2-50

Fixed Tool Holder



B.2

For Insert ▶ 389-392

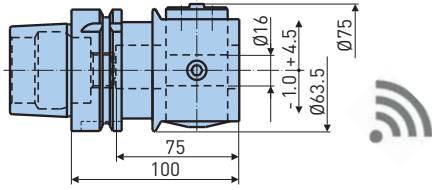


## Boring Head

## Order No.

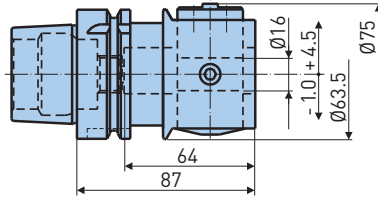
EWE2-152HSK-A63

112.126



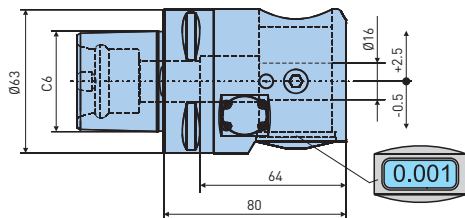
EWN2-152HSK-A63

112.123



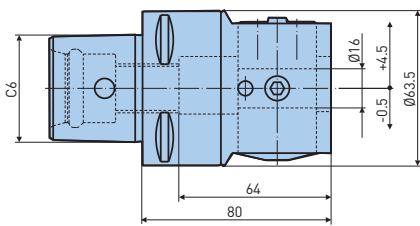
EWD2-54C6

470.109



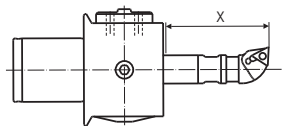
EWN2-152C6

470.108



B.2

X = Boring depth



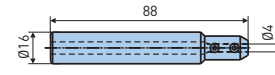
ØD

Boring range for the fine boring head EWN 2-152. Under full use of the adjustment range, the max. boring range will be,

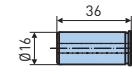
- for EWN, EWE, EWB: Lower range + 9 mm Ø
- for EWD: Lower range + 5 mm Ø

 Carbide tool holders

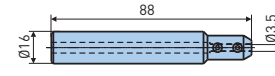
RB16-4-88  
613.434



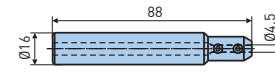
RB16-4  
613.404



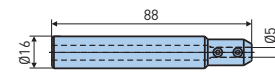
RB16-3.5-88  
613.432



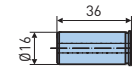
RB16-4.5-88  
613.433



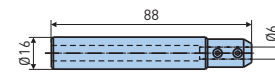
RB16-5-88  
613.435



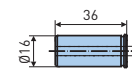
RB16-5  
613.405



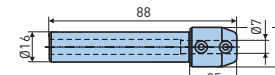
RB16-6-88  
613.436



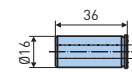
RB16-6  
613.406



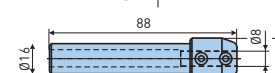
RB16-7-88  
613.437



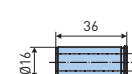
RB16-7  
613.407



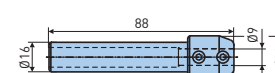
RB16-8-88  
613.438



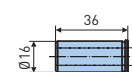
RB16-8  
613.408



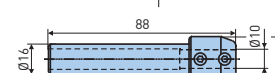
RB16-9-88  
613.439



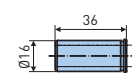
RB16-9  
613.409



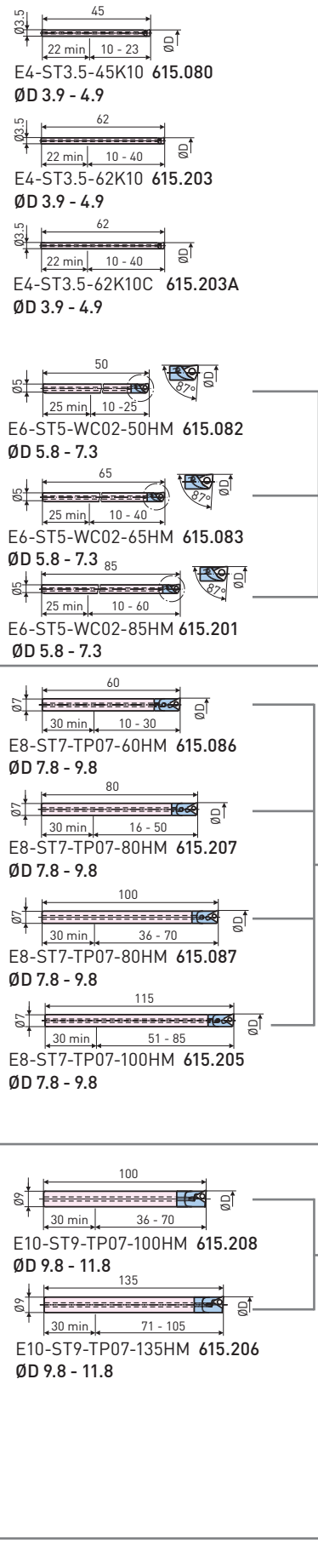
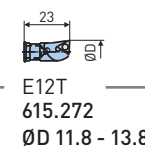
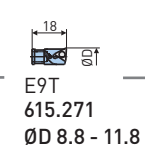
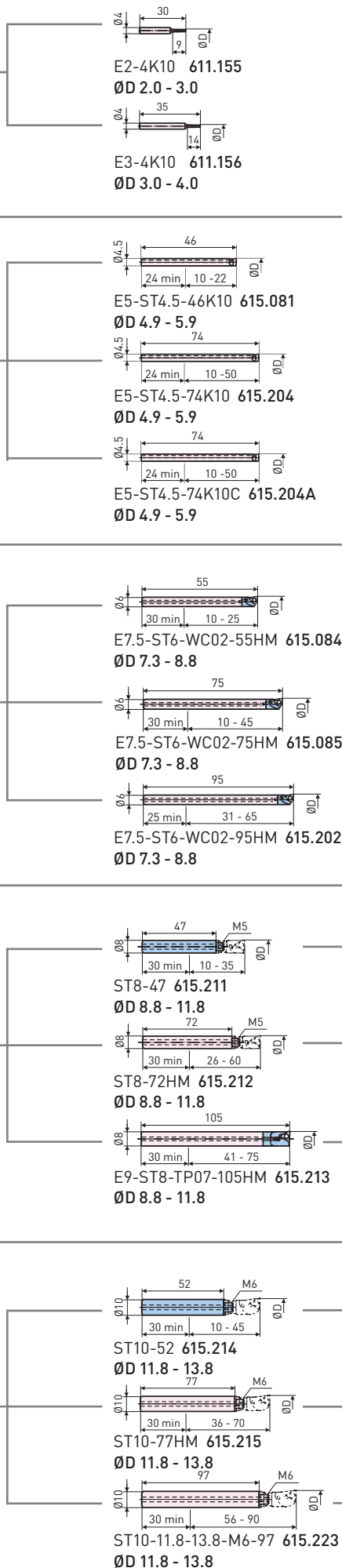
RB16-10-88  
613.440



RB16-10  
613.410



Fixed Tool Holder



WC 02

WC 02

TP 07

TP 07

TP 07

TP 07

TP 07

TP 07

B.2

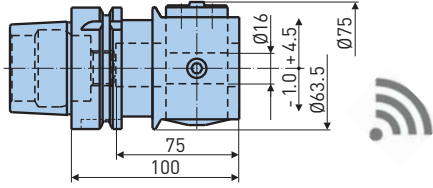
# Fine Boring Heads, Accessories

Boring Head

Order No.

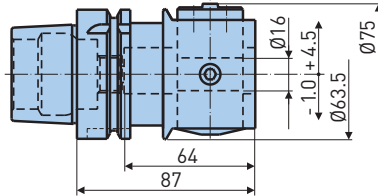
EWE2-152HSK-A63

112.126



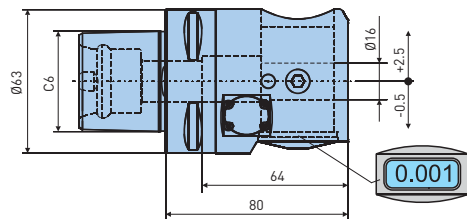
EWN2-152HSK-A63

112.123



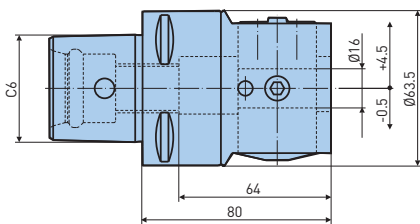
EWD2-54C6

470.109

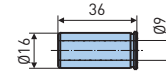


EWN2-152C6

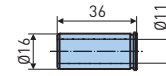
470.108



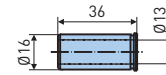
RB16-9  
613.409



RB16-11  
613.411

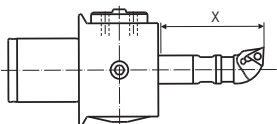


RB16-13  
613.413



B.2

X = Boring depth



ØD

Boring range for the fine boring head EWN 2-152.

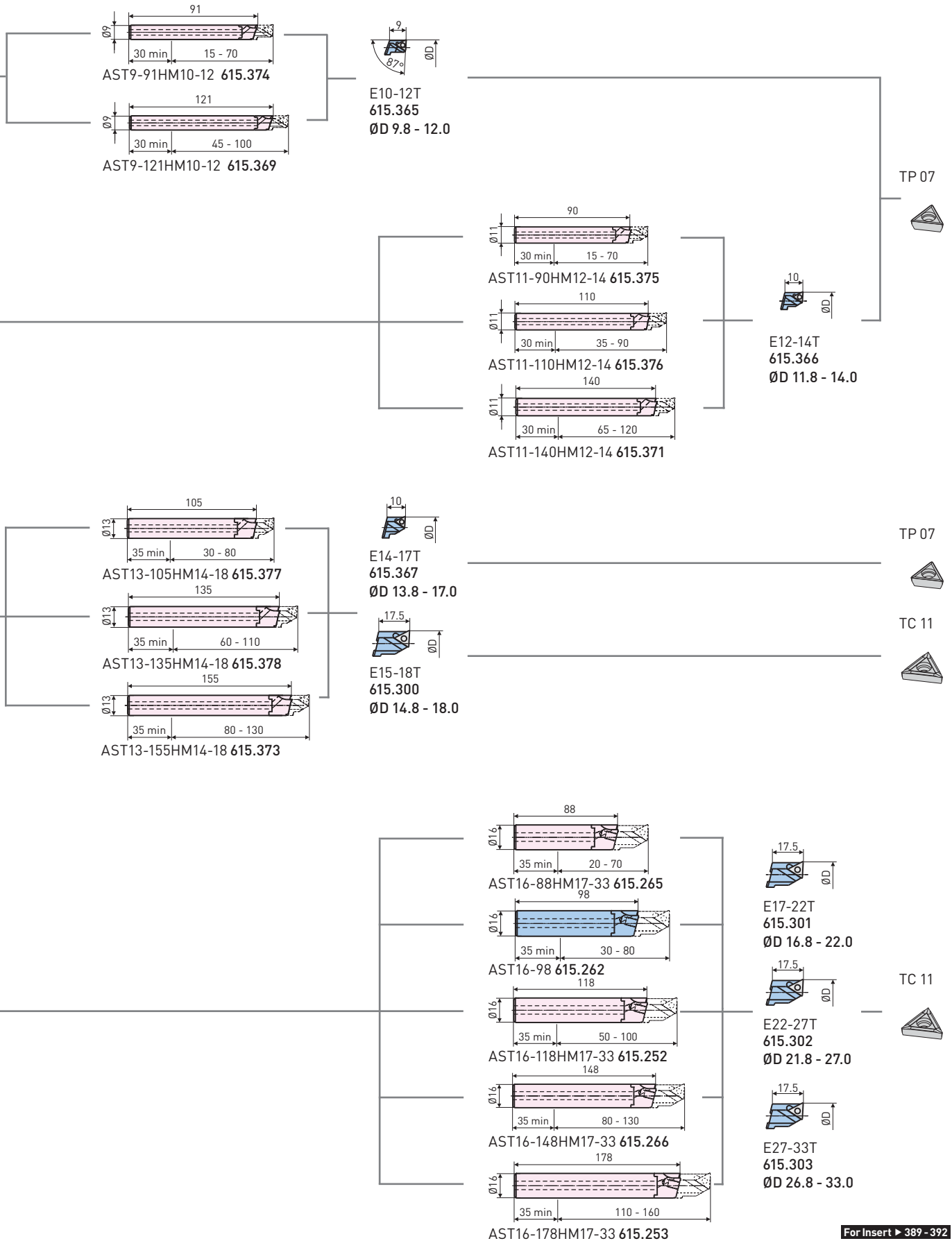
Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø
- for EWD: Lower range + 5 mm Ø

 Carbide tool holders

### Adjustable Tool Holder

The adjustable tool holder allows the coarse diameter setting on the insert holder. This leads to the possibility to machine bores from  $\varnothing 9.8 - 54$  mm with the tool holder in the centre position and as a result, with the best possible balancing of the tool combination.



B.2

For Insert ▶ 389-392

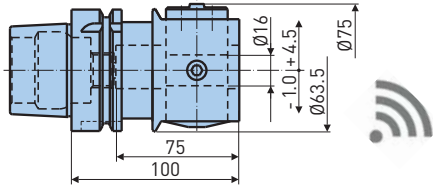
# Fine Boring Heads, Accessories

Boring Head

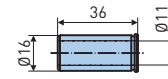
Order No.

EWE2-152HSK-A63

112.126

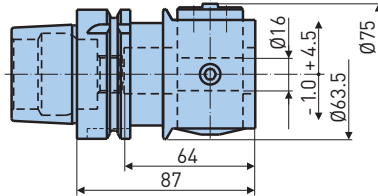


RB16-11  
613.411

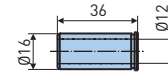


EWN2-152HSK-A63

112.123

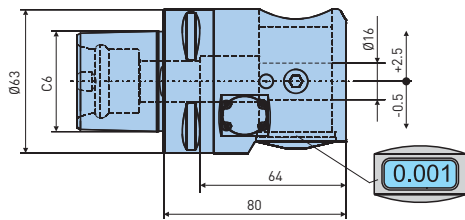


RB16-12  
613.412

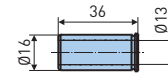


EWD2-54C6

470.109

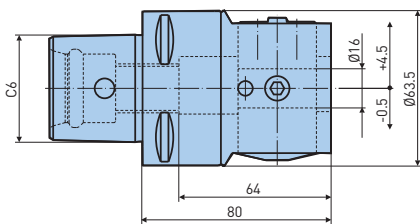


RB16-13  
613.413

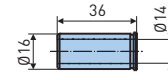


EWN2-152C6

470.108

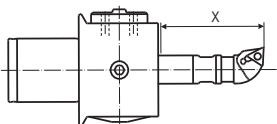


RB16-14  
613.414



B.2

X = Boring depth



ØD

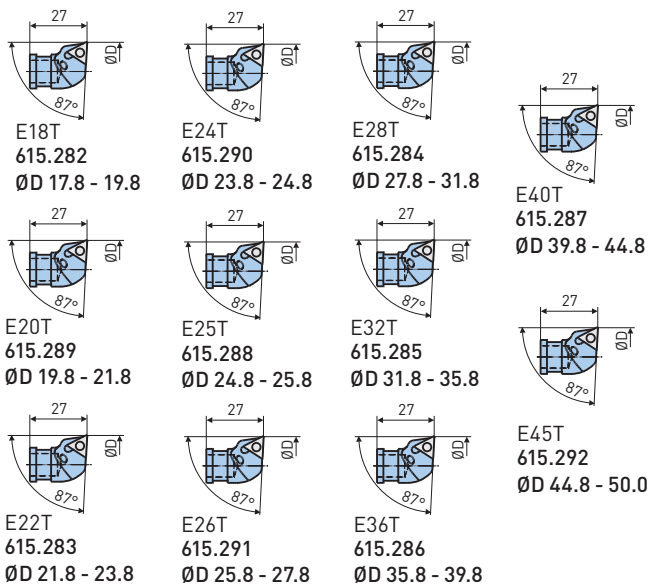
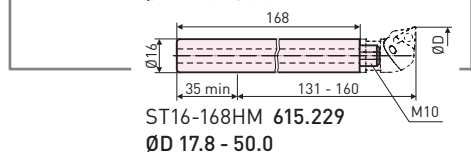
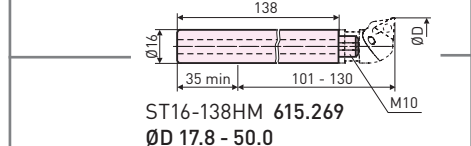
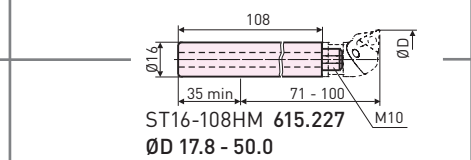
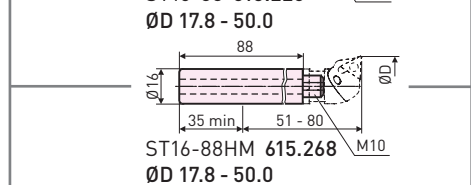
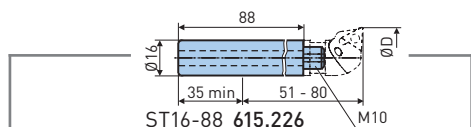
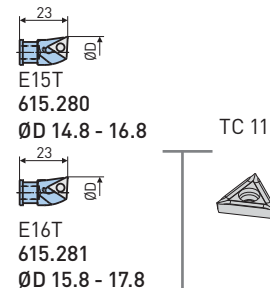
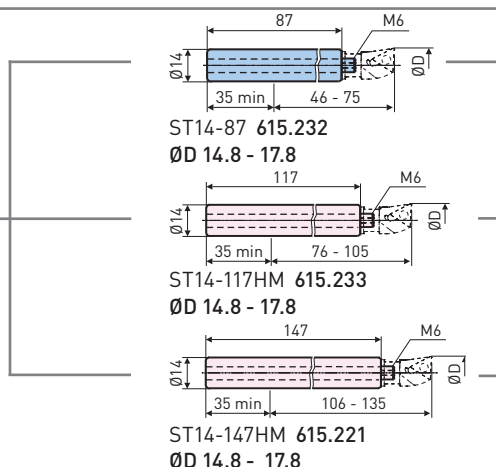
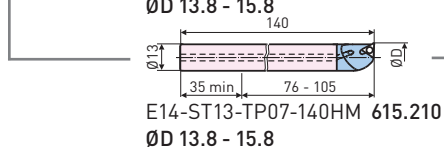
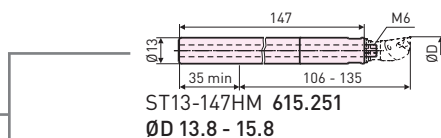
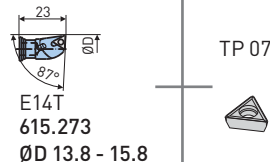
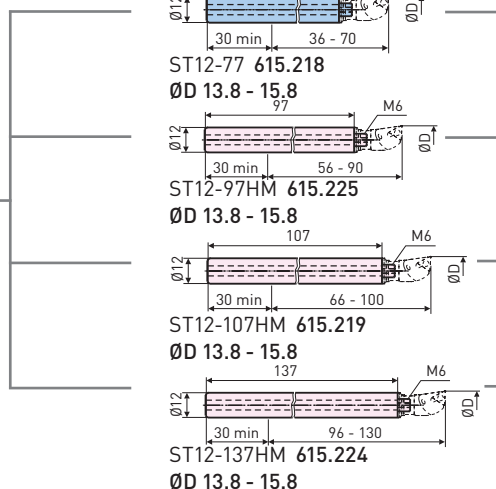
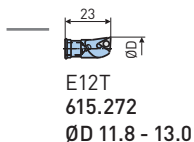
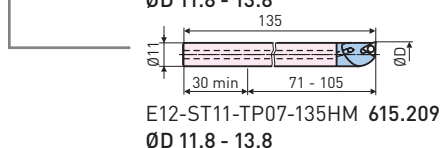
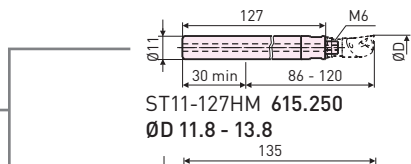
Boring range for the fine boring head EWN 2-152.

Under full use of the adjustment range, the max. boring range will be,

- for EWN, EWE, EWB: Lower range + 9 mm Ø
- for EWD: Lower range + 5 mm Ø

 Carbide tool holders

Fixed Tool Holder

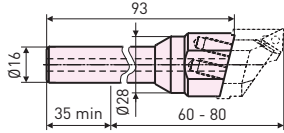


B.2

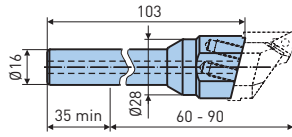
For Insert ▶ 389-392

## Adjustable Tool Holders

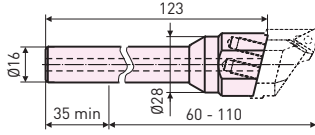
AST16-93HM32-54 615.267  
ØD 31.8 - 54.0



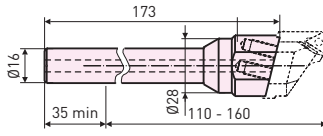
AST16-103 615.264  
ØD 31.8 - 54.0



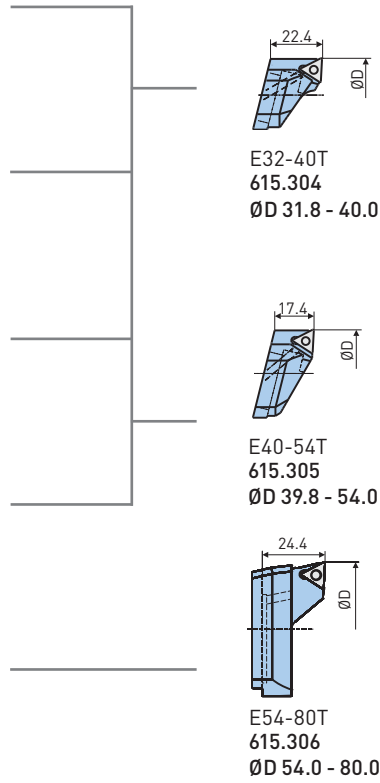
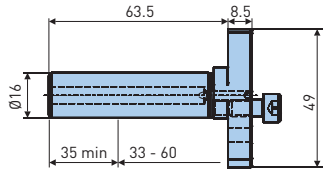
AST16-123HM32-54 615.257  
ØD 31.8 - 54.0



AST16-173HM32-54 615.258  
ØD 31.8 - 54.0



AST16-72 615.387B  
ØD 54.0 - 80.0

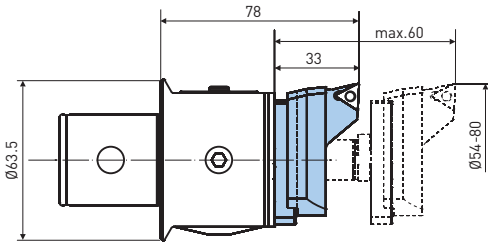


TC 11



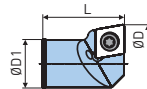
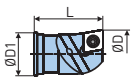
For Insert ▶ 390-392

X = Boring depth



B.2

## 90° Insert Holders



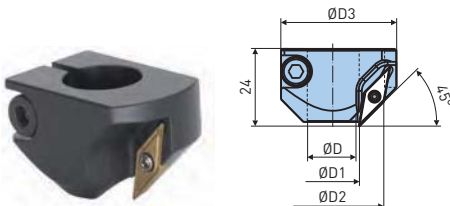
Model	Order No.	ØD1	L	ØD	
E12C	615.420	10	23	11.8 - 14.5	CC 06
E14C	615.421	12	23	13.8 - 16.5	
E16C	615.422	14	23	15.8 - 18.5	CC 09
E18C	615.423	16	27	17.8 - 20.5	
E20C	615.424	16	27	19.8 - 22.5	

Model	Order No.	ØD1	L	ØD	
E22C	615.425	16	27	21.8 - 24.5	CC 09
E24C	615.426	16	27	23.8 - 25.5	
E26C	615.427	16	27	25.8 - 28.5	
E28C	615.428	16	27	27.8 - 32.5	
E30C	615.429	16	27	29.8 - 34.5	

For Insert ▶ 393-394

## Chamfering Rings

Chamfering rings for tool holders made of steel and carbide Ø 12 and Ø 16 mm, for 45° chamfering right after boring, without tool change.



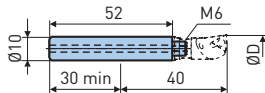
Model	Order No.	Dimensions				
		ØD	ØD1	ØD2	ØD3	
CR13-27ST12V	615.394	12	12.6	27.7	35	VC 11
CR17-31ST16V	615.395	16	16.6	31.7	39.5	

For Insert ▶ 413

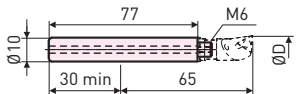
Carbide tool holders

Back Boring Holders

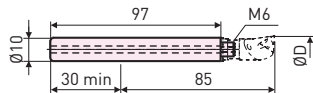
ST10-52 615.214  
ØD 15.8 - 20.5



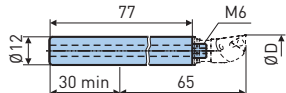
ST10-77HM 615.215  
ØD 15.8 - 20.5



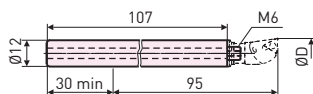
ST10-97HM 615.223  
ØD 15.8 - 20.5



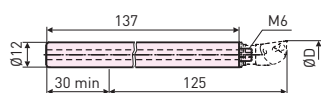
ST12-77HM 615.218  
ØD 19.8 - 25.8



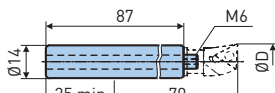
ST12-107HM 615.219  
ØD 19.8 - 25.8



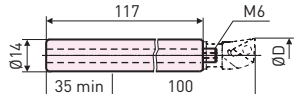
ST12-137HM 615.224  
ØD 19.8 - 25.8



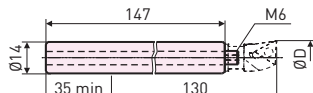
ST14-87HM 615.232  
ØD 25.8 - 28.8



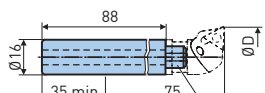
ST14-117HM 615.233  
ØD 25.8 - 28.8



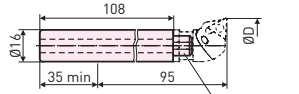
ST14-147HM 615.221  
ØD 25.8 - 28.8



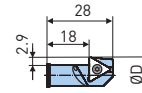
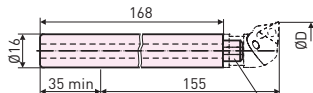
ST16-88 615.226  
ØD 28.8 - 44.5



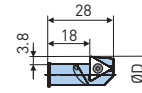
ST16-108HM 615.227  
ØD 28.8 - 44.5



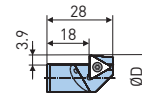
ST16-168HM 615.229  
ØD 28.8 - 44.5



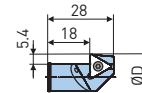
E16T-BB  
615.401  
ØD 15.8 - 18.5  
Entry Dia. 13.0



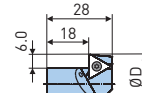
E18T-BB  
615.402  
ØD 17.8 - 20.5  
Entry Dia. 13.9



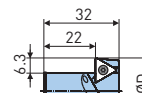
E20T-BB  
615.403  
ØD 19.8 - 22.8  
Entry Dia. 15.9



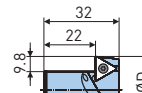
E20T-BB  
615.404  
ØD 22.8 - 25.8  
Entry Dia. 17.4



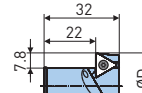
E26T-BB  
615.405  
ØD 25.8 - 28.8  
Entry Dia. 19.9



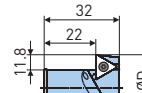
E29T-BB  
615.406  
ØD 28.8 - 33.5  
Entry Dia. 22.4



E36T-BB  
615.408  
ØD 35.8 - 40.5  
Entry Dia. 25.9



E32T-BB  
615.407  
ØD 31.5 - 36.5  
Entry Dia. 23.9



E40T-BB  
615.409  
ØD 39.8 - 44.5  
Entry Dia. 27.9

TC 11



B.2

For Insert ▶ 390 - 392

Reducers

Model	Order No.	ØD	Model	Order No.	ØD
ST16-10-32	615.230	11.8 - 14.5	ST16-12-32	615.231	13.8 - 18.5

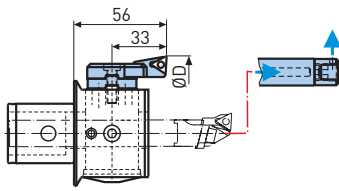
Extensions

Model	Order No.	ØD	Model	Order No.	ØD
ST12-18	615.220	13.8 - 16.5	ST16-25	615.228	17.8 - 50.0

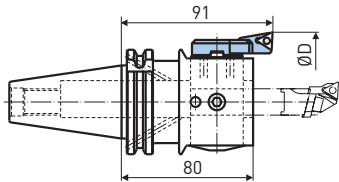


## Insert Holders for EWN/EWE, Ø 80 - 152

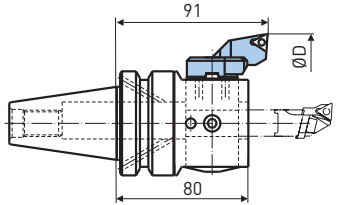
EWN2-152CK6



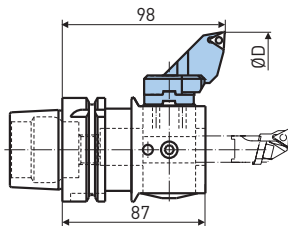
EWN2-152DV40



EWN2-152BT40



EWN2-152HSK-A63



B.2

	Parts	Model	Order No.	Insert	ØD
	Insert Holder	EK80-104T	626.908		80 - 92
	Spacer *	DD30-6	626.907		92 - 104
	Insert Holder	EK80-104T	626.908		
	Insert Holder *	EK104-128T	626.909		104 - 116
	Spacer *	DD30-6	626.907	TC 11 	116 - 128
	Insert Holder	EK104-128T	626.909		
	Insert Holder *	EK128-152T	626.910		128 - 140
	Spacer *	DD30-6	626.907		140 - 152
	Insert Holder	EK128-152T	626.910		
	Tool Holder	ST16-88	615.226		
	Coolant Nozzle	CN2-50	615.392		

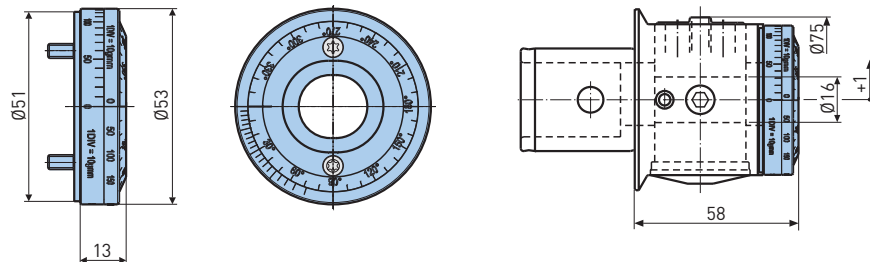
1. \* Also suitable for back boring.

For Insert ► 390-392

## Balancing Rings

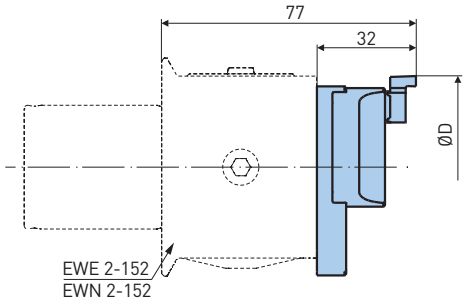
After removing the front cover plate, the balancing rings can be mounted on to the boring heads. The imbalance has to be measured on a balancing machine. The correction of the imbalance is done by moving the scale rings.

Model	Order No.
BR2-152	112.806



# Face Grooving Holders for EWN/EWE, Ø 14 - 53

Tool holder, insert holder, and grooving insert are made for face grooving with the fine boring head EWN/EWE 2-152.



## Tool- and Insert Holder

Fig. 1

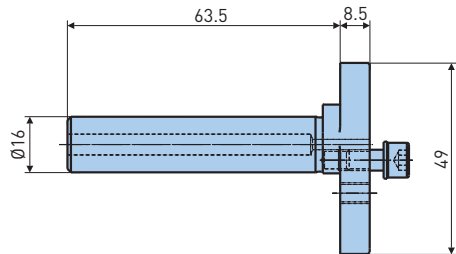
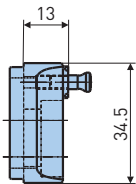


Fig. 2



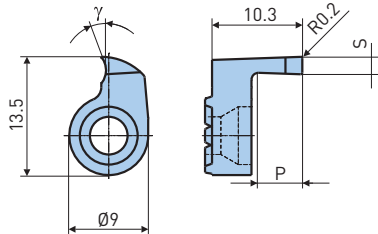
Model	Order No.	Fig.	ØD
AST16-72	615.387B	1	14 - 53
FGH14-54	615.388	2	14 - 53

For Boring Head ▶ 312  
For Spare Parts ▶ 431

B.2

## Grooving Inserts

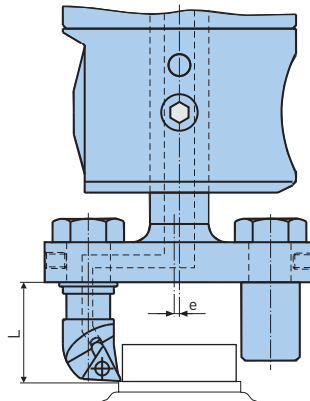
For all materials.



Model	Order No.	S	P	γ
RD1420P30C	958.501	2.0	5	20°
RD1425P30C	958.502	2.5		
RD1430P30C	958.503	3.0		

## OD Turning Holders for EWN/EWE, Ø 1 - 32

By using an eccentric bar on the fine boring heads EWN/EWE 2-152, it is possible to turn outside diameters up to 32 mm with lengths up to 50 mm. The counterweight is moveable on the eccentric bar. By moving the counterweight, the imbalance can be compensated to a minimum.



Max. Spindle Speeds		
e [mm]	L = 27 [min <sup>-1</sup> ]	L = 52 [min <sup>-1</sup> ]
0	8 000	6 000
0.5	6 000	4 500
2.5	4 000	3 500
4.5	3 000	2 500

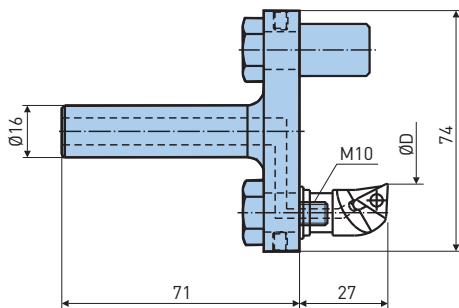
**Attention:** Counter-clockwise rotation of spindle!

**Remark:**

Adjustment of the scale in clockwise direction and eccentric bar with cutting edge positioned as shown on the drawing, results in a smaller pin diameter.

**B.2**

### Eccentric Bar

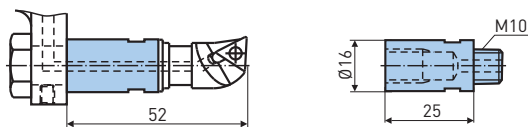


Model	Order No.	ØD
ST16-OD-32	615.390	1 - 32

For Boring Head ▶ 312

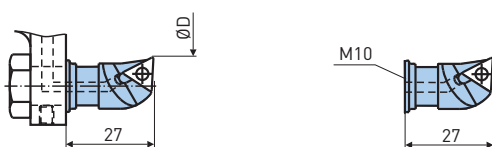
For Spare Parts ▶ 438


### Extension



Model	Order No.
ST16-25	615.228

### Insert Holders



Model	Order No.	ØD	Insert
E18T	615.282	28 - 32	TC 11 
E22T	615.283	24 - 28	
E26T	615.291	20 - 24	
E32T	615.285	15 - 20	
E36T	615.286	11 - 15	
E40T	615.287	6 - 11	
E45T	615.292	1 - 6	

For Insert ▶ 390-392

## Tool Kit EWN 2-152, Ø 16.8 - 33

Model	Order No.
EWN2-152-17-33SET	112.097A



Contents	Order No.	Qty.
Boring head		
EWN2-152CK6	112.108	1
Tool holder		
AST16-118HM17-33	615.252	1
Adjustable tool holder		
E17-22T	615.301	1
E22-27T	615.302	1
E27-33T	615.303	1

Contents	Order No.	Qty.
Insert		
TCGT-110204-K10C	655.383	10
Wrench		
ETL-GRS-SW5x80	690.816	1
ETL-ST5-SW6	690.806	1
ETL-ST5-SW4	690.804	1
ETL-GRS-TORX-PLUS-T7-IP	694.807	1
Case		
CASE-EWD/EWN16.8-33	671.151	1

## Tool Kit EWN/EWE 2-152, Ø 17.8 - 152

The tool kit EWN 2-152 and EWE 2-152, Ø 17.8 – 152 mm, is available in different versions. The versions differ in the length and the material of the tool holders and in the quantity of the inserts.

Model	Order No.
EWN2-152-18-152SET	112.837 *



Model	Order No.	Qty.
Boring head		
EWN2-152CK6	112.108 *	1
Tool holder		
AST16-72	615.387B	1
ST16-88	615.226 *	1
Insert holder		
E18T	615.282	1
E25T	615.288	1
E32T	615.285	1
E40T	615.287	1
E45T	615.292	1
E54-80TC	615.306	1
DD30-6	626.907	1
EK80-104T	626.908	1
EK104-128T	626.909	1
EK128-152TC11	626.910	1

Model	Order No.	Qty.
Insert		
TCGT-110204-M10C	655.389 *	10
Screw		
ETL-M6x20A-DIN6912	690.156	2
Wrench		
ETL-GRS-SW5x80	690.816	1
ETL-GRS-TORX-PLUS-T7-IP	694.807	1
Coolant nozzle		
CN2-50	615.392	1
Case		
CASE-EWN2-150	671.150	1

B.2

### \* Other versions available

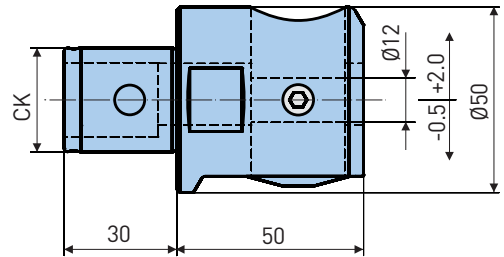
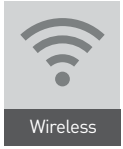
Order No.	Model	Order No.	Qty.
112.837A	Tool holder made of steel		
	ST16-88	615.226	1
	Insert		
112.837B	Tool holder made of carbide		
	ST16-108HM	615.227	1
	Insert		
112.837C	Tool holder made of carbide		
	ST16-108HM	615.227	1
	Insert		
112.837E	Tool holder made of carbide		
	ST16-108HM	615.227	1
	Insert		
	TCGT-110204-M20C	655.318	2
	Boring head		
	EWE2-152CK6	112.110	1



For tool kit with EWE 2-152, order 112.837E.

## EWE 2-32 Digital Fine Boring Head, Ø 2 - 32

The EWE 2-32 is the smallest digital fine boring head with centre insert holder. It is especially suitable for the use on small machines.



Model	Order No.
EWE2-32CK5	112.310

### Other execution

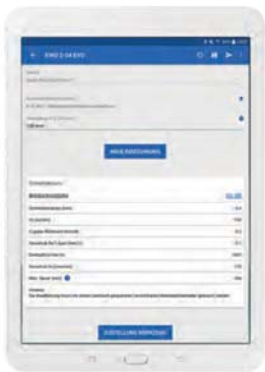
EWD2-32C5  
470.103



## BIG KAISER App

B.2

Enhances user friendliness while assembling and running our boring tools. The app helps operators to determine optimal cutting parameters, manuals and provides a history of all adjustments made with an EWE boring head.



Cutting data



Send your data to...



History (made automatically)

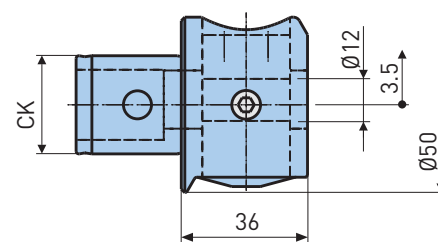
### This is how the app is going to support your daily challenges

1. Choose your tool
2. Type in your application values
3. Calculate cutting data
4. Adjust machine and make a measuring bore
5. Infeed tool with the diameter of the measuring bore
6. Make the bore



## EWN 2-32 Fine Boring Head, Ø 2 - 32

Fine boring head in integral, modular, and screw-on execution for the precise machining of bores.



Model	Order No.
EWN2-32CK5	112.301A

### Other executions

EWB2-32CK5  
112.306

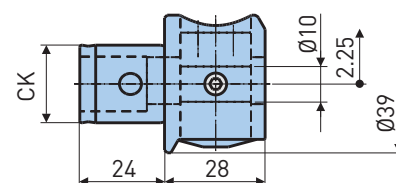
Balanced

EWN2-32ES32  
112.304A

EWN2-32DV30  
112.303A

B.2

## EWN 04-22 Fine Boring Head, Ø 0.4 - 22



Model	Order No.
EWN04-22CK4	112.206

### Other executions

EWN04-22HSK-E40  
112.207

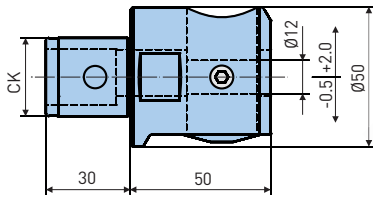
EWN04-22ES25  
112.205

## Boring Head

## Order No.

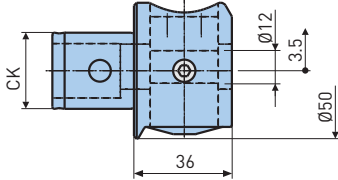
EWE2-32CK5

112.310



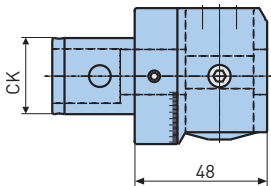
EWN2-32CK5

112.301A



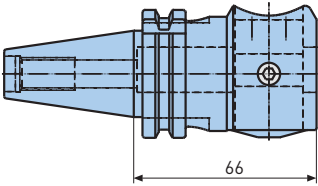
EWB2-32CK5

112.306



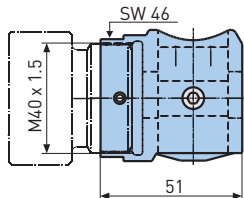
EWN2-32DV30

112.303A



EWN2-32ES32

112.304A



## Sleeve for ER Tool Holder

Model	Order No.	A1
TB-ES32-ES25	112.353	M32 x 1.5
TB-ES32-ES16	112.385	M22 x 1.5

## ØD

Boring range for the fine boring head EWN 2-32.  
Under full use of the adjustment range, the max boring range will be,

- for EWN/EWB 2-32: Lower range + 7 mm Ø
- for EWE 2-32: Lower range + 4 mm Ø

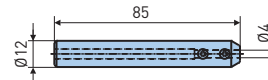


Carbide tool holders

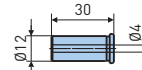


Recommended for EWB 2-32

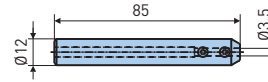
RB12-4-84  
613.324 ♦



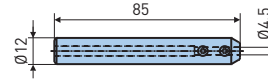
RB12-4  
613.304 ♦



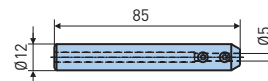
RB12-3.5-85  
613.323 ♦



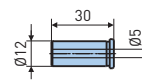
RB12-4.5-85  
613.326 ♦



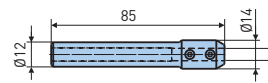
RB12-5-85  
613.325 ♦



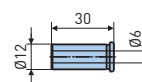
RB12-5  
613.305 ♦



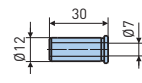
RB12-6-85  
613.327 ♦



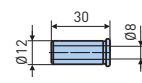
RB12-6  
613.306 ♦



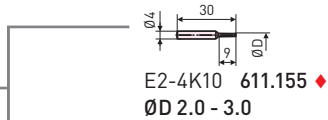
RB12-7  
613.307 ♦



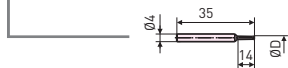
RB12-8  
613.308 ♦



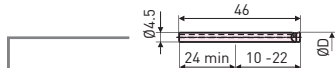
Fixed Tool Holder



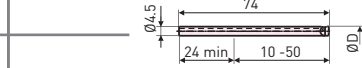
E2-4K10 611.155 ♦  
ØD 2.0 - 3.0



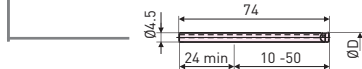
E3-4K10 611.156 ♦  
ØD 3.0 - 4.0



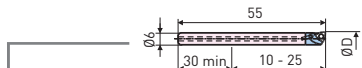
E5-ST4.5-46K10 615.081  
ØD 4.9 - 5.9



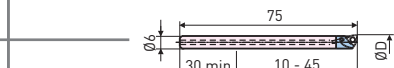
E5-ST4.5-74K10 615.204 ♦  
ØD 4.9 - 5.9



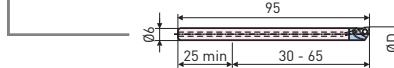
E5-ST4.5-74K10C 615.204A ♦  
ØD 4.9 - 5.9



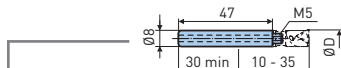
E7.5-ST6-WC02-55HM 615.084  
ØD 7.3 - 8.8



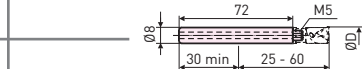
E7.5-ST6-WC02-75HM 615.085  
ØD 7.3 - 8.8



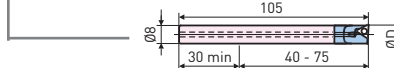
E7.5-ST6-WC02-95HM 615.202 ♦  
ØD 7.3 - 8.8



ST8-47 615.211  
ØD 8.8 - 11.8



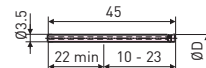
ST8-72HM 615.212 ♦  
ØD 8.8 - 11.8



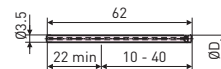
E9-ST8-TP07-105HM 615.213 ♦  
ØD 8.8 - 11.8



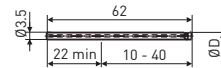
E9T  
615.271 ♦  
ØD 8.8 - 11.8



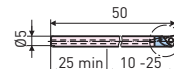
E4-ST3.5-45K10 615.080  
ØD 3.9 - 4.9



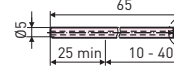
E4-ST3.5-62K10 615.203 ♦  
ØD 3.9 - 4.9



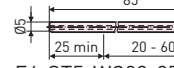
E4-ST3.5-62K10C 615.203A ♦  
ØD 3.9 - 4.9



E6-ST5-WC02-50HM 615.082  
ØD 5.8 - 7.3



E6-ST5-WC02-65HM 615.083  
ØD 5.8 - 7.3

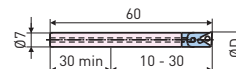


E6-ST5-WC02-85HM 615.201 ♦  
ØD 5.8 - 7.3

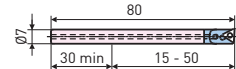
WC 02



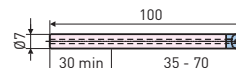
WC 02



E8-ST7-TP07-60HM 615.086  
ØD 7.8 - 9.8



E8-ST7-TP07-80HM 615.207 ♦  
ØD 7.8 - 9.8



E8-ST7-TP07-80HM 615.087  
ØD 7.8 - 9.8



E8-ST7-TP07-100HM 615.205 ♦  
ØD 7.8 - 9.8

TP 07



TP 07



B.2

For Insert ▶ 388-389

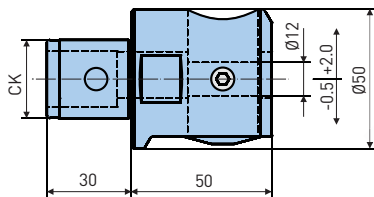


## Boring Head

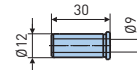
## Order No.

EWE2-32CK5

112.310

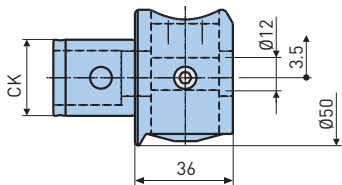


RB12-9  
613.309



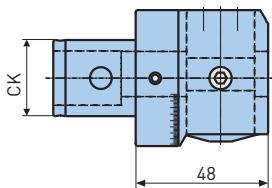
EWN2-32CK5

112.301A

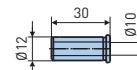


EWB2-32CK5

112.306

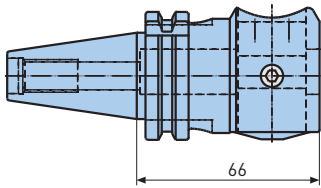


RB12-10  
613.310



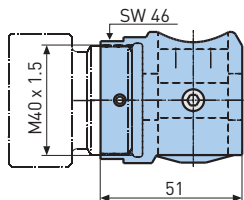
EWN2-32DV30

112.303A



EWN2-32ES32

112.304A



B.2

## Sleeve for ER Tool Holder

Model	Order No.	A1
TB-ES32-ES25	112.353	M32 x 1.5
TB-ES32-ES16	112.385	M22 x 1.5

## ØD

Boring range for the fine boring head EWN 2-32.

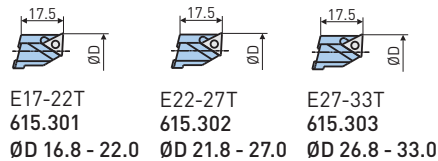
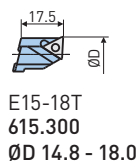
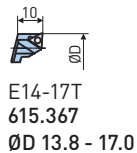
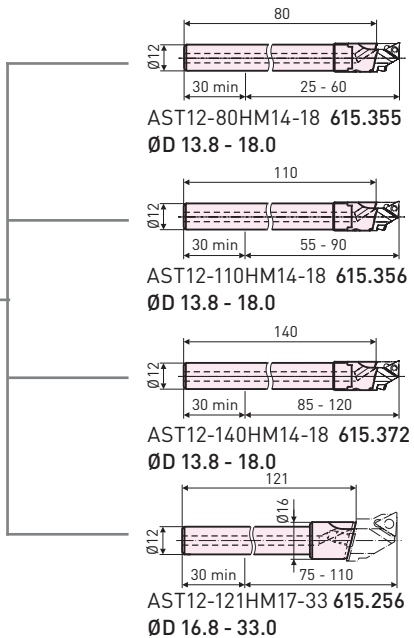
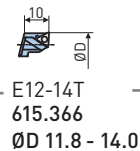
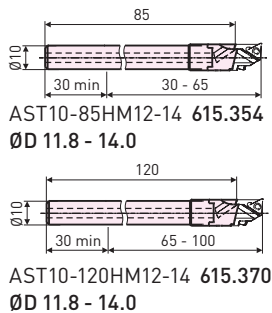
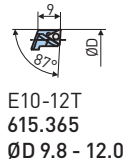
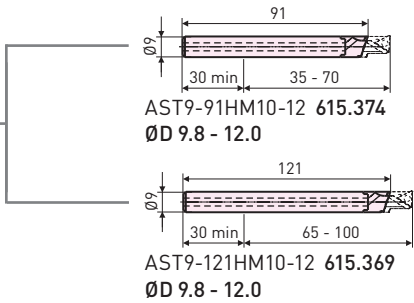
Under full use of the adjustment range, the max boring range will be,

- for EWN/EWB 2-32: Lower range + 7 mm Ø
- for EWE 2-32: Lower range + 4 mm Ø

Carbide tool holders

♦ Recommended for EWB 2-32

Adjustable Tool Holder



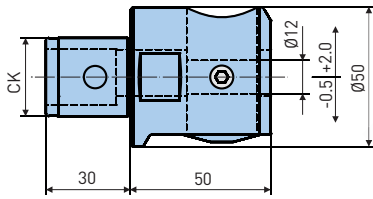
B.2

## Boring Head

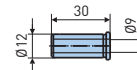
## Order No.

EWE2-32CK5

112.310

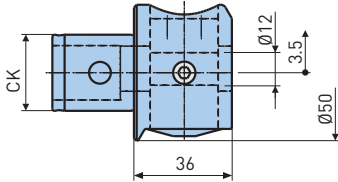


RB12-9  
613.309

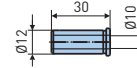


EWN2-32CK5

112.301A

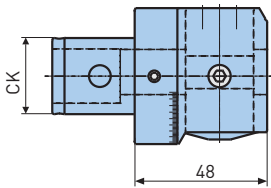


RB12-10  
613.310



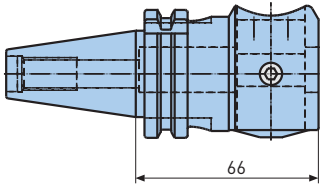
EWB2-32CK5

112.306



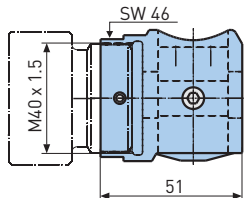
EWN2-32DV30

112.303A



EWN2-32ES32

112.304A



B.2

## Sleeve for ER Tool Holder

Model	Order No.	A1
TB-ES32-ES25	112.353	M32 x 1.5
TB-ES32-ES16	112.385	M22 x 1.5

## ØD

Boring range for the fine boring head EWN 2-32.

Under full use of the adjustment range, the max boring range will be,

- for EWN/EWB 2-32: Lower range + 7 mm Ø
- for EWE 2-32: Lower range + 4 mm Ø

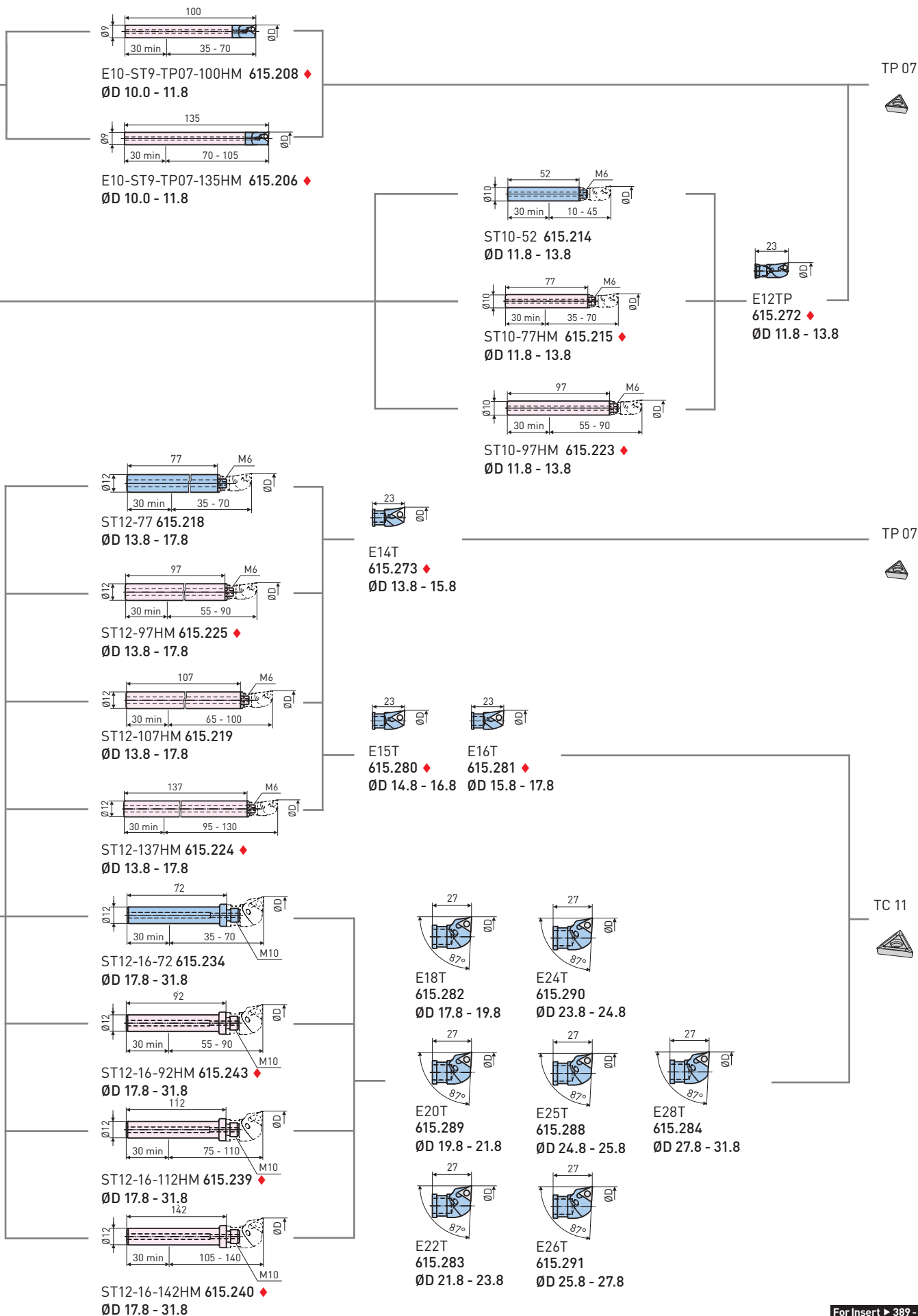


Carbide tool holders



Recommended for EWB 2-32

Fixed Tool Holder



B.2

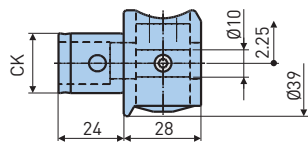
For Insert ▶ 389-392

## Boring Head

## Order No.

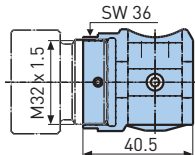
EWN04-22CK4

112.206



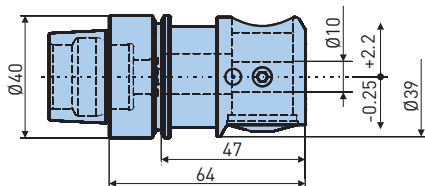
EWN04-22ES25

112.205

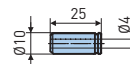


EWN04-22HSK-E40

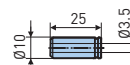
112.207



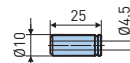
RB10-4  
613.204



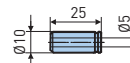
RB10-3.5  
613.202



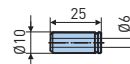
RB10-4.5  
613.203



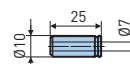
RB10-5  
613.205



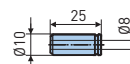
RB10-6  
613.206



RB10-7  
613.207




RB10-8  
613.208



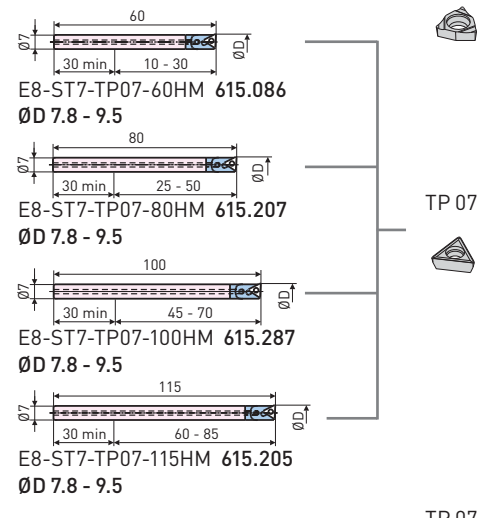
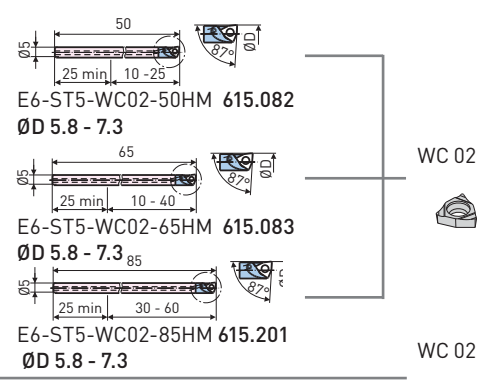
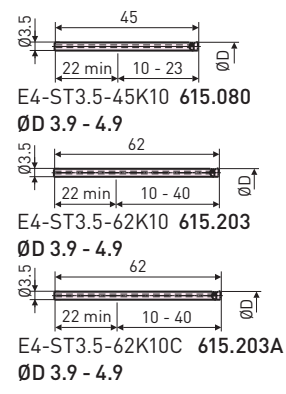
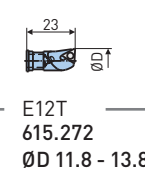
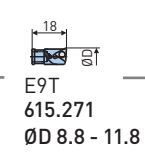
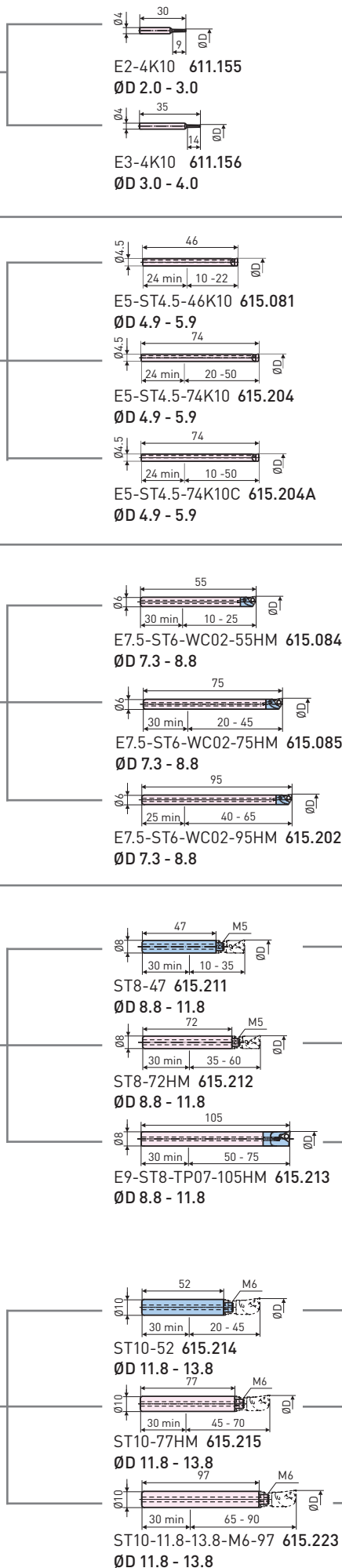
B.2

## Sleeve for ER Tool Holder

Model	Order No.	A1
TB-ES25-ES20	112.271	M25 x 1.5
TB-ES25-ES16	112.272	M22 x 1.5

 Carbide tool holders

Fixed Tool Holder



WC 02

WC 02

TP 07

TP 07

TP 07

TP 07

B.2

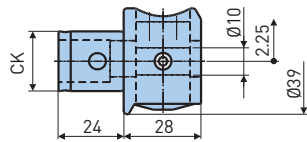
For Insert ▶ 388-389

## Boring Head

## Order No.

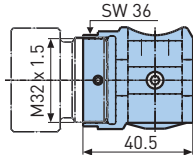
EWN04-22CK4

112.206



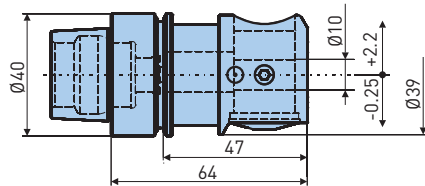
EWN04-22ES25

112.205



EWN04-22HSK-E40

112.207

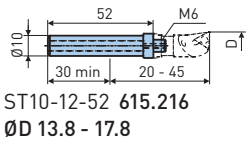


## B.2

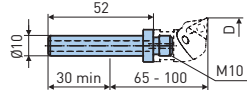
## Sleeve for ER Tool Holder

	Model	Order No.	A1
	TB-ES25-ES20	112.271	M25 x 1.5
	TB-ES25-ES16	112.272	M22 x 1.5

Fixed Tool Holder



ST10-12-52 615.216  
ØD 13.8 - 17.8



ST10-16-52 615.217  
ØD 17.8 - 21.8



E14T  
615.273  
ØD 13.8 - 15.8



E15T  
615.280  
ØD 14.8 - 16.8



E16T  
615.281  
ØD 19.8 - 17.8



E18T  
615.282  
ØD 17.8 - 19.8



E20T  
615.289  
ØD 19.8 - 21.8

TP 07



TC 11



For Insert ▶ 389 - 392



# EWN 04-15 Fine Boring Head, Ø 0.4 - 15

Fine boring heads for the machining of smallest bores with highest spindle speeds on small machine tools. The boring heads are available with both modular CK3 connection and cylindrical shanks Ø 16 mm.

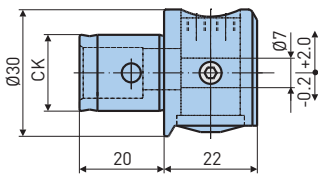


Model	Order No.
EWN04-15CK3	112.505

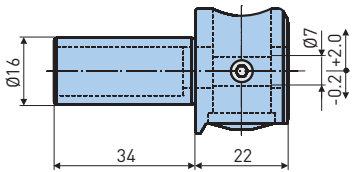
**Other execution**

EWN04-15ST16  
112.506

Boring Head	Order No.
EWN04-15CK3	112.505



EWN04-15ST16	112.506
--------------	---------

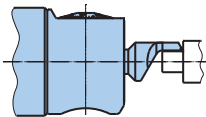


B.2

Boring Cutter	Model	Order No.	L	X	Cutting Edge	ØD	
	E0.4-ST7-52K10C	615.522	52	1.5	K10C	0.4 - 1.0	
	E0.9-ST7-52K10C	615.524		3		0.9 - 1.5	
	E1.4-ST7-52K10C	615.525		5		1.4 - 2.0	
	E2-ST7-52K10C	615.501		6		1.9 - 3.0	
	E3-ST7-52K10C	615.502		10		2.9 - 4.0	
	E4-ST7-52K10C	615.503		13		3.9 - 5.0	
E5-ST7-52K10C	615.504	16		4.9 - 6.0			
	E6-ST7-WC02-52HM	615.505		20	WC 02	5.8 - 7.0	
	E7-ST7-WC02-52HM	615.506		20		6.8 - 8.0	
	E8-ST7-TP07-52HM	615.507		30	TP 07	7.8 - 9.0	
	E9-ST7-TP07-52HM	615.508		30		8.8 - 10.0	
	E10-ST7-TP07-52HM	615.509		30			9.8 - 12.0
	E12-ST7-TP07-52HM	615.511		30		11.8 - 15.5	

For Spare Parts ▶ 429  
For Insert ▶ 388 - 389

**OD Turning**



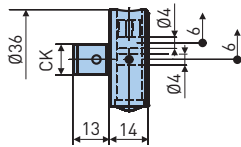
OD Turning Cutter	Model	Order No.	L	X	Cutting Edge	ØD
	OD-0-3-ST7-52K10C	615.530	52	2.5	K10C	0.2 - 3.0
	OD-2-6-ST7-52K10C	615.531		6		2.0 - 6.0

## EWN 04-24/12-36 Fine Boring Heads, Ø 0.4 - 36

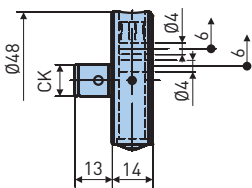
Special fine boring heads with huge diameter range for the micro industry. Dedicated cutters for OD turning and face grooving available.

**Boring Head                      Order No.**

EWN04-24CK1                      188.133



EWN12-36CK1                      188.134



OD Turning Cutters	Model	Order No.	L	X	Cutter	ØD	
	OD-0.2-2.3-ST4-25K10C	615.590	25	2.2	K10C	0.2 - 2.3	
Face Grooving Cutters	Model	Order No.	L	X	B	Cutter	ØD
	FG2-ST4-22K10C	689.290 *	22	5	1.75	K10C	> 12

- \* Special dimensions available on request.
- For fine boring cutters refer to page 346 OD turning.

OD Turning



Fine Boring



Face Grooving

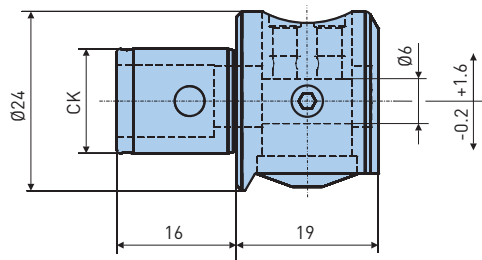


B.2

## EWN 04-12 Fine Boring Head, Ø 0.4 - 12

Fine boring heads for the machining of smallest bores with highest spindle speeds on machine tools with spindles ISO 20, HSK-E25 and bigger. The boring heads are available with the modular CK2 connection and with cylindrical shanks Ø 6 and 10 mm.

Model	Order No.
EWN04-12CK2	112.507



For Spare Parts ▶ 429

## EWN 04-7 Fine Boring Head, Ø 0.4 - 7

World's smallest fine boring head: Thanks to its body diameter of only Ø 18.5 mm, the EWN 04-7 is the perfect solution for micro machining applications.

Model	Order No.
EWN04-7CK1	112.503

World's smallest fine boring head.



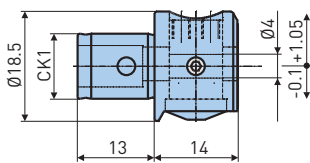
**Other executions**



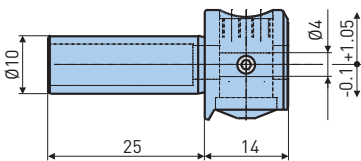
B.2

Model Order No.

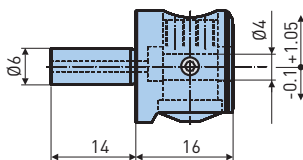
EWN04-7CK1 112.503



EWN04-7ST10 112.504



EWN04-7ST6 112.508

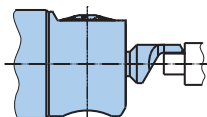


Boring Cutter	Model	Order No.	L	X	R	Cutting Edge	ØD			
	E0.4-ST4-30K10C	615.541	30	1.5	0.05	K10C	0.4 - 0.9			
	E0.9-ST4-30K10C	615.542		3			0.9 - 1.4			
	E1.4-ST4-30K10C	615.543		5			1.4 - 2.0			
	E2-ST4-30K10C	615.544		6			1.9 - 3.0			
	E3-ST4-30K10C	615.545		10			2.9 - 4.0			
	E4-ST4-30K10C	615.546		13			3.9 - 5.0			
	E5-ST4-30K10C	615.547		16			4.9 - 7.0			
	E0.4-ST4-25K10C	615.561		25			1.1	0.1	K10	0.4 - 1.6
	E0.6-ST4-25K10C	615.562					1.5			0.6 - 0.8
	E0.8-ST4-25K10C	615.563					2			0.8 - 1.2
E1.2-ST4-25K10C	615.564	2.5	1.2 - 1.5							
E1.5-ST4-25K10C	615.565	3.5	1.5 - 1.9							
E1.9-ST4-25K10C	615.566	4.5	1.9 - 3.0							
E0.4-ST4-25K10	615.551	23.4	1.1		0.1	CBN-20	0.4 - 0.6			
E0.6-ST4-25K10	615.552		1.5				0.6 - 0.8			
E0.8-ST4-25K10	615.553		2				0.8 - 1.2			
E1.2-ST4-25K10	615.554		2.5				1.2 - 1.5			
E1.5-ST4-25K10	615.555		3.5	1.5 - 1.9						
E1.4-ST4-24CBN20	615.571		3.5	1.4 - 2.0						
E1.9-ST4-24CBN20	615.572	4.5	1.9 - 3.0							
E2.9-ST4-27CBN20	615.573	8	2.9 - 4.0							
E3.9-ST4-30CBN20	615.574	11	3.9 - 5.0							
E4.9-ST4-30CBN20	615.575	16	4.9 - 6.0							

The boring cutters are made with flat for cutting edge orientation. Other lengths and geometries on request.

For Spare Parts ▶ 429

OD Turning

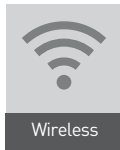


OD Turning Cutter	Model	Order No.	L	X	Cutting Edge	ØD
	OD-0.2-2.3-ST4-25K10C	615.590	25	2.2	K10C	0.2 - 2.3

## Fine Boring Heads with Peripheral Cutting Edge

<b>Overview</b>	<b>348</b>
<b>EWE Digital Fine Boring Heads</b>	<b>349</b>
<b>EWD Smart Damper Digital Fine Boring Heads</b>	<b>350</b>
<b>EWN Fine Boring Heads</b>	<b>351</b>
<b>EWN BIG CAPTO Fine Boring Heads</b>	<b>352</b>
<b>Accessories</b>	<b>353 - 357</b>
<b>EWB/EWB-AL Balanced Fine Boring Heads</b>	<b>358</b>
<b>EWBD BIG CAPTO Digital and Balanced Fine Boring Heads</b>	<b>359</b>
<b>EWB-UP Balanceable Fine Boring Heads</b>	<b>360</b>
<b>EW Fine Boring Heads</b>	<b>361</b>
<b>Carbide Bars</b>	<b>362</b>

B.3



## EWE Digital Fine Boring Heads

Wireless communication for easy readout with the BIG KAISER app: The brandnew EWE fine boring heads revolutionate fine boring.

Ø 41 - 203 mm, CKB1-CKB6

▶ 349



## EWD Smart Damper Digital Fine Boring Heads

The combination of the most advanced technologies to a powerful and highly productive tool: an integral digital fine boring head with an innovative and patented damping technology.

Ø 41 - 150 mm, CKB4-CKB6

▶ 350



## EWN Fine Boring Heads

The EWN single cutter boring tool program for fine boring covers a range of Ø 20 - 203 mm with only 7 precision boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1200 m/min are permitted.

Ø 41 - 203 mm, CKB1-CKB7/BIG CAPTO C3-C8

▶ 351



## EWB Balanced Fine Boring Heads

Even at max. speeds the balanced EWB fine boring heads guarantee vibration-free boring, resulting in increased productivity and highest precision.

Ø 32 - 105 mm, CK3-CK6

▶ 358



## EWB-AL Balanced Fine Boring Head

The fine boring heads EWB AL are made of high strength aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%.

Ø 100 - 203 mm, CK6-CK7

▶ 358



## EWB-UP Balanceable Fine Boring Heads

The ultra-precision EWB-UP series sets higher standards for boring heads concerning adjustment accuracy and balance quality.

Ø 25 - 100 mm, CK2-CK6

▶ 360



## EW Fine Boring Heads

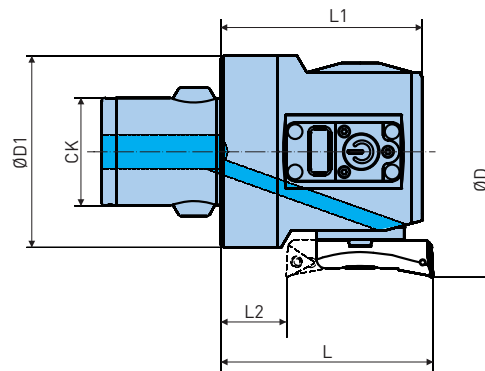
These heads are designed to be used in combination with the steel or carbide-boring bars Ø 14 and Ø 16 mm out of the accessory program. In conjunction with the long carbide bar, the tool is well suited for vibration-free finishing operations in bores with unfavorable Ø/L-ratios.

Ø 15 - 22 mm, ES15/ES18

▶ 361

## EWE Digital Fine Boring Heads, Ø 41 - 203

Thanks to wireless communication with the BIG KAISER app, manufacturing precise bores has become very easy.



Model	Order No.	CK	Front Bore ØD	Back Bore ØD	ØD1	L	L1	L2	Weight (kg)
EWE41-74CKB4	310.840	CKB4	41 - 74	53 - 74	38	47	43	14	0.33
EWE53-95CKB5	310.850	CKB5	53 - 95	62 - 95	49	57	53	19	0.76
EWE68-150CKB6	310.860	CKB6	68 - 150	80 - 150	64	71	67.2	22	1.7
EWE100-203CKB6	310.865	CKB6	100 - 203	112 - 203	66.5/90 *	71	67.2	22	2.5
EWE100-203CKB7	310.870	CKB7			90				

- \* Max. body diameter: 90 mm
- Insert holder is to be ordered separately.

For Spare Parts ▶ 432

For Insert Holder ▶ 353-355

## BIG KAISER App

Enhances user friendliness while assembling and running our boring tools. The app helps operators to determine optimal cutting parameters, manuals and provides a history of all adjustments made with an EWE boring head.

B.3



Cutting data



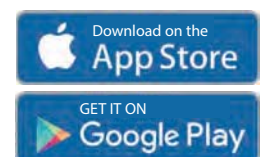
Send your data to...



History (made automatically)

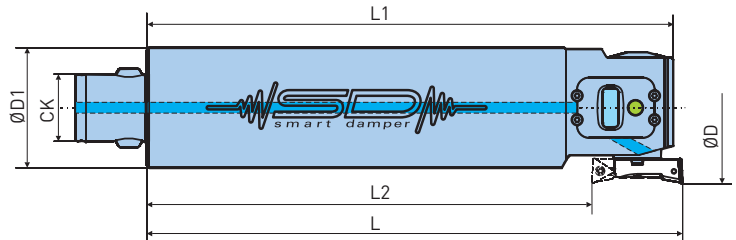
### This is how the app is going to support your daily challenges

1. Choose your tool
2. Type in your application values
3. Calculate cutting data
4. Adjust machine and make a measuring bore
5. Infeed tool with the diameter of the measuring bore
6. Make the bore



## EWD Smart Damper Digital Fine Boring Heads, Ø 41 - 150

With the new EWD Smart Damper BIG KAISER combines its most advanced technologies to a powerful and highly productive tool: a digital fine boring head with an innovative and patented damping technology.



Model	Order No.	CK	Front Bore ØD	Back Bore ØD	L	L1	L2	D1	Weight (kg)
EWD41-74CKB4-200DP	389.395	CKB4	41 - 74	53 - 74	200	196	167	39	2.4
EWD53-95CKB5-225DP	389.396	CKB5	53 - 95	62 - 95	225	221	187	50	4.5
EWD68-150CKB6-260DP	389.397	CKB6	68 - 150	80 - 150	260	241	211	64	9.5

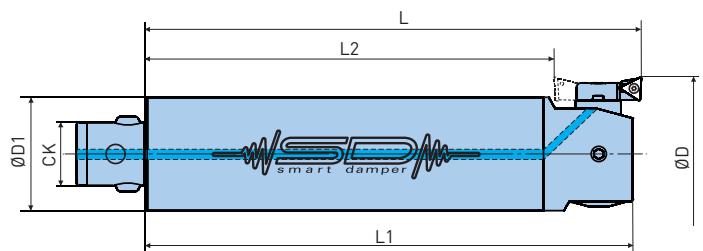
1. Insert holder is to be ordered separately.

For Spare Parts ▶ 432

For Insert Holder ▶ 353 - 355

B.3

## EWN Smart Damper Fine Boring Head, Ø 41 - 150



Model	Order No.	CK	Front Bore ØD	Back Bore ØD	L	L1	L2	D1	Weight (kg)
CKB4-EWN41DP-185	806.742	CKB4	41 - 74	61 - 74 *	185	181	152	39	2.4
CKB5-EWN53DP-210	806.743	CKB5	53 - 95	74 - 95 *	210	206	172	50	4.5
CKB6-EWN68DP-240	806.744	CKB6	68 - 150	90 - 150	240	236.2	191	64	9.5

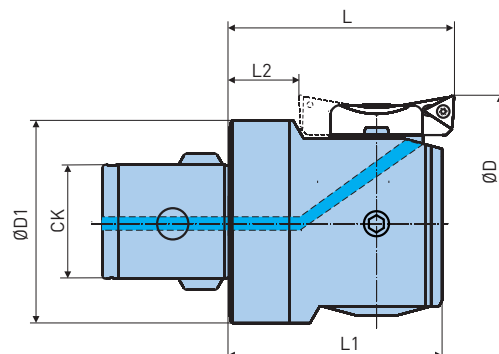
1. Insert holder (type 1) included. Other sizes are available.  
 2. \* Attention: Use insert holders type 2 or 3 for back boring.

For Spare Parts ▶ 432

For Insert Holder ▶ 353 - 355

## EWN Fine Boring Heads, Ø 20 - 203

The EWN single cutter boring tool program for fine boring covers a range of Ø 20 - 203 mm with only 7 fine boring heads. Due to the optimized balance over the whole adjustment range, cutting speeds up to 1200 m/min are permitted.



Model	Order No.	CK	Front Bore ØD	Back Bore ØD	ØD1	L	L1	L2	Weight (kg)
EWN20-36CKB1	310.101	CKB1	20 - 36	28 - 36	18.5	32.5	29.5	10.5	0.075
EWN25-47CKB2	310.201	CKB2	25 - 47	36 - 47	23.4	35.5	32.5	11.5	0.13
EWN32-60CKB3	310.301	CKB3	32 - 60	46 - 60	30	40	35	10	0.21
EWN41-74CKB4	310.401	CKB4	41 - 74	53 - 74	38	47	43	14	0.40
EWN53-95CKB5	310.501	CKB5	53 - 95	62 - 95	49	57	53	19	0.83
EWN68-150CKB6	310.601	CKB6	100 - 203	112 - 203	64	71	67.2	22	1.7
EWN100-203CKB6	310.602	CKB6			90	71	67.2	22	2.4
EWN100-203CKB7 -87	310.701	CKB7			90	87	83.2	38	3.9
EWN100-203CKB7L -117	310.708	CKB7			90	117	113.2	68	5.4

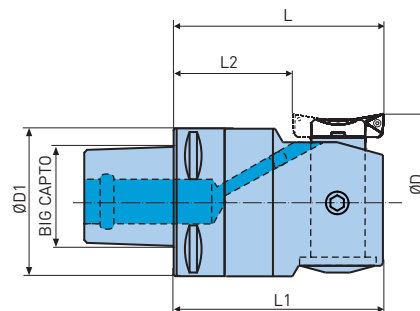
For Spare Parts ▶ 432

For Insert Holder ▶ 353 - 355



## EWN BIG CAPTO Fine Boring Heads, Ø 32 - 203

With only 5 fine boring heads, the diameter range from Ø 32-203 mm is completely covered. The boring heads can be clamped in BIG CAPTO shanks and other polygonal basic holders, or directly in BIG CAPTO machine spindles.



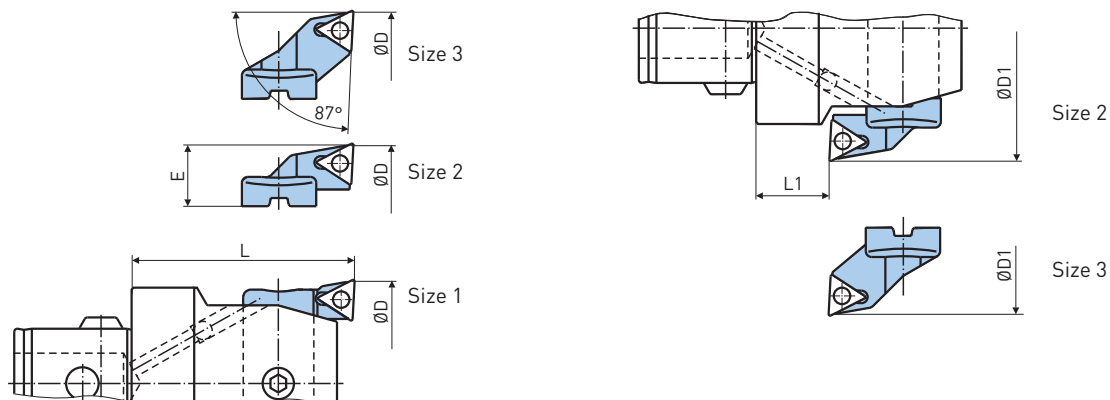
Model	Order No.	BIG CAPTO	Front Bore ØD	Back Bore ØD	ØD1	L	L1	L2	Weight (kg)
EWN32- 60C3	470.301	C3	33 - 60	46 - 60	32	55	50	25	0.3
EWN41- 74C4	470.401	C4	41 - 74	53 - 74	40	67	63	34	0.6
EWN53- 95C5	470.501	C5	53 - 95	62 - 95	50	77	73	39	1.1
EWN68- 150C6	470.601	C6	68 - 150	80 - 150	64	92	88	43	2.2
EWN100- 203C6	470.602	C6	100 - 203	112 - 203	90	92	88	43	2.9
EWN100- 203C8	470.801	C8	100 - 203	112 - 203	90	117	113	68	5.2


For Spare Parts ▶ 432

For Insert Holder ▶ 353 - 355

## Insert Holders Type E

Standard holder with 87° entering angle, suitable for fine boring in through and blind holes. Three different insert holders for the extension of the diameter range and for back boring applications.



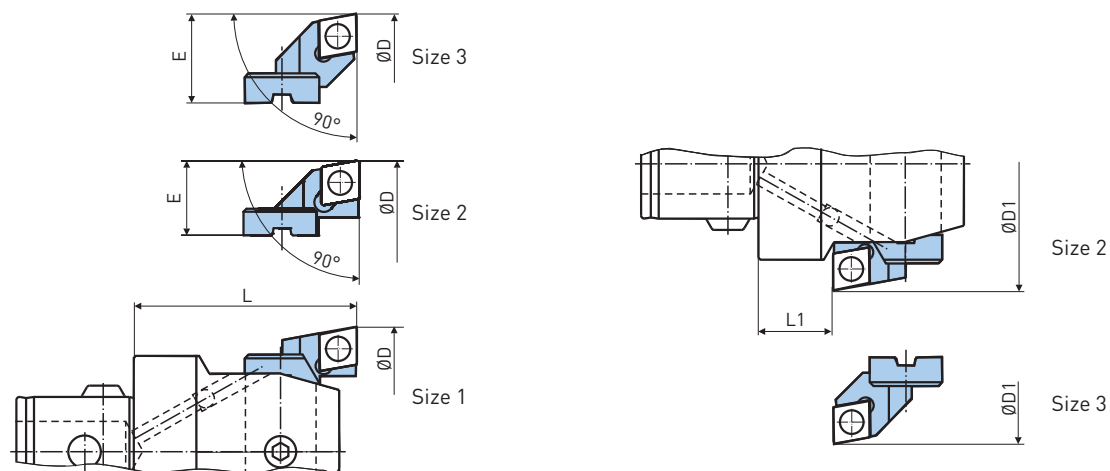
For Boring Head	Model	Order No.	Insert Holder Size	Front Bore ØD	Back Bore ØD1	E	L	L1	
EWN20	ENH1-1T	626.111	1	20 - 26		4.65	32.5	10.5	TP 07
	ENH1-2T	626.112	2	25 - 31	28 - 31	7.15			
	ENH1-3T	626.113	3	30 - 36	30 - 36	9.65			
EWN25	ENH2-1T	626.121	1	25 - 33		5.45	35.5	11.5	TP 07
	ENH2-2T	626.122	2	32 - 40	36 - 40	8.95			
	ENH2-3T	626.123	3	39 - 47	39 - 47	12.45			
EWN32	ENH3-1T	626.131	1	32 - 42		7.4	40	10	TP 07
	ENH3-2T	626.132	2	41 - 51	46 - 51	11.9			
	ENH3-3T	626.133	3	50 - 60	50 - 60	16.4			
EWE/EWN41	ENH4-1T	626.141	1	41 - 54		8.1	47	14	TP 07
	ENH4-2T	626.142	2	50 - 63	53 - 63	12.6			
	ENH4-3T	626.143	3	61 - 74	61 - 74	18.1			
EWE/EWN53	ENH5-1T	626.151	1	53 - 70	62 - 70	10	57	19	TC 11
	ENH5-2T	626.152	2	65 - 82	69 - 82	16			
	ENH5-3T	626.153	3	78 - 95	78 - 95	22.5			
EWE/EWN68	ENH6-1T	626.161	1	68 - 100	80 - 100	12.5	71	22	TC 11
	ENH6-2T	626.162	2	94 - 126	94 - 126	25.5			
	ENH6-3T	626.163	3	118 - 150	118 - 150	37.5			
EWE/EWN100	ENH6-1T	626.161	1	100 - 153	112 - 153	12.5	71 / 87 / 117	22 / 38 / 68	TC 11
	ENH6-2T	626.162	2	126 - 179	126 - 179	25.5			
	ENH6-3T	626.163	3	150 - 203	150 - 203	37.5			


For Insert ▶ 389 - 392

B.3

## Insert Holder Type C

With 90° approach angle, suitable for semi-finish and finish boring and for stepped bores. For each boring head, insert holders with different projections are available for the extension of the boring range and for back boring.



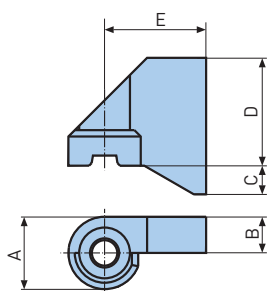
For Boring Head	Model	Order No.	Insert Holder Size	Front Bore ØD	Back Bore ØD1	E	L	L1	
EWN25	ENH 2-2C	626.322	2	33 - 41	37 - 41	9.5	35.5	11.5	CC 06
	ENH 2-3C	626.323	3	39 - 47	39 - 47	12.5			
EWN32	ENH 3-1C	626.331	1	32 - 42	-	7.4	40	10	
	ENH 3-2C	626.332	2	41 - 51	47 - 51	11.9			
	ENH 3-3C	626.333	3	50 - 60	50 - 60	16.4			
EWE/EWN41	ENH 4-1C	626.341	1	41 - 54	-	8.1	47	14	
	ENH 4-2C	626.342	2	50 - 63	54 - 63	12.6			
	ENH 4-3C	626.343	3	61 - 74	61 - 74	18.1			
EWE/EWN53	ENH 5-1C	626.351	1	53 - 70	62 - 70	10	57	19	
	ENH 5-2C	626.352	2	62 - 79	67 - 79	14.5			
	ENH 5-3C	626.353	3	78 - 95	78 - 95	22.5			
EWE/EWN68	ENH 6-1C	626.361	1	68 - 100	80 - 100	12.5	71	22	CC 09
	ENH 6-2C	626.362	2	78 - 110	82 - 110	17.5			
	ENH 6-3C	626.363	3	108 - 140	108 - 140	32.5			
EWE/EWN100	ENH 6-1C	626.361	1	100 - 153	112 - 153	12.5	71 / 87 / 117	22 / 38 / 68	
	ENH 6-2C	626.362	2	110 - 163	110 - 163	17.5			
	ENH 6-3C	626.363	3	140 - 193	140 - 193	32.5			

For Insert ► 393 - 394

B.3

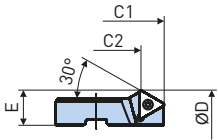
## Blank Insert Holder Type ENH


If required, the blanks can be hardened. (Mat. 1.2343)



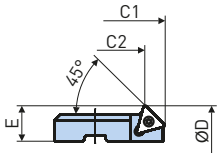
For Boring Head	Model	Order No.	A	B	C	D	E
EWN20	ENH1-B	626.901	8.4	4.2	2.61	11	11.8
EWN25	ENH2-B	626.902	10.4	5.2	3.16	10	17.2
EWN32	ENH3-B	626.903	11.4	5.7	4.5	17	16
EWN41	ENH4-B	626.904	15.4	7.7	5	20	20
EWN53	ENH5-B	626.905	19	9.5		25	20
EWN68/100	ENH6-B	626.906	29	14.5		40	26
		626.916					50


### Insert Holders 30°



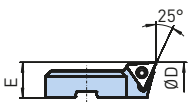
For Boring Head	Model	Order No.	ØD	E	C1	C2	
EWN25	ENH2-1T30	626.422	28 - 36	6.95	35.5	29.8	TC 11
EWN32	ENH3-1T30	626.432	36 - 46	9.4	42	33.3	
EWN41	ENH4-1T30	626.442	45 - 58	10.1	49	40.3	
EWN/EWE53	ENH5-1T30	626.452	56 - 73	11.5	57	48.4	
EWN/EWE68	ENH6-1T30	626.462	68 - 100	12.5	71	62.3	
EWN/EWE100	ENH6-1T30	626.462	100 - 153	12.5	87	78.3	


### Insert Holders 45°



For Boring Head	Model	Order No.	ØD	E	C1	C2	
EWN25	ENH2-1T45	626.423	28 - 36	6.95	35.5	30.8	TC 11
EWN32	ENH3-1T45	626.433	36 - 46	9.4	42	34.8	
EWN41	ENH4-1T45	626.443	45 - 58	10.1	49	41.8	
EWN/EWE53	ENH5-1T45	626.453	56 - 73	11.5	57	49.8	
EWN/EWE68	ENH6-1T45	626.463	68 - 100	12.5	71	63.8	
EWN/EWE100	ENH6-1T45	626.463	100 - 153	12.5	87	79.8	

### Insert Holders 25°



For Boring Head	Model	Order No.	ØD	E	
EWN32	ENH3-1T25	689.197	32 - 42	7.4	TC 11
EWN41	ENH4-1T25	689.198	41 - 54	8.1	
EWN/EWE53	ENH5-1T25	689.001	53 - 70	10	
EWN/EWE68	ENH6-1T25	689.007	68 - 100	12.5	
EWN/EWE100	ENH6-1T25	689.007	100 - 153	12.5	

For Insert ▶ 389 - 392

### Back Boring Instructions

For back boring, it is required to enter into the bore off centre, with a tool adjusted to the back bore diameter. In this respect, the back bore diameter «ØD» as well as the diameters of the entry bore «C» and the tool body «ØD1», are related to each other. In order to check the feasibility of the back boring operation and to select the best possible tool combination, these values can be calculated as follows:

**Example:**

Calculation of the minimum entry bore diameter «C».

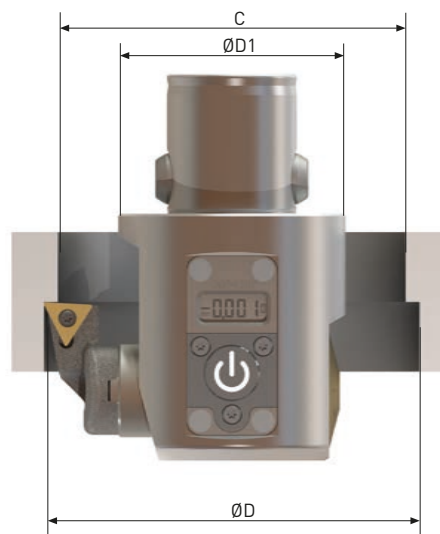
**Given:**

- Back bore diameter ØD = 93mm
- Tool combination EWN53, with Insert holder no. 3, ØD1 = 50 mm

$$C = \frac{\text{ØD} + \text{ØD1}}{2} = \frac{93 + 50}{2} = 71.5 \text{ mm}$$

**Caution:**

- Counter clockwise spindle rotation is required for back boring operations.
- The cutting edge is at a shorter length than the boring head. Consider total length of tool. Check the space at the back side of the work piece.



Min. entry bore diameter «C»

$$C = \frac{\text{ØD} + \text{ØD1}}{2}$$

Max. back bore diameter «ØD»

$$\text{ØD} = 2C - \text{ØD1}$$

Max. tool body diameter «ØD1»

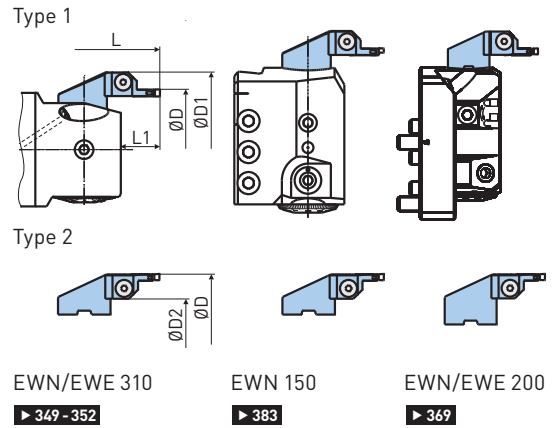
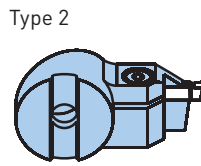
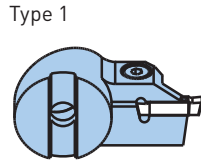
$$\text{ØD1} = 2C - \text{ØD}$$

## Face Grooving with EWN/EWE, Ø 53 - 3040

The insert holders and inserts are made for face grooving with the fine boring heads EWN and EWE Series 310 and with the large diameter boring tools Series 317 und 318.



### Insert Holders



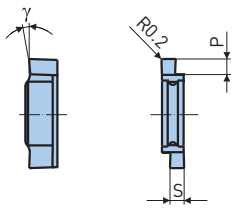
B.3

For Boring Head	Insert holder									
	Type 1				Type 2				L *	L1
	ØD	ØD1	Model	Order No.	ØD	ØD2	Model	Order No.		
EWN/EWE53 (310.501)/(310.850)	53 - 70	ØD + 22	ENH5-1FG4	626.935	73 - 90	ØD - 30	ENH5-1FG4R	626.945	73	20
EWN/EWE68 (310.601)/(310.860)	68 - 100	ØD + 24	ENH6-1FG4	626.936	88 - 120	ØD - 28	ENH6-2FG4R	626.946	88	21
	94 - 126		ENH6-2FG4	626.937	114 - 146		ENH6-3FG4R	626.947		
EWN/EWE100 (310.602)/(310.865)	100 - 153	ØD + 24	ENH6-1FG4	626.936	120 - 173	ØD - 28	ENH6-2FG4R	626.946	88	21
	126 - 179		ENH6-2FG4	626.937	146 - 199		ENH6-3FG4R	626.947		
EWN/EWE100 (310.701)/(310.870)	100 - 153	ØD + 24	ENH6-1FG4	626.936	120 - 173	ØD - 28	ENH6-2FG4R	626.946	104	21
	126 - 179		ENH6-2FG4	626.937	146 - 199		ENH6-3FG4R	626.947		
EWN100L (310.708)	100 - 153	ØD + 24	ENH6-1FG4	626.936	120 - 173	ØD - 28	ENH6-2FG4R	626.946	134	21
	126 - 179		ENH6-2FG4	626.937	146 - 199		ENH6-3FG4R	626.947		
EWN150 (317.102A)	200 - 613	ØD + 24	ENH6-1FG4	626.936	220 - 633	ØD - 28	ENH6-2FG4R	626.946	134	21
	226 - 639		ENH6-2FG4	626.937	246 - 659		ENH6-3FG4R	626.947		
EWN/EWE200 (318.101)/(318.104)	200 - 3000	ØD + 21	ENH7-1FG4	626.938	220 - 3040	ØD - 28	ENH7-2FG4R	626.948	134	21

1. \* Tool length to the CK connection

For Spare Parts ▶ 439

### Inserts

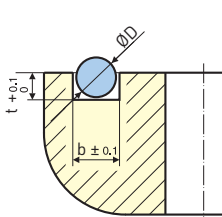


Inserts for Steel and Cast Iron			
S	P	γ	Order No.
2.5	2.7	5°	958.425
3.0	3.3	5°	958.430
3.3	3.6	5°	958.433
3.5	3.8	5°	958.435
4.0	4.3	5°	958.440

Inserts for Aluminium			
S	P	γ	Order No.
2.5	2.7	15°	958.475
3.0	3.3	15°	958.480
3.3	3.6	15°	958.483
3.5	3.8	15°	958.485
4.0	4.3	15°	958.490

### Groove Dimensions

Recommended groove dimensions for given cross section diameters of O-rings, for static sealing.

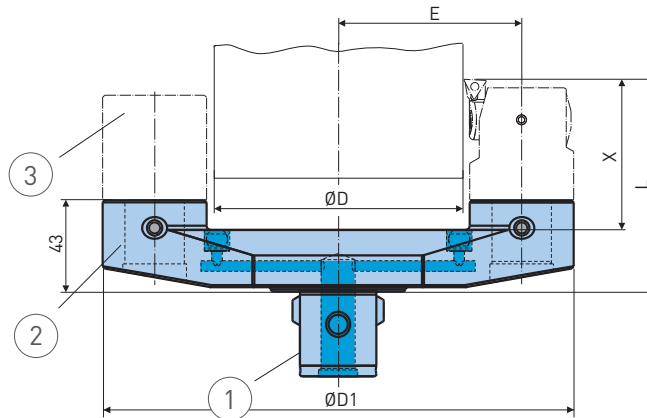


ØD	Groove Width b	Groove Depth t
1.78	2.5	1.3
2.0	2.5	1.6
2.5	3.3	1.9
2.62	3.5	2.05
3.0	4.0	2.4

Work Piece Material	Vc m/min	fn mm/rev
Construction- heat treatable steels	120 - 200	0.01 - 0.03
Stainless steels	60 - 120	0.01 - 0.02
Cast iron	80 - 160	0.02 - 0.04
Aluminium	200 - 400	0.02 - 0.04
Non-ferrous metals		

## OD Turning with EWN/EWE/SW, Ø 16 - 120

This program consists of tool holders with CKB5 and CKB6 connectors, made for different turning ranges and with tool connections in the sizes CKB3, CKB4 and CKB5. The corresponding precision finish or rough boring heads and counterweights can be mounted on the tool holder either directly or by means of an extension. With this program, outer diameters in the range from Ø 16 -120 mm can be machined.



**Attention: Counter-clockwise rotation of spindle! Vc max 450 m/min**

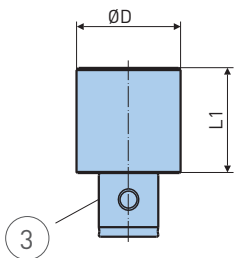
ØD	Model	Order No.	Tool Holder						Weight (kg)
			① CK	② CK	ØD1	E	L *	X *	
16 - 44	OD16-44CKB5-CKB3	335.906	CKB5	CKB3	107	38	83 (113) (128)	51 (81) (96)	2.7
16 - 44	OD16-44CKB6-CKB3	335.905	CKB6	CKB3	107	38	83 (113) (128)	51 (81) (96)	1.5
34 - 67	OD34-67CKB6-CKB4	335.904	CKB6	CKB4	147	54	90 (130) (150)	58 (98) (118)	1.8
57 - 90	OD57-90CKB6-CKB4	335.903	CKB6	CKB4	170	65.5	90 (130) (150)	58 (98) (118)	2.1
78 - 120	OD78-120CKB6-CKB5	335.902	CKB6	CKB5	222	86.5	100 (160) (190)	68 (128) (158)	2.8

1. \* The numbers in brackets indicate the tool length (L) and the max. pin length (X) with the use of the corresponding extensions.

For Extension ▶ 197

### Counter Weight for OD Turning

B.3



Model	Order No.	Counter Weight			Weight (kg)
		③ CK	ØD	L1	
CW-CK3	335.915	CK3	31.3	35	0.20
CW-CK4	335.913	CK4	39	36.4	0.40
CW-CK5	335.912	CK5	49	49.5	0.85

For EWE ▶ 349

For EWN ▶ 351

For SW ▶ 297

### Selection of the Insert Holder

Fine Boring

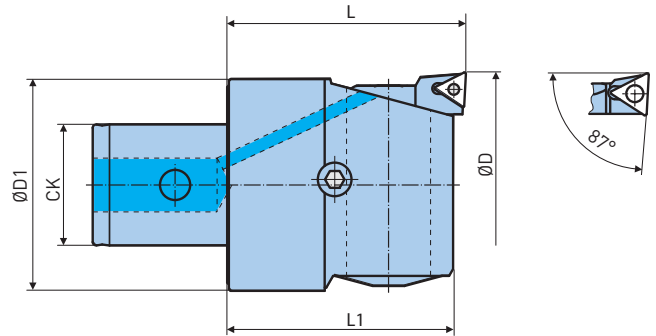
Rough Boring

ØD	Tool Holder	For Boring Head	Range ØD Insert Holder Order No.		
16 - 44	335.905	EWN32	16 - 26	25 - 35	34 - 44
16 - 44	335.906	EWN32	16 - 26	25 - 35	34 - 44
		310.301	626.133	626.132	626.131
34 - 67	335.904	EWE/EWN41	34 - 47	45 - 58	54 - 67
57 - 90	335.903	EWE/EWN41	57 - 70	68 - 81	77 - 90
		310.840/310.401	626.143	626.142	626.141
78 - 120	335.902	EWE/EWN53	78 - 95	91 - 108	103 - 120
		310.850/310.501	626.153	626.152	626.151

ØD	Tool Holder	For Boring Head	Range ØD Insert Holder Order No.	
25 - 44	335.905	SW32	25 - 35	34 - 44
25 - 44	335.906	SW32	25 - 35	34 - 44
		319.301	639.437	639.433
42 - 67	335.904	SW41	42 - 55	54 - 67
65 - 90	335.903	SW41	65 - 78	77 - 90
		319.401	639.447	639.443
87 - 120	335.902	SW53	87 - 104	103 - 120
		319.501	639.457	639.453

## EWB Balanced Fine Boring Head, Ø 32 - 105

Even at max. speeds balanced tools guarantee vibration-free boring, resulting in increased productivity and highest precision.



Model	Order No.	CK	ØD	ØD1	L	L1	Weight (kg)	
EWB32-42CK3	310.305A	CK3	32 - 42	30	40	37	0.22	TP 07
EWB41-54CK4	310.405A	CK4	41 - 54	38	47	43	0.41	TC 11
EWB53-70CK5	310.505A	CK5	53 - 70	49	57	53	0.81	
EWB68-88CK6	310.605A	CK6	68 - 88	63	71	67.2	1.7	
EWB85-105CK6	310.606A	CK6	85 - 105	63	71	67.2	1.7	

1. EWB boring heads will be delivered with assembled insert holder.

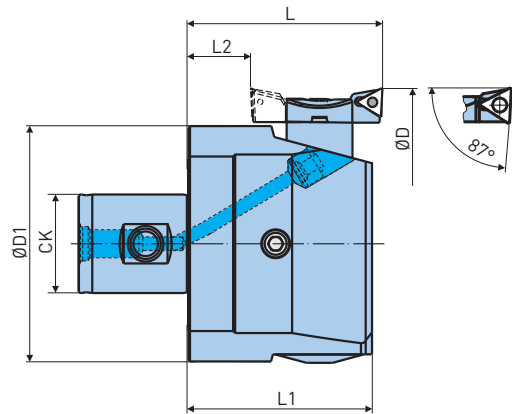
For Spare Parts ▶ 432

For Insert ▶ 389 - 392

B.3

## EWB-AL Balanced Fine Boring Head, Ø 100 - 203

The fine boring heads EWB-AL are made of high strength aluminium with hard coating. Together with reductions and extensions made in the same way, the weight for long and large diameter tool combinations is reduced by more than 50%.



Model	Order No.	CK	Front Bore ØD	Back Bore ØD	ØD1	L	L2	L1	Weight (kg)	
EWB100-153CK6AL	310.607A	CK6	100 - 153	112 - 153	90	71	25	67	0.6	TC 11
EWB150-203CK6AL	310.608A		150 - 203	150 - 203	126	71	25	67	0.8	
EWB100-153CK7AL	310.705A	CK7	100 - 153	112 - 153	90	87	41	83	0.9	
EWB150-203CK7AL	310.706A		150 - 203	150 - 203	126	87	41	83	1.2	

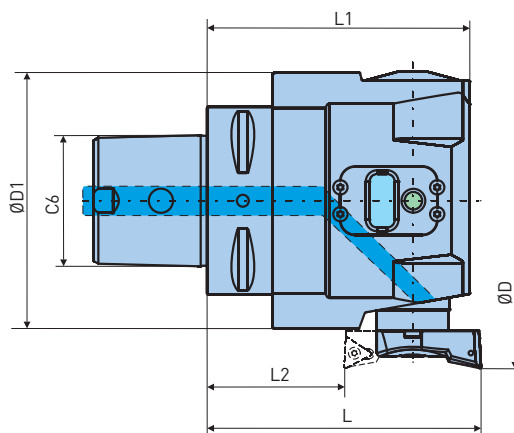
1. EWB-AL boring heads will be delivered with assembled insert holder.

For Spare Parts ▶ 432

For Insert ▶ 390 - 392

## EWBD BIG CAPTO Digital and Balanced Fine Boring Heads, Ø 68 - 153

The fine boring heads EWBD combine the most advanced technologies in one spectacular tool: digital and self-balanced. In addition the ultra-light fine boring head EWBD 100 AL is the worlds first tool with BIG CAPTO shank, completely made of aluminium.



Model	Order No.	BIG CAPTO	Front ØD	Back ØD	Material	ØD1	L	L2	L1	Weight (kg)	
EWBD68-102C6	470.606	C6	68 - 102	80 - 102	Steel	64	92	46	88	2.1	TC 11
EWBD100-153C6AL	470.609	C6	100 - 153	112 - 153	Aluminium	90	92	46	88	1.4	

1. EWBD boring heads will be delivered with assembled insert holder.

For Spare Parts ▶ 432

For Insert ▶ 390-392

### Other execution

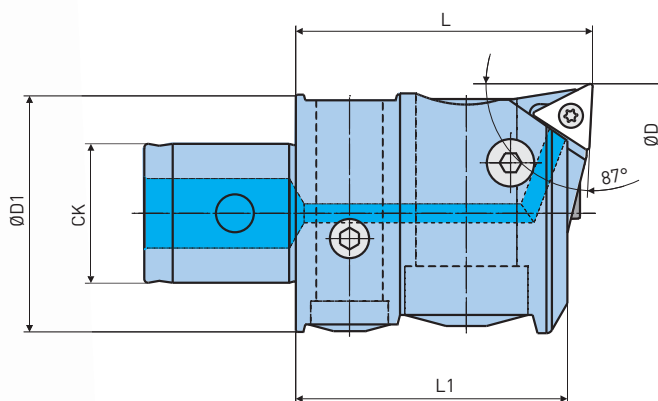
EWBD68-102C6 (Steel)  
470.606






## EWB-UP Balanceable Fine Boring Head, Ø 25 - 100

The ultra-precise EWB-UP series sets higher standards for boring heads concerning adjustment accuracy and balance quality. Cutting speed up to  $V_c \text{ max.} = 2000 \text{ m/min.}$



Model	Order No.	CK	ØD	ØD1	L	L1	Max. Imbalance [gmm]	Weight (kg)	
EWB25-33UP-CK2	309.201	CK2	25 - 33	23.4	35.5	32.5	3	0.12	TP 07
EWB32-42UP-CK3	309.301	CK3	32 - 42	30	40	37	5	0.22	TC 11
EWB41-54UP-CK4	309.401	CK4	41 - 54	38	47	43	5	0.40	
EWB53-70UP-CK5	309.501	CK5	53 - 70	49	57	53	10	0.85	
EWB68-100UP-CK6	309.601	CK6	68 - 100	64	71	67.2	30	1.8	

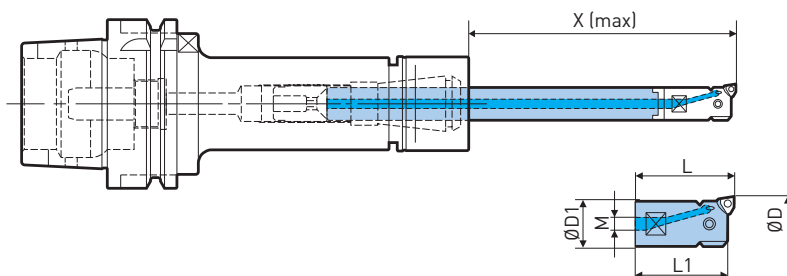
1. EWB-UP boring heads will be delivered with assembled insert holder.

For Spare Parts ▶ 433

For Insert ▶ 389 - 392

## EW Fine Boring Heads, Ø 15 - 22

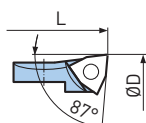
These heads are designed to be used in combination with the steel or carbide-boring bars Ø 14 and Ø 16 mm out of the accessory program. In conjunction with the long carbide bar, the tool is well suited for vibration-free finishing operations in bores with unfavorable Ø/L-ratios.




Model	Order No.	ØD	ØD1	L	M	L1	Weight (kg)
EW15M6	310.020	15 - 18.5	14	30	M6	27.5	0.03
EW18M10	310.030	18 - 22	16	36	M10	33	0.05

For Spare Parts ▶ 433

### Insert Holders

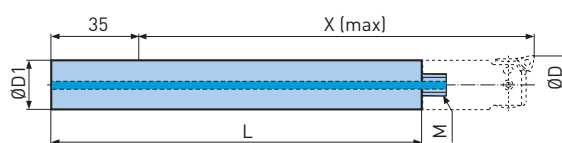


For Boring Head	Model	Order No.	ØD	L	
EW15	15EKWC02	625.020	15 - 18.5	30	WC 02
EW18		625.020	18 - 22	36	

For Insert ▶ 388

B.3

### Boring Bars

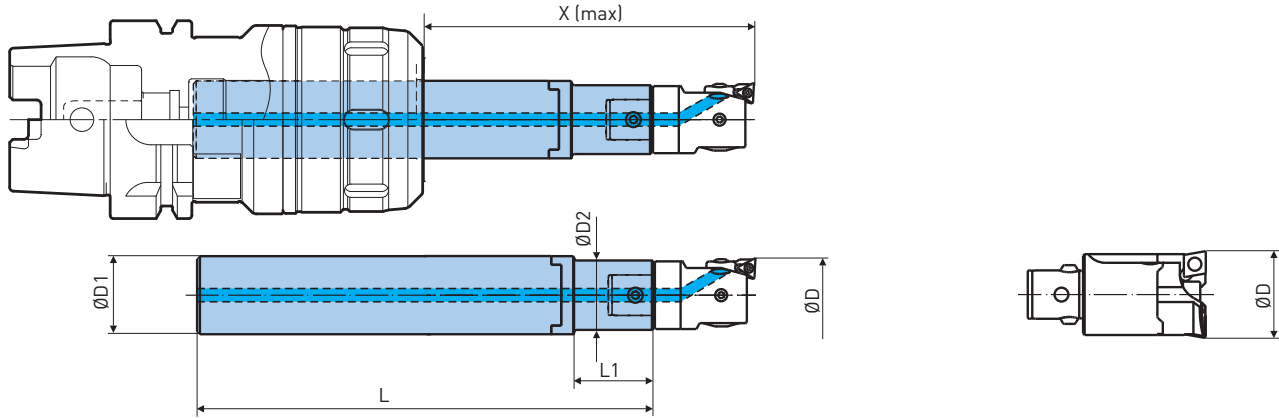


For Boring Head		Model	Order No.	Boring Bar				Weight (kg)
Type	ØD			ØD1	M	L	X (max)	
EW15	15 - 18.5	ST14-87	615.232	14	M6	87	82	0.09
		ST14-117HM	615.233			117	112	0.25
		ST14-147HM	615.221			147	142	0.30
EW18	18 - 22	ST16-88	615.226	16	M10	88	89	0.12
		ST16-108HM	615.227			108	109	0.26
		ST16-168HM	615.229			168	169	0.40

## Carbide Bars

Due to maximum rigidity, a carbide bar, optimized in length and with the biggest possible diameter, guarantees the best result when machining deep bores.

For the work range from  $\varnothing 20 - 33$  [47] mm, the fine graduated carbide bar program contains bars with 6 different diameters and 3 different lengths per diameter. Therefore, for every deep bore machining in this range, the optimal carbide bar is always available. The program is completed with carbide bars  $\varnothing 31$  and  $\varnothing 40$  mm in 3 different lengths each, for the boring range from  $\varnothing 32 - 54$  [74] mm. Carbide bars  $\varnothing 40$  mm are also available for rent.



For Boring Heads	Model	Order No.	CK	Boring Range $\varnothing D$	$\varnothing D1$	$\varnothing D2$	L	L1	X max.	Weight (kg)	
SW20, EWN20	ST19-CKB1-140HM	335.320	CKB1	20 - 26 [31/36]	19	19	140	-	98	0.47	
	ST19-CKB1-190HM	335.321					190		148	0.74	
	ST19-CKB1-240HM	335.322					240		198	0.95	
	SW25, EWN25	ST21-CKB1-140HM	335.380	CKB1	20 - 26 [31/36]	21	19	140	26	98	0.57
		ST21-CKB1-190HM	335.381					190		148	0.81
		ST21-CKB1-240HM	335.382					240		198	1.0
		ST23-CKB1-140HM	335.383					CKB1		20 - 26 [31/36]	23
	ST23-CKB1-190HM	335.384	190	148	0.97						
ST23-CKB1-240HM	335.385	240	198	1.3							
SW32, EWN32	ST24-CKB2-160HM	335.323	CKB2	25 - 33 [40/47]	24	24	160	-	121	0.86	
	ST24-CKB2-220HM	335.324					220		181	1.1	
	ST24-CKB2-290HM	335.325					290		251	1.8	
	ST27-CKB2-160HM	335.386					160		121	1.1	
	ST27-CKB2-220HM	335.387			220	181	1.5				
	ST27-CKB2-290HM	335.388			290	251	2.1				
	ST29-CKB2-160HM	335.389			29	24	160	28	121	1.2	
	ST29-CKB2-220HM	335.390					220		181	1.8	
ST29-CKB2-290HM	335.391	290	251	2.4							
SW41, EWN41, EWE41	ST31-CKB3-200HM	335.326	CKB3	32 - 42 [51/60]	31	31	200	-	168	1.8	
	ST31-CKB3-260HM	335.331					260		228	2.5	
	ST31-CKB3-350HM	335.327					350		318	3.7	
SW41, EWN41, EWE41	ST40-CKB4-235HM	335.328	CKB4	41 - 54 [66/74]	40	40	235	-	207	3.7	
	ST40-CKB4-335HM	335.329					335		307	5.4	
	ST40-CKB4-435HM	335.330					435		407	7.2	

For Spare Parts ▶ 418

Hydraulic Chuck

Hi Power Milling Chuck



To clamp BIG KAISER carbide bars with shank diameter  $\varnothing 19, 24, 31$  and  $40$ , milling chuck are highly recommended.

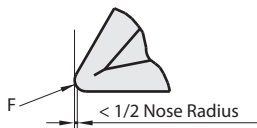
## Guidelines

### Major Influences of Fine Boring

- The amount of stock to be removed (D.O.C.)
- Feed rate
- Cutting speed

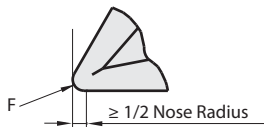
For all of these influences, a balance must be obtained for optimal machining. Too much stock or too heavy of a feed rate will generate excessive cutting forces that can result in inconsistent bore size. When stock or feed rates are too light, the possibility of chatter increases due to deflection.

#### D.O.C



#### High Possibility for Deflection & Chatter:

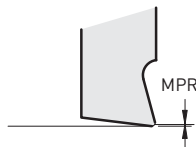
When D.O.C. is less than half the insert nose radius, the resulting forces (F) are almost 100% radial.



#### Good Stable Cut:

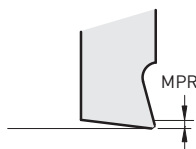
When D.O.C. is greater than or equal to half the insert nose radius, the resulting forces (F) are almost 100% axial.

#### Feed Rate



#### High Possibility for Deflection & Chatter:

When the feed rate is less than the hone on the insert tip, the risk of vibration increases.



#### Good Stable Cut:

When the feed rate is larger than the hone on the insert tip, full use of the chip breaker is allowed. This results in lower cutting forces.

B.3

## Cutting Speed

### Higher Speeds:

- Better surface finish
- Shorter machining times
- Better chip evacuation

As a general rule, the tool's length/diameter ratio and insert radius will determine optimum cutting speed.

\*For smaller diameter bores, carbide or heavy metal bars may be required to eliminate vibration & chatter

### Lower Speeds:

- Poorer surface finish
- Low chance for chatter
- Longer machining times
- High chance for built-up edge, results in shorter insert life

L/D Ratio	Max. Insert Radius	Speed Reduction
≤4:1	0.8	100% of optimum
≤5:1	0.4	75% of optimum
≤6:1	0.2	60% of optimum
≥7:1	0.2	50% of optimum

## Troubleshooting

Under certain conditions, it may be necessary to modify or adapt recommended cutting data and/or tooling configurations of the application. Below are general solutions to common problems.

Problem	Possible Cause	Remedy
Poor Tool Life	Wrong insert grade	Change to higher wear resistant grade
	Excessive speed	Reduce Vc
	Poor cooling of insert	Apply through-tool coolant
	Excessive stock allowance	Decrease depth of cut
Chatter & Vibration	Excessive speed	Reduce Vc, check cutting data tables
	Extreme length/diameter ratio	Shorten tool to increase stiffness
		Increase boring bar diameter to larger size
		Change boring bar to carbide or heavy metal
Wrong insert	Reduce nose radius of insert Use ground geometry inserts	
Incorrect stock allowance	Check cutting data tables	
Poor Size Repeatability	Inaccurate tool changes	Worn and/or damaged tool shank; replace Clean spindle and tool shank
	Variation of stock allowance	Semi-finish with rough insert boring head
	Excessive spindle looseness	Use ground geometry inserts
Unacceptable Roundness	Excessive boring tool imbalance	Change to auto-balance or balanceable head
		Balance tool assembly
		Reduce speed
	Excessive cutting forces	Check stock allowance and feed rate
	Insufficient workpiece clamping	Check for uniform workpiece clamping
Workpiece non-symmetrical	Reduce cutting forces; change to ground insert	
	Increase cutting speed, reduce feed	
Unacceptable Position	Original bore off position	Semi-finish with rough insert boring head
	Excessive stock allowance	Decrease depth of cut
		Decrease insert radius
	Reduce cutting forces; change to ground insert	
Poor Surface Finish	Wrong insert radius	Use larger insert radius
	Excessive feed rate	Reduce feed; maximum 25% of insert radius
	Poor chip evacuation	Increase bore to boring bar clearances
		Apply through-tool coolant; adjust nozzles
		Change insert to higher rake angle
	Check depth of cut	
Taper	Premature insert wear	Change to higher wear resistance insert grade
		Increase insert radius
		Change from ground to pressed geometry insert
		Increase coolant flow

## Large Diameter Boring Tools

<b>SERIES 318</b>	
<b>Overview</b>	<b>366</b>
<b>Components Ø 200 - 620</b>	<b>367 - 369</b>
<b>Rough Boring Component Selection</b>	<b>370</b>
<b>Fine Boring Component Selection</b>	<b>371</b>
<b>Accessories</b>	<b>372 - 373</b>
<b>Components Ø 620 - 3000</b>	<b>374</b>
<b>Rough and Fine Boring Component Selection Guide</b>	<b>375</b>
<b>Accessories</b>	<b>376 - 378</b>
<b>SERIES 317</b>	
<b>Components Ø 200 - 620</b>	<b>379 - 380</b>
<b>Rough Boring Component Selection</b>	<b>381 - 382</b>
<b>Fine Boring Component Selection</b>	<b>383</b>

### Large Diameter Boring Tools Series 318

The system is based on aluminum extension slides of different lengths, which support a variety of aluminum and steel components for roughing and finishing tool assemblies. The mounting components are pinned to fit onto specific locations on the slides, and secured with steel bolts. The precise positioning of the components on the slide along with incremental adjustment scales for insert holders permit diameter and length setting without a tool presetter.

#### Series 318 with Flange Only

Execution with flange only. Especially built to fit on machine tools with 40 taper spindle. For rough and fine boring, OD turning, chamfering and face grooving.

Ø 200 - 320 mm, CKB6/CKN6

▶ 367

#### Series 318 with Flange and Extension Slide

Edition with flange and extension slides. For rough and fine boring, OD turning, chamfering and face grooving.

Ø 200 - 620 mm, CKB7/CKN7

▶ 367

#### Series 318 with Bridge and Extension Slides

Edition with shanks, large bridges and extension slides. For rough and fine boring, OD turning and face grooving.

Ø 620 - 3000 mm, DV50/BT50/HSK-A100

▶ 374

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Series 318 with Flange Only, Ø 200 - 340



Series 318 with Flange and Extension Slide, Ø 200 - 620





## Flanges

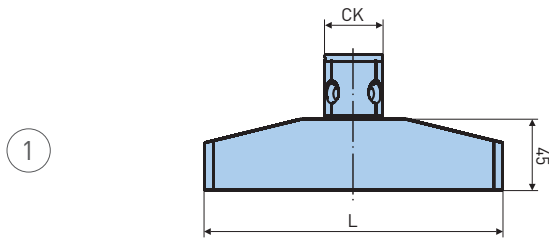


Fig. 1

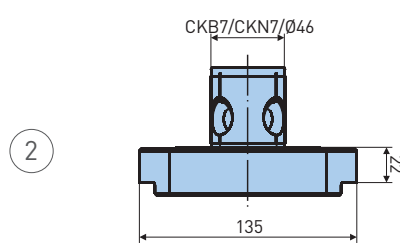


Fig. 2

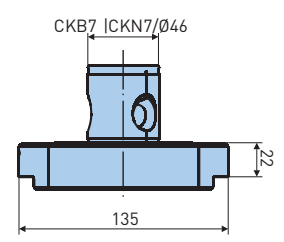


Fig. 3

Standard execution

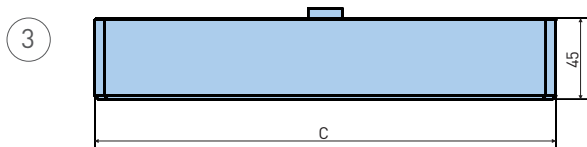
Flange with cutter position rotated 90°

Model	Order No.	Fig.	ØD	CK	L	Weight (kg)
CKN6-FL200-270	318.205N	1	200 - 270	CKN6	185	1.83
CKB6-FL200-270	318.205	1	200 - 270	CKB6		1.83
CKN6-FL270-340	318.206N	1	270 - 340	CKN6	255	2.32
CKB6-FL270-340	318.206	1	270 - 340	CKB6		2.32

Model	Order No.	Fig.	CK	Weight (kg)
CKN7-FL135	318.201N	2	CKN7	2.80
CKB7-FL135	318.201		CKB7	2.75
CKN7-FL135-90	318.202N	3	CKN7	2.73
CKB7-FL135-90	318.202		CKB7	2.73

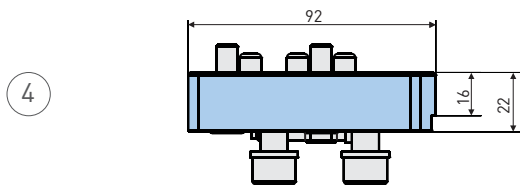
## Extension Slides



Model	Order No.	C	ØD	Max. Speed (min <sup>-1</sup> )	Weight (kg)
SLN200-270AL	318.222	185	200 - 270	3 200	1.50
SLN270-340AL	318.223	255	270 - 340	2 400	2.04
SLN340-410AL	318.224	325	340 - 410	1 900	2.62
SLN410-480AL	318.225	395	410 - 480	1 600	3.21
SLN480-550AL	318.226	465	480 - 550	1 300	3.90
SLN550-620AL	318.227	535	550 - 620	1 200	4.40

B.4

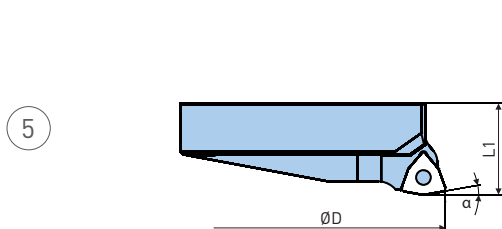
## Clamp Bases



Model	Order No.	Weight (kg)
CB200	318.240	1.50

1. Clamp bases are sold in pairs.

## Insert Holders



Model	Order No.	ØD	L1	Angle α	Insert	Weight (kg)
IHTW200C	637.940	200 - 620	34	0°	CC 12	0.71
IHTW200C16	637.941		34	0°	CC 16	0.71
IHTW200S	637.942		34	6°	SC 12	0.75
IHTW200W	637.943		34	10°	WC 08	0.7
IHTW200C-DVS*	637.951		34.4	0°	CC 12	0.35
IHTW200C16-DVS*	637.953		34.4	0°	CC 16	0.35

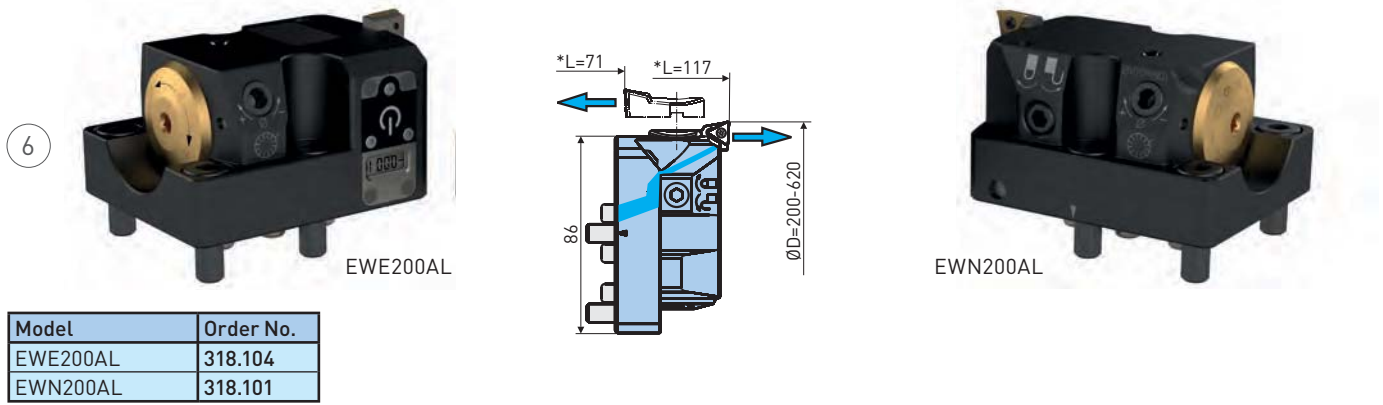
1. Insert holders is composed of 2pcs of holders.

\* DVS Insert holder are delivered individually.

For Insert ▶ 395 - 405

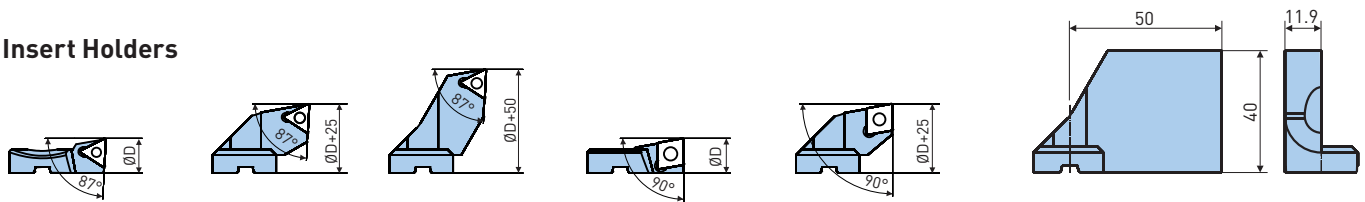
For Spare Parts ▶ 434

## EWN/EWE Fine Boring Heads, Ø 200 - 3000



Model	Order No.
EWE200AL	318.104
EWN200AL	318.101

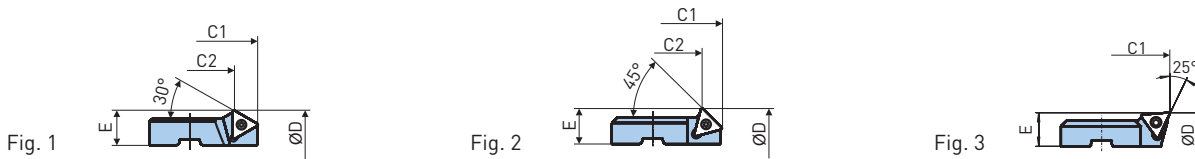
### Insert Holders



Order No.	626.271	626.272	626.273	626.371	626.372	626.917
Model	ENH7-1T	ENH7-2T	ENH7-3T	ENH7-1C	ENH7-2C	ENH7-BLANK L
Type	TC 11			CC 09		Blank

### Insert Holders for Chamfering and Undercuts

For Insert ▶ 390 - 394



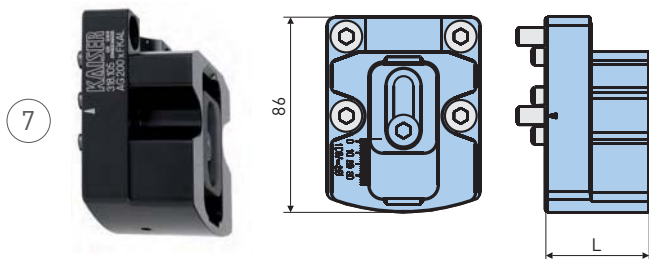
Model	Order No.	Fig.	Type	C1	C2	E	
EW7-1T30	626.472	1	30°	117	108.3	12.5	TC 11
EW7-1T45	626.473	2	45°		109.8		
EW7-1T25	689.189	3	25°		-		

Min. diameter for back boring / back chamfering = ØD min. (of the respective boring range) + 12 mm.  
 Example for the lowest range: Min. diameter = 200 + 12 = 212 mm

For Insert ▶ 390 - 392

### Counter Weights

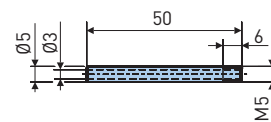
There are two different counter weights available. Type 1 is made of steel and is used for coarse balancing. Type 2 is made of aluminum and contains a slide with a graduated scale for fine balancing of the tool assembly.



Model	Order No.	L	Material
CW200AL	318.105	46	Aluminium
CW200	318.107	22.5	Steel

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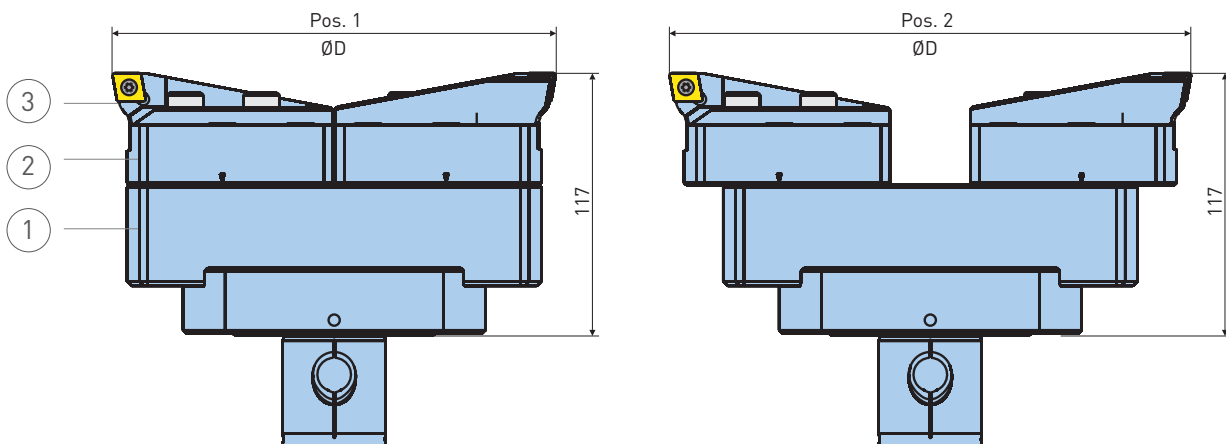
### Coolant Pipe



Model	Order No.
CP-DM5-50-M5	692.415

## Rough Boring Component Selection

The table below determines the components such as extension slide (1), clamp bases (2) and insert holders (3) for each diameter range (ØD) and shows in which position (1 or 2) the clamp bases (2) have to be mounted on the extension slide (1). Further, this table also serves for the coarse diameter setting of the cutting edges by means of the scale on the clamp base (2) and the marking on the insert holder (3). The required scale value is calculated by the difference between bore diameter and correction value (α). The insert holder has to be adjusted to the scale value. See example below.



Range ØD	Extension Slide	Fixed Position/Range		Clamp Bases	Insert Holders	Correction α		Max. Speed
	①	Pos. 1/ØD	Pos. 2/ØD	②	③	Pos. 1	Pos. 2	
200 - 270	318.205N	199 - 236	234 - 271	318.240	See page 368	200	-	3 200
	318.222					-	235	
270 - 340	318.206N	269 - 306	304 - 341			270	-	2 400
	318.223					-	305	
340 - 410	318.224	339 - 376	374 - 411			340	-	1 900
						-	-	
410 - 480	318.225	409 - 446	444 - 481			410	-	1 600
						-	-	
480 - 550	318.226	479 - 516	514 - 551			480	-	1 300
						-	-	
550 - 620	318.227	549 - 586	584 - 621			550	-	1 200
						-	-	

B.4

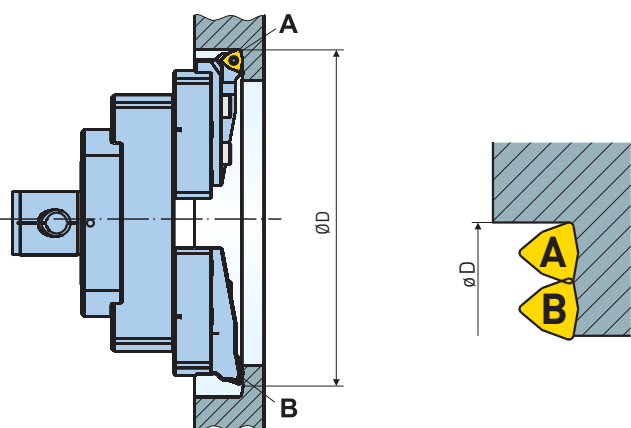
For Spare Parts ► 434

### Example: Diameter setting according to scale

ØD: 430                      Position: 1                      Scale value:  $ØD - \alpha = 430 - 410 = 20$   
 Extension slide: 318.225                      Correction value α: 410

## Full Profile Roughing

Full profile roughing permits boring with large stock allowance (up to 60 mm in diameter) in a single operation with relatively low drive power. Set cutting edge A to the final bore diameter, and cutting edge B according to the machining allowance, as listed in the table above.



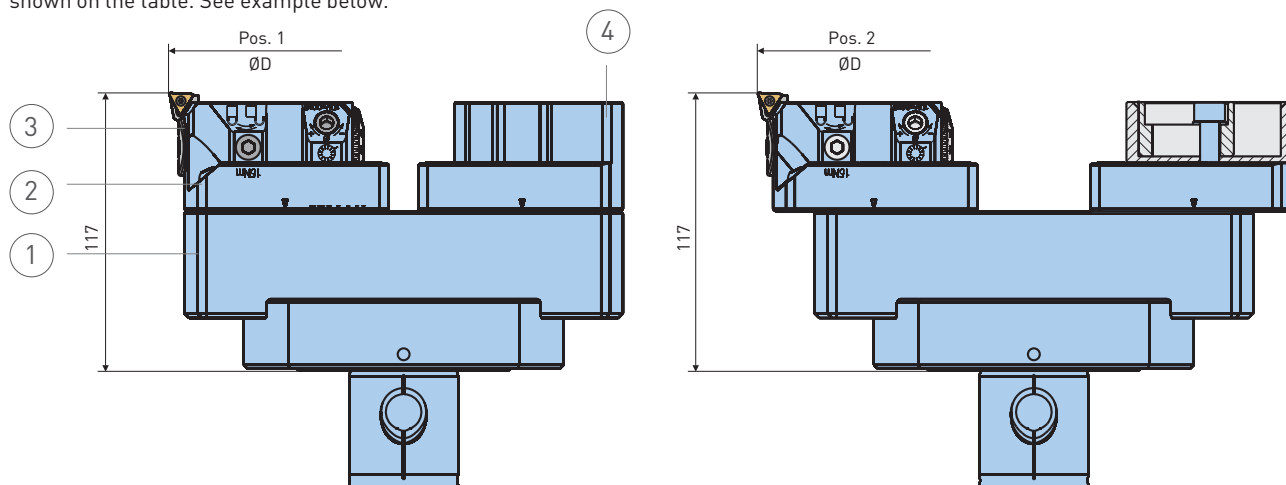
Stock Allowance [mm Ø]	Cutting Edge A [mm Ø]	Cutting Edge B [mm Ø]
22 - 29.9	ØD	D - 2
30 - 35.9		D - 6
36 - 41.9		D - 12
42 - 47.9		D - 18
48 - 53.9		D - 24
54 - 60		D - 30

Cutting Data Vc [m/min]	fn [mm/rev]
100 - 180	0.1 - 0.2

## Fine Boring Component Selection

The table below determines the components such as extension slide (1), boring head (2), insert holder (3) and counter weight (4) for each diameter range and shows in which position the boring head and the counter weight have to be mounted on the extension slide.

Balancing of the tool combination takes place by adjusting the slide on the counter weight according to the scale. The correction value ( $\alpha$ ) is shown on the table. See example below.



Range ØD	Extension Slide	Fixed Position/Range		Boring Head ②	Insert Holder ③	Counter Weight ④	Correction $\alpha$		Max. Speed	
		Pos. 1/ØD	Pos. 2/ØD				Pos. 1	Pos. 2		
200 - 270	318.205N	199 - 236		318.101	626.271	318.105 (for fine balancing)	200		3 200	
	318.222		234 - 271					235		
270 - 340	318.206N	269 - 306					304 - 341	270		2 400
	318.223							305		
340 - 410	318.224	339 - 376					374 - 411	340		1 900
								375		
410 - 480	318.225	409 - 446					444 - 481	410		1 600
								445		
480 - 550	318.226	479 - 516					514 - 551	480		1 300
								515		
550 - 620	318.227	549 - 586		584 - 621	550		1 200			
					585					

### Example: Diameter setting according to scale

ØD: 335 H7  
 Extension slide: 318.223  
 Position: 2

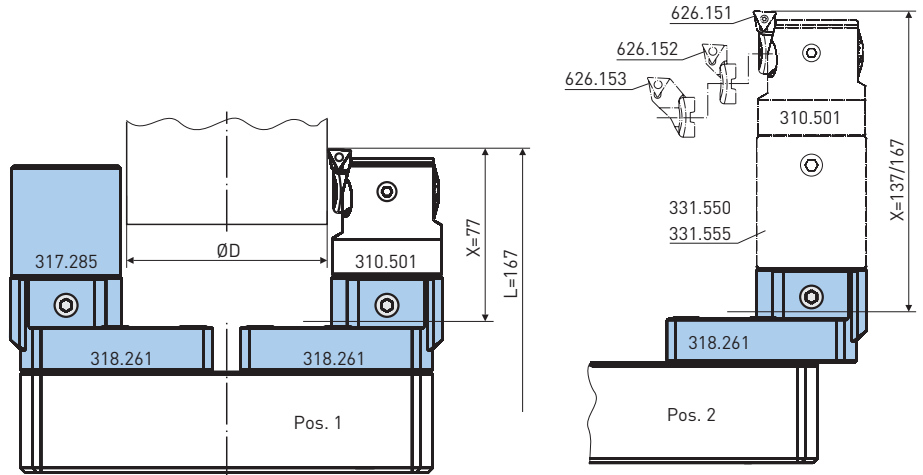
Counter weight: 318.105  
 Correction value: 305  
 Scale:  $D - \alpha = 335 - 305 = 30$

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## OD Turning Holders, Ø 49 - 476

The tool holder with CKB5 connection can be mounted on any extension slide. For OD turning it is required to connect the fine boring head EWN53 x CKB5 either directly or by means of an extension to the holder. To compensate the imbalance, a second tool holder and a special counter weight have to be mounted on the opposite side of the extension slide.

**Attention: Counter-clockwise rotation of spindle!**



L = Distance to the CK connection.

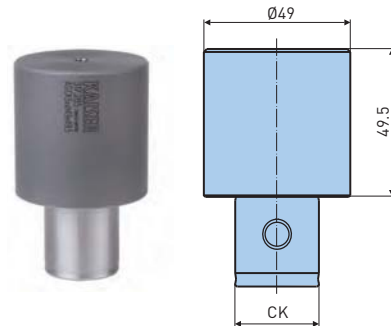
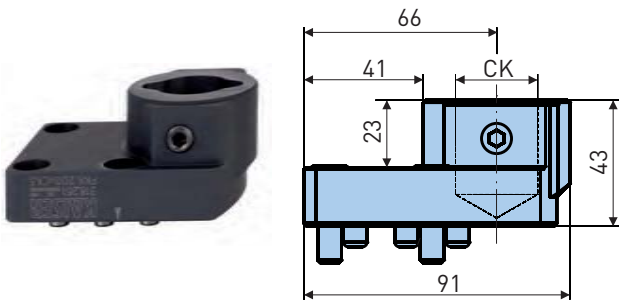
### Tool Holder

Model	Order No.	CK
CB200CKB5	318.261	CKB5

### Counter Weight

Model	Order No.	CK
CW-CK5-DM49-50	317.285	CK5

B.4



### Adjusting Table

Range	Extension Slide	Pos. 1			Pos. 2		
		Range with Insert Holder No:			Range with Insert Holder No:		
		626.153 ØD	626.152 ØD	626.151 ØD	626.153 ØD	626.152 ØD	626.151 ØD
49 - 126	318.222	49 - 66	62 - 79	74 - 91	84 - 101	97 - 114	109 - 126
119 - 196	318.223	119 - 136	132 - 149	144 - 161	154 - 171	167 - 184	179 - 196
189 - 266	318.224	189 - 206	202 - 219	214 - 231	224 - 241	237 - 254	249 - 266
259 - 336	318.225	259 - 276	272 - 289	284 - 301	294 - 311	307 - 324	319 - 336
329 - 406	318.226	329 - 346	342 - 359	354 - 371	364 - 381	377 - 394	389 - 406
399 - 476	318.227	399 - 416	412 - 429	424 - 441	434 - 451	447 - 464	459 - 476

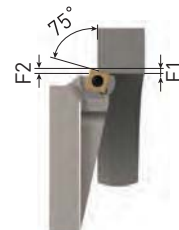
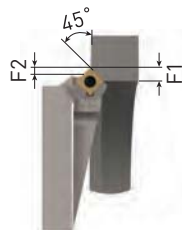
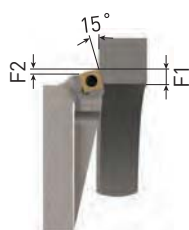
## Insert Holders for Chamfering

The insert holder with step-less adjustable chamfer angle from 15-75° is made for front chamfering and with limitations also for back chamfering.

Model	Order No.
CFTW200S	637.959

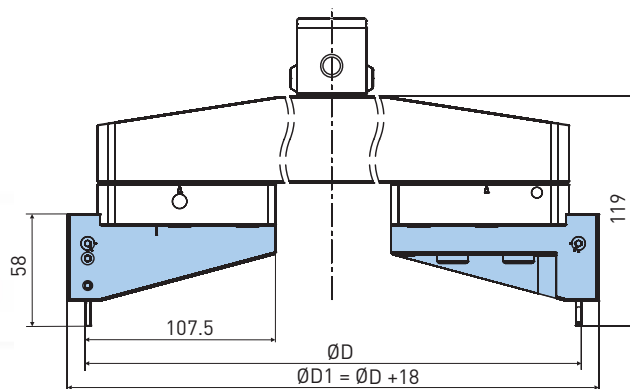


ØD	Chamfer Angle α									
	15°		30°		45°		60°		75°	
	min Ø	max Ø	min Ø	max Ø	min Ø	max Ø	min Ø	max Ø	min Ø	max Ø
200 - 270	182	276	186	278	190	279	195	278	199	277
270 - 340	252	346	256	348	260	349	265	348	269	347
340 - 410	322	416	326	418	330	419	335	418	339	417
410 - 480	392	486	396	488	400	489	405	488	409	487
480 - 550	462	556	466	558	470	559	475	558	479	557
550 - 620	532	626	536	628	540	629	545	628	549	627



Insert Holder	Max. Radial Chamfer Length for Front and Back Chamfering									
	15°		30°		45°		60°		75°	
	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
SC12	11.4	3	10.3	4	8.4	4.2	5.9	3.9	3	3

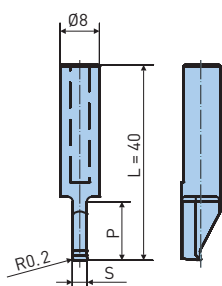
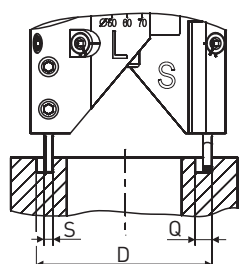
## Face Grooving Holders



Model	Order No.	ØD
FGHTW200	637.961	198 - 3002

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### Cutters

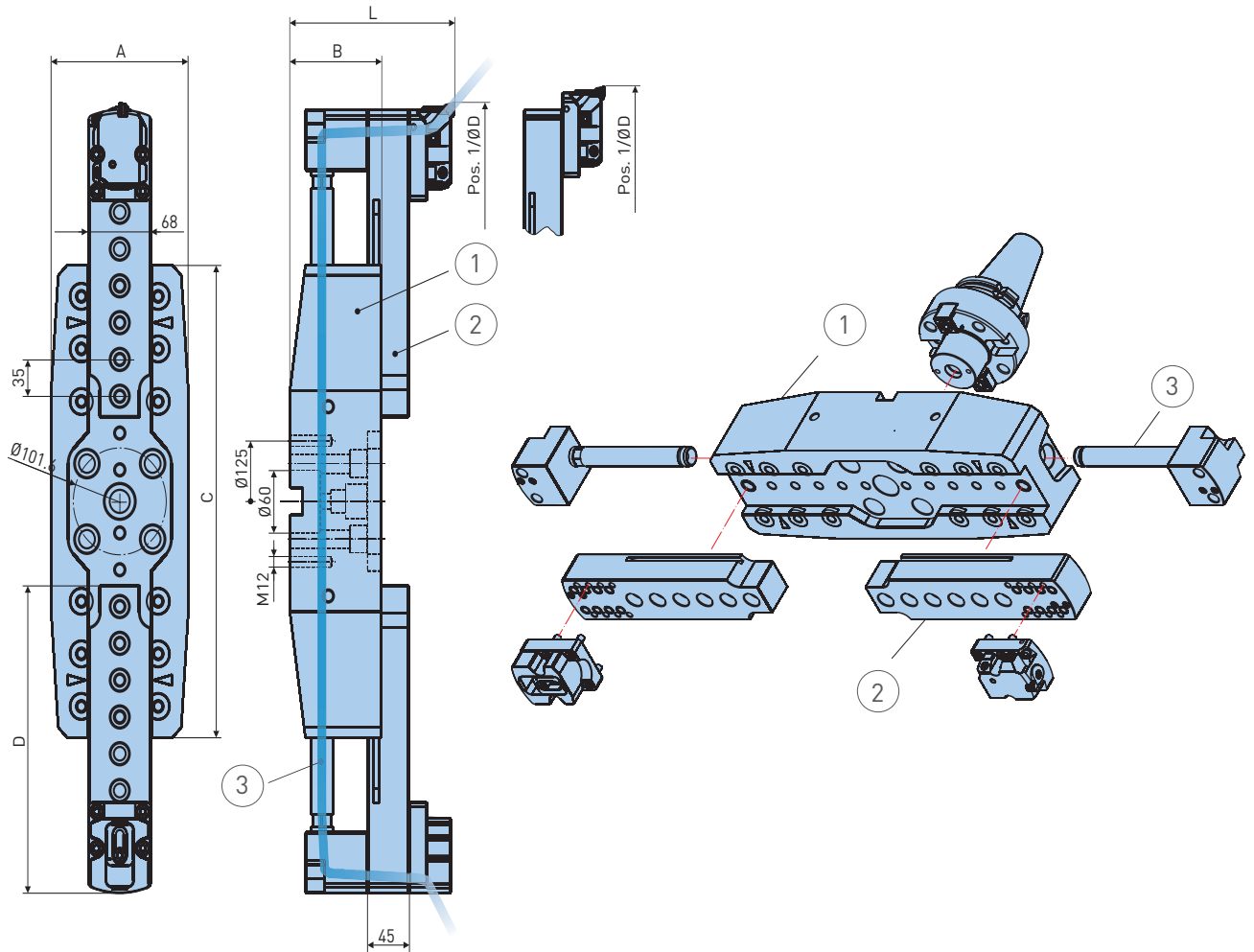


Model	Order No.	Cutter	Width of Cutter S	Max. Width of Groove Q	Max. Depth of Groove P
FG2-ST8-40K40	958.601	uncoated K40/AL *	2	3.5	12
FG3-ST8-40K40	958.602		3	5.5	
FG4-ST8-40K40	958.603		4	7.5	
FG5-ST8-40K40	958.604		5	9.5	
FG2-ST8-40K40C	958.611		coated P40C/ST, GG *	2	
FG3-ST8-40K40C	958.612	3		5.5	
FG4-ST8-40K40C	958.613	4		7.5	
FG5-ST8-40K40C	958.614	5		9.5	

\* Application  
AL = Aluminium  
ST = Steel  
GG = Cast iron

### Series 318 with Bridge and Extension Slides, Ø 620 - 3000

The boring range from Ø 620 – 3000 mm is covered with only five aluminium bridges and five pairs of extension slides. All other components such as boring head, clamp bases and insert holders are the same as for the existing light weight boring tool system Ø 200 – 620 mm.



B.4

ØD	L	A	B	C	D
620 - 830	180	150	100	450	292.5
830 - 1110	180	150	100	660	397.5
1110 - 1530	180	150	100	940	537.5
1530 - 2020	200	170	120	1360	642.5
2020 - 2510	210	190	130	1850	642.5
2510 - 3000	210	190	130	1850	1167.5

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## Rough and Fine Boring Component Selection

The table below refers to the drawings on page 374. It determines the components such as bridge (1), extension slide (2) and coolant supply (3) for each diameter range (ØD) and shows in which position (1 or 2) the roughing or finishing tools have to be mounted.

In addition, this table also serves to determine the scale values for the coarse diameter setting of the cutting edges for finishing, and to adjust the slide on the counter weight for precise balancing of finish tools. The required scale values are calculated by the difference between bore diameter and correction value (α). See example below.

ØD	Model	① Order No.	Model	② * Order No.	Position		α		Model	③ * Order No.
					Pos. 1/ØD	Pos. 2/ØD	Pos. 1	Pos. 2		
620 - 690	BR620-830AL	318.421	SL620-830AL	318.431	619 - 656	654 - 691	620	655	CS620-1110	318.441
690 - 760					689 - 726	724 - 761	690	725		
760 - 830					759 - 796	794 - 831	760	795		
830 - 900	BR830-1110	318.422	SL830-1110	318.432	829 - 866	864 - 901	830	865	CS620-1110	318.441
900 - 970					899 - 936	934 - 971	900	935		
900 - 1040					969 - 1006	1004 - 1041	970	1005		
1040 - 1110					1039 - 1076	1074 - 1111	1040	1075		
1110 - 1180	BR1110-1530	318.423	SL1110-1530	318.433	1109 - 1146	1144 - 1181	1110	1145	CS1110-1530	318.442
1180 - 1250					1179 - 1216	1214 - 1251	1180	1215		
1250 - 1320					1249 - 1286	1284 - 1321	1250	1285		
1320 - 1390					1319 - 1356	1354 - 1391	1320	1355		
1390 - 1460					1389 - 1426	1424 - 1461	1390	1425		
1460 - 1530					1459 - 1496	1494 - 1531	1460	1495		
1530 - 1600	BR1530-2020	318.424	SL1530-2510	318.434	1529 - 1566	1564 - 1601	1530	1565	CS1530-2510	318.443
1600 - 1670					1599 - 1636	1634 - 1671	1600	1635		
1670 - 1740					1669 - 1706	1704 - 1741	1670	1705		
1740 - 1810					1739 - 1776	1774 - 1811	1740	1775		
1810 - 1880					1809 - 1846	1844 - 1881	1810	1845		
1880 - 1950					1879 - 1916	1914 - 1951	1880	1915		
1950 - 2020					1949 - 1986	1984 - 2021	1950	1985		
2020 - 2090	BR2020-2510	318.425	SL1530-2510	318.434	2019 - 2056	2054 - 2091	2020	2055	CS1530-2510	318.443
2090 - 2160					2089 - 2126	2124 - 2161	2090	2125		
2160 - 2230					2159 - 2196	2194 - 2231	2160	2195		
2230 - 2300					2229 - 2266	2264 - 2301	2230	2265		
2300 - 2370					2299 - 2336	2334 - 2371	2300	2335		
2370 - 2440					2369 - 2406	2404 - 2441	2370	2405		
2440 - 2510	2439 - 2476	2474 - 2511	2440	2475						
2510 - 2580	BR2020-2510	318.425	SL2510-3000	318.435	2509 - 2546	2544 - 2581	2510	2545	CS2510-3000	318.444
2580 - 2650					2579 - 2616	2614 - 2651	2580	2615		
2650 - 2720					2649 - 2686	2684 - 2721	2650	2685		
2720 - 2790					2719 - 2756	2754 - 2791	2720	2755		
2790 - 2860					2789 - 2826	2824 - 2861	2790	2825		
2860 - 2930					2859 - 2896	2894 - 2931	2860	2895		
2930 - 3000					2929 - 2966	2964 - 3001	2930	2965		

B.4

1. \* Single pieces.

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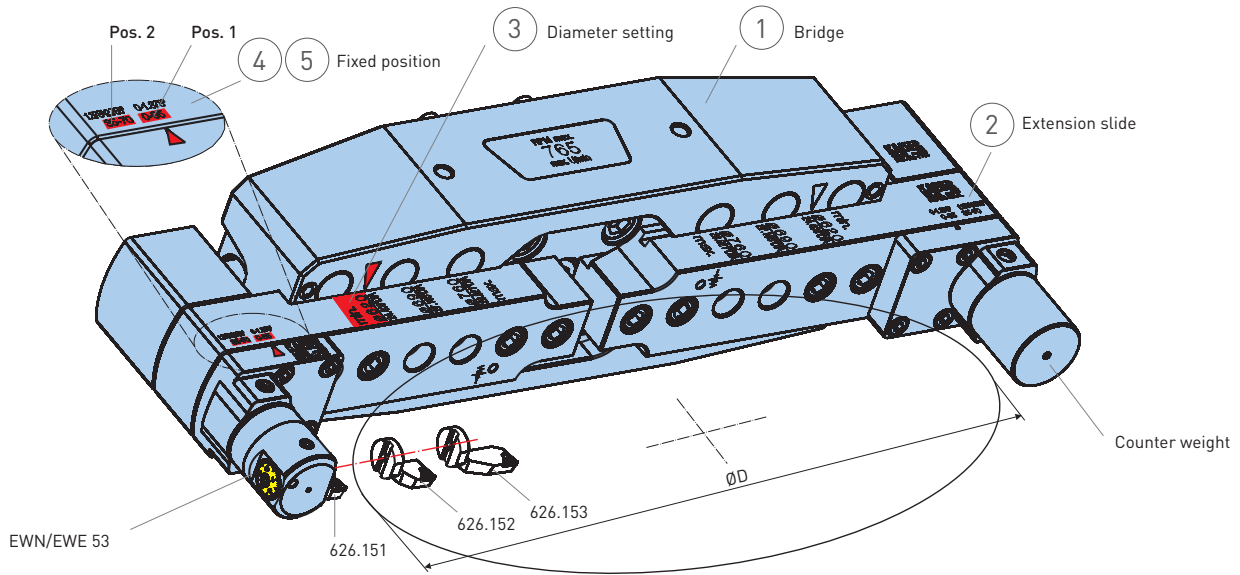
### Example: Diameter setting according to scale

ØD: 1170 H7  
 Bridge: 318.423  
 Extension slide: 318.433  
 Position: 2  
 Counter weight: 318.105  
 Coolant supply: 318.442  
 Correction value α: 1145  
 Scale: ØD - α = 1170 - 1145 = 25



# OD Turning Holders, Ø 469 - 2856

Attention: Counter-clockwise rotation of spindle!

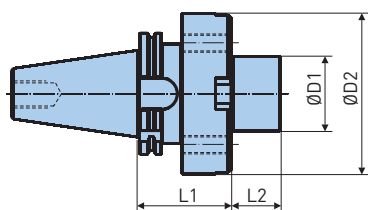


① Bridge	② Extension Slide	ØD	③ Dia. Setting	④ Pos. 1 Range with Insert Holder Order No:			⑤ Pos. 2 Range with Insert Holder Order No:		
				626.153 ØD	626.152 ØD	626.151 ØD	626.153 ØD	626.152 ØD	626.151 ØD
318.421	318.431	469 - 546	620	469 - 486	482 - 499	494 - 511	504 - 521	517 - 534	529 - 546
		539 - 616	690	539 - 556	552 - 569	564 - 581	574 - 591	587 - 604	599 - 616
		609 - 686	760	609 - 626	622 - 639	634 - 651	644 - 661	657 - 674	669 - 686
318.422	318.432	679 - 756	830	679 - 696	692 - 709	704 - 721	714 - 731	727 - 744	739 - 756
		749 - 826	900	749 - 766	762 - 779	774 - 791	784 - 801	797 - 814	809 - 826
		819 - 896	970	819 - 836	832 - 849	844 - 861	854 - 871	867 - 884	879 - 896
		889 - 966	1040	889 - 906	902 - 919	914 - 931	924 - 941	937 - 954	949 - 966
318.423	318.433	959 - 1036	1110	959 - 976	972 - 989	984 - 1001	994 - 1011	1007 - 1024	1019 - 1036
		1029 - 1106	1180	1029 - 1046	1042 - 1059	1054 - 1071	1064 - 1081	1077 - 1094	1089 - 1106
		1099 - 1176	1250	1099 - 1116	1112 - 1129	1124 - 1141	1134 - 1151	1147 - 1164	1159 - 1176
		1169 - 1246	1320	1169 - 1186	1182 - 1199	1194 - 1211	1204 - 1221	1217 - 1234	1229 - 1246
		1239 - 1316	1390	1239 - 1256	1252 - 1269	1264 - 1281	1274 - 1291	1287 - 1304	1299 - 1316
318.424	318.434	1309 - 1386	1460	1309 - 1326	1322 - 1339	1334 - 1351	1344 - 1361	1357 - 1374	1369 - 1386
		1379 - 1456	1530	1379 - 1396	1392 - 1409	1404 - 1421	1414 - 1431	1427 - 1444	1439 - 1456
		1449 - 1526	1600	1449 - 1466	1462 - 1479	1474 - 1491	1484 - 1501	1497 - 1514	1509 - 1526
		1519 - 1596	1670	1519 - 1536	1532 - 1549	1544 - 1561	1554 - 1571	1567 - 1584	1579 - 1596
		1589 - 1666	1740	1589 - 1606	1602 - 1619	1614 - 1631	1624 - 1641	1637 - 1654	1649 - 1666
		1659 - 1736	1810	1659 - 1676	1672 - 1689	1684 - 1701	1694 - 1711	1707 - 1724	1719 - 1736
318.425	318.435	1729 - 1806	1880	1729 - 1746	1742 - 1759	1754 - 1771	1764 - 1781	1777 - 1794	1789 - 1806
		1799 - 1876	1950	1799 - 1816	1812 - 1829	1824 - 1841	1834 - 1851	1847 - 1864	1859 - 1876
		1869 - 1946	2020	1869 - 1886	1882 - 1899	1894 - 1911	1904 - 1921	1917 - 1934	1929 - 1946
		1939 - 2016	2090	1939 - 1956	1952 - 1969	1964 - 1981	1974 - 1991	1987 - 2004	1999 - 2016
		2009 - 2086	2160	2009 - 2026	2022 - 2039	2034 - 2051	2044 - 2061	2057 - 2074	2069 - 2086
		2079 - 2156	2230	2079 - 2096	2092 - 2109	2104 - 2121	2114 - 2131	2127 - 2144	2139 - 2156
		2149 - 2226	2300	2149 - 2166	2162 - 2179	2174 - 2191	2184 - 2201	2197 - 2214	2209 - 2226
		2219 - 2296	2370	2219 - 2236	2232 - 2249	2244 - 2261	2254 - 2271	2267 - 2284	2279 - 2296
318.425	318.435	2289 - 2366	2440	2289 - 2306	2302 - 2319	2314 - 2331	2324 - 2341	2337 - 2354	2349 - 2366
		2359 - 2436	2510	2359 - 2376	2372 - 2389	2384 - 2401	2394 - 2411	2407 - 2424	2419 - 2436
		2429 - 2506	2580	2429 - 2446	2442 - 2459	2454 - 2471	2464 - 2481	2477 - 2494	2489 - 2506
		2499 - 2576	2650	2499 - 2516	2512 - 2529	2524 - 2541	2534 - 2551	2547 - 2564	2559 - 2576
		2569 - 2646	2720	2569 - 2586	2582 - 2599	2594 - 2611	2604 - 2621	2617 - 2634	2629 - 2646
		2639 - 2716	2790	2639 - 2656	2652 - 2669	2664 - 2681	2674 - 2691	2687 - 2704	2699 - 2716
		2709 - 2786	2860	2709 - 2726	2722 - 2739	2734 - 2751	2744 - 2761	2757 - 2774	2769 - 2786
2779 - 2856	2930	2779 - 2796	2792 - 2809	2804 - 2821	2814 - 2831	2827 - 2844	2836 - 2856		

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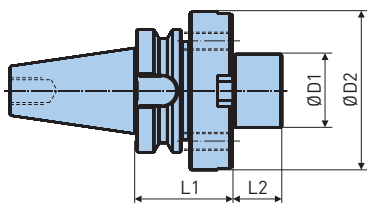
## Shanks and Tool Holders for Bridge Tool Series 318, Ø 620 - 3 000

### BDV, DIN 69871 AD



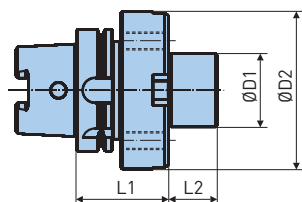
Model	Order No.	Taper Size	ØD1	ØD2	L1	L2
BDV50-F60-75	328.215	DV50	60	129	75	40

### BBT50, MAS 403/BT



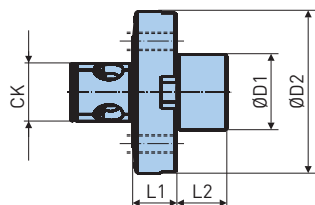
Model	Order No.	Taper Size	ØD1	ØD2	L1	L2
BBT50-F60-85	328.213	BT50	60	129	85	40

### HSK-A100, DIN 69893A



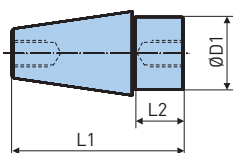
Model	Order No.	Taper Size	ØD1	ØD2	L1	L2
HSK-A100-F60-75	328.214	HSK-A100	60	129	75	40

### BIG KAISER CKN



Model	Order No.	CK	ØD1	ØD2	L1	L2
CKN7-F60	328.217N	CKN7	60	129	35	40

### Centering Shank ISO 50

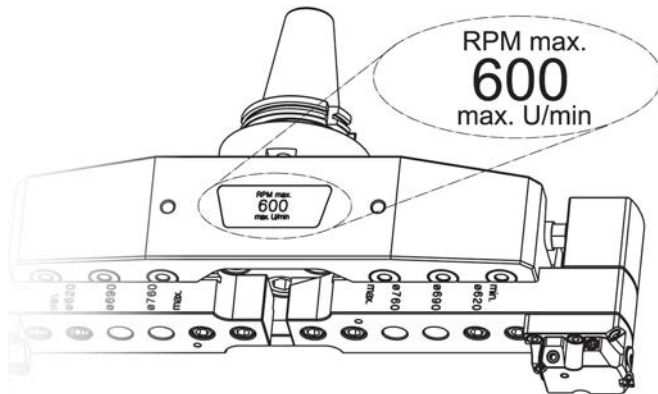


Model	Order No.	Taper Size	ØD1	ØD2	L1	L2
DV50-F60	328.216	ISO 50, M24	60	-	140	40

Adapter rings and spacers available on request.

## Safety Instructions

The max. speed allowed for series 318 boring tools is in relation to the boring diameter and the extension slide used. All extension slides are marked with max. speed allowed [n max.].



ØD	Max. Speed [min <sup>-1</sup> ]	Bridge Aluminium
619 - 831	600	318.421
829 - 1111	450	318.422
1109 - 1531	350	318.423
1529 - 2021	250	318.424
2019 - 2511	190	318.425
2509 - 3001	150	318.425

## Application Notes

### 1. Roughing

#### Ø 620 – 1110 mm

Up to Ø 830 mm the bridge tool can be connected to the machine spindle over a tool shank, but only on a machine with good spindle taper, good spindle bearings and with the nominal retraction force available. For the range between Ø 830 – 1110 mm, roughing is possible with the bridge bolted on to the machine spindle. If vibration occurs use just one cutting edge.

#### Ø > 1110 mm

Roughing is not recommended

### 2. Finishing

#### Ø 620 – 1110 mm

Finishing is possible with the bridge tool connected to the machine spindle over a tool shank, providing that the machine spindle is in good condition.

#### Ø > 1110 mm

The bridge tool must be bolted on to the machine spindle, either directly or if required over a special flange.

## Connecting the Bridge to the Machine Spindle

The bridge tool can be connected to the machine spindle over a tool shank (Fig. 1) or it can be bolted on to the spindle face (Fig. 2). A combination of both variants is also possible. A bolted connection is recommended for bore sizes Ø 1110 mm and bigger.

Fig. 1

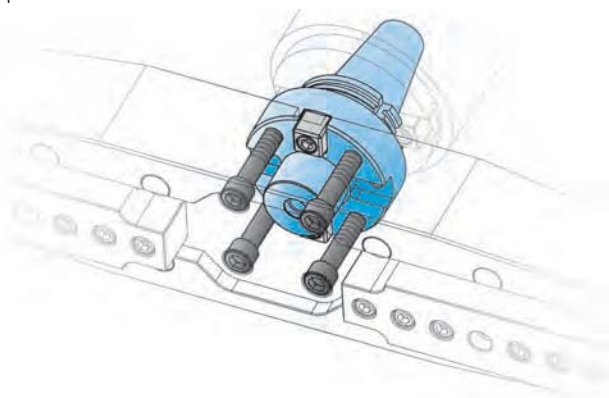
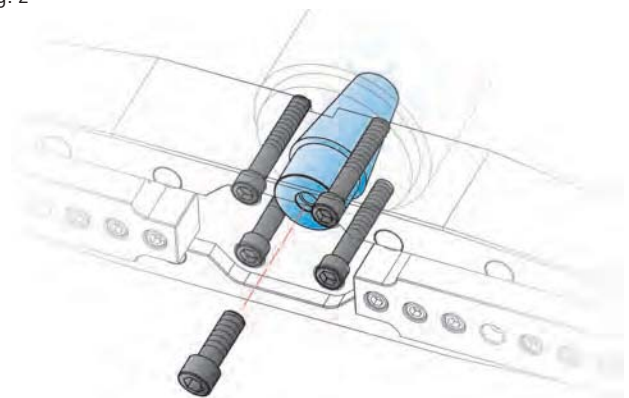


Fig. 2



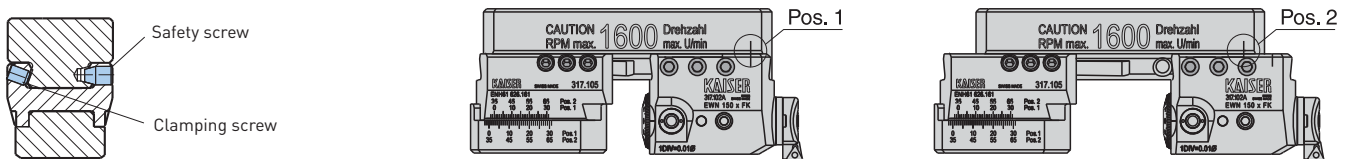
## Series 317, Ø 200 - 620

The modular components such as flange, extension slide, tool holder and boring head, can easily be assembled to single cutter-, rough cutter- and OD turning tools.



B.4

With the introduction of the safety screws on roughing and finishing components as well as on the compensation weight, and with the corresponding bores in the extension slides, these components can be mounted in two fixed positions (Pos. 1 and Pos. 2) on the extension slide.



### Compatibility

New components with safety screws can be mounted on existing extension slides without any restrictions whereas the safety screws have to be removed. Existing components without safety screws can as well be mounted without any restrictions on the new extension slides.

### Modification

On request, safety screw modifications can be made to existing precision boring heads and extension slides to prevent tool breakage from accidentally high spindle speeds.

## Series 317, Ø 200 - 620

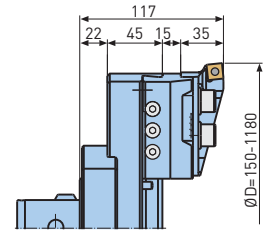
Clamping base



Insert holder

Coolant nozzle

Rough boring tool



Extension slide

Flange

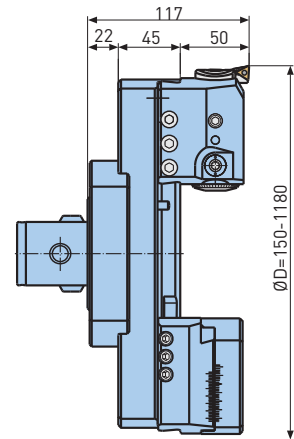


Insert holder

Fine boring head

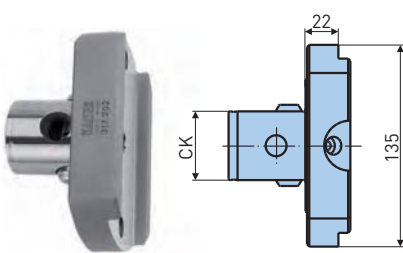
Counter weight

Fine boring tool



### Flanges

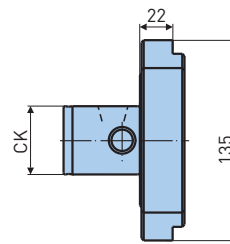
#### Preferred execution



Model	Order No.
CKB7/Ø46	317.202

#### Additional executions

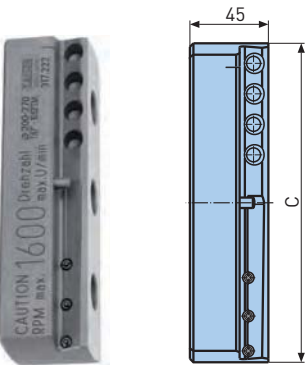
Flange with cutter position 90° twisted.



Model	Order No.
CKB7/Ø46	317.206

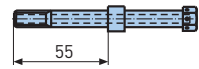
B.4

#### 1 Extension Slide Steel



#### Ø 150 - 620

C	Order No.	ØD <sup>1)</sup>
183	317.222	200 - 270
253	317.223	270 - 340
323	317.224	340 - 410
393	317.225	410 - 480
463	317.226	480 - 550
533	317.227	550 - 620

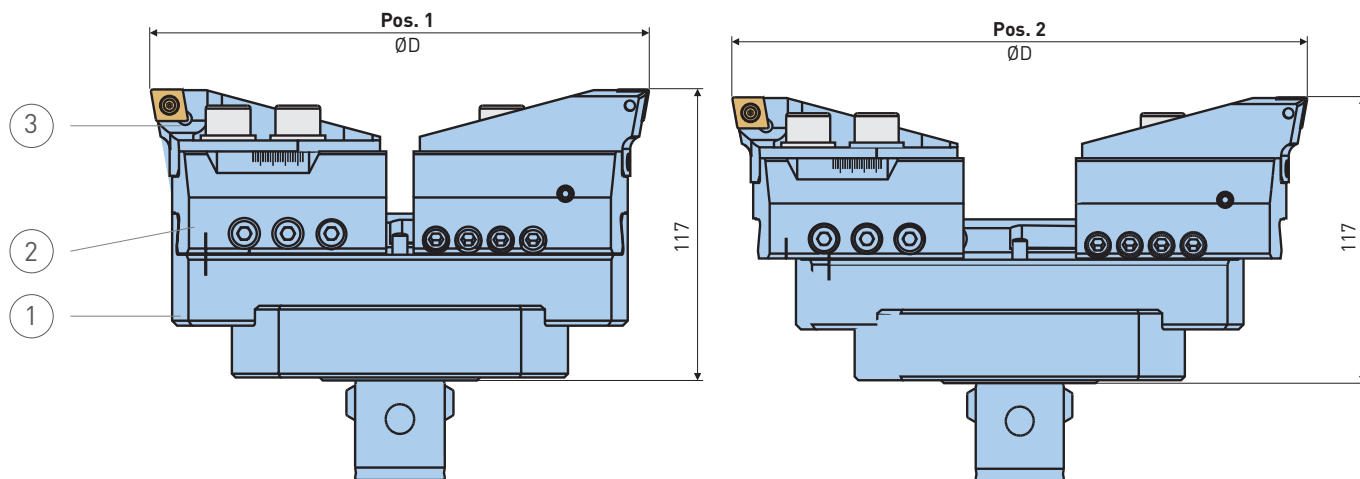
Coolant Nozzle	Order No.
	317.205

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<sup>1)</sup> The diameter ranges D are valid for the tool program for roughing. With the tool program for finishing, the work ranges starting from Ø 200 mm will become bigger; with insert holder type 2, order No. 626.162 by 26 mm and with insert holder type 3, order No. 626.163 by 50 mm. The minimum diameter of the respective work range will be reached with insert holder type 1, order No. 626.161.

## Rough Boring Component Selection

The table below determines the components such as extension slide (1), clamping bases (2) and insert holders (3) for each diameter range and shows in which position the clamping bases have to be mounted on the extension slide. Further, this table also serves for the coarse diameter setting of the cutting edges by means of the scale on the clamping bases (2). The required scale value can be found under consideration of the correction value  $\alpha$  on the table. See example below.



ØD	Extension Slide ①	Fixed Position/Range		Correction $\alpha$
		Pos. 1/ØD	Pos. 2/ØD	
200 - 270	317.222	197 - 235	232 - 270	200
270 - 340	317.223	267 - 305	302 - 340	270
340 - 410	317.224	337 - 375	372 - 410	340
410 - 480	317.225	407 - 445	442 - 480	410
480 - 550	317.226	477 - 515	512 - 550	480
550 - 620	317.227	547 - 585	582 - 620	550

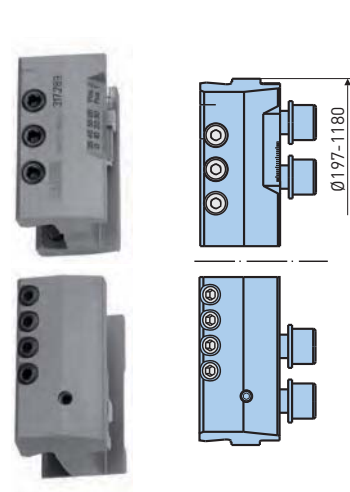
### Example: Diameter setting according to scale

ØD: 430  
 Extension slide: 317.225  
 Position: 1  
 Clamping base: 317.289  
 Insert holder: Ø 200 - 620  
 Correction value  $\alpha$ : 410  
 Scale:  $\text{ØD} - \alpha = 430 - 410 = 20$

For Spare Parts ▶ 436 / 437

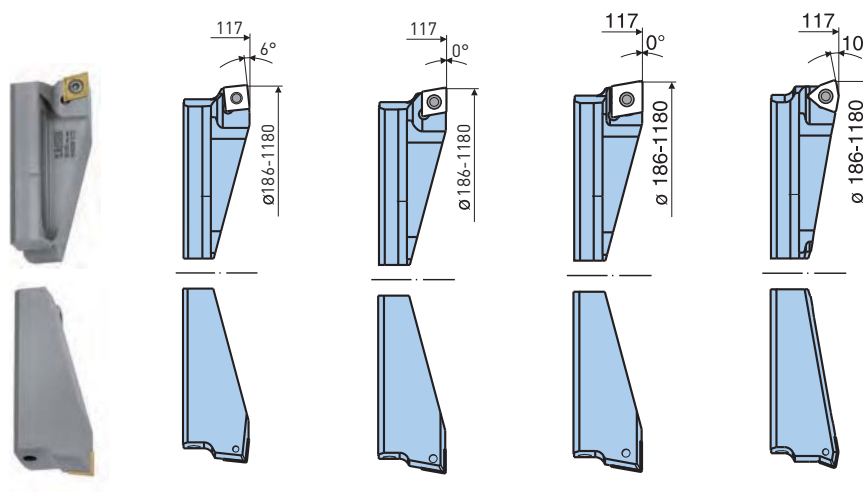
B.4

### ② Clamping Bases, Ø 200 - 620



Order No.  
317.289

### ③ Insert Holders, Ø 200 - 620



Order No.	637.814	637.830	637.834	637.846
Type	SC12	CC12	CC16	WC08

For Insert ▶ 395 - 405

## Double offset roughing

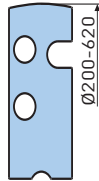
In diameter and height offset cutters allow the removal of twice the stock and with half the feed rate compared with symmetrical roughing.

The cutting edge adjusted to half the stock has to be set in front by means of the spacer.

## Spacers

For double offset roughing

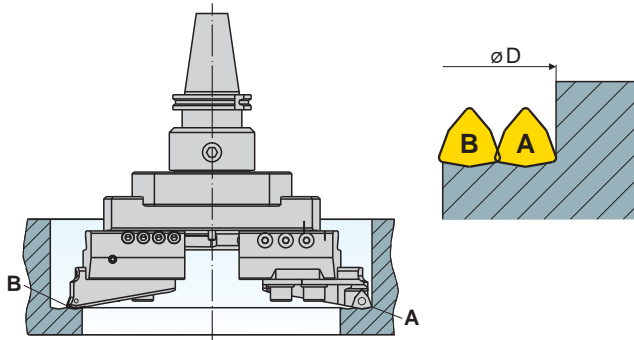
Spacer 0.5 mm	Order No.
Ø 200 - 620	317.287



## Full Profile Roughing (VPS)

### Adjustment instructions

Full profile roughing permits boring with large stock allowance (up to 60 mm in diameter) in a single operation with relatively low drive power. Set cutting edge A to the final bore diameter, and cutting edge B according to the machining allowance, as listed in the table below.



Machining Allowance [mm Ø]	Cutting Edge A [mm Ø]	Cutting Edge B [mm Ø]
24 - 29.9	ØD	D - 2
30 - 35.9		D - 6
36 - 41.9		D - 12
42 - 47.9		D - 18
48 - 53.9		D - 24
54 - 60		D - 30

B.4

### Example for adjustment

Given: Boring diameter 580 mm Machining allowance 46 mm Ø  
 Result: Cutting edge A: Ø 580 mm  
 Cutting edge B: Ø 580 - 18 = Ø 562 mm

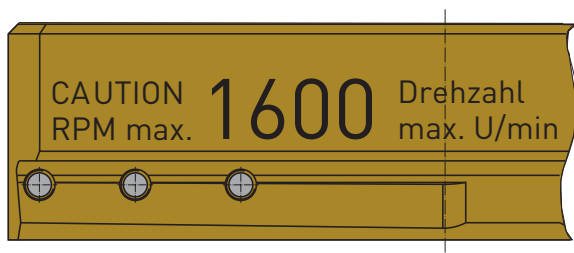
### Cutting data-guide values

Cutting speed:  $V_c = 80-180$  m/min  
 Feed:  $f = 0.1-0.2$  mm/rev

## Safety Instructions

The max. speed allowed for series 317 boring tools is in relation to the boring diameter and the extension slide used. All extension slides are marked with max. speed allowed [n max.].

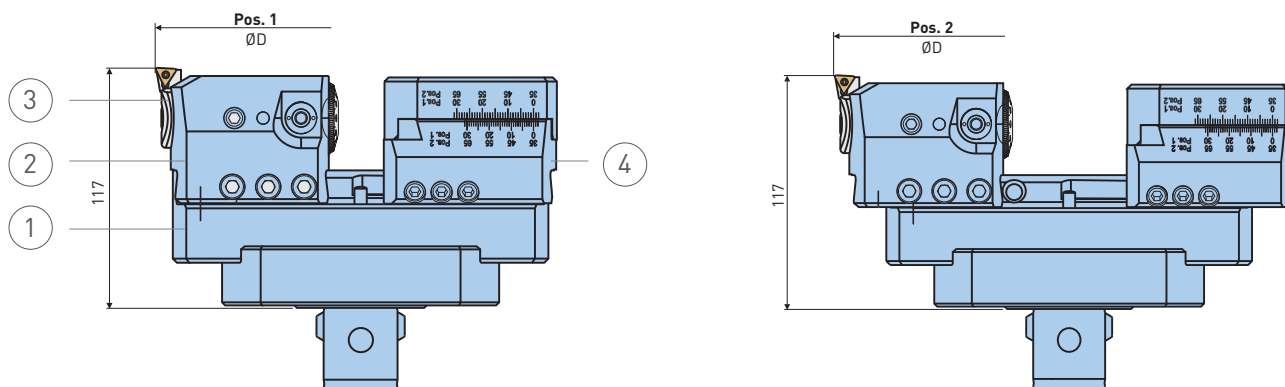
### Extension slide



ØD	Max. Speed [min <sup>-1</sup> ]	Extension Slide Steel	Extension Slide Aluminium
200 - 270	1600	317.222	317.252 *
270 - 340	1200	317.223	317.253 *
340 - 410	900	317.224	317.254 *
410 - 480	750	317.225	317.255 *
480 - 550	650	317.226	317.256 *
550 - 620	600	317.227	317.257 *

## Fine Boring Component Selection

The table below determines the components such as extension slide (1), boring head (2), insert holder (3) and compensation weight (4) for each diameter range and shows in which position the boring head and the compensation weight have to be mounted on the extension slide.



Range ØD	Extension Slide ①	Fixed Position/Range		Insert Holder ③	Correction α
		Pos. 1/ØD	Pos. 2/ØD		
200 - 270	317.222	198 - 228	233 - 263	626.161	200
		224 - 254	259 - 289	626.161	
270 - 340	317.223	268 - 298	303 - 333	626.161	270
		294 - 324	329 - 359	626.162	
340 - 410	317.224	338 - 368	373 - 403	626.161	340
		364 - 394	399 - 429	626.162	
410 - 480	317.225	408 - 438	443 - 473	626.161	410
		434 - 464	469 - 499	626.162	
480 - 550	317.226	478 - 508	513 - 543	626.161	480
		504 - 534	539 - 569	626.162	
550 - 620	317.227	548 - 578	583 - 613	626.161	550
		574 - 604	609 - 639	626.162	

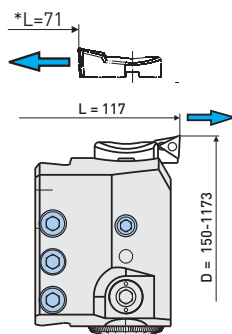
### Example: Balancing

Balancing of the tool combination takes place by adjusting the slide (5) on the compensation weight according to the scale. The correction value α is shown on the table.

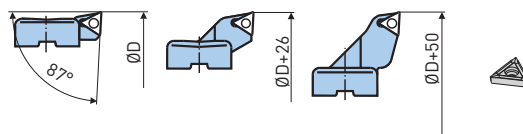
ØD: 335 H7  
 Extension slide: 317.223  
 Position: 2  
 Insert holder: 626.162  
 Counter weight: 317.105  
 Correction value α: 270  
 Scale: ØD - α = 335 - 270 = 65

### 2 Boring Head

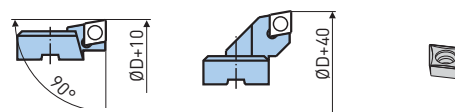
Order No.  
317.102A



### 3 Insert Holders



Order No.	626.161	626.162	626.163	TC 11
-----------	---------	---------	---------	-------



Order No.	626.362	626.363	CC 09
-----------	---------	---------	-------

For Insert ▶ 390-394

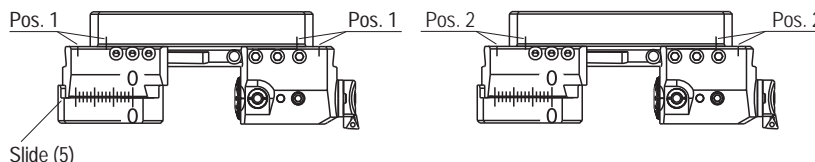
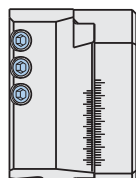
For Spare Parts ▶ 436

B.4

### 4 Counter Weight

By fixing the compensation weight in the same position (pos. 1 or pos. 2) as the boring head and with the slide on the compensation weight in zero position, a large amount of the imbalance will be compensated. Fine balancing which also compensates the position of the cutting edge as well as the size of the insert holder is possible by adjusting the slide to the corresponding scale value according to the balancing table.

Order No.  
317.105







## Indexable Inserts and Cutters

Application Advice	386 - 387
WC-Inserts for Fine Boring Heads	388
TP/TC-Inserts for Fine Boring Heads	389 - 392
MW/CC-Inserts for Fine and Rough Boring Heads	393 - 396
SP/SC/SD-Inserts for Rough Boring Heads	397 - 400
WP 337/WC-Inserts for Indexable Insert Drills and Rough Boring Heads	401 - 406
CBN/PCD-Inserts for Fine and Rough Boring Heads	407 - 410
Inserts for Different Applications	411 - 413
Solide Carbide Boring Cutters for Fine Boring Heads	414 - 416

This catalogue contains a wide range of indexable inserts specially selected for boring with single-cutter or rough boring tools which have been tested under the most diverse working conditions.

For individual tool combinations comprehensive cutting data tables with detailed information about selection of insert, cutting speed, feed, stock allowance, ect. for different cutting methods are available on request.

## Cutting materials

ISO main groups	Work piece materials	ISO application groups				
<b>P</b>	Carbon steels Cast steel	<b>P10</b>	<b>P20</b>	<b>P30</b>	<b>P40</b>	<b>P50</b>
<b>M</b>	Stainless steels	<b>M10</b>	<b>M20</b>	<b>M30</b>	<b>M40</b>	
<b>K</b>	Cast iron	<b>K10</b>	<b>K20</b>	<b>K30</b>		
<b>N</b>	Aluminium Non-ferrous metals Synthetic materials	<b>N10</b>				
<b>S</b>	Titanium NiCo Alloys High temperature alloys	<b>S10</b>	<b>S20</b>			

## Features

### Uncoated carbide

Uncoated hard metal cutting materials are based on tungsten carbide with the addition of titanium carbide, tantalum carbide and cobalt as binding agents. Depending on the allotted ISO group, they are suitable for rough machining and finishing of metallic and non-metallic materials.

### Coated carbide C

Coated hard metal is characterised by its high resistance to wear, its low friction coefficient and minimal built-up edge formation. The multiple coating is a good precondition for cost-effective production machining of all commonly available materials.

B.5

### Cermet CT

Cermet cutting materials consist of titanium carbide and titanium nitride. They are characterised by high thermal and abrasion resistance and are suitable for finish machining and light rough-machining of steel, cast iron and light metal at high cutting speeds.

### Silicon nitride SN

Ceramic cutting edges are extremely temperature-stable, highly impact-resistant and accommodate the highest cutting speeds when machining cast iron in continuous as well as in interrupted cutting.

### Polycrystalline cubic boron nitride CBN

CBN cutting materials feature an extremely high wear and heat resistance. Depending on the design, CBN cutting edges are suitable for boring hardened steel, up to 70 HRC, hard cast steel, cast iron and hard nickel alloys.

### Polycrystalline diamond PCD




















PCD cutting edges are extremely hard and abrasion-resistant. They permit high speed finish machining of non-ferrous materials and composites.
















### Symbols










	= less suitable
+	= suitable
++	= first choice

ISO Code for inserts for boring and turning

<b>T</b>	<b>C</b>	<b>G</b>	<b>T</b>	<b>11</b>	<b>02</b>	<b>04</b>	<b>F</b>	<b>N</b>
1	2	3	4	5	6	7	8	9

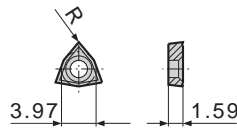
1	Insert Shape	2	Clearance angle	3	Tolerance class														
	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>C</b></p>  </div> <div style="text-align: center;"> <p><b>S</b></p>  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p><b>T</b></p>  </div> <div style="text-align: center;"> <p><b>W</b></p>  </div> </div>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>C</b></p>  </div> <div style="text-align: center;"> <p><b>D</b></p>  </div> </div> <div style="text-align: center; margin-top: 10px;"> <p><b>P</b></p>  </div>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Class</th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td><b>C</b></td> <td>± 0.025</td> <td>± 0.013</td> <td>± 0.025</td> </tr> <tr> <td><b>G</b></td> <td>± 0.025</td> <td>± 0.025</td> <td>± 0.13</td> </tr> <tr> <td><b>M</b></td> <td>± 0.05 - 0.1<sup>1)</sup></td> <td>± 0.08 - 0.20<sup>1)</sup></td> <td>± 0.13</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">1) Dependent upon insert size</p>	Class				<b>C</b>	± 0.025	± 0.013	± 0.025	<b>G</b>	± 0.025	± 0.025	± 0.13	<b>M</b>	± 0.05 - 0.1 <sup>1)</sup>	± 0.08 - 0.20 <sup>1)</sup>	± 0.13
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4	Chip breaker/Mounting criteria	5	Insert size																																																																																																																				
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6	Insert thickness	7	Corner radius	8	Cutting edge	9	Cutting direction																							
	 <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><b>01</b></td> <td>s = 1.59</td> </tr> <tr> <td><b>02</b></td> <td>s = 2.38 (2.5*)</td> </tr> <tr> <td><b>03</b></td> <td>s = 3.18 (3.0*)</td> </tr> <tr> <td><b>T3</b></td> <td>s = 3.97</td> </tr> <tr> <td><b>04</b></td> <td>s = 4.76</td> </tr> <tr> <td><b>05</b></td> <td>s = 5.56</td> </tr> </tbody> </table> <p style="text-align: center; font-size: small;">*) Special size</p>	<b>01</b>	s = 1.59	<b>02</b>	s = 2.38 (2.5*)	<b>03</b>	s = 3.18 (3.0*)	<b>T3</b>	s = 3.97	<b>04</b>	s = 4.76	<b>05</b>	s = 5.56	 <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td><b>01</b></td> <td>R = 0.1</td> </tr> <tr> <td><b>02</b></td> <td>R = 0.2</td> </tr> <tr> <td><b>03</b></td> <td>R = 0.3</td> </tr> <tr> <td><b>04</b></td> <td>R = 0.4</td> </tr> <tr> <td><b>06</b></td> <td>R = 0.6</td> </tr> <tr> <td><b>08</b></td> <td>R = 0.8</td> </tr> <tr> <td><b>12</b></td> <td>R = 1.2</td> </tr> </tbody> </table>	<b>01</b>	R = 0.1	<b>02</b>	R = 0.2	<b>03</b>	R = 0.3	<b>04</b>	R = 0.4	<b>06</b>	R = 0.6	<b>08</b>	R = 0.8	<b>12</b>	R = 1.2	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p><b>F</b></p>  </div> <div style="text-align: center;"> <p><b>E</b></p>  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <p><b>T</b></p>  </div> <div style="text-align: center;"> <p><b>S</b></p>  </div> </div> <p style="text-align: center; margin-top: 10px;"><b>(W)</b></p> <p style="text-align: center; font-size: small;">Wiper geometry, see page 392</p>	<div style="text-align: center;"> <p><b>R</b></p>  </div> <div style="text-align: center; margin-top: 10px;"> <p><b>L</b></p>  </div> <div style="text-align: center; margin-top: 10px;"> <p><b>N</b></p>  </div>
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<b>12</b>	R = 1.2																													

B.5

Insert							Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]	Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



## WCGT 0201

Circumference ground, chip-breakers pressed & polished

	WCGT0201	655.600	02	FN	15°	P10CT		+	+							+				
--	----------	---------	----	----	-----	-------	--	---	---	--	--	--	--	--	--	---	--	--	--	--

Circumference and chip-breakers ground

	WCGT 0201	655.604	01	FL	23°	K10CT									++						
	WCGT 0201	655.601	02	FL	23°	K10CT									++						
	WCGT 0201	655.605	01	FL	23°	K10	C (TiAlN)	+	+	+	++	++	+	+	+					++	
	WCGT 0201	655.603	02	FL	23°	K10	C (TiAlN)	+	+	+	++	++	+	+	+					++	+
	WCGT 0201	655.606	01	FL	23°	M10	C (AlCrN)	++	++	++	+	+	+	+	+					++	
	WCGT 0201	655.602	02	FL	23°	M10	C (AlCrN)	++	++	++	+	+	+	++	++					++	+

Torx Plus T6 IP M2x3.6

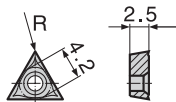
694.101



Torx Plus T6 IP

694.188

Insert							Work Piece Material							Machining						
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



**TPGT 0702**

Circumference ground, chip-breakers pressed & polished

	TPGT 0702	651.802	02	FN	15°	P10CT		++	++			+				++				
	TPGT 0702	651.702	04	FN	15°	P10CT		++	++			+				++				
	TPGT 0702	651.835	02	FL	18°	P10CT		++	++			+	+				++			
	TPGT 0702	651.824	01	FL	25°	K10	C (TiAlN)	+	+	+	+	+	+	+			++			
	TPGT 0702	651.735	03	FL	25°	K10	C (TiAlN)	++	++	+	++	++	+	++	+	++		+		
	TPGT 0702	651.823	01	FL	25°	K10							++				++			
	TPGT 0702	651.723	03	FL	25°	K10							++			++		++	+	

**TPMT 0702**

Chip-breakers pressed

	TPMT 0702	651.713	04	FN	15°	P10CT	C (AlCrN)	++	++	+	+	+	+			++		+		
	TPMT 0702	651.813	02	FN	15°	P10CT	C (AlCrN)	++	++	+	+	+	+			++		+		

**TPGT 0702**

Circumference and chip-breakers ground

	TPGT 0702	651.833	02	FL	15°	P10	C (TiAlN)	+	+	+	+	+		+	+	+	++	+		
	TPGT 0702	651.838	02	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+	+			+	++		
	TPGT 0702	651.738	03	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+	+		++		+		
	TPGT 0702	651.839	02	FL	15°	S10	C (TiAlN)			+					++	++	+	++	+	
	TPGT 0702	651.736	03	FL	18°	P10CT		++	++			+	+			++				
	TPGT 0702	651.834	02	FL	20°	P10	C (TiAlN)	+	+	+	+	+		++	+	+	++	+		
	TPGT 0702	651.734	04	FL	20°	P10	C (TiAlN)	++	++	+	++	++		++	+	++		+		
	TPGT 0702	651.837	02	FL	25°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	+	++			
	TPGT 0702	651.737	03	FL	25°	M10	C (AlCrN)	++	++	++	+	+	+	++	++	++		+		
	TPGT 0702	651.825	02	FL	25°	K10							++			++	++			++
	TPGT 0702	651.725	04	FL	25°	K10							++			++				++

**TPGW 0702**

Circumference ground without chip-breakers

	TPGW 0702	651.632	03	FN	5°	K10	C (TiAlN)	+	+	+	++	+		++		++			+	
	TPGW 0702	651.623	03	FN	5°	K10					+			+						+

Torx Plus T6 IP M2x4.8 **694.103**  
Torx Plus T6 IP M2x4.1 **694.102<sup>1)</sup>**

Torx Plus T6 IP **694.188**

$\gamma$  Rake angle with insert on tool.

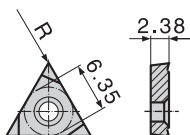
Clamping screw (10 screws and 1 wrench)

<sup>1)</sup> For insert holders 615.205/615.207/615.507/615.508/615.271

Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

Insert							Work Piece Material							Machining						
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



## TCMT 1102

Chip-breakers pressed & polished

	TCMT 1102	655.322	04	FN	15°	P10CT		++	++			+				++		+		
	TCMT 1102	655.332 *	08	FN	15°	P10CT		++	++			+				++		+		
	TCMT 1102	655.322A	04	FN	15°	P10CT		++	++			+				++		+		
	TCMT 1102	655.324	04	FN	15°	P10CT	C (TiAlN)	++	++	+	+	+	+			++		+		
	TCMT 1102	655.334	08	FN	15°	P10CT	C (TiAlN)	++	++	+	+	+	+			++		+		
	TCMT 1102	655.316	02	FN	15°	S10	C (TiAlN)			+	+				++	++	+	++	+	
	TCMT 1102	655.326	04	FN	15°	S10	C (TiAlN)			+	+				++	++	+	++	+	
	TCMT 1102	655.311A	02	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiCN)	+	+							+	+	+		
	TCMT 1102	655.321A	04	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiCN)	+	+							+		++	+	
	TCMT 1102	655.331A	08	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiCN)	+	+							++		++	+	
	TCMT 1102	655.354	04	FN	20°	M30C	C (TiAlN+Al <sub>2</sub> O <sub>3</sub> )	++	++	++	+	+			++	++	++	++	++	
	TCMT 1102	655.364	08	FN	20°	M30C	C (TiAlN+Al <sub>2</sub> O <sub>3</sub> )	++	++	++	+	+			++	++	+	++	++	

## TCGT 1102

Circumference ground with chip-breakers pressed

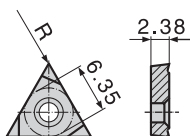
	TCGT 1102	655.301B	02	FN	12°	K10	C (TiCN-Al <sub>2</sub> O <sub>3</sub> )	+	+	+	+	+		++		+	+	+		
	TCGT 1102	655.302B	04	FN	12°	K10	C (TiCN-Al <sub>2</sub> O <sub>3</sub> )	++	++	++	+	+		++		+		+	+	
	TCGT 1102	655.303B	08	FN	12°	K10	C (TiCN-Al <sub>2</sub> O <sub>3</sub> )	++	++	++	+	+		++		+		+	++	

## TCGW 1102

Circumference ground without chip-breakers

	TCGW 1102	655.301A	02	FN	0°	K10	C (TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN)				++	++			++	+	+			
	TCGW 1102	655.302A	04	FN	0°	K10	C (TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN)	+	+	+	++	++			++		+	+		
	TCGW 1102	655.303A	08	FN	0°	K10	C (TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN)	+	+	+	++	++			++		+	++		
	TCGW 1102	655.305	04	FN	0°	K10					+									++
	TCGW 1102	655.306	08	FN	0°	K10					+									++

Insert							Work Piece Material							Machining						
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



**TCGT 1102**

Circumference ground, chip-breakers pressed

	TCGT 1102	655.313	02	FN	15°	P10CT		++	++								++				
	TCGT 1102	655.314	08	FN	15°	M30	C(TiCN- Al2O-3TiN)	+	+	++	+	+		+		++		++	++		

**TCGT 1102**

Circumference ground, chip-breakers pressed & polished

	TCGT 1102	655.369	01	FL	23°	M10	C (AlCrN)	++	+	++	+	+	+	++	+	+	++				
	TCGT 1102	655.379	02	FL	23°	M10	C (AlCrN)	++	+	++	+	+	+	++	+	+	++				
	TCGT 1102	655.389	04	FL	23°	M10	C (AlCrN)	++	+	++	+	+	+	++	+	++	+	+			
	TCGT 1102	655.399	08	FL	23°	M10	C (AlCrN)	++	+	++	+	+	+	++	+	++		++	+		
	TCGT 1102	655.363	01	FL	23°	K10	C (TiAlN)	+	+	+	+	+					++				
	TCGT 1102	655.373	02	FL	23°	K10	C (TiAlN)	+	+	+	+	+					+				
	TCGT 1102	655.383	04	FL	23°	K10	C (TiAlN)	++	++	+	++	++	+	++	+	++		+			
	TCGT 1102	655.393	08	FL	23°	K10	C (TiAlN)	++	++	+	++	++	+	++	+	++		+			
	TCGT 1102	655.378	02	FL	23°	K10							++			+	++				
	TCGT 1102	655.388	04	FL	23°	K10							++			++	+	+			
	TCGT 1102	655.398	08	FL	23°	K10							++			++		+			
	TCGT 1102	655.371	02	FL	15°	P10	C (TiAlN)	+	+		+	+		+			++				
TCGT 1102	655.381	04	FL	18°	P10	C (TiAlN)	+	+	+	+	+	+	+	+	+			+			

**TCGT 1102**

Circumference and chip-breakers ground

	TCGT 1102	655.370	02	FL	10°	K20	C (TiAlN)	++	++	+	++	++	+	++		+	++	++	+		
	TCGT 1102	655.380	04	FL	10°	K20	C (TiAlN)	++	++	+	++	++	+	++		++		++	++		
	TCGT 1102	655.390	08	FL	10°	K20	C (TiAlN)	++	++	+	++	++	+	++		++		++	++		
	TCGT 1102	655.372	02	FN	20°	P10CT		+	+								++				
	TCGT 1102	655.386	04	FL	18°	P10CT		++	++		+	+				++					
	TCGT 1102	655.375	02	FL	15°	P10CT	C (TiAlN)	++	++	+	+	+	+	+		+	++				
	TCGT 1102	655.385	04	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+	+		++	+				
	TCGT 1102	655.395	08	FL	18°	P10CT	C (TiAlN)	++	++	+	+	+	+	+		++					
	TCGT 1102	655.387	04	FL	20°	K10							++			++	+				++
	TCGT 1102	655.397	08	FL	20°	K10							++			++					
	TCGT 1102	655.319	02	FL	23°	M20	C (AlCrN)	++	++	++	++	++	+	++	++	++	+	++	+		
	TCGT 1102	655.327	03	FL	23°	M20	C (AlCrN)	++	++	++	++	++	+	++	++	++	+	++	+		
	TCGT 1102	655.318	04	FL	23°	M20	C (AlCrN)	++	++	++	++	++	+	++	++	++	+	++	+		
	TCGT 1102	655.328	06	FL	23°	M20	C (AlCrN)	++	++	++	++	++	+	++	++	++	+	++	+		
	TCGT 1102	655.320	08	FL	23°	M20	C (AlCrN)	++	++	++	++	++	+	++	++	++	+	++	+		

B.5

Torx Plus T7 IP M2.5x6.5 694.122

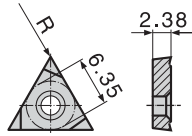
Torx Plus T7 IP 694.189

$\gamma$  Rake angle with insert on tool.  
 Clamping screw (10 screws and 1 wrench)  
 Inserts are sold in packages of 10 pieces.  
 \* as long as stock lasts.

= less suitable  
 + = suitable  
 ++ = first choice



Insert							Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]	Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



## Wiper TCGX 1102

Circumference and chip-breakers ground

	TCGX 1102	655.317	04	WL	20°	K10							++	++	++		+	+	++
	TCGX 1102	655.315	04	WL	20°	P10CT	C (TiAlN-TiN)	++	++		+	+	+		++		+	+	++
	TCGX 1102	655.310	04	WL	20°	K10	C (AlCrN)	++	++	++	++	+	+	+	++		+	+	++

## Wiper TCGX 1102

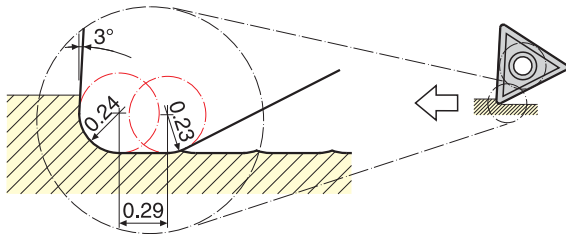
Circumference ground, chip-breakers pressed

	TCGX 1102	655.374	04	WL	15°	K10	C (PVD Oxid)	++	++	+	+	+			++				++
	TCGX 1102	655.384	04	WL	15°	P10CT		++	++		+	+		++					

### B.5 Wiper geometry

Comparison with standard nose radius 0.4 mm

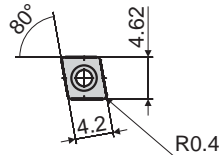
Wiper: Two times the feed rate → Same surface finish  
 Same feed rate → Two times better surface finish



Torx Plus T7 IP M2.5x6.5 694.122

Torx Plus T7 IP 694.189

Insert							Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]	Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



**MW 0404**

Chip-breakers pressed & polished

	MW 0404	655.942	04		P30	C (TiAlN-AlCrN)	+	++	++						++	+	+		
	MW 0404	655.941	04		K30	C (TiAlN-AlCrN)				++	++				++	+	+		
	MW 0404	655.940	04		N15	C (DLC)						++			++	+	+		

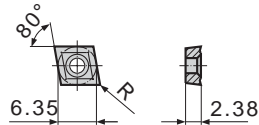
Torx Plus T6 M1.6x4.2

694.105



Torx Plus T6

694.181



**CCMT 0602**

Chip-breakers pressed & polished

	CCMT 0602	654.840A	02	FN	15°	P30	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	+	+	+	+	+			+	+			
	CCMT 0602	654.858	04	FN	15°	K20				+	+								+
	CCMT 0602	654.851A	04	FN	15°	P30	C (TiAlN)	++	++	+	+	+		+	+	++		+	
	CCMT 0602	654.853	08	FN	15°	P30	C (TiAlN)	++	++	+	++	++		+	+	++	+	+	+
	CCMT 0602	654.852	04	FN	15°	K20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	+	+	+	++	++		+	+	++		+	
	CCMT 0602	654.846	02	FN	15°	P35	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	++	+	+		+	+	++		++	++
	CCMT 0602	654.856	04	FN	15°	P35	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	+	+		+	+	++		++	++
	CCMT 0602	654.850A	04	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	+	+		+	+	++			

B.5

**CCGT 0602**

Circumference ground, chip-breakers pressed & polished

	CCGT 0602	654.837	02	FN	8°	S10	C (TiAlN)			++				++	++	++	+		
	CCGT 0602	654.847	04	FN	8°	S10	C (TiAlN)			++				++	++	+	+		

**CCMT 0602**

Chip-breakers ground

	CCMT 0602	654.877	02	FL	23°	K10						++			++	+	+		
	CCMT 0602	654.888	04	FL	23°	K10						++		+	++		+		
	CCMT 0602	654.879	02	FL	23°	N10	C (AlCrN)					++		+	++	+	+		
	CCMT 0602	654.889	04	FL	23°	N10	C (AlCrN)					++		+	++		+		

Torx Plus T7 IP M2.5x6.5

694.122



Torx Plus T7 IP

694.189

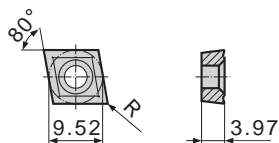
$\gamma$  Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

Insert								Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



## CCMT 09T3

Chip-breakers pressed & polished

	CCMT 09T3	654.942	04	FN	15°	K20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)				++	++			+	++		+		
	CCMT 09T3	654.952	08	FN	15°	K20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)				++	++			+	++		+		
	CCMT 09T3	654.950	08	FN	15°	P30	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	+	+		+	+	++		++	+	
	CCMT 09T3	654.935	02	FN	15°	P35	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	++	+	+		+	+	+	++	++	+	
	CCMT 09T3	654.945	04	FN	15°	P35	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	++	+	+		+	+	++		++	++	
	CCMT 09T3	654.955	08	FN	15°	P35	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	++	+	+		+	+	++		++	++	
	CCMT 09T3	654.930A	02	FN	15°	P30	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	+	+	+	+	+					+			
	CCMT 09T3	654.940A	04	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	+	+		+	+	++		+		

## CCGT 09T3

Circumference ground, chip-breakers pressed & polished

	CCGT 09T3	654.937	02	FN	8°	S10	C (TiAlN)			++					++	++	++	+		
	CCGT 09T3	654.947	04	FN	8°	S10	C (TiAlN)			++					++	++	+	+		
	CCGT 09T3	654.957	08	FN	8°	S10	C (TiAlN)			++					++	++		+		

## CCMT 09T3

Chip-breakers ground

	CCMT 09T3	654.977	04	FL	23°	K10							++			++	+	+		
	CCMT 09T3	654.987	08	FL	23°	K10							++			++		+		
	CCMT 09T3	654.949	04	FL	23°	N10	C (AlCrN)						++	+	++	+	+			
	CCMT 09T3	654.959	08	FL	23°	N10	C (AlCrN)						++	+	++		+			

## CCGW 09T3

Circumference ground, without chip-breakers

	CCGW 09T3	654.941	04	TN	0°	SN					++	+				++		+		

Torx Plus T15 IP M4x9.2

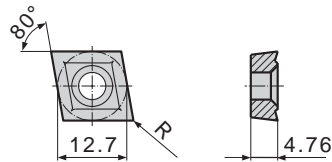
694.141



Torx Plus T15 IP

694.193

Insert							Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]	Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



**CCMT 1204**

Chip-breakers pressed & polished

	CCMT 1204	654.989	04	FN	15°	K20	C (TiAlN)				++	++			+	++			
	CCMT 1204	654.991	08	FN	15°	K20	C (TiAlN)				++	++			+	++			
	CCMT 1204	654.964	04	FN	15°	P35	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	++	+	+			+	++	++	++	++
	CCMT 1204	654.965	08	FN	15°	P35	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	++	+	+			+	++	++	++	++
	CCMT 1204	654.993A	04	FN	15°	P30	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	+	+	+	+	+							+
	CCMT 1204	654.988	08	FN	15°	P30	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	+	+			+	++		++	+
	CCMT 1204	654.990A	08	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	+	+			+	++		+	
	CCMT 1204	654.968	04	FN	8°	S10	C (TiAlN)			++				++	++			+	
	CCMT 1204	654.969	08	FN	8°	S10	C (TiAlN)			++				++	++			+	

Chip-breakers ground

	CCMT 1204	654.995	04	FL	23°	K10							++		++	+	+		
	CCMT 1204	654.992	08	FL	23°	K10							++		++		+		
	CCMT 1204	654.978	04	FL	23°	N10	C (AlCrN)					++	++	++	+	+	+	+	
	CCMT 1204	654.979	08	FL	23°	N10	C (AlCrN)					++	++	++		+	+		

B.5

**CCGW 1204**

Circumference ground, without chip-breakers

	CCGW 1204	654.980	08	TN	0°	SN					++	+			++		+		
--	-----------	---------	----	----	----	----	--	--	--	--	----	---	--	--	----	--	---	--	--

Torx Plus T20 IP M5x13.3 694.150

Torx Plus T20 IP 694.194

$\gamma$  Rake angle with insert on tool.

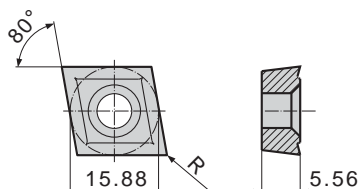
Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

# Inserts for Rough Boring Heads

Insert							Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]	Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



## CCMT 1605

Chip-breakers pressed & polished

	CCMT 1605	654.997	08	FN	15°	K10					+	+						+		
	CCMT 1605	654.983	08	FN	15°	K20					++	++			+	++				+
	CCMT 1605	654.996	08	FN	15°	P30					++	++	+	+	+	++		++		+
	CCMT 1605	654.986	08	FN	15°	P30					++	++	+	+	+	++		++		++

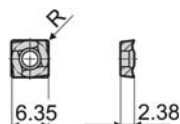
Chip-breakers ground

	CCMT 1605	654.998	08	FL	23°	K10							++		+	++				+
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Torx Plus T20 IP M5x13.3 694.150

Torx Plus T20 IP 694.194

Insert								Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



**SPMT 0602**

Chip-breakers pressed & polished

	SPMT 0602	654.150	04	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	++	+	+		+	+	+			+	
	SPMT 0602	654.158 *	04	FN	15°	K20					+									++
	SPMT 0602	654.152	04	FN	15°	K20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)				++	++		+	+	+				+

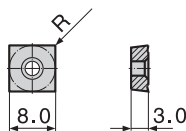
Chip-breakers ground

	SPMT 0602	654.168	04	FL	23°	K10								++	+	+				+
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Torx Plus T7 IP M2.5x6.5 694.122

Torx Plus T7 IP 694.189

**SPGW 0803**



Circumference ground, without chip-breakers

	SPGW 0803	654.128	05	FN	0°	K20					++									+
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**SPGT 0803**

Circumference ground, without chip-breakers

	SPGT 0803	654.183	05	FL	5°	P20		++	++	++	+	++	+							+
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Torx Plus T7 IP M2.5x5.5 694.121

Torx Plus T7 IP 694.189

$\gamma$  Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

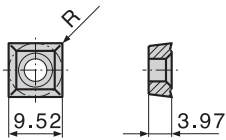
Inserts are sold in packages of 10 pieces.

\* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

# Inserts for Rough Boring Heads

Insert							Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]	Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



## SCMT 09T3

Chip-breakers pressed & polished

	SCMT 09T3	654.259 *	08	FN	15°	K30					+	+							+
	SCMT 09T3	654.240	04	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	++	++	++	+		+	+	+		
	SCMT 09T3	654.250	08	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	++	++	++	+		+		+		
	SCMT 09T3	654.251	08	FN	15°	P30	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	+	+	+		++		++	++	

Chip-breakers ground

	SCMT 09T3	654.277	04	FL	23°	K10						++			+	+	+		
	SCMT 09T3	654.287	08	FL	23°	K10						++			+			+	

Torx Plus T15 IP M4x9.2

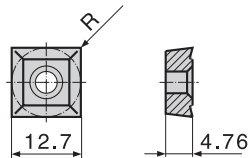
694.141



Torx Plus T15 IP

694.193

Insert								Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



**SCMT 1204**

Chip-breakers pressed & polished

	SCMT 1204	654.340	04	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	+	+	+	+	+		+			+	+		
	SCMT 1204	654.350	08	FN	15°	P20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	++	++	+		+			+			+
	SCMT 1204	654.354 *	08	FN	15°	P30		+	+	+		+							++	++
	SCMT 1204	654.351	08	FN	15°	P30	C (Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	+	+		+	+	+			++	++

Chip-breakers ground

	SCMT 1204	654.387	08	FL	23°	K10								++			+			+

Torx Plus T20 IP M4 x 11.6    694.142  
For insert holder RW53

Torx Plus T20 IP    694.194

B.5

Torx Plus T20 IP M4x15    694.144  
For insert holder RW 68/RW100

Torx Plus T20 IP M5 x 13.3    694.150  
For insert holder «TW» and «SW»

$\gamma$  Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

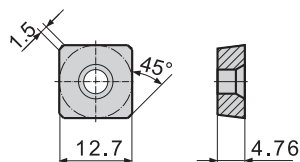
\* As long as stock lasts..

	= less suitable
+	= suitable
++	= first choice



# Inserts for Rough Boring Heads

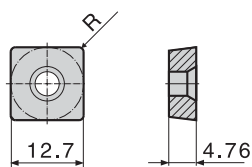
Insert							Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]	Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 56$ HRC	NiCo Alloys/Titanium	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



**SDCW 1204**

Circumference ground, without chip-breakers

	SDCW 1204AE TN	688.599		7°	SN					++	+				++			++	
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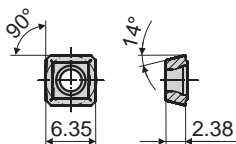
Circumference ground, without chip-breakers

	SDCW 1204	688.619 *	08	TN	7°	SN				++	+				++			+	
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Torx Plus T20 IP M4x15 694.144

Torx Plus T20 IP 694.194

Insert						Work Piece Material							Machining				
Insert Shape	Model	Order No.	Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast iron GG	Cast iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 54$ HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



**WP 337-1, Ø16 - 20 mm**

Chip-breakers pressed & polished

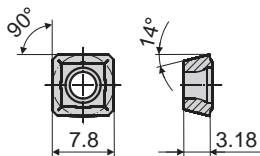
	WP 337-1 16/20	655.910	15°	P35	C (TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	++	+						+	+
	WP 337-1 16/20	655.911	15°	P40	C (TiCN)	+	+	+	+	+		+	+		++	++	+

Circumference ground, chip-breakers pressed

	WP 337-1 16/20	655.912	15°	M35	C (TiCN)	+	+	++	+	+	+			++		+	++
	WP 337-1 16/20	655.913	15°	K40								++				+	+

Torx Plus T7 IP M2.5x5.8      694.123

Torx Plus T7 IP      694.189



**WP 337-2, Ø21 - 25 mm**

Chip-breakers pressed & polished

	WP 337-2 21/25	655.920	15°	P35	C (TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	++	+						+	+
	WP 337-2 21/25	655.921	15°	P40	C (TiCN)	+	+	+	+	+		+	+		++	++	+

Circumference ground, chip-breakers pressed

	WP 337-2 21/25	655.922	15°	M35	C (TiCN)	+	+	++	+	+	+			++		+	++
	WP 337-2 21/25	655.923	15°	K40								++				+	+

Torx Plus T7 IP M3x6      694.130

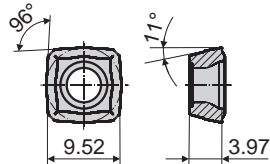
Torx Plus T7 IP      694.189

- $\gamma$  Rake angle with insert on tool.
- Clamping screw (10 screws and 1 wrench)
- Inserts are sold in packages of 10 pieces.
- \* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice

# Inserts for Indexable Insert Drills

Insert						Work Piece Material								Machining			
Insert Shape	Model	Order No.	Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast iron GG	Cast iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 54$ HRC	Ni/Co Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



WP 337-3,  $\varnothing 26 - 30$  mm

Chip-breakers pressed & polished

	WP 337-3 26/30	655.930	15°	P35	C (TiCN-Al <sub>2</sub> O <sub>3</sub> -TiN)	++	++	+	++	+						+	+
	WP 337-3 26/30	655.931	15°	P40	C (TiCN)	+	+	+	+	+		+	+		++	++	+

Circumference ground, chip-breakers pressed with dimples

	WP 337-3 26/30	655.932	15°	M35	C (TiCN)	+	+	++	+	+	+			++		+	++
	WP 337-3 26/30	655.933	15°	K40								++				+	+

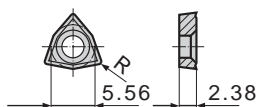
Torx Plus T10 IP M3.5x8.2 694.136



Torx Plus T10 IP 694.192

Insert								Work Piece Material							Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 54$ HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert

## WCMT 0302



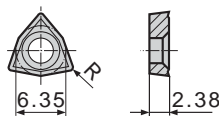
Chip-breakers pressed & polished

	WCMT 0302	655.620	08	FN	15°	P45	C (TiCN-TiN)	++	++		+	+						+	+
	WCMT 0302	655.622 *	08	FN	15°	P45	C (TiCN)	+	+	++								+	+
	WCMT 0302	655.621	08	FN	15°	K20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)				++	++	+					+	+

Torx Plus T7 IP M2.2x6 694.110

Torx Plus T7 IP 694.189

## WCMT 0402



Chip-breakers pressed & polished

	WCMT 0402	655.630	08	FN	15°	P45	C (TiCN-TiN)	++	++		+	+						+	+
	WCMT 0402	655.632	08	FN	15°	P45	C (TiCN)	+	+	++								+	+
	WCMT 0402	655.631	08	FN	15°	K20	C (Al <sub>2</sub> O <sub>3</sub> -TiN)				++	++	+					+	+

Torx Plus T7 IP M2.5x6.3 694.124

Torx Plus T7 IP 694.189

$\gamma$  Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.



\* As long as stock lasts.

	= less suitable
+	= suitable
++	= first choice


Insert								Work Piece Material							Machining				
Insert Shape	Model	Order No.	Radius [mm]	Rake Angle $\gamma$	Grade	Coating		Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 54$ HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert

**WCMT 0503**

Chip-breakers pressed & polished

	WCMT 0503	655.640	08	FN	15°	P45	C (TiN)	++	++	++	+	+						+	+
	WCMT 0503	655.644	08	FN	15°	P40	C (TiN)	++	++	++	+	+					++	++	+
	WCMT 0503	655.641	08	FN	15°	K20	C (TiCN-Al <sub>2</sub> O <sub>3</sub> )				++	++	+					+	+

Chip-breakers pressed with dimples

	WCMT 0503	655.642	08	FN	15°	P45	C (TiN)	++		+							++		++
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 Torx Plus T9 IP M3x8.2 694.131

 Torx Plus T9 IP 694.191


B.5

**WCMT 06T3**

Chip-breakers pressed & polished

	WCMT 06T3	655.650	08	FN	15°	P45	C (TiN)	++	++	++	+	+						+	+
	WCMT 06T3	655.654	08	FN	15°	P40	C (TiN)	++	++	++	+	+					++	++	+
	WCMT 06T3	655.651	08	FN	15°	K20	C (TiCN-Al <sub>2</sub> O <sub>3</sub> )				++	++	+					+	+

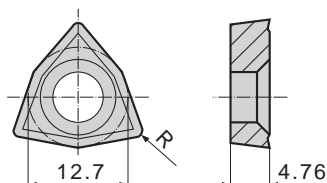
Chip-breakers pressed with dimples

	WCMT 06T3	655.652	08	FN	15°	P45	C (TiN)	++		+							++		++
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 Torx Plus T10 IP M3.5x9.2 694.137



 Torx Plus T10 IP 694.192

Insert							Work Piece Material							Machining					
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 54$ HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert




## WCMT 0804

Chip-breakers pressed & polished

	WCMT 0804	655.660	12	FN	15°	P45	C (TiN)	++	++	++	+	+						+	+
	WCMT 0804	655.664	12	FN	15°	P40	C (TiN)	++	++	++	+	+					++	++	+
	WCMT 0804	655.661	12	FN	15°	K20	C (TiCN-Al <sub>2</sub> O <sub>3</sub> )				++	++	+					+	+


Chip-breakers pressed with dimples

	WCMT 0804	655.662	12	FN	15°	P45	C (TiN)	+		+						++			++
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 Torx Plus T15 IP M4x11.8      694.143

Torx T15 M4x8.2      336.905

For drills with pockets

 Torx Plus T15 IP      694.193

Torx T15      690.186

$\gamma$  Rake angle with insert on tool.

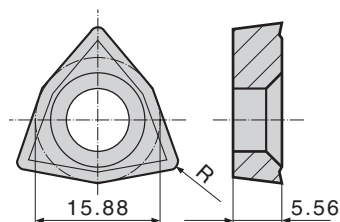
 Clamping screw (10 screws and 1 wrench)

Inserts are sold in packages of 10 pieces.

	= less suitable
+	= suitable
++	= first choice

# Inserts for Indexable Insert Drills

Insert							Work Piece Material							Machining				
Insert Shape	Model	Order No.	Radius [mm]	Rake Angle $\gamma$	Grade	Coating	Construction Steels	Heat Treatable Steels	Stainless Steels	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\leq 54$ HRC	NiCo Alloys/Titanium	Long Chipping Materials	Tough Materials	Inner Insert	Outer Insert



## WCMT 1005

Chip-breakers pressed & polished

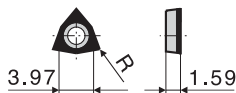
	WCMT 1005	655.670	12	FN	15°	P45	C (TiCN)	++	++	++	++	++						+	+	
	WCMT 1005	655.671	12	FN	15°	K20					+	+	+						+	+

Torx Plus T20 IP M5x13.3 694.150

Torx Plus T20 IP 694.194

Insert							Work Piece Material						Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\geq 52$ HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

**WCGW 02**



Full face made with CBN/PCD, 3 cutting edges

	WCGW 0201	938.883	02	FN	0°	PCD			++			++	++		+		+
	WCGW 0201	938.884	02	FN	0°	CBN-10		++					++	+	+		
	WCGW 0201	938.885	02	FN	0°	CBN-25				++	+		++				



One cutting edge made with CBN

	WCGW 0201	948.101	02	TN	0°	CBN-30				++			++		++	++	
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Torx Plus T6 IP M2x3.6 694.101

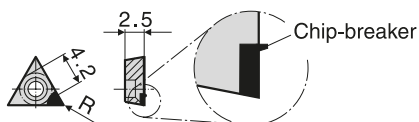
Torx Plus T6 IP 694.188

$\gamma$  Rake angle with insert on tool.  
 Clamping screw (10 screws and 1 wrench)  
 CBN/PCD inserts are sold individually.

	= less suitable
+	= suitable
++	= first choice



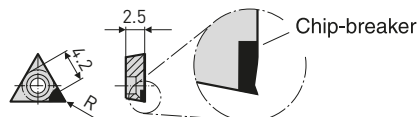
Insert							Work Piece Material						Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake angle $\gamma$	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\geq 52$ HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC



## TPGW 07

One cutting edge made with PCD

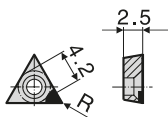
	TPGW 0702	948.201	04	FL	5°	PCD			+			++	++		+		++
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## TPGT 07

One cutting edge made with PCD

	TPGT 070202	948.202	02	FL	8°	PCD			++								
	TPGT 070204	948.203	04	FL	8°	PCD			++								



## TPGW 07

One cutting edge made with PCD/CBN

	TPGW 0702	938.840	03	FN	5°	PCD			++			++	++		+		+
	TPGW 0702	948.210	02	FN	5°	CBN-15	++	++		+			+	+			
	TPGW 0702	938.837	03	FN	5°	CBN-10	++	+		+			+				
	TPGW 0702	948.211	04	FN	5°	CBN-15	++	++		+			+		+		
	TPGW 0702	948.230	02	TN	5°	CBN-15	++	++					++	+	++		
	TPGW 0702	938.879	03	TN	5°	CBN-10	++	+					++		++		
	TPGW 0702	948.231	04	TN	5°	CBN-15	++	++					++		++	+	
	TPGW 0702	948.270	01	TN	5°	CBN-30				++			++	+	+		
	TPGW 0702	948.271	03	TN	5°	CBN-30				++			++		++	+	
	TPGW 0702	938.880*	03	TN	5°	CBN-25				++			++		+	+	

## TPGW 07

Three cutting edges made with CBN

	TPGW 0702	948.252	02	FN	5°	CBN-30				++	++		+	+			
	TPGW 0702	948.251A	03	FN	5°	CBN-30				++	++		+				
	TPGW 0702	948.253	04	FN	5°	CBN-30				++	++		+				

Torx Plus T6 IP M2x4.8  
Torx Plus T6 IP M2x4.1

694.103  
694.102 <sup>1)</sup>



Torx Plus T6 IP

694.188

Insert							Work Piece Material						Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\geq 52$ HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

**TCMW 11**

One cutting edge made with PCD

	TCMW 1102	948.301	04	FL	0°	PCD			+			++	++		+		++
	TCMW 1102	948.302	08	FL	0°	PCD			+			++	++		+		++

**TCGT 11**

One cutting edge made with PCD

	TCGT 110202	948.373	02	FL	8°	PCD			++			++	++		+		++
	TCGT 110204	948.374	04	FL	8°	PCD			++			++	++		+		++
	TCGT 110208	948.375	08	FL	8°	PCD			++			++	++		+		++

**TCMW 11**

One cutting edge made with PCD/CBN

	TCMW 1102	938.841	04	FN	5°	PCD			++			+	++		+		+
	TCMW 1102	948.310	02	FN	0°	CBN-15	++	++			+		++	++			
	TCMW 1102	948.311	04	FN	0°	CBN-15	++	++			+		++	+	+		
	TCMW 1102	948.312	08	FN	0°	CBN-15	++	++			+		++		+		
	TCMW 1102	938.834	04	FN	0°	CBN-10	++	+			+		++	+	+		
	TCMW 1102	948.330	02	TN	0°	CBN-15	++	++					++		+		
	TCMW 1102	948.331	04	TN	0°	CBN-15	++	++					++		+		
	TCMW 1102	948.332	08	TN	0°	CBN-15	++	++					++		++	+	
	TCMW 1102	938.876	08	TN	0°	CBN-10	++	+					++		+		
	TCMW 1102	938.878*	04	FN	0°	CBN-25					++	+		+			
	TCMW 1102	948.370	02	TN	0°	CBN-30					++		++	+	+		
	TCMW 1102	948.371	04	TN	0°	CBN-30					++		++		++		
	TCMW 1102	948.372	08	TN	0°	CBN-30					++		++		++	+	

**TCMW 11** Three cutting edges made with CBN

	TCMW 1102	948.350A	02	FN	0°	CBN-30				++	++		+	+			
	TCMW 1102	948.351A	04	FN	0°	CBN-30				++	++		+				
	TCMW 1102	948.352A	08	FN	0°	CBN-30				++	++		++		+		

\* As long as stock lasts.

$\gamma$  Rake angle with insert on tool.

Clamping screw (10 screws and 1 wrench)

<sup>1)</sup> For insert holders 615.205/615.207/615.507/615.508/615.271

CBN/PCD inserts are sold individually.

	= less suitable
+	= suitable
++	= first choice

Torx Plus T7 IP M2.5x6.5

694.122



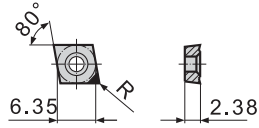
Torx Plus T7 IP

694.189

# CBN/PCD Inserts for Fine and Rough Boring Heads

Insert							Work Piece Material						Machining				
Insert Shape	Model	Order No.	Radius [mm]		Rake Angle $\gamma$	Grade	Cast Iron GG	Cast Iron GGG	AL / Non-Ferrous Metals	Hardened Steel $\geq 52$ HRC	NiCo Alloys/Titanium	Carbon Fiber	High Volume Machining	Unfavorable Conditions	Slightly Interrupted Cut	Heavily Interrupted Cut	HSC

## CCGT/W 06



One cutting edge made with PCD/CBN

	CCGT 0602	938.866	04	FL	5°	PCD			++			++	++		+		
	CCGW 0602	938.867	04	FN	0°	CBN-10	++	+					++				

Torx Plus T7 IP M2.5x6.5

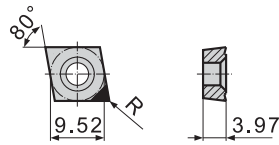
694.122



Torx Plus T7 IP

694.189

## CCGT/W 09



One cutting edge made with PCD/CBN

	CCGT 09T3	938.868	04	FL	5°	PCD			++			++	++		+		
	CCGW 09T3	938.869	04	FN	0°	CBN-10	++	+					++				
	CCGW 09T3	938.835	08	FN	0°	CBN-10	++	+					++		+		

Torx Plus T15 IP M4x9.2

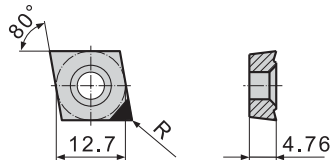
694.141



Torx Plus T15 IP

694.193

## CCGT/W 12



One cutting edge made with PCD/CBN

	CCGT 1204	938.870	04	FL	5°	PCD			++			++	++	+	+		
	CCGT 1204	938.871	08	FL	5°	PCD			++			++	++		+		
	CCGW 1204	938.862	08	FN	0°	CBN-10	++	+					++		+		

Torx Plus T20 IP M5x13.3

694.150



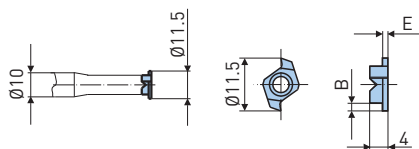
Torx Plus T20 IP

694.194

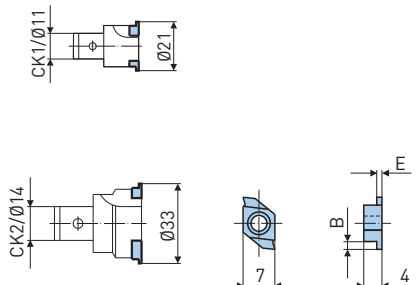
CBN/PCD inserts are sold individually.

Carbide inserts for circlip grooves as per DIN 472

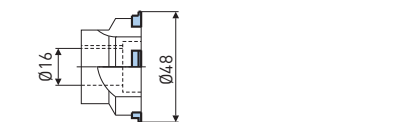
Insert			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Capacity D	Width of Groove E	Depth of Groove B	Cast Iron	Steel	Aluminium



Type 0	Order No.	Grade	Capacity D	Width of Groove E	Depth of Groove B	Cast Iron	Steel	Aluminium
	958.052	K20	12 - 24	1.15	0.9	++		
	958.051	P20					++	
	958.053	K20					++	
	958.056	K20				++		
	958.055	P20	12 - 24	1.35	1.3		++	
Blank	958.057	K20						++
	958.313	K20						
	958.314	P20						



Type 1	Order No.	Grade	Capacity D	Width of Groove E	Depth of Groove B	Cast Iron	Steel	Aluminium
	958.062	K20	22 - 34	1.15	1.1	++		
	958.061	P20					++	
	958.063	K20						++
	958.066	K20				++		
	958.065	P20	22 - 34	1.35	1.5		++	
	958.067	K20						++
	958.072	K20				++		
	958.071	P20	34 - 50	1.65	1.6		++	
	958.073	K20						++
	958.076	K20				++		
	958.075	P20	34 - 50	1.90	2.0		++	
	958.077	K20						++
	958.082	K20				++		
	958.081	P20	50 - 85	2.20	2.2		++	
	958.083	K20						++
958.086	K20				++			
958.085	P20	50 - 85	2.70	2.6		++		
958.087	K20						++	
Blank	958.157	K20						
	958.158	P20						



Type 2	Order No.	Grade	Capacity D	Width of Groove E	Depth of Groove B	Cast Iron	Steel	Aluminium
	958.092	K20	> 85	3.20	3.0	++		
	958.091	P20					++	
	958.093	K20						++
	958.096	K20				++		
	958.095	P20	> 85	4.20	3.5		++	
Blank	958.097	K20						++
	958.155	K20						
	958.156	P20						

Torx T8 M3x9.0 958.048

Torx T8 694.183

Torx T20 M5x16.5 958.049

Torx T20 694.187

Clamping screw (10 screws and 1 wrench)  
Inserts are sold individually.

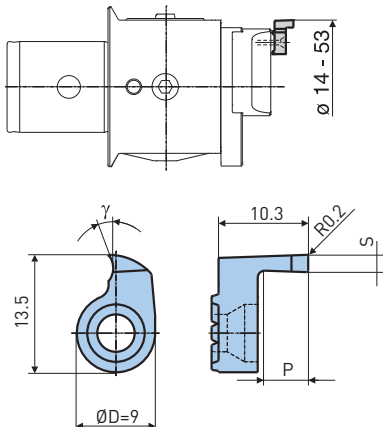
= less suitable  
 = suitable  
 = first choice

B.5

# Inserts for Face Grooving

## Inserts for face grooves, Ø 14 - 53

(Insert holder, boring head EWN/EWE 2 - 152)



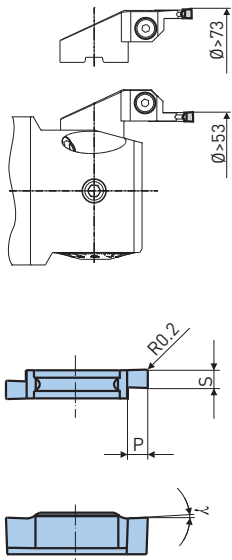
Insert			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Rake Angle $\gamma$	Width of Groove S	Depth of Groove P	Cast iron	Steel	Aluminium
	958.501	P30C	20°	2.0	5.0	++	++	++
	958.502			2.5		++	++	++
	958.503			3.0		++	++	++

Torx Plus T15 IP M4x11.8 694.143

Torx T15 IP 694.193

## Inserts for face grooves, Ø 53 - 3040

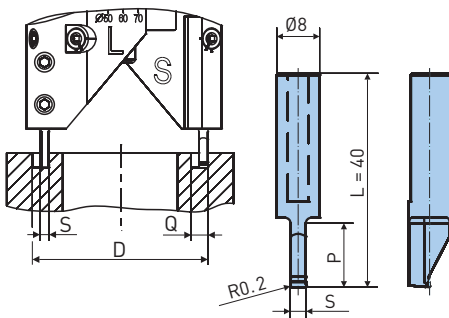
(Insert holder, boring heads EWN/EWE 53 - 100, EWN 150, EWN/EWE 200, Series 310/317/318)



Insert			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Rake Angle $\gamma$	Width of Groove S	Depth of Groove P	Cast iron	Steel	Aluminium
	958.425	P20C	5°	2.5	2.7	++	++	
	958.430			3.0	3.3	++	++	
	958.433			3.3	3.6	++	++	
	958.435			3.5	3.8	++	++	
	958.440			4.0	4.3	++	++	
	958.475	K10	15°	2.5	2.7			++
	958.480			3.0	3.3			++
	958.483			3.3	3.6			++
	958.485			3.5	3.8			++
	958.490			4.0	4.3			++

1. Further sizes on request

Insert holder, boring head SW 53 - 148, Series 318

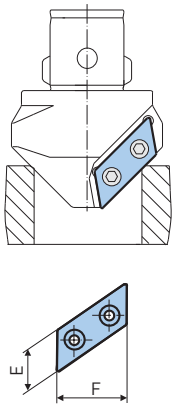



Grooving Cutter			Dimensions			Work Piece Material		
Insert Shape	Order No.	Grade	Rake Angle $\gamma$	Width of Groove S	Depth of Groove P	Cast iron	Steel	Aluminium
	958.611	K40C	7°	2.0	12	++	++	
	958.612			3.0		++	++	
	958.613			4.0		++	++	
	958.614			5.0		++	++	
	958.601	K40	7°	2.0	12			++
	958.602			3.0				++
958.603	4.0						++	
958.604			5.0				++	

K10/K40 = Uncoated carbide

P20C/30C/P40C = Coated carbide AlCrN

Inserts for chamfering mills C-Cutter 45°



Insert					Dimensions		Screws/Wrench			Work Piece Material		
Insert Shape	Insert Type	Order No.	Grade	Capacity D	F	F	Screws	Type	Wrench	Cast Iron	Steel	Aluminium
	CW1206	978.283	P30	5 - 25	6.35	12.7	978.284	T6	690.834	++	+	
		800.951	P20C							+	++	
		801.753	N20C									++
	CW1909	978.817	P30	10 - 40 and 30 - 60	9.525	19.05	801.696	T10	690.837	++	+	
		800.952	P20C							+	++	
		801.754	N20C									++
CW3115	978.826	P30	50 - 100	18.875	31.75	801.699	T20	690.838	++	+		
	800.953	P20C							+	++		
	801.755	N20C									++	

1. Inserts are sold individually.

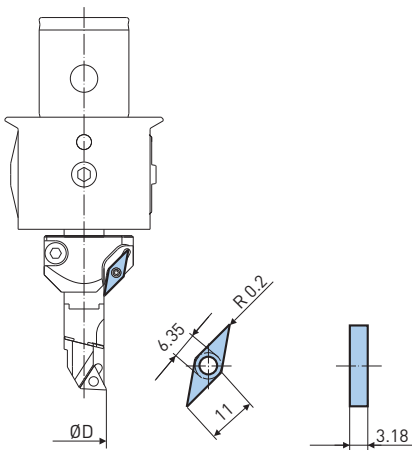



Torx Plus T8 IP

694.190


Inserts for chamfering rings 45°, diameter range Ø 12.6 - 39.5 mm

(Boring heads EWN/EWE 2 - 32, EWN/EWE 2 - 152, Series 112)



Insert							Work Piece Material		
Insert Shape	Model	Order No.	Grade	Capacity D	Rake Angle $\gamma$	Cast Iron	Steel	Aluminium	
	VCMT 110302	655.821	P20C	12.6 - 39.5	15°	++	++		
	VCGT 110302	655.822	K20		23°			++	

1. Inserts are sold in packages of 10 pieces.

 Torx Plus T8 IP M2.5x8.7

694.125

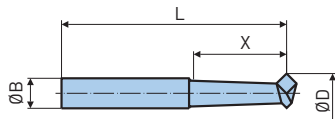


Torx Plus T8 IP

694.190

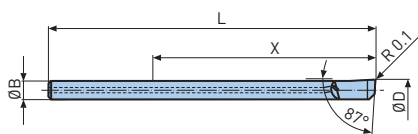
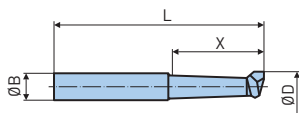
## Boring cutters for fine boring heads, Series 112

Boring Cutter				Dimensions			Work Piece Material		
Shape	Order No.	Grade	Capacity D	X	B	L	Cast Iron	Steel	Aluminium



	612.110 *	HSS	0.4 - 0.7	3	4	27		+	+
	612.111 *		0.6 - 1.0	3		28		+	+
	612.112 *		0.9 - 1.5	4		28		+	+
	612.113 *		1.2 - 1.8	5		29		+	+
	612.114 *		1.5 - 3.5	7		31		+	+
	612.116 *		3.0 - 5.5	14		38		+	+
	612.117 *		5.0 - 7.5	22		38		+	+
	612.213 *	HSS	7.0 - 9.5	28	10	56		+	+
	612.215 *		13.0 - 17.5	54		80		+	+
	611.115	K10	2.0 - 3.5	9	4	33	+	+	+
	611.116		3.0 - 5.5	14		38	+	+	+
	611.117	K10	5.0 - 7.5	22	10	38	+	+	+
	611.212		5.0 - 7.5	22		50	+	+	+
	611.213	K10	7.0 - 9.5	28	10	56	+	+	+
	611.214		9.0 - 13.5	32		64	+	+	+
	611.215		13.0 - 17.5	54		80	+	+	+

## Counter boring cutters for fine boring heads, Series 112



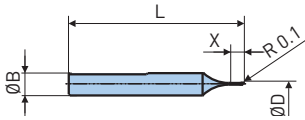
	611.152	K10	0.9 - 1.5	4	4	25	+	+	+
	611.153		1.2 - 1.8	6		27	+	+	+
	611.154		1.5 - 3.5	7		28	+	+	+
	611.155		2.0 - 3.5	9		30	+	+	+
	611.156		3.0 - 5.5	14		35	+	+	+
	611.157		5.0 - 7.5	22		38	+	+	+
			611.252 *	HSS		5.0 - 7.5	22	10	50
611.253 *		7.0 - 9.5	28		56	+	+		+
611.254 *		9.0 - 13.5	32		65	+	+		+
611.255 *		13.0 - 17.5	55		80	+	+		+
	612.253 *	K10	7.0 - 9.5	28	10	56		+	+
	612.254 *		9.0 - 13.5	32		65		+	+
	612.255 *		13.0 - 17.5	55		80		+	+
	615.203	K10	4.0 - 6.0	42	3.5	62		+	+
	615.203A	K10C						+	++
	615.204	K10	5.0 - 7.0	54	4.5	74		+	+
	615.204A	K10C						+	++

K10 = Uncoated carbide  
 HSS = High speed steel  
 K10C = Coated carbide AlCrN  
 \* As long as stock lasts.

  = less suitable  
+ = suitable  
++ = first choice

Counter boring cutters for fine boring heads, EWN 04-7

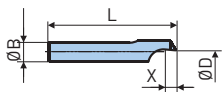
Boring Cutter				Dimensions				Work Piece Material		
Shape	Order No.	Grade	Capacity D	X	B	L	R	Cast Iron	Steel	Aluminium



	615.541	K10C	0.4 - 0.9	1.5	4	30	0.05	+	++	++
	615.542		0.9 - 1.4	3				+	++	++
	615.543		1.4 - 2.0	5				+	++	++
	615.544		1.9 - 3.0	6				+	++	++
	615.545		2.9 - 4.0	10				+	++	++
	615.546		3.9 - 5.0	13				+	++	++
	615.547		4.9 - 7.0	16				+	++	++
	615.561		0.4 - 0.6	1.1				+	++	++
	615.562		0.6 - 0.8	1.5				+	++	++
	615.563		0.8 - 1.2	2				+	++	++
	615.564		1.2 - 1.5	2.5				+	++	++
	615.565		1.5 - 1.9	3.5				+	++	++
	615.566	1.9 - 3.0	4.5	+		++	++			
	615.551	K10	0.4 - 0.6	1.1		+	+	+		
	615.552		0.6 - 0.8	1.5		+	+	+		
	615.553		0.8 - 1.2	2		+	+	+		
	615.554		1.2 - 1.5	2.5		+	+	+		
	615.555		1.5 - 1.9	3.5		+	+	+		
	615.571	CBN-20	1.4 - 2.0	3.5		+	++			
	615.572		1.9 - 3.0	4.5		+	++			
	615.573		2.9 - 4.0	8		+	++			
	615.574		3.9 - 5.0	11		+	++			
	615.575		4.9 - 6.0	16		+	++			

OD turning

The boring cutters are made with flat for cutting edge orientation.



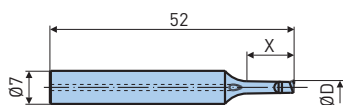
	615.590	K10C	0.2 - 2.3	2.2	4	25		+	++	++
--	---------	------	-----------	-----	---	----	--	---	----	----

K10 = Uncoated carbide  
K10C = Coated carbide AlCrN

= less suitable  
+ = suitable  
++ = first choice



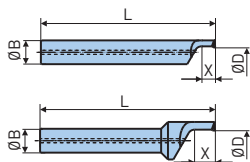
## Counter boring cutters for fine boring heads, EWB 04-12 / EWN04-15



Boring Cutter				Dimensions			Work Piece Material		
Shape	Order No.	Grade	Capacity D	X	B	L	Cast Iron	Steel	Aluminium

	615.522	K10C	0.4 - 1.0	1.5	7	52	+	++	++
	615.524		0.9 - 1.5	3			+	++	++
	615.525		1.4 - 2.0	5			+	++	++
	615.501		1.9 - 3.0	6			+	++	++
	615.502		2.9 - 4.0	10			+	++	++
	615.503		3.9 - 5.0	13			+	++	++
	615.504		4.9 - 6.0	16			+	++	++

### OD turning



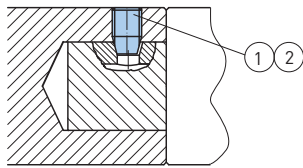
	615.530	K10C	0.2 - 3.0	4	7	52	+	++	++
	615.531	K10C	2.0 - 6.0	6	7	52	+	++	++

## Spare Parts

<b>Modular Components Shanks</b>	<b>418 - 420</b>
<b>Indexable Insert Drills / Rough Boring Heads / Insert Holders</b>	<b>421 - 428</b>
<b>Fine Boring Heads / Centric Insert Holders</b>	<b>429 - 431</b>
<b>Fine Boring Heads / Peripheral Insert Holders</b>	<b>432 - 433</b>
<b>Series 318/317 Large Diameter Boring Tools</b>	<b>434 - 437</b>
<b>Face Grooving / OD Turning / Chamfering / Milling</b>	<b>438 - 439</b>
<b>Tool Holders / Tapping Attachments</b>	<b>440</b>
<b>Screws and Wrenches</b>	<b>441 - 442</b>

## CKB connection

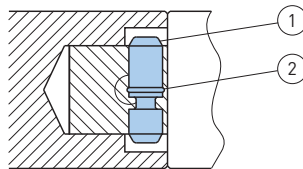
### CK- screws and allen wrenches



Clamping Screw					Allen Wrench		
CK	A	B	①	M [Nm] *	CK	SW	②
CK1	M4 x 0.5	5	690.431	1.5	CK1	2	690.801
CK2	M5 x 0.5	6.5	690.432	3.0	CK2	2.5	690.802
CK3	M6 x 0.75	8.5	690.433	4.5	CK3	3	690.803
CK4	M8 x 0.75	11	690.434	7.0	CK4	4	690.804
CK5	M10 x 1	14	690.435	14.0	CK5	5	690.805
CK5	M10 x 1	12	690.594 *	14.0	CK5	5	690.805
CK6	M12 x 1	18	690.436	24.0	CK6	6	690.806
CK7	M20 x 1.5	29	690.437	45.0	CK7	10	690.808

1. \*\* Shanks 326.005 / 329.866

### Cross bolts and locking rings

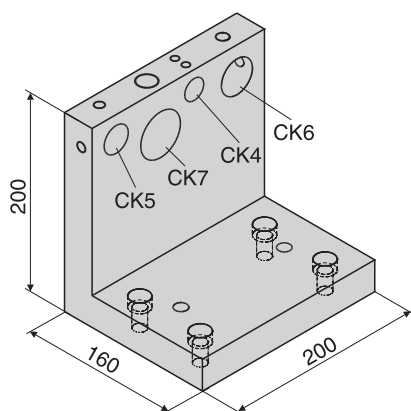


Cross Bolts				O-Ring	Snap Ring
CK	A	B	①	②	②
CKB1	4	13.5	691.501	692.270	
CKB2	5	17	691.502	692.271	
CKB3	7	22	691.503	692.272	
CKB4	8.5	26.5	691.504	692.286	
CKB5	11	33	691.505		693.304
CKB6	14	43	691.506		693.305
CKB7	18	56	691.507		693.306

## CKS connection

### B.6 Assembling device for reductions and extensions

The assembly device is used to tighten and loosen the CKS thread bushings in reductions and extensions. The CK connectors of reductions and extensions in the system sizes CK4 - CK7 can be mounted from both sides into the assembly device.

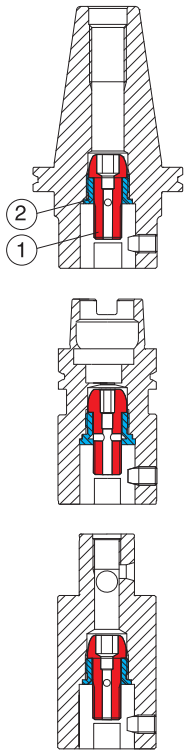


Order No.
662.600

\* M = Recommended torque for tightening the screws

CKS connection

CKS components



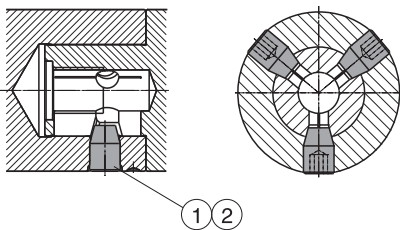
		Tension Screw			Thread Bushing	Socket Wrench with Thread	Socket Wrench		
ISO	CKS	A		M [Nm] *			L	SW	
40	CKS4	M12 x 1.5	690.126	100	690.654	690.851	140	8	690.847
	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.128	120	690.656	690.853	140	10	690.848
50	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.129	160	690.656	690.853	180	12	690.855
	CKS7	M24 x 2	690.130	200	690.657	690.854	150	14	690.850

HSK	CKS	A		M [Nm] *			L	SW	
63	CKS4	M12 x 1.5	690.126	100	690.654	690.851	140	8	690.847
	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.167	100	690.656	690.853	140	8	690.847
100	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.128	120	690.656	690.853	140	10	690.848
	CKS7	M24 x 2	690.168	120	690.657	690.854	140	10	690.848

	CKS4	M12 x 1.5	690.126	100	690.654	690.851	140	8	690.847
	CKS5	M14 x 1.5	690.127	100	690.655	690.852	140	8	690.847
	CKS6	M18 x 2	690.129	160	690.656	690.853	140	12	690.849
	CKS7	M24 x 2	690.130	200	690.657	690.854	150	14	690.850

CKN connection

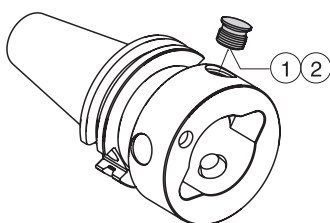
CK- screws and allen wrenches



	Clamping Screws				Allen Wrenches	
CKN	A	B	①	M [Nm] *	SW	②
CKN6	M12 x 1	18	690.436	24	6	690.806
CKN7	M20 x 1.5	29	690.437	45	10	690.808

B.6

Blind screws

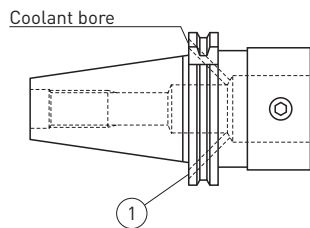



	Blind Screws		Allen Wrenches	
Type	①	SW	②	
CKN6	690.666	6	690.806	
CKN7	690.667	10	690.810	

\* M = Recommended torque for tightening the screws

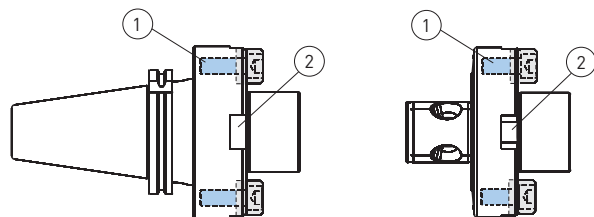
## Shanks



### Set screws for coolant bores



		
ISO	①	Remarks
30	690.451	
	690.451	
40	690.576	Only for shanks 323.826, 326.041
	690.419	Only for shank 326.163
50	690.576	

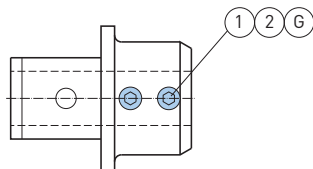
### Shanks and tool holders for bridge tools Series 318, Ø 620 - 3 000 mm





		
Type	①	②
328.215	690.131	691.637
328.213	690.131	
328.214	690.131	
328.217N	690.172	

### Tool holders and shanks for carbide boring bars

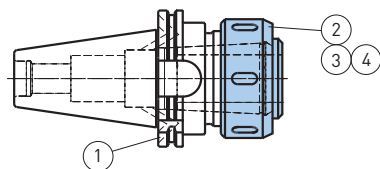
#### Clamp screws and Allen wrenches for tool holders with CK connection







				
Type	①	M [Nm] *	G	②
335.301	690.460	8	M8	690.804
335.302	690.452	15	M10	690.805
335.312	690.469	15	M10	690.805
335.313	690.484	75	M20	690.810

## B.6

### Clamp nuts, hook wrenches and set screws for collet holders



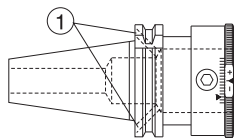
					
Type	①	②	M [Nm] *	③	④
335.342		951.108	160	951.109	951.149
335.343	690.451	951.108		951.109	
335.344	690.418	951.108		951.109	
335.352		951.128	220	951.129	
335.353	690.576	951.128		951.129	
335.354	690.576	951.128		951.129	

1. ④ Hook attachment for torque wrench

\* M = Recommended torque for tightening the screws

## Adjustable drill holder

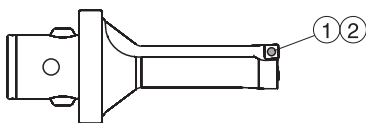
### Set screws for coolant bores



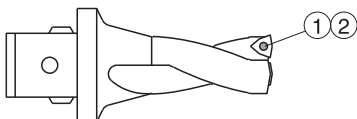
Type	①
336.301	690.451
336.302	690.419
336.303	690.419
336.304	690.573

## Indexable insert drills, Series 336/337

### Clamp screws for inserts

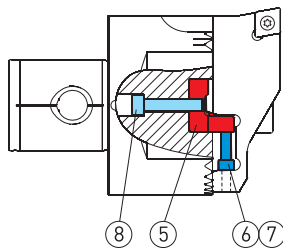
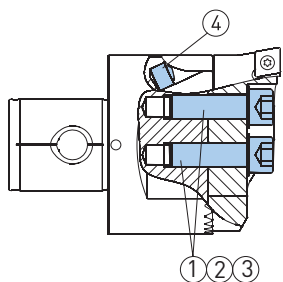


Type	①**	M [Nm] *	②
WP 337-1	694.123	0.7	694.807
WP 337-2	694.130	0.7	694.807
WP 337-3	694.136	1.8	694.810



Type	①**	M [Nm] *	②
WC 03	694.110	0.7	694.807
WC 04	694.124	0.7	694.807
WC 05	694.131	0.5	694.809
WC 06	694.137	1.8	694.810
WC 08	694.143	3.0	694.815
WC 10	694.150	6.0	694.820

## Boring heads for roughing SW, Series 319



Type	①	②	M [Nm] *	③	④	⑤	⑥	⑦	⑧
SW20	690.188	693.175	4.0	690.803		319.150	690.191	690.819	690.184
SW25	690.157	693.176	7.0	690.804		319.250	690.192	690.819	690.186
SW32	690.108	693.177	12.0	690.805		319.350	690.193	690.811	690.189
SW41	690.163	693.178	20.0	690.806		319.450	690.194	690.812	690.189
SW53	690.105	693.179	35.0	690.807	692.409	319.550	690.195	690.812	690.189
SW68	690.106	693.179	35.0	690.807	692.406	319.650	690.196	690.813	690.101
SW98 x CKB6	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.108
SW98 x CKB7	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.173
SW148 x CKB6	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.108
SW148 x CK7	690.970	693.187	40.0	690.810	692.406	319.750	690.197	690.814	690.173

\* M = Recommended torque for tightening the screws

\*\*Per package: 10 screws and 1 wrench

## Insert holders

	Type CC			Type SC/SP			Type WC		
Type	D			D			D		

### Preferential line

SW20	20 - 26	639.411	639.412	20 - 26	639.111	639.112			
	25 - 31	639.415	639.416						
SW25	25 - 33	639.421	639.422	25 - 33	639.121	639.122			
	32 - 40	639.425	639.426						
SW32	32 - 42	639.431	639.432	32 - 42	639.131	639.132			
	41 - 51	639.435	639.436	41 - 51	639.135	639.136			
SW41	41 - 54	639.441	639.442	41 - 54	639.141	639.142	49 - 62	639.241	639.242
	53 - 66	639.445	639.446	53 - 66	639.145	639.146			
SW53	53 - 70	639.451	639.452	53 - 70	639.151	639.152	59 - 76	639.251	639.252
	69 - 86	639.455	639.456	69 - 86	639.155	639.156	69 - 86	639.255	639.252
SW68	68 - 90	639.461	639.462	68 - 90	639.161	639.162	73 - 95	639.261	639.262
	88 - 110	639.465	639.466	88 - 110	639.165	639.166	90 - 112	639.265	639.266
SW98	98 - 126	639.471	639.472	98 - 126	639.171	639.172	106 - 134	639.271	639.272
	125 - 153	639.475	639.476	125 - 153	639.175	639.176	131 - 159	639.275	639.276
SW148	148 - 176	639.481	639.482	148 - 176	639.181	639.182	156 - 184	639.281	639.282
	175 - 203	639.485	639.486	175 - 203	639.185	639.186	181 - 209	639.285	639.286

### Additional line

SW68	68 - 90	639.561	639.562
	88 - 110	639.565	639.566
SW98	98 - 126	639.571	639.572
	125 - 153	639.575	639.576
SW148	148 - 176	639.581	639.582
	175 - 203	639.585	639.586

## Clamp screws for inserts

Type	**	M [Nm] *	
CC 06	694.122	0.7	694.807
CC 09	694.141	3.0	694.815
CC 12	694.150	6.0	694.820
CC 16	694.150	6.0	694.820

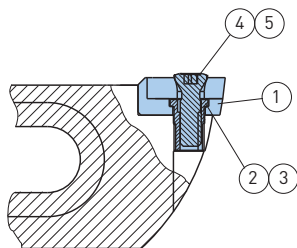
Type	**	M [Nm] *	
SP 06	694.122	0.7	694.807
SC 09	694.141	3.0	694.815
SC 12	694.150	6.0	694.820

Type	**	M [Nm] *	
WC 04	694.124	0.7	694.807
WC 05	694.131	1.5	694.809
WC 06	694.137	1.8	694.810

\* M = Recommended torque for tightening the screws

\*\*Per package: 10 screws and 1 wrench

## Insert holders SW, for chamfering



Type	①	②	③		④ **	M [Nm] *	⑤
639.191	695.101	691.756	690.899	SC 09	694.138	3.0	694.815
639.192	695.101	691.756	690.899		694.138		694.815
639.193	695.101	691.755	690.899		694.138		694.815
639.194	695.102	691.757	690.804	SC 12	694.145	3.0	694.815
639.195	695.102	691.757	690.804		694.145		694.815
639.196	695.102	691.757	690.804		694.145		694.815
639.197	695.102	691.757	690.804		694.145		694.815

## Insert holders SW, back boring



Type	① **	M [Nm] *	②	Type	① **	M [Nm] *	②
639.490	694.141	3.0	694.815	639.494	694.150	3.0	694.820
639.491	694.141		694.815	639.495	694.150		694.820
639.492	694.150	3.0	694.820	639.496	694.150		694.820
639.493	694.150		694.820	639.497	694.150		694.820

\* M = Recommended torque for tightening the screws

\*\* Per package: 10 screws and 1 wrench

## Insert holders for chamfering



Fig. 1

Fig. 2

Model	Fig. 1	Model	Fig. 2	Icon	Diameter Range					
					15° min - max	30° min - max	45° min - max	60° min - max	75° min - max	L ***
CHF-SW41SC09	639.191	DP-SW41	639.914	SC 09	33 - 60	36 - 62	39 - 63	43 - 63	45 - 62	51
CHF-SW53SC09	639.192	DP-SW53	639.915		45 - 76	48 - 78	51 - 79	55 - 79	57 - 78	58
CHF-SW68SC09	639.193	DP-SW68	639.916		61 - 97	64 - 99	67 - 100	71 - 100	73 - 99	68
CHF1-SW98SC12	639.194	DP-SW98	639.917	SC 12	77 - 126	81 - 128	86 - 129	90 - 128	94 - 127	73 / 89 / 119
CHF2-SW98SC12	639.195				104 - 153	108 - 155	113 - 156	117 - 155	121 - 154	
CHF1-SW148SC12	639.196	DP-SW148	639.918		131 - 180	135 - 182	140 - 183	144 - 182	148 - 181	
CHF2-SW148SC12	639.197			158 - 207	162 - 209	167 - 210	171 - 209	175 - 208	73 / 119	

1. \*\*\* Adjustment RSS

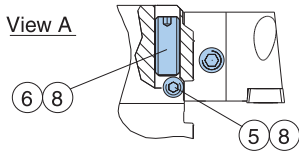
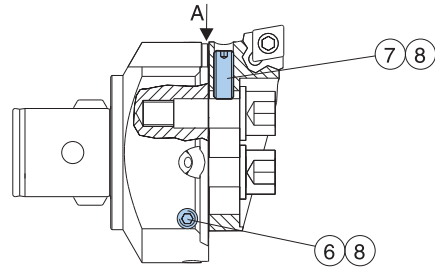
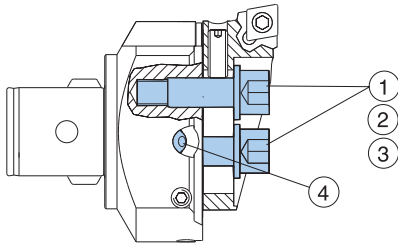
B.6

## Insert holders SW for back boring

Model	Fig. 1	Model	Fig. 2	Icon	ØD	A	B	L1	L2
BB44-54SW32CC09	639.490	DP-SW32	639.913	CC 09	44 - 54	31	D-17 / min. 31	24	38
BB53-66SW41CC09	639.491	DP-SW41	639.914		53 - 66	39	D-21 / min. 39	29	44
BB65-82SW53CC12	639.492	DP-SW53	639.915	CC 12	65 - 82	50	D-28 / min. 50	34	55
BB81-103SW68CC12	639.493	DP-SW68	639.916		81 - 103	63.5	D-27 / min. 63.5	41	66
BB102-130SW98CC12	639.494	DP-SW98	639.917		102 - 130	90	90	38	69 / 78 / 108
BB129-157SW98CC12	639.495				129 - 157				
BB156-184SW148CC12	639.496	DP-SW148	639.918		156 - 184	140	140	38	69 / 108
BB183-211SW148CC12	639.497			183 - 211					



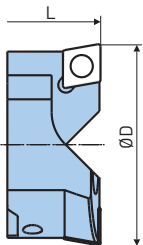
## Boring heads for roughing TW, Series 315



Type	①	②	M [Nm] *	③	④
TW20	315.160	693.180	4.0	690.803	
TW25	315.250	693.181	7.0	690.804	
TW32	315.350	693.182	12.0	690.805	
TW41	315.450	693.183	20.0	690.806	
TW53	315.550	693.184	35.0	690.807	692.409
TW68	315.650	693.184	35.0	690.807	692.406
TW98	315.750	693.185	40.0	690.810	692.406
TW148	315.750	693.185	40.0	690.810	692.406


Type	⑤	⑥	M [Nm] *	⑦	M [Nm] *	⑧
TW20	315.161	690.529	0.3	690.900	0.3	690.800
TW25	315.251	690.538	0.3	690.901	0.3	690.800
TW32	315.351	690.451	0.8	690.902	0.8	690.811
TW41	315.451	690.541	1.5	690.903	1.5	690.812
TW53	315.551	690.583	2.5	690.904	2.5	690.813
TW68	315.651	690.586	2.5	690.906	2.5	690.813
TW98	315.751	690.585	2.5	690.908	2.5	690.814
TW148	315.751	690.585	2.5	690.908	2.5	690.814

## Insert holders TW, Type CC for RSS



B.6

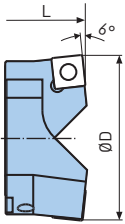
### Additional line


Insert Holders Type	ØD	L	Order No.	
TW68	68 - 90	71	638.561	CC 16
	88 - 110	71	638.562	
TW98	98 - 126	71	638.571	
	125 - 153	71	638.572	
TW98	98 - 126	87	638.571	
	125 - 153	87	638.572	
TW98 L	98 - 126	117	638.571	
	125 - 153	117	638.572	
TW148	148 - 176	71	638.571	
	175 - 203	71	638.572	
TW148	148 - 176	117	638.571	
	175 - 203	117	638.572	

1. The insert holders are sold in pairs.

\* M = Recommended torque for tightening the screws

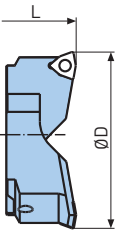
## Insert holders TW, Type SC/SP for RSS




Insert Holders			Order No.	
Type	ØD	L		
TW20	20 - 26	32.5	638.111	SP 06
TW25	25 - 33	35.5	638.121	
TW32	32 - 42	40	638.131	SC 09
	41 - 51	40	638.132	
TW41	41 - 54	47	638.141	
	53 - 66	47	638.142	
TW53	53 - 70	57	638.151	SC 12
	69 - 86	57	638.152	
TW68	68 - 90	71	638.161	
	88 - 110	71	638.162	
TW98	98 - 126	71	638.171	
	125 - 153	71	638.172	
TW98	98 - 126	87	638.171	
	125 - 153	87	638.172	
TW98 L	98 - 126	117	638.171	
	125 - 153	117	638.172	
TW148	148 - 176	71	638.171	
	175 - 203	71	638.172	
TW148	148 - 176	117	638.171	
	175 - 203	117	638.172	

1. The insert holders are sold in pairs.




## Insert holders TW, Type WC for RSS and VPS









Insert Holders			Order No.	
Type	D	L		
TW41	49 - 62	47	638.241	WC 04
TW53	59 - 76	57	638.251	WC 05
	69 - 86	57	638.252 ***	
TW68	73 - 95	71	638.261	WC 06
	90 - 112	71	638.262	
TW98	106 - 134	71	638.271	
	131 - 159	71	638.272	
TW98	106 - 134	87	638.271	
	131 - 159	87	638.272	
TW98 L	106 - 134	117	638.271	
	131 - 159	117	638.272	
TW148	156 - 184	71	638.271	
	181 - 209	71	638.272	
TW148	156 - 184	117	638.271	
	181 - 209	71	638.272	

1. The insert holders are sold in pairs.

## Clamp screws for inserts

			
Type	**	M [Nm] *	
CC 06	694.122	0.7	694.807
CC 09	694.141	3.0	694.815
CC 12	694.150	6.0	694.820
CC 16	694.150	6.0	694.820

			
Type	**	M [Nm] *	
SP 06	694.122	0.7	694.807
SC 09	694.141	3.0	694.815
SC 12	694.150	6.0	694.820

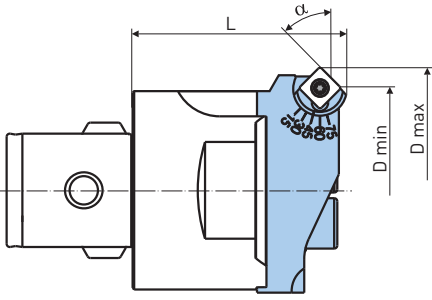
			
Type	**	M [Nm] *	
WC 04	694.124	0.7	694.807
WC 05	694.131	1.5	694.809
WC 06	694.137	1.8	694.810

\* M = Recommended torque for tightening the screws

\*\* Per package: 10 screws and 1 wrench

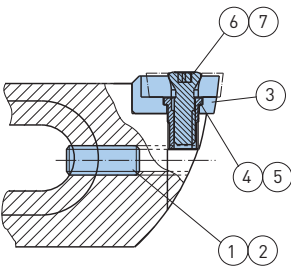
\*\*\*Pair consisting of insert holders of different size. Only for full profile roughing (VPS).

## Chamfering tool TW, with adjustable chamfering angle



Boring Head Type	Chamfering Tool Order No.		Ø-Range
TW41	638.104	SC 09	29 - 58
TW53	638.105		43 - 75
TW68	638.106		61 - 98
TW98	638.107	SC 12	79 - 128
	638.108		109 - 158
TW148	638.107		129 - 178
	638.108		159 - 208

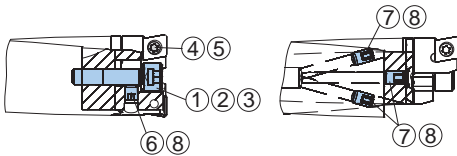
## Clamp screws for inserts



Type	①	②	③	④	⑤
638.104	690.903	690.802	695.101	691.756	690.899
638.105	690.904	690.803	695.101	691.755	690.899
638.106	690.905	690.803	695.101	691.755	690.899
638.107	690.907	690.804	695.102	691.757	690.804
638.108	690.908	690.804	695.102	691.757	690.804

	⑥**	M [Nm] *	⑦
SC 09	694.138	3.0	694.815
SC 09	694.138	3.0	694.815
SC 09	694.138	3.0	694.815
SC 12	694.145	3.0	694.815
SC 12	694.145	3.0	694.815

## Rough boring heads MW



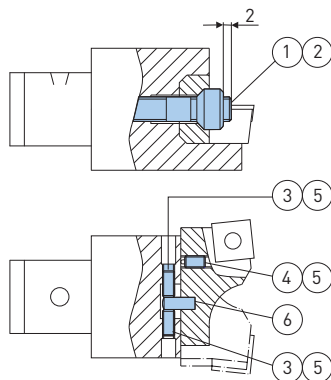
B.6

Type	①	②	M [Nm] *	③	④**	M [Nm] *	⑤	⑥**	⑦**	⑧
MW1619	690.159	693.186	1	690.802	694.105	0.3	694.806	690.413	690.668	690.833
MW1821	690.159	693.186	1	680.802	694.105	0.3	694.806	690.668	690.668	690.833

\* M = Recommended torque for tightening the screws

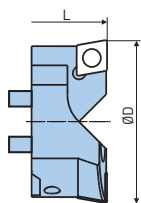
\*\*Per package: 10 screws and 1 wrench

## Boring heads for roughing RW, Series 314



Type	①	M [Nm] *	②	③	M [Nm] *	④	⑤	⑥
RW25	690.603	2.0	690.811	690.467	0.2	690.467	690.833	691.371
RW32	690.604	3.5	690.812	690.462	0.3	690.462	690.800	691.370
RW41	690.605	10.0	690.814	690.425	0.8	690.425	690.811	691.369
RW53	690.606	18.0	690.805	690.464	1.5	690.466	690.812	691.372
RW68	690.607	25.0	690.806	690.464	2.0	690.466	690.812	691.372
RW100	690.607	25.0	690.806	690.465	2.0	690.466	690.812	691.372

## Insert holders RW, Type CC



Insert Holder Type	ØD	Order No.
<b>Preferential line</b>		
RW25	25 - 33	637.421 ***
	30 - 37	637.422 ***
RW32	32 - 42	637.431 ***
	40 - 48	637.432 ***
RW41	41 - 54	637.441 ***
	51 - 62	637.442 ***
RW53	53 - 70	637.451 ***
	66 - 81	637.452 ***
RW68	68 - 88	637.461 ***
	86 - 106	637.462 ***
RW100	100 - 125	637.463 ***
	125 - 150	637.464 ***
<b>Additional line</b>		
RW68	68 - 88	637.561 ***
	86 - 106	637.562 ***
RW100	100 - 125	637.563 ***
	125 - 150	637.564 ***

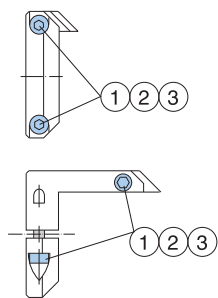
The insert holders are sold in pairs.




## Clamp screws for inserts

Type	**	M [Nm] *	
CC 06	694.122	0.7	694.807
CC 09	694.141	3.0	694.815
CC 12	694.150	6.0	694.820
CC 16	694.150	6.0	694.820

\* M = Recommended torque for tightening the screws  
 \*\* Per package: 10 screws and 1 wrench  
 \*\*\* As long as stock lasts.

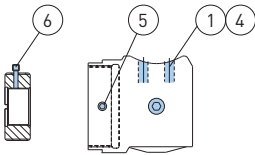
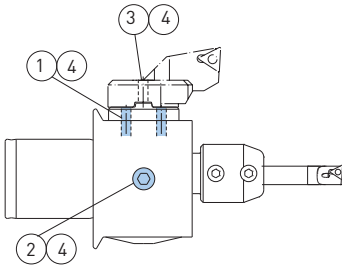
## Clamp screws for chamfering rings



				
Type	①	②	M [Nm] *	③
20	690.101	693.175	4.0	690.803
25	690.102	693.176	7.0	690.804
32	690.103	693.176	7.0	690.804
41	690.104	693.176	7.0	690.804
53	690.105	693.131	25.0	690.807
68	690.106	693.131	25.0	690.807
90	690.106	693.131	25.0	690.807

\* M = Recommended torque for tightening the screws

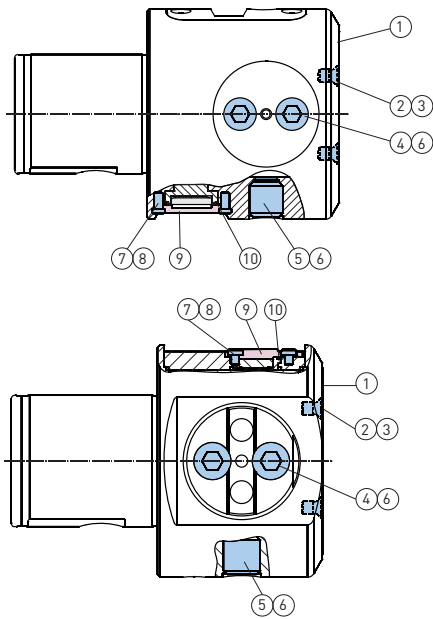
Fine boring heads EWN, Series 112



Type	①	M [Nm] *	②	M [Nm] *	③	M [Nm] *	④
EWN 04-7	690.538	0.8	690.978	0.8			690.800
EWN 04-15	690.440	1.5	690.418	1.5			690.812
EWN 04-22	690.421	2.5	690.489	2.5			690.813
EWN 2-32	690.460	5.0	690.449	5.0			690.814
EWN 2-152	690.595	10.0	690.452	10.0	690.156	12.0	690.816
EWN 04-12	690.417	1.2	690.417	1.2			690.811

Type	⑤	Type	⑥
EWN 04-22 x ES	690.417	112.271	195.003
		112.272	195.001
EWN 2-32 x ES	690.582	112.353	195.001
		112.385	195.007

Fine boring heads EWD/EWE, Series 112

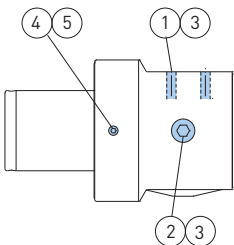


Type	①	②	③	④	M [Nm]	⑤	M [Nm]
EWD 2-54	195.081 <sup>1</sup>	690.981 <sup>1</sup>	690.843	690.457	10.0	690.469 <sup>1</sup>	10.0
	195.127 <sup>2</sup>	690.614 <sup>2</sup>					
EWD 2-32	112.371	690.611	690.836	690.460	5.0	690.996	5.0
EWE 2-152	112.804	690.614	690.843	690.457	10.0	690.995	10.0
EWE 2-32	112.371	690.611	690.836	690.460	5.0	690.996	5.0

Type	⑥	⑦	M [Nm]	⑨	⑩	⑧
EWD 2-54	690.816	690.320 <sup>1</sup>	4.0	112.080 <sup>1</sup>	692.296 <sup>1</sup>	690.843
		690.994 <sup>2</sup>	1.0	310.905 <sup>2</sup>	692.381 <sup>2</sup>	694.808
EWD 2-32	690.814	690.994	1.0	310.905	692.381	694.808
EWE 2-152	690.816	690.326	1.0	395.170	395.161	694.808
EWE 2-32	690.814	690.326	1.0	395.170	395.161	694.808

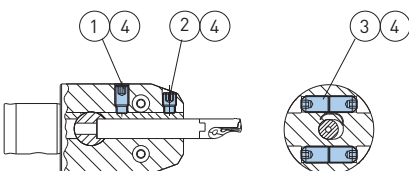
- 1. <sup>1</sup> Spare parts for boring heads with Order No. 112.109A
- 2. <sup>2</sup> Spare parts for boring heads with Order No. 112.109B

Fine boring heads EWB, Series 112



Type	①	M [Nm] *	②	M [Nm] *	③	④	M [Nm] *	⑤
EWB 2-32	690.460	4.0	690.449	4.0	690.814	112.381	0.5	690.811
EWB 2-50	690.457	8.0	690.452	8.0	690.816	690.208	1.5	690.812

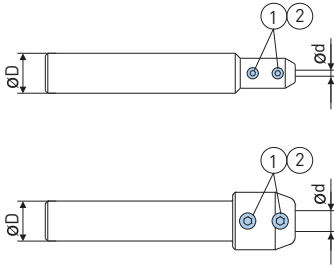
EWB 04-12 Hi-Speed



Type	①	M [Nm] *	②	M [Nm] *	③	M [Nm] *	④
EWB 04-12	690.925	3.0	690.541	3.0	690.947	3.0	690.812

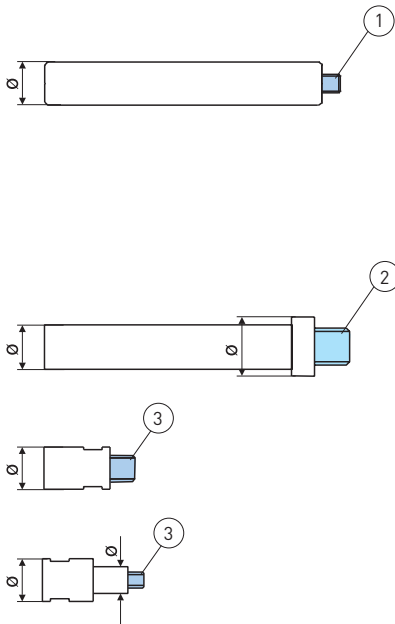
\* M = Recommended torque for tightening the screws

## Reducers



Type	Type			
Ø D - d	Ø D - d	①	M [Nm] *	②
12 - 3.5	16 - 3.5	690.459	0.5	690.801
12 - 4.0	16 - 4.0			
12 - 4.5	16 - 4.5			
12 - 5.0	16 - 5.0			
12 - 6.0	16 - 6.0			
	16 - 7.0	690.489	2.5	690.803
	16 - 8.0			
	16 - 9.0			
	16 - 10.0			

## Tool holders



Ø	Type	G	
			①
8	615.088	M5	690.486
	615.211		690.486
	615.212		690.486
	615.222		690.486
10	615.089	M6	690.487A
	615.214		690.487A
	615.215		690.487A
	615.223		690.487A

Ø	Type	G	
			①
11	615.250	M6	690.487A
12	615.218	M6	690.487A
	615.219		690.487A
	615.224		690.487A
	615.225		690.487A
13	615.251	M6	690.487A
14	615.232	M6	690.487A
16	615.226	M10	690.488

Type	Ø	G	
			②
615.216	10 / 12	M6	690.487A
615.239	12 / 16	M10	690.488
615.240	12 / 16	M10	690.488
615.243	12 / 16	M10	690.488

Type	Ø	G	
			③
615.220	12	M6	690.487A
615.230	16 / 10	M6	690.487A
615.231	16 / 12	M6	690.487A

Screws glued in with Locite 270 or Ergo 4101.

## B.6

### Clamp screws for inserts



Type	**	M [Nm] *	
WC 02	694.101	0.5	694.806



Type	**	M [Nm] *	
TP 07	694.102 <sup>1</sup>	0.5	694.806
TP 07	694.103	0.5	694.806



Type	**	M [Nm] *	
TC 11	694.122	0.7	694.807



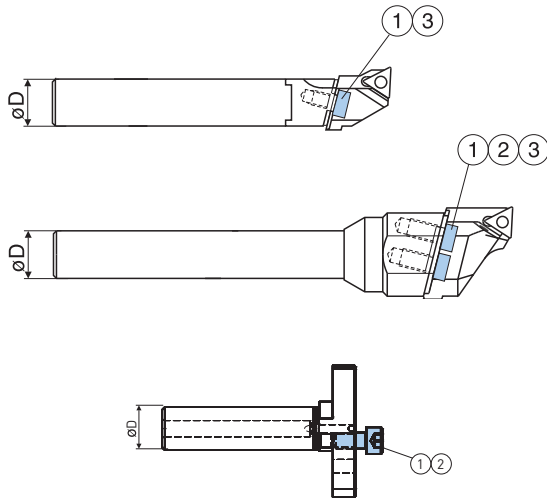
Type	**	M [Nm] *	
CC 06	694.122	0.7	694.807
CC 09	694.141	3.0	694.815

<sup>1</sup> For Insert holder 615.086/615.207/615.087/615.205/615.271/615.507/615.508

\* M = Recommended torque for tightening the screws

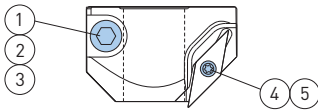
\*\*Per package: 10 screws and 1 wrench

Adjustable tool holder



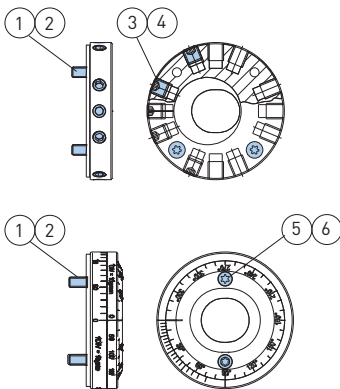
$\varnothing D$	Type	①	②	M [Nm] *	③
9	615.369	690.323		1.0	690.837
	615.374	690.323		1.0	690.837
11	615.371	690.324		2.0	690.838
	615.375	690.324		2.0	690.838
13	615.373	690.183		4.0	690.803
	615.377	690.183		4.0	690.803
	615.378	690.183		4.0	690.803
16	615.252	690.113		10.0	690.804
	615.253	690.113		10.0	690.804
	615.262	690.113		10.0	690.804
	615.265	690.113		10.0	690.804
	615.266	690.113		10.0	690.804
16	615.257	690.150	615.904	17.0	690.805
	615.258	690.150	615.904	17.0	690.805
	615.264	690.150	615.904	17.0	690.805
	615.267	690.150	615.904	17.0	690.805
16	615.387B	690.107	693.182	12.0	690.805

Chamfering rings



Type	①	②	M [Nm] *	③	④	M [Nm] *	⑤
615.394	690.157	693.181	10.0	690.814	VC 11	694.125	0.8
615.395							

Balancing rings



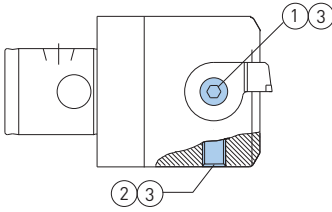
Type	①	②	③ **	④	⑤	⑥
112.387	690.611	690.836	690.541	690.812		
112.805	690.614	690.843	690.964	690.813		
112.806	690.614	690.843			694.141	690.965




\* M = Recommended torque for tightening the screws

\*\* Per package: 10 screws and 1 wrench

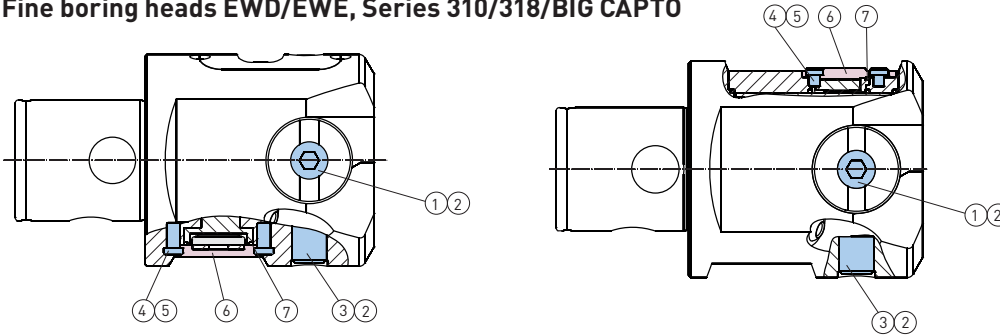







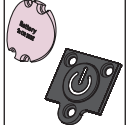

## Fine boring heads EWN, Series 310



					
Type	①	M [Nm] *	②	M [Nm] *	③
EWN 20	690.135	1.0	690.410	0.5	690.811
EWN 25	690.136	1.0	690.549	0.5	690.811
EWN 32	690.137	2.5	690.550	1.5	690.812
EWN 41	690.138	3.0	690.551	2.5	690.813
EWN 53	690.139	6.0	690.552	6.0	690.814
EWN 68	690.141	12.0	690.553	10.0	690.816
EWN 100	690.141	12.0	690.553	10.0	690.816

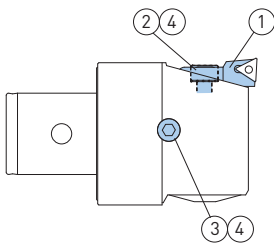
## Fine boring heads EWD/EWE, Series 310/318/BIG CAPTO







											
Type	①	M [Nm] *	③	M [Nm] *	②	④	M [Nm] *	⑤	⑥	⑦	
EWD 41	690.138	3.0	690.997	2.5	690.813	690.994	1.0	694.808	310.905	692.381	
EWD 53	690.139	6.0	690.996	6.0	690.814						
EWD 68	690.141	12.0	690.469	10.0	690.816						
EWD 100			690.553								
EWD 200			690.469								
EWBD 68	690.140	12.0	690.580	12.0	690.816						
EWBD 100 AL			690.580								
EWE 41	690.138	3.0	690.997	2.5	690.813	690.326	1.0	694.808	395.170	395.161	
EWE 53	690.139	6.0	690.996	6.0	690.814						
EWE 68	690.141	12.0	690.469	10.0	690.816						
EWE 100			690.553								
EWE 200			690.469								

B.6

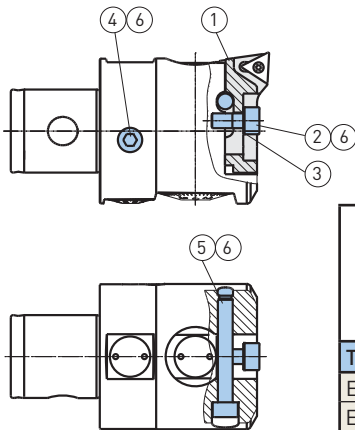
## Fine boring heads EWB, Series 310









						
Type	①	②	M [Nm] *	③	M [Nm] *	④
EWB 32	626.231	690.137	2.5	690.577	2.5	690.812
EWB 41	626.241	690.138	3.0	690.578	3.0	690.813
EWB 53	626.251	690.139	6.0	690.579	6.0	690.814
EWB 68	626.261	690.140	12.0	690.580	12.0	690.816
EWB 85	626.261	690.140	12.0	690.580	12.0	690.816
EWB 100 AL	626.261	690.140	12.0	690.580	12.0	690.816
EWB 150 AL	626.261	690.140	12.0	690.580	12.0	690.816

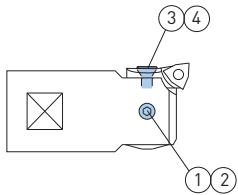
\* M = Recommended torque for tightening the screws





Fine boring heads EWB-UP, Series 309



									
Type	①	②	③	M [Nm] *	④	M [Nm] *	⑤	M [Nm] *	⑥
EWB 25 UP	627.121	690.182	693.289	1.0		1.0	690.940	1.0	690.811
EWB 32 UP	627.131	690.179	693.186	1.5	690.550	1.5	690.180	1.5	690.812
EWB 41 UP	627.141	690.176	693.175	2.5	690.943	2.5	690.115	2.5	690.813
EWB 53 UP	627.151	690.177	693.176	4.0	690.658	4.0	690.178	4.0	690.814
EWB 68 UP	627.161	690.953	693.177	5.0	690.591	5.0	690.954	6.5	690.816




Boring heads with thread connection EW 15/EW 18, Series 310






						
Type	①	M [Nm] *	②	③ **	M [Nm] *	④
EW 15	690.414	0.5	690.819	694.120	1.2	694.807
EW 18	690.416	0.5	690.819	694.120	1.2	694.807

Clamp screws for inserts






			
Type	**	M [Nm] *	
WC 02	694.101	0.5	694.806



			
Type	**	M [Nm] *	
TP 07	694.103	0.5	694.806
TC 11	694.122	0.7	694.807

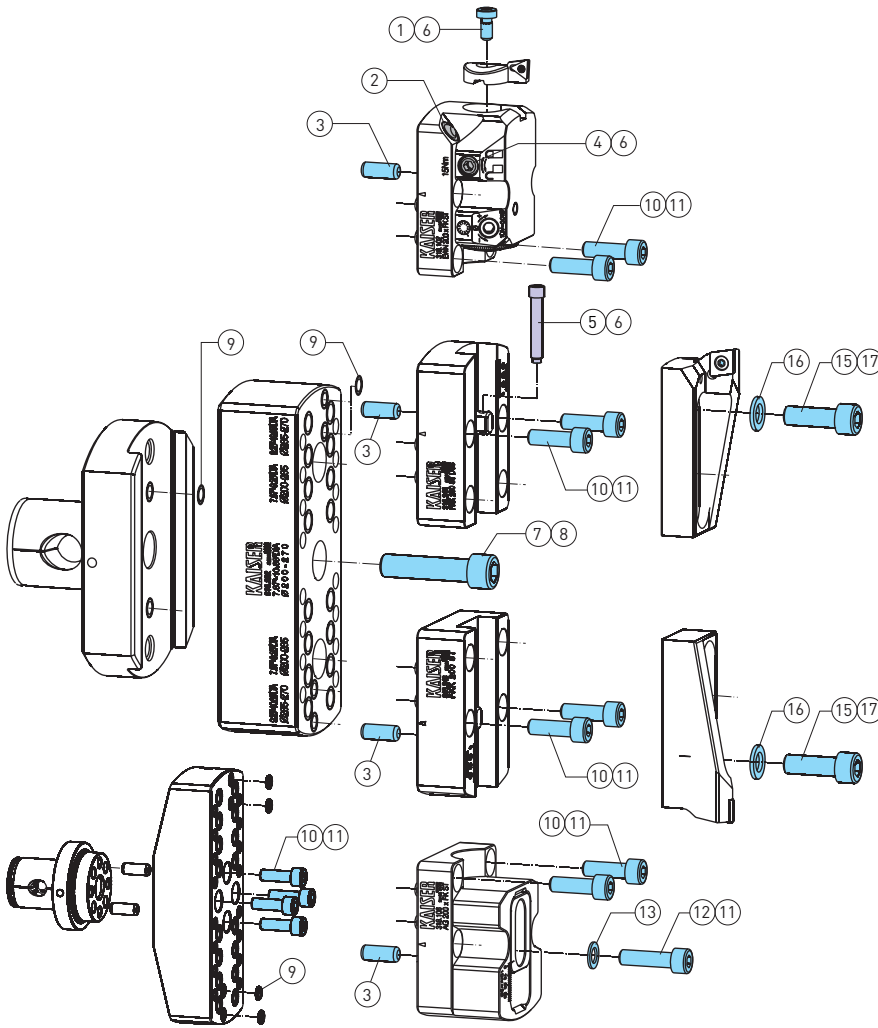


			
Type	**	M [Nm] *	
CC 06	694.122	0.7	694.807
CC 09	694.141	3.0	694.815

\* M = Recommended torque for tightening the screws

\*\* Per package: 10 screws and 1 wrench

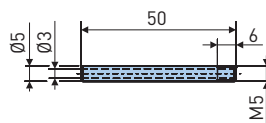
## Lightweight boring tools, Ø 200 - 620 mm, Series 318



①	M [Nm] *	②	③
690.140	12.0	692.406	691.390
④	M [Nm] *	⑤	⑥
690.553	10.0	317.193	690.816
⑦	M [Nm] *	⑧	⑨
690.121	45.0	690.808	692.295
⑩	M [Nm] *	⑪	
690.163	20.0	690.806	
⑫	⑬	M [Nm] *	⑪
690.124	693.183	15.0	690.806
⑮	⑯	M [Nm] *	⑰
690.105	693.184	30.0	690.807

### Coolant pipe, series 318

Model	Order No.
CP-DM5-50-M5	692.415



B.6

### Clamp screws for inserts

Type	**	M [Nm] *	
CC 12	694.150	5.0	694.820
CC 16	694.150	5.0	694.820

Type	**	M [Nm] *	
SC 12	694.144	5.0	694.820

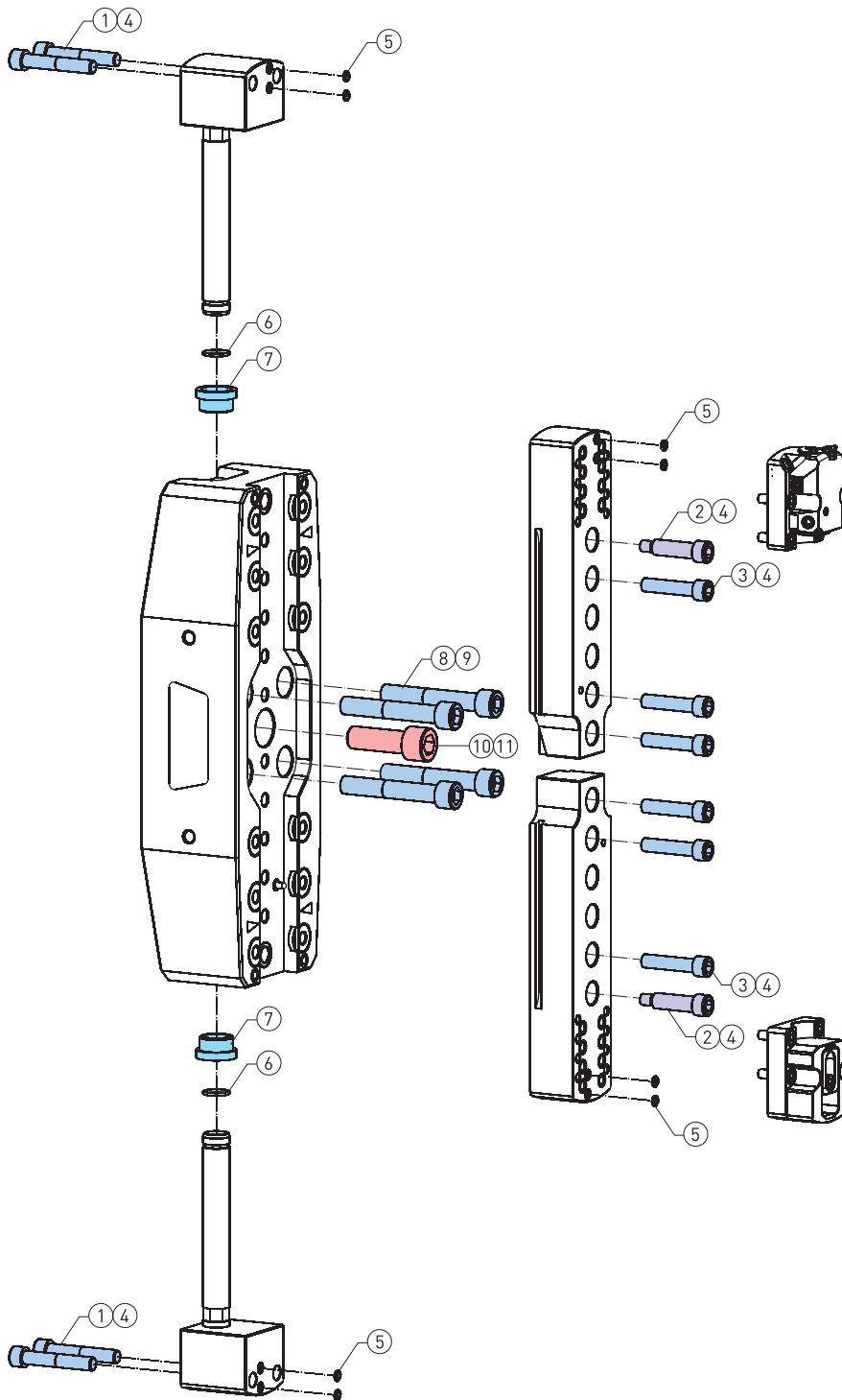
Type	**	M [Nm] *	
WC 08	694.143	3.0	694.815












Type	**	M [Nm] *	
TC 11	694.122	0.7	694.807

\* M = Recommended torque for tightening the screws

\*\*Per package: 10 screws and 1 wrench

Lightweight boring tools, Ø 620 - 3 000 mm, Series 318



		
①	M [Nm] *	
690.991	50	
		
②	M [Nm] *	
690.989	30	
		
③	M [Nm] *	④
690.132	50	690.810
		
⑤	⑥	⑦
692.295	692.298	690.990
		
⑧	M [Nm] *	⑨
690.984 <sup>1</sup>	125	690.832
690.985 <sup>2</sup>		
690.986 <sup>3</sup>		
		
⑩	M [Nm] *	⑪
690.987	250	690.861

<sup>1</sup> For bridges 318.421/318.422/318.424

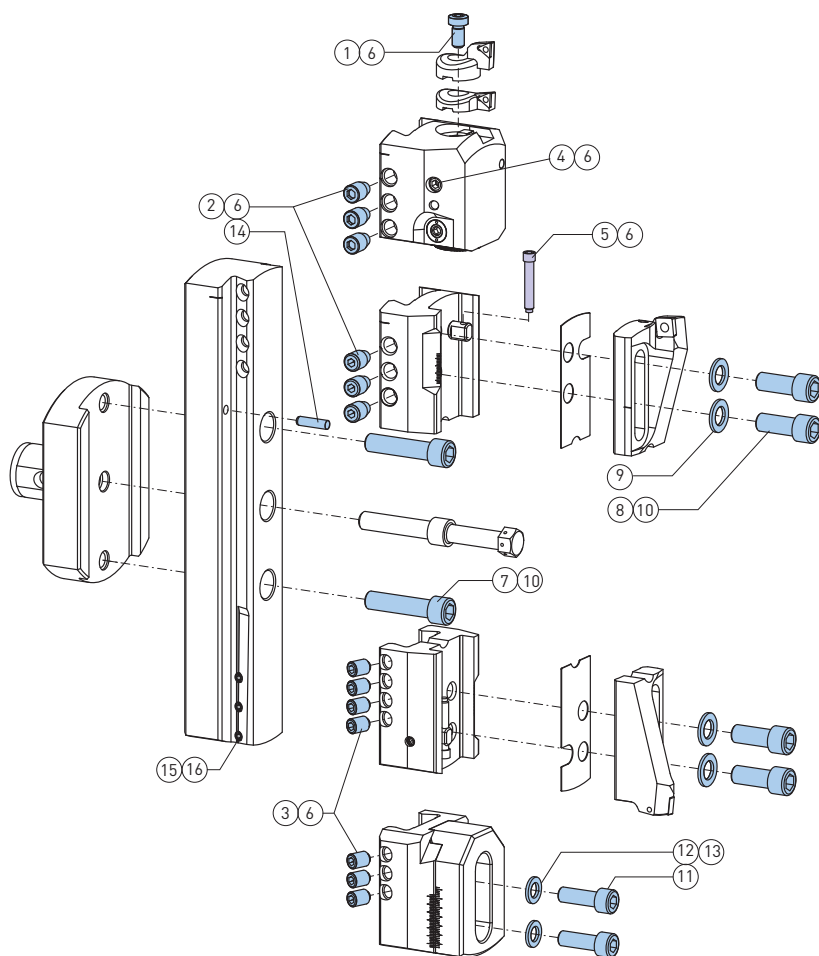
<sup>2</sup> For bridge 318.423

<sup>3</sup> For bridge 318.425

\* M = Recommended torque for tightening the screws

\*\* Per package: 10 screws and 1 wrench

## Large diameter boring tools, Series 317



①	M [Nm] *	②	M [Nm] *
690.141	15	690.596	10
③	M [Nm] *	④	M [Nm] *
690.469		690.553	15
⑤	⑥	⑦	M [Nm] *
317.193	690.816	690.121	120
⑧	⑨	M [Nm] *	⑩
690.172	693.185	100	690.808
⑪	⑫	M [Nm] *	⑬
690.105	693.184	70	690.807
⑭	⑮	⑯	
691.373	317.274	690.845	

### Clamp screws for inserts

B.6

Type	**	M [Nm] *	
CC 12	694.150	6.0	694.820
CC 16	694.150	6.0	694.820

Type	**	M [Nm] *	
SC 12	694.144	5.0	694.820
SD 12	694.144	5.0	694.820

Type	**	M [Nm] *	
WC 08	694.143	3.0	694.815

Type	**	M [Nm] *	
TC 11	694.122	0.7	694.807

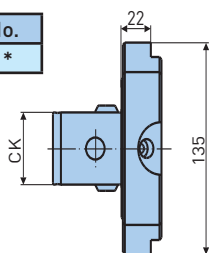
\* M = Recommended torque for tightening the screws

\*\* Per package: 10 screws and 1 wrench

### Flanges steel

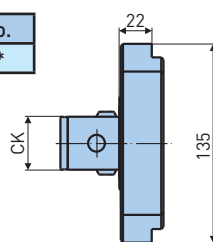
Type	Order No.
CKS7/Ø46	317.204 *

Flange with adjustable coolant nozzles mounted on both side



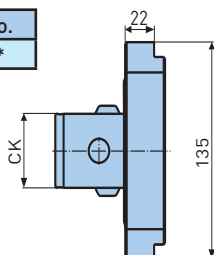
Type	Order No.
CKS6/Ø36	317.207 *

With CK6 connector for boring range 150 - 200 mm



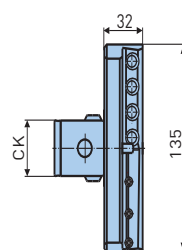
### Flange aluminium

Type	Order No.
CKS7/Ø46	317.261 *



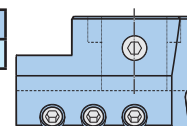
### Flange CK6 with extension slide

Type	Order No.
CKS6/Ø36	317.208 *

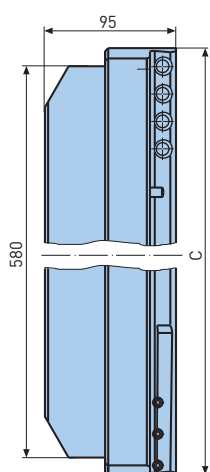


### Tool holders for OD turning

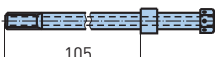
Type	Order No.
CKB5/28	317.284



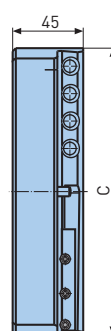
### Extension slides steel



C	Boring Range		Order No.
	D	D *	
603	620 - 690		317.231 *
673	690 - 760		317.232 *
743	760 - 830		317.233 *
813	830 - 900		317.234 *
883	900 - 970		317.235 *
953	970 - 1040		317.236 *
1023	1040 - 1110		317.237 *
1093	1110 - 1180		317.238 *

Coolant Nozzle	Order No.
	389.221

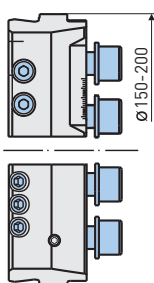
### Extension slides aluminium



C	Boring Range		Order No.
	D	D *	
183	200 - 270		317.252 *
253	270 - 340		317.253 *
323	340 - 410		317.254 *
393	410 - 480		317.255 *
463	480 - 550		317.256 *
533	550 - 620		317.257 *

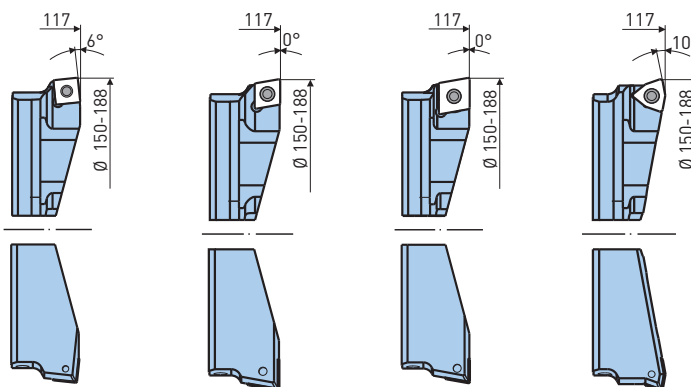
### Clamping bases Ø 150 - 200

Order No.
317.288 *



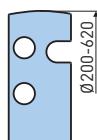
### Insert holders Ø 150 - 188

Order No.	637.813	637.829	637.833	637.845
Type	SC 12	CC 12	CC 16	WC 08



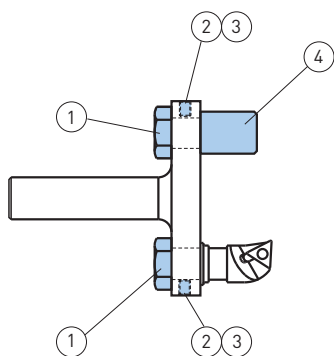
### Spacers

Spacer	Order No.
0.5 mm	317.286
Ø 150 - 200	



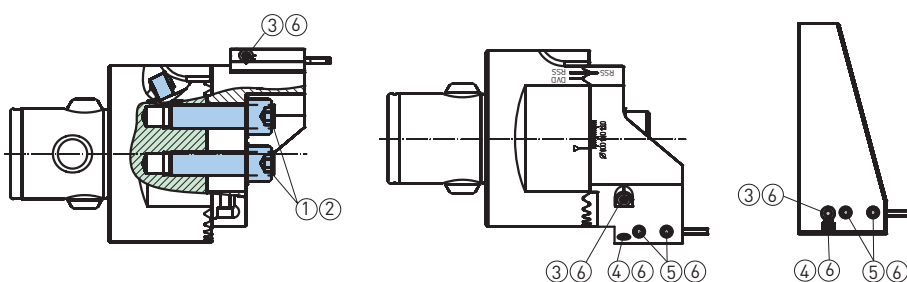
\* As long as stock lasts.

## OD turning / Eccentric bar



Type	①	②	③	④
615.390	690.716	690.573	690.813	615.903

## Face grooving holder SW, Series 318



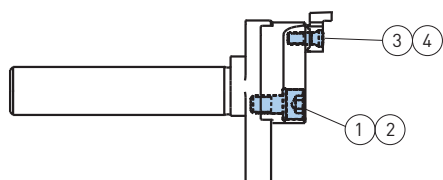
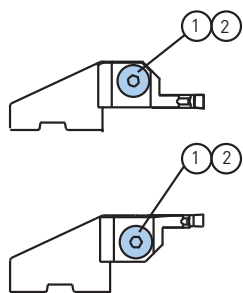
Type	①	M [Nm] *	②	③	④	⑤	M [Nm] *	⑥
SW53	639.691	16	690.805	639.690	690.400	690.511	2.5	690.813
SW68	639.691	16	690.805	639.690	690.400	690.622	2.5	690.813
SW98xCKN6	639.693	20	690.806	639.690	690.400	690.912	2.5	690.813
SW98xCKN7	639.693	20	690.806	639.690	690.400	690.912	2.5	690.813
SW148xCKN6	639.693	20	690.806	639.690	690.400	690.913	2.5	690.813
SW148xCKN7	639.693	20	690.806	639.690	690.400	690.913	2.5	690.813
FKW200 [Serie 318]	-	-	-	637.962	690.400	690.511	2.5	690.813



B.6





## Face grooving holder / Blind Piece

Type	ØD			
SW53	53 - 70	639.651	639.652	639.915
SW68	68 - 90	639.661	639.662	639.916
	88 - 110	639.665	639.666	
SW98	98 - 126	639.671	639.672	639.917
	125 - 153	639.675	639.676	
SW148	148 - 176	639.681	639.682	639.918
	175 - 203	639.685	639.686	

Insert holders for face grooving

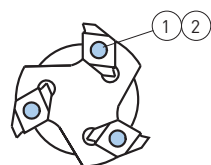




Type	Type		M [Nm] *	
		①		②
626.935	626.945	690.183	4.0	690.813
626.936	626.946			
626.937	626.947			
626.938	626.948			

Type			M [Nm] *		M [Nm] *	
	①	②		③ **		④
615.387	690.107	693.182	12.0	694.143	3.0	694.815
615.388						

Slot milling cutters

Clamp screws for inserts



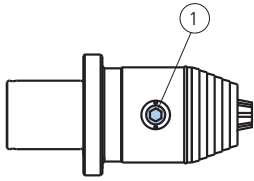
Type		M [Nm] *	
	① **		②
0	958.048	0.8	690.836
1	958.048	0.8	690.836
2	958.049	6.0	690.838

\* M = Recommended torque for tightening the screws

\*\* Per package: 10 screws and 1 wrench

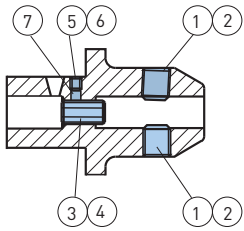


## Drill chuck



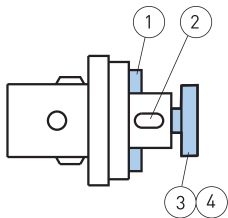
Type	①	M [Nm] *
335.042	690.817	20
335.044	690.817	20

## End mill holders



Type	①	M [Nm] *	②	③	④	⑤	⑥	⑦
6	690.477	5	690.803	690.512	690.802	690.419	690.802	691.318
8	690.478	10	690.804	690.513	690.803	690.489	690.803	691.316
10	690.479	16	690.805	690.514	690.804	690.489	690.803	691.316
12	690.480	28	690.806	690.515	690.805	690.489	690.803	691.315
14	690.480	28	690.806	690.515	690.805	690.489	690.803	691.315
16	690.481	28	690.806	690.510	690.806	690.489	690.803	691.315
18	690.481	28	690.806	690.510	690.806	690.489	690.803	691.315
20	690.482	42	690.807	690.510	690.806	690.489	690.803	691.315
25	690.483	50	690.810	690.510	690.806	690.489	690.803	691.315
32	690.484	72	690.810					
40	690.484	72	690.810					

## Universal milling cutter holders

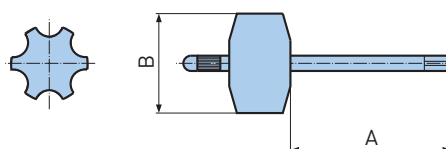
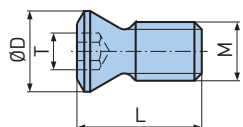


Type	①	②	③	M [Nm] *	④
16	691.605	691.600	690.703	18	690.805
22	691.606	691.601	690.704	35	690.806
27	691.607	691.602	690.705	70	690.807
32	691.608	691.604	690.706	80	690.810
40	691.609	691.603	690.707	80	690.809

B.6

\* M = Recommended torque for tightening the screws

Clamp screws and wrenches for inserts



Screws

Dimensions					Torx	Torx Plus
Torx/Torx Plus	Thread M	ØD	L	Nm <sup>1</sup>	Order No.	Order No.

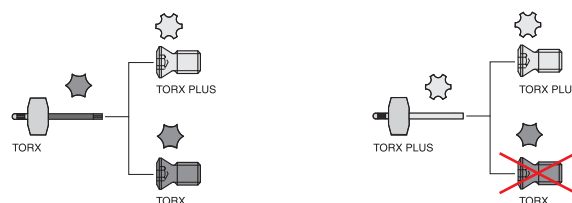
T6	M2	3.0	4.0	0.5	335.035	
T6 IP	M2	2.7	3.6			694.101
T6 IP	M2	2.7	4.1			694.102
T6 IP	M2	2.7	4.8		694.103	
T7 IP	M2.2	3.5	6.0	0.7	694.110	
T7 IP	M2.5	3.5	6.5			694.122
T7 IP	M2.5	3.5	5.8			694.123
T7 IP	M2.5	3.5	6.3		694.124	
T7 IP	M2.5	4.3	5.5		694.121	
T7 IP	M3	4.6	6.0		694.130	
T8	M3	4.4	9.0	0.8	958.048	
T8 IP	M2.5	3.5	8.7			694.125
T9 IP	M3	4.4	8.2	1.5		694.131
T10	M3	4.1	7.0	1.8	335.036	
T10 IP	M3.5	4.8	9.2			694.137
T10 IP	M3.5	5.5	8.2			694.136
T15	M4	5.7	8.2	3.0	336.905	
T15 IP	M4	5.1	9.2			694.141
T15 IP	M4	5.5	11.8			694.143
T20	M5	6.6	16.5	6.0	658.049	
T20	M5	7.0	12.0			335.037
T20 IP	M4	6.4	15.0			694.144
T20 IP	M4	6.5	11.6			694.142
T20 IP	M5	7.0	13.3			694.150

Wrench

Dimensions			Torx	Torx Plus
Torx/Torx Plus	A	B	Order No.	Order No.

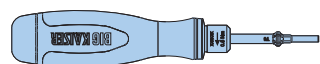
T6	42	26	690.834	
T6 IP				694.806
T7 IP				694.807
T8	50	34	690.836	
T8 IP				694.808
T9 IP				694.809
T10	50	34	690.837	
T10 IP				694.810
T15				690.843
T15 IP				694.815
T20				690.838
T20 IP			694.820	

Compatibility TORX - TORX PLUS



Size	Torque	Set		Order No.
		Torque Wrench	Torx Blade	
Torx 6	0.5 Nm	694.160	694.167	694.181
Torx 7	0.7 Nm	694.161	694.168	694.182
Torx 8	0.8 Nm	694.162	694.169	694.183
Torx 9	1.5 Nm	694.163	694.170	694.184
Torx 10	1.8 Nm	694.164	694.171	694.185
Torx 15	3.0 Nm	694.165	694.172	694.186
Torx 20	5.0 Nm	694.166	694.173	694.187

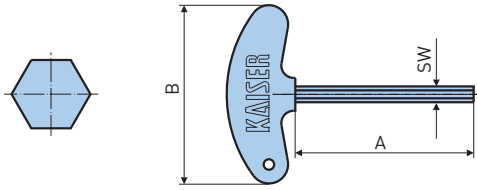
Size	Torque	Set		Order No.
		Torque Wrench	Torx Plus Blade	
Torx 6	0.5 Nm	694.160	694.174	694.188
Torx 7	0.7 Nm	694.161	694.175	694.189
Torx 8	0.8 Nm	694.162	694.176	694.190
Torx 9	1.5 Nm	694.163	694.177	694.191
Torx 10	1.8 Nm	694.164	694.178	694.192
Torx 15	3.0 Nm	694.165	694.179	694.193
Torx 20	5.0 Nm	694.166	694.180	694.194



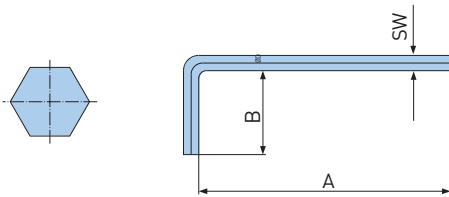
<sup>1</sup> Maximum tightening torque

The clamping screws for the inserts are supplied in packages of 10 pieces with a corresponding wrench.

## Wrenches



A	B	SW	Order No.
50	45	1.5	690.819
		2	690.811
		2.5	690.812
		3	690.813
		4	690.814
70	65	5	690.816
		6	690.817

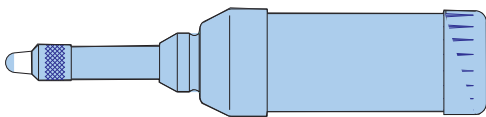


A	B	SW	Order No.
42	14	1.3	690.833
50		1.5	690.800
50	16	2	690.801
56	18	2.5	690.802
63	20	3	690.803
67	24	3.5	690.899
71	25	4	690.804
80	28	5	690.805
90	32	6	690.806
100	36	8	690.807
112	40	10	690.810
200		690.808	
125	45	12	690.809
140	56	14	690.832
140	63	17	690.861

## Lubrication gun

Order No.
692.404A

B.6



### Lubricant

For lubricating the fine boring heads type AW, EW, EWN, EWD, EWB, EWB-UP a light machine oil of the following types is recommended:

- Mobil Vactra Oil No. 2
- BP Energol HLP-32
- Klueber Isoflex PDP 94

The lubricating instructions are shown in the operating instructions that are included with each head.

## Indexable End Mills

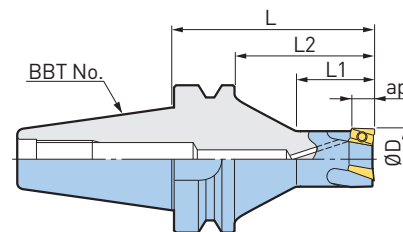
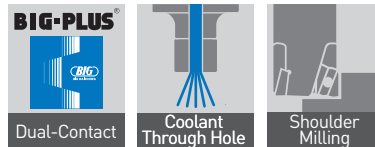
Fullcut Mill FCM	444 - 450
Fullcut Mill FCM Arbor Type	451
Fullcut Mill FCM Inserts	452 - 454
Fullcut Mill FCR	455 - 458
Fullcut Mill FCR Inserts	459 - 461
Contact Grip	462 - 465
Spare Parts	466
Surface Mill	467
Speed Finisher	468 - 469



## Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.

### For Standard Type with FCM



BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BBT30 -FCM16092 - 65	966.216	9	65	23	43	2	ARG16	0.50
20	-FCM20093 - 65	966.217			28	43	3	ARG20	0.51
25	-FCM25093 - 65	966.218			33	43	3	ARG25	0.55
32	-FCM32113 - 65	966.219			38	43	3	ARG32	0.60
40	-FCM40114 - 50	966.220	11	50	25	28	4	ARG40	0.60
50	-FCM50115 - 50	966.120			28		5		0.73
16	BBT40 -FCM16092 - 85	966.221	9	85	23	58	2	ARG16	1.2
	-105	966.121		105	30	78			1.3
	-120	966.122		120	93	1.4			
	-150	966.123		150	25	123			1.7
20	-FCM20093 - 85	966.222	9	85	28	58	3	ARG20	1.2
	-105	966.124		105	35	78			1.3
	-120	966.125		120	30	93			1.4
	-150	966.126		150	123	1.7			
25	-FCM25093 - 85	966.223	9	85	33	58	3	ARG25	1.2
	-120	966.127		120	45	93			1.4
	-135	966.128		135	40	108			1.6
	-165	966.129		165	138	1.9			
32	-FCM32113 - 85	966.224	11	85	38	58	3	ARG32	1.3
	-120	966.130		120	60	93			1.5
	-135	966.131		135	50	108			1.7
	-165	966.132		165	40	138			2.1
40	-FCM40114 - 85	966.225	11	85	43	58	4	ARG40	1.4
	-120	966.133		120	65	93			1.7
	-135	966.134		135	60	108			2.0
	-165	966.135		165	50	138			2.4
50	-FCM50115 - 70	966.226	11	70	38	43	5	ARG40	1.5
	-120	966.136		120	65	93			2.2
	-135	966.137		135	60	108			2.4
	-165	966.138		165	50	138			3.0

C.1

1. Wrench is included. Inserts are to be ordered separately.

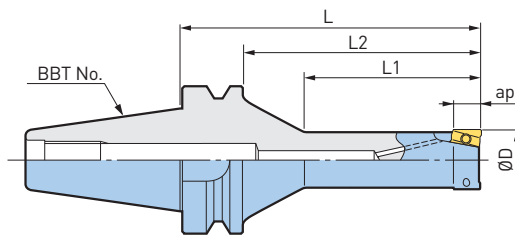
For Insert ▶ 452

For Cutting Condition ▶ 453

For BBT50 Adapter ▶ 445



**For Long Nose Type with BBT**



BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BBT30 -FCM16092L - 85	966.081	9	85	45	63	2	ARG16	0.52
20	-FCM20092L - 85	966.082			50	63		ARG20	0.55
25	-FCM25092L - 85	966.083			50	63		ARG25	0.62
32	-FCM32112L - 85	966.084			60	63		ARG32	0.71
16	BBT40 -FCM16092L -105	966.085	9	105	45	78	2	ARG16	1.3
	-120	966.086		120	93	1.4			
20	-FCM20092L -120	966.087	9	120	60	93	2	ARG20	1.4
	-135	966.088		135		108			1.5
25	-FCM25092L -135	966.089	9	135	75	108	2	ARG25	1.5
	-150	966.090		150		123			1.7
32	-FCM32112L -135	966.091	11	135	80	108	2	ARG32	1.7
	-150	966.092		150		123			1.9

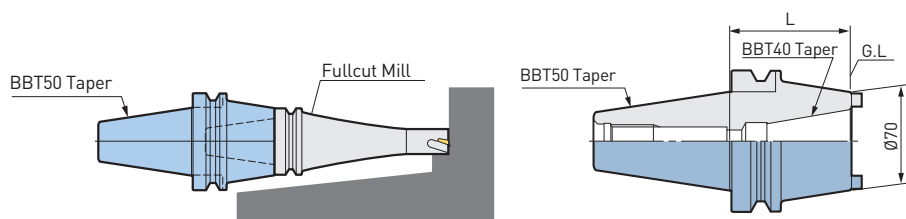
1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 452

For Cutting Condition ▶ 453

**Adapter for BBT50 taper shank (FCR & FCM)**

An adapter for use of the BBT40 (Fullcut Mill) on BBT50/BT50 to machines.



Model	Order No.	L
BBT50 -BBT40 -50	803.730	50
-90	803.731	90

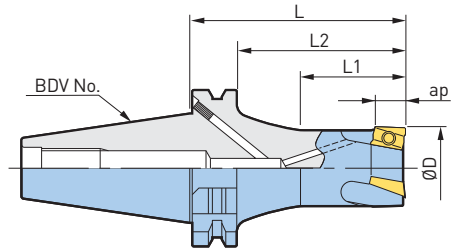
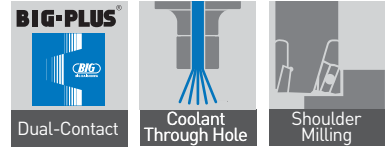
Combination with the long type enables further workpiece interference countermeasures.

C.1

## Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.

### For Standard Type with BDV



BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	
16	BDV40 -FCM16092 - 85	966.206	9	85	23	65	2	ARG16	1.2	
	-105	966.161		105	35	85			1.3	
	-120	966.162		120	34	100			1.4	
20	-FCM20093 - 85	966.207		85	35	65	3	ARG20	1.2	
	-105	966.163		105	40	85			1.3	
	-120	966.164		120	39	100			1.4	
25	-FCM25093 - 85	966.208		85	33	65		3	ARG25	1.2
	-120	966.165		120	45	100				1.4
	-135	966.166		135	40	115				1.6
32	-FCM32113 - 85	966.209	85	38	65	4		ARG32	1.3	
	-120	966.167	120	60	100				1.5	
	-135	966.168	135	50	115				1.7	
40	-FCM400114 - 85	966.210	85	45	65		4	ARG40	1.4	
	-120	966.169	120	65	100				1.7	
	-135	966.170	135	60	115				2.0	
50	-FCM50115 - 70	966.211	70	50	50		5	ARG40	1.5	
	-120	966.171	120	100	100				2.2	
	-135	966.172	135	115	115				2.4	

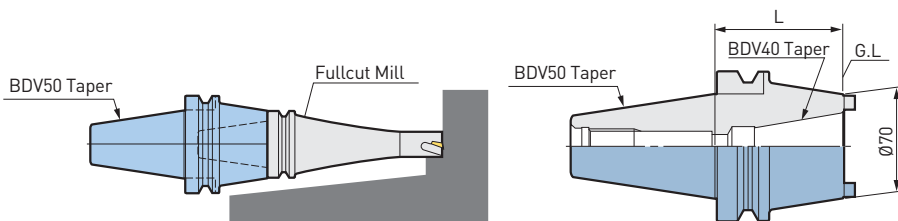
1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 452

For Cutting Condition ▶ 453

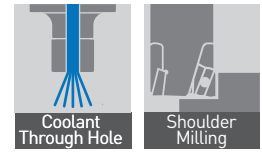
### Adapter for BDV50 taper shank (FCR & FCM)

C.1 An adapter for use of the BDV40 (Fullcut Mill) on BDV50/DV50 to machines.

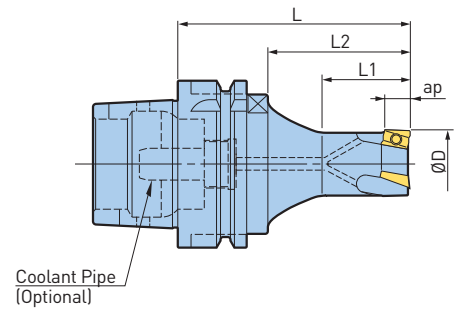


Model	Order No.	L
BDV50 -BDV40 -50	805.856	50
-90	805.857	90

Combination with the long type enables further workpiece interference countermeasures.



For Standard Type with HSK-A



Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)	
16	HSK-A40 -FCM16092 - 65	966.101	9	65	23	37	2	ARG16	0.3	
20	-FCM20093 - 65	966.102			28		3	ARG20	0.3	
25	-FCM25093 - 65	966.103			35		3	ARG25	0.4	
32	-FCM32113 - 65	966.104			45	-	4	ARG32	0.5	
40	-FCM40114 - 65	966.105					5	ARG40	0.6	
50	-FCM50115 - 65	966.106	11						0.7	
16	HSK-A50 -FCM16092 - 75	966.107	9	75	23	41	2	ARG16	0.6	
20	-FCM20093 - 75	966.108			28		3	ARG20	0.6	
25	-FCM25093 - 75	966.109			33		3	ARG25	0.6	
32	-FCM32113 - 75	966.110			39	-	4	ARG32	0.7	
40	-FCM40114 - 75	966.111					48	4	ARG40	0.9
50	-FCM50115 - 75	966.112	11						1.0	
16	HSK-A63 -FCM16092 - 85	966.231	9	85	23	51	2	ARG16	0.9	
		966.141		105	30	71			1.0	
		966.142		120	25	86			1.1	
		966.143		150	25	116			1.3	
20	-FCM20093 - 85	966.232		85	28	51	3	ARG20	1.0	
		966.144		105	35	71			1.1	
		966.145		120	30	86			1.2	
		966.146		150	30	116			1.4	
25	-FCM25093 - 85	966.233		85	33	51	3	ARG25	1.0	
		966.147		120	45	86			1.2	
		966.148		135	40	101			1.3	
		966.149		165	40	131			1.5	
32	-FCM32113 - 85	966.234		11	85	38	51	3	ARG32	1.1
		966.150			120	60	86			1.3
		966.151			135	50	101			1.4
		966.152			165	40	131			1.7
40	-FCM40114 - 85	966.235	85		43	51	4	ARG40	1.3	
		966.153	120		65	86			1.5	
		966.154	135		60	101			1.7	
		966.155	165		50	131			2.1	
50	-FCM50115 - 70	966.236	70		28	28	5	ARG40	1.3	
		966.156	120		78	78			1.9	
		966.157	135		93	93			2.2	
		966.158	165		123	123			2.8	

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 452

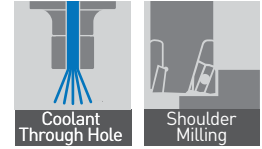
For Cutting Condition ▶ 453

For Coolant Pipe ▶ 175

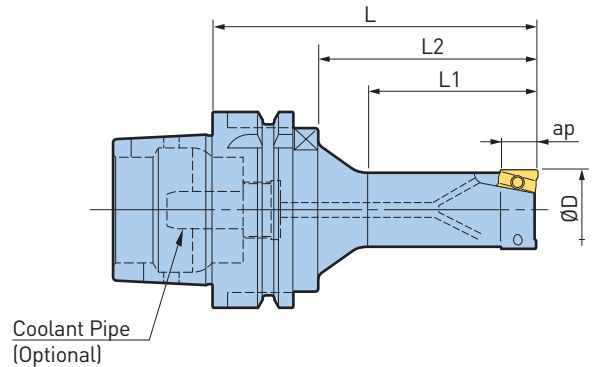


## Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.



### For Long Nose Type with HSK-A



Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	HSK-A63 -FCM16092L - 85	966.093	9	85	40	51	2	ARG16	0.9
	-120	966.094		120	45	86			1.0
20	-FCM20092L -105	966.095	9	105	50	71	2	ARG20	1.1
	-120	966.096		120	60	86			1.2
25	-FCM25092L -105	966.097	9	105	55	71	2	ARG25	1.1
	-120	966.098		120	65	86			1.2
32	-FCM32112L -120	966.099	11	120	70	86	2	ARG32	1.3
	-135	966.100		135	80	101			1.4

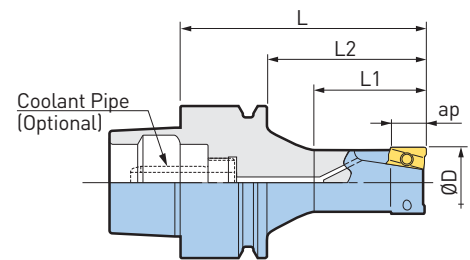
1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 452

For Cutting Condition ▶ 453

For Coolant Pipe ▶ 175

### For Standard Type with HSK-E



Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	HSK-E25 -FCM16092 -45	966.173	9	45	23	35	2	ARG16	0.17
	-E32 -FCM16092 -55	966.174		55	23	35			0.20
	-E40 -FCM16092 -65	966.115		65	28	45			0.45

1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

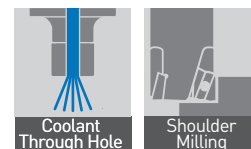
For Insert ▶ 452

For Cutting Condition ▶ 453

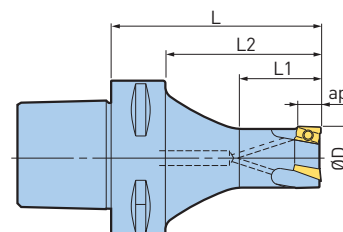
For Coolant Pipe ▶ 175

### Caution

As the HSK-E type interface does not have drive key grooves, there is a risk that it may slip in the machine spindle and damage it if cutting load exceeds clamping force of the machine tool. Starting from the lowest possible conditions, increase them gradually while observing the cutting status, and find the optimum with sufficient safety margin.



For Standard Type with BIG CAPTO



Cutter Dia. $\varnothing D$	Model	Order No.	L	L1	L2	$a_p$	No. of Inserts	Insert Size	Weight (kg)
16	C5 -FCM16092 -65	805.858	65	23	45	9	2	ARG16	0.5
	-90	805.859	90	30	70				0.6
20	-FCM20093 -65	973.609	65	28	45	9	3	ARG20	0.5
	-90	805.860	90	35	70				0.6
25	-FCM25093 -65	805.861	65	33	45	9	3	ARG25	0.6
	-90	805.862	90	40	70				0.7
32	-FCM32113 -65	805.863	65	38	45	11	3	ARG32	0.6
	-90	805.864	90	45	70				0.8
40	-FCM40114 -50	805.865	50	25	30	11	4	ARG40	0.6
	-90	805.866	90	60	70				1.0
50	-FCM50115 -50	805.867	50	25	30	11	5	ARG40	0.7
	-90	805.868	90	65	70				1.0

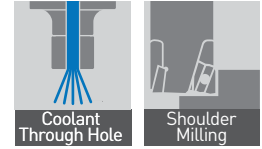
1. Wrench is included.
2. Inserts are to be ordered separately.

For Insert ▶ 452

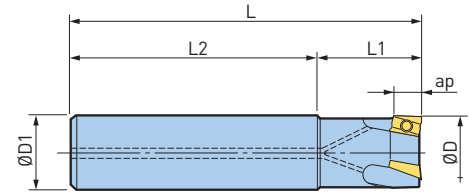
For Cutting Condition ▶ 453

## Fullcut Mill FCM

The indexable endmill that combines sharpness and rigidity has no match.



### For Long Nose Type with Cylindrical Shank



Cutter Dia. ØD	Model	Order No.	ØD1	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
12	ST16 -FCM12091 - 90	966.237	16	9	90	15	70	1	ARG16	0.1
14	-FCM14091 - 90	966.238				17				
16	-FCM16092 - 90	966.239				25	65			
20	ST20 -FCM20093 -110	966.240	20	9	110	30	80	3	ARG20	0.2
25	ST25 -FCM25093 -120	966.241	25	9	120	35	85	3	ARG25	0.4
32	ST32 -FCM32113 -130	966.242	32	11	130	35	95	3	ARG32	0.7
40	-FCM40114 -130	966.243				90	4	ARG40	0.8	
40	-180	802.963				140				1.2
50	-FCM50115 -130	966.244				130				90

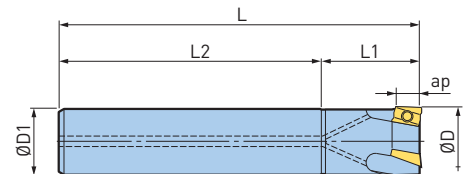
1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 452

For Cutting Condition ▶ 453

### For Oversize Type with Cylindrical Shank

"Thin wall" at deep pocket & deep shoulder endmilling.



Cutter Dia. ØD	Model	Order No.	ØD1	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
17	ST16 -FCM17092 -120	966.181	16	9	120	25	95	2	ARG16	0.2
21	ST20 -FCM21092 -165	966.182	20	9	165	30	135	2	ARG20	0.4
	-FCM21093 -135	966.183					105	3		0.3
26	ST25 -FCM26092 -165	966.184	25	9	165	38	127	2	ARG25	0.6
	-FCM26093 -150	966.185					112	3		0.6
33	ST32 -FCM33112 -180	966.186	32	11	180	48	132	2	ARG32	1.1
	-FCM33113 -180	966.187					132	3		1.0

1. Wrench is included. Inserts are to be ordered separately.

2. For medium-heavy or heavy slot milling with projection longer than 2.5 times of diameter, 2-flutes models are recommended.

For Insert ▶ 452

For Cutting Condition ▶ 453

### Application Example

Model	ST32-FCM33112-180
Material	C55 (S55C)
Cutting Speed Vc (m/min.)	120
Feed Rate fz (mm/tooth)	0.1
Axial DOC ap (mm)	10 mm x 10 steps
Radial DOC ae (mm)	Max. 33 mm

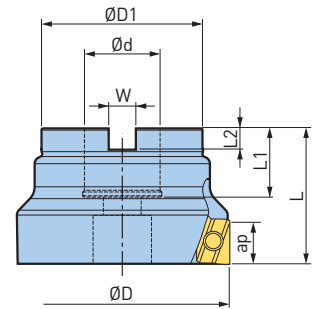
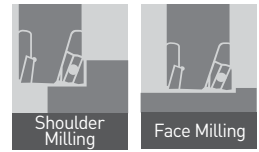
### Result

Deep shoulder endmilling is achieved with 110 mm projection length and 10 mm axial depth.



## Fullcut Mill FCM, Arbor Type

Corresponding to Form FMH of new standard face milling adapter.



### Form FMH

Cutter Dia. ØD	Model	Order No.	ap	Ød	ØD1	L	L1	L2	W	No. of Inserts	Insert Size	Weight (kg)
50	FMH22 -FCM50115 -40	966.212	11	22	47	40	20	6	10.4	5	ARG40	0.5
63	-FCM63116 -40	966.213								6	ARG63	0.7
80	FMH27 -FCM80116 -50	966.214	11	27	60	50	22	7	12.4	6	ARG80	1.2
100	-FCM100116 -50	805.461			76							2.0

1. Wrench is included. Inserts are to be ordered separately.

For FMH Type BBT ▶ 72

For FMH Type BDV ▶ 111

For FMH Type HSK ▶ 148

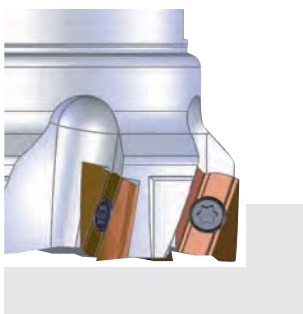
For Insert ▶ 452

## Application Example

### Indexable Insert Endmill, achieving the excellent squareness and fine surface finish

Machined by Fullcut Mill model: FMH22-FCM63116-40

Arbor model: BBT40-FMH22-47-45



#### Squareness

Cutting Speed Vc (m/min.)	150
Feed Rate fz (mm/tooth)	0.1
Axial DOC ap (mm)	5
Radial DOC ae (mm)	0.1

<b>BIG KAISER</b>	10 µm
Other manufacturer	40 µm

#### Wiper cutting edge

Cutting Speed Vc (m/min.)	250
Feed Rate fz (mm/tooth)	0.2
Axial DOC ap (mm)	0.1
Radial DOC ae (mm)	50

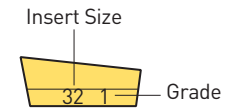
<b>BIG KAISER</b>	Ra=0.51 µm
Other manufacturer	Ra=1.56 µm

# Fullcut Mill FCM

## Indexable Inserts



### Marking Description



- 1: ACZ310
- 2: DS20
- P2: ACP200
- M3: ACM300S
- P3: ACP300
- 5S: ACZ350S

Model	Cutter Dia. ØD	ap	Nose R	P		M		K	N
				ACP200	ACP300	ACM300S	ACZ350S	ACZ310	DS20
ARG 160902	12 - 17	9	0.2	-	978.812	-	978.805	800.488	978.801
ARG 160904			0.4	978.827	966.245	805.869	966.246	966.248	966.249
ARG 200902	20, 21	9	0.2	-	978.813	-	978.806	800.046	978.807
ARG 200904			0.4	978.804	966.250	805.870	966.251	966.253	966.254
ARG 250902	25, 26	9	0.2	-	978.814	-	978.808	800.047	978.803
ARG 250904			0.4	800.048	966.255	805.871	966.256	966.258	966.259
ARG 321102	32, 33	11	0.2	-	978.828	-	800.050	800.049	966.270
ARG 321104			0.4	800.051	966.260	805.872	966.261	966.263	966.264
ARG 401102	40, 50	11	0.2	-	800.052	-	978.819	800.053	978.821
ARG 401104			0.4	978.809	966.265	805.873	966.266	966.268	966.269
ARG 631104	63	11	0.4	-	-	806.257	-	-	-
ARG 631108			0.8	978.810	966.280	-	966.281	966.283	966.284
ARG 801104	80, 100	11	0.4	-	-	806.258	-	-	-
ARG 801108			0.8	978.811	966.285	-	966.286	966.288	966.289

1. ACP300 is first recommendation for steel and ACM300S is first recommendation for stainless steel.

For Spare Parts ▶ 466

### Caution

- It is important to use the correct insert for the diameter of Fullcut Mill. Failure to use the correct insert will result in incorrect cutting conditions and poor results.
- Nose radius 0.2 inserts are suitable for light cutting.
- There is no compatibility with those of FCR type.

### Insert classifications

ISO	Grade	Material	Coating
P20	ACP200	Prehardened steel	TiAlN / AlCrN
P30	ACP300	General steel	
M30	ACM300S	Stainless steel	TiAlN / TiCN
	ACZ350S	Stainless steel	
K10	ACZ310	Cast iron	
N20	DS20	Aluminium	DLC

C.1

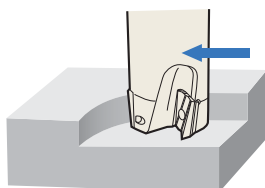
### Note

It is recommended to regularly replace clamping screws and wrench to ensure the correct clamping force is maintained.

## Fullcut Mill FCM

### Recommended Cutting Condition

Shoulder milling and slot milling



Finish-light cutting

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Cast Iron	Aluminium
	Insert Grade	ACP300		ACP200	ACM300S (ACZ350S)	ACZ310	DS20
	Cutting Fluid	Dry			Dry/Wet	Dry	Dry/Wet
Ø12 - Ø14	Speed (m/min)	150 - 250	180 - 250	80 - 140	140 - 180	100 - 200	200 - 750
	Feed (mm/tooth)	0.1 - 0.2	0.1 - 0.2	0.08 - 0.12	0.12 - 0.18	0.1 - 0.2	0.1 - 0.3
Ø16 - Ø21	Speed (m/min)	150 - 250	180 - 250	80 - 140	140 - 180	100 - 200	200 - 1000
	Feed (mm/tooth)	0.1 - 0.2	0.1 - 0.2	0.08 - 0.12	0.12 - 0.18	0.1 - 0.2	0.1 - 0.3
Ø25 - Ø33	Speed (m/min)	180 - 280	200 - 280	80 - 140	140 - 200	100 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.2	0.1 - 0.2	0.1 - 0.35
Ø40 - Ø50	Speed (m/min)	180 - 280	200 - 280	80 - 140	140 - 200	80 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.2	0.1 - 0.2	0.1 - 0.35
Ø63 - Ø100	Speed (m/min)	100 - 220	150 - 240	80 - 120	120 - 180	100 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.24	0.1 - 0.22	0.08 - 0.14	0.12 - 0.2	0.1 - 0.25	0.1 - 0.35

#### Caution

Fullcut Mill, FCM type, cannot be used for feeding in Z-axis such as ramping, plunging and boring.

### Medium-heavy cutting

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Stainless Steel	Cast Iron	Aluminium
	Insert Grade	ACP300		ACM300S (ACZ350S)	ACZ310	DS20
	Cutting Fluid	Dry			Dry/Wet	Dry
Ø12 - Ø14	Speed (m/min)	100 - 200	150 - 200	120 - 180	100 - 180	200 - 750
	Feed (mm/tooth)	0.08 - 0.14	0.1 - 0.15	0.12 - 0.15	0.08 - 0.18	0.1 - 0.2
Ø16 - Ø21	Speed (m/min)	100 - 200	150 - 200	120 - 180	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.14	0.1 - 0.15	0.12 - 0.15	0.08 - 0.18	0.1 - 0.2
Ø25 - Ø50	Speed (m/min)	100 - 200	160 - 220	120 - 180	100 - 200	200 - 1500
	Feed (mm/tooth)	0.1 - 0.16	0.1 - 0.15	0.12 - 0.15	0.08 - 0.2	0.1 - 0.3
Ø63 - Ø100	Speed (m/min)	100 - 200	150 - 200	120 - 180	100 - 180	200 - 750
	Feed (mm/tooth)	0.08 - 0.18	0.1 - 0.16	0.12 - 0.15	0.1 - 0.2	0.1 - 0.3

#### Caution

- Nose radius 0.2 inserts are suitable for light cutting.
- Care should be taken in the selection of both axial & radial depth of cut as well as the feed rate.
- This table is a general guideline for cutting data. Please adjust according to machine and workpiece conditions, as well as width of cutting.
- Dry cutting (including air blow) is recommended when cutting of steel, except for finishing.
- Dry cutting is recommended for stainless steel. However use soluble oil in a case where severe built-up edge occurs.

### Finishing milling with axial DOC of 0.2 mm or smaller

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Stainless Steel	Cast Iron	
	Insert Grade	ACP200		ACZ310		
	Cutting Fluid	Wet				
Ø12 - Ø100	Speed (m/min)	200 - 250				
	Feed (mm/tooth)	0.1 - 0.2				

#### Caution

- For aluminium alloy, same conditions as „Finish-light cutting“ shown above should be applied.
- For finishing of steel, wet cutting improves both surface finish and insert life. ACZ310 grade extends the life further.

C.1

## Fullcut Mill FCM

### Application Examples

#### Slot milling



Fullcut Mill	BBT40-FCM32113-85
Insert	ARG321104 (ACP300)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	150
Feed Rate fz (mm/tooth)	0.12
Axial DOC ap (mm)	9

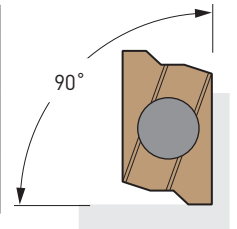


Only Fullcut Mill was capable of achieving this data in a No.40 spindle taper machine.

#### Shoulder milling



Fullcut Mill	BBT40-FCM32113-85
Insert	ARG321104 (ACP300)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	200
Feed Rate fz (mm/tooth)	0.15
Axial DOC ap (mm)	11
Radial DOC ae (mm)	5



Excellent perpendicularity is achieved.

#### Face milling



Fullcut Mill	BBT40-FCM50115-70
Insert	ARG401104 (ACP300)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	200
Feed Rate fz (mm/tooth)	0.15
Axial DOC ap (mm)	1
Radial DOC ae (mm)	30

	Surface Roughness Ry
BIG KAISER	2.53
Manufacturer A	3.75
Manufacturer B	4.32

Finishing surface roughness was Ry = 2.53 at Vc = 200, fz = 0.15 cutting data.

#### Material of low machinability

C.1



Fullcut Mill	ST25-FCM25093-120
Holder	BBT50-MEGA25D-105
Insert	ARG250904 (ACZ350S)
Work Material	SUS304 Stainless steel
Cutting Speed Vc (m/min.)	150
Feed Rate fz (mm/tooth)	0.2
Axial DOC ap (mm)	9
Radial DOC ae (mm)	3



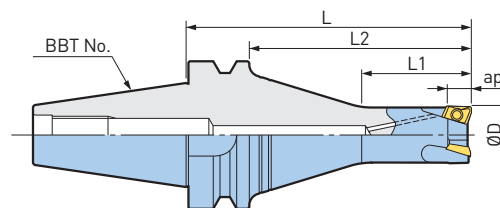
High efficiency and stable milling (Vf = 1140 mm/min.) is achieved.

## Fullcut Mill FCR

Unique inserts designed for ramping make multi-functional cutting possible.



### For Standard Type with BBT



BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BBT30 -FCR16082 - 65	966.683	8	65	28	43	2	BRG16	0.5
20	-FCR20083 - 65	966.685			33		3	BRG20	0.5
25	-FCR25083 - 65	966.687			40		3	BRG25	0.6
32	-FCR32103 - 65	966.689	10					BRG32	0.6
16	BBT40 -FCR16082 - 85	966.616	8	85	25	58	2	BRG16	1.3
	-120	966.617		120	30	93			1.5
	-135	966.618		135	25	108			1.6
20	-FCR20083 - 85	966.619		85	35	58	3	BRG20	1.2
	-120	966.620		120	30	93			1.6
	-135	966.621		135	35	108			1.7
25	-FCR25083 - 85	966.622		85	40	58	3	BRG25	1.3
	-120	966.623		120	45	93			1.6
	-135	966.624		135	35	108			1.8
32	-FCR32103 - 85	966.625	10	85	45	58	3	BRG32	1.4
	-120	966.626		120	50	93			1.7
	-135	966.627		135	40	108			1.9

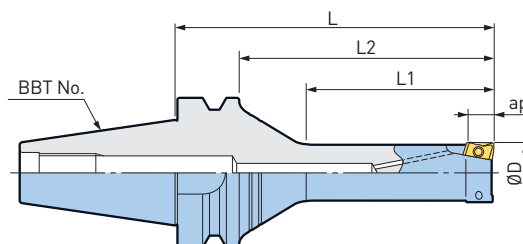
1. Wrench is included. Inserts are to be ordered separately.
2. Long nose type shown below is recommended for medium-heavy or heavy slot milling with long projection, exceeding L = 120 mm for 16 and 20 mm diameters / L = 135 mm for 25 or larger diameters.

For Insert ▶ 459

For Cutting Condition ▶ 460

For BBT50 Adapter ▶ 445

### For Long Nose Type with BBT



BIG-PLUS tools can be used in machining centers with conventional spindles.

Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BBT30 -FCR16082L - 85	966.684	8	85	45	63	2	BRG16	0.5
20	-FCR20082L - 85	966.686			50			BRG20	0.5
25	-FCR25082L - 85	966.688			60			BRG25	0.6
32	-FCR32102L - 85	966.690	10					BRG32	0.7
16	BBT40 -FCR16082L -105	966.691	8	105	45	78	2	BRG16	1.3
	-120	966.692		120	93	1.4			
	-120	966.693		120	60	BRG20			1.4
20	-FCR20082L -120	966.693		135	60	108	2	BRG20	1.5
	-135	966.694		135	75	123			1.5
	-150	966.695		150	123	BRG25			1.7
25	-FCR25082L -135	966.695		135	80	108	2	BRG25	1.7
	-150	966.696		150	90	123			1.7
	-150	966.697		150	90	123			BRG32
32	-FCR32102L -135	966.697	10	135	80	108	2	BRG32	1.7
	-150	966.698		150	90	123			1.9

1. Wrench is included. Inserts are to be ordered separately.

For Insert ▶ 459

For Cutting Condition ▶ 460

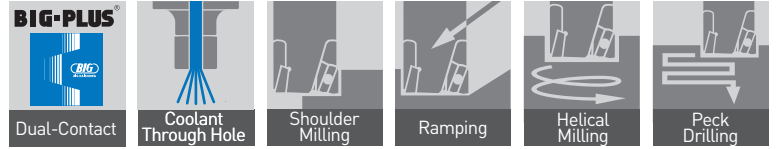
For BBT50 Adapter ▶ 445

C.1

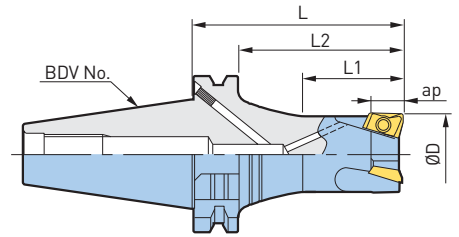


## Fullcut Mill FCR

Unique inserts designed for ramping make multi-functional cutting possible.



### For Standard Type with BDV



BIG-PLUS tools can be used in machining centers with conventional spindles.

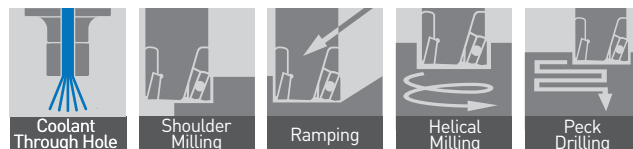
Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	BDV40 -FCR16082 - 85	966.601	8	85	25	65	2	BRG16	1.3
	-120	966.602		120	30	100			1.5
	-135	966.603		135	25	115			1.6
20	-FCR20083 - 85	966.604	8	85	35	65	3	BRG20	1.2
	-120	966.605		120	30	100			1.6
	-135	966.606		135	30	115			1.7
25	-FCR25083 - 85	966.607	8	85	40	65	3	BRG25	1.3
	-120	966.608		120	45	100			1.6
	-135	966.609		135	35	115			1.8
32	-FCR32103 - 85	966.610	10	85	45	65	3	BRG32	1.4
	-120	966.611		120	50	100			1.7
	-135	966.612		135	40	115			1.9

1. Wrench is included. Inserts are to be ordered separately.

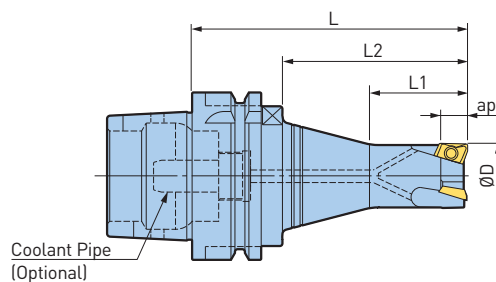
For Insert ▶ 459

For Cutting Condition ▶ 460

For BDV50 Adapter ▶ 446



**For Standard Type with HSK-A**



Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	HSK -A50 -FCR16082 - 75	966.671	8	75	27	41	2	BRG16	0.5
20	-FCR20083 - 75	966.672			28			BRG20	0.6
25	-FCR25083 - 75	966.673			33			BRG25	0.6
32	-FCR32103 - 75	966.674	10		39		3	BRG32	0.7
16	HSK -A63 -FCR16082 - 85	966.631	8	85	25	51	2	BRG16	0.9
	-120	966.632		120	30	86			1.1
	-135	966.633		135	25	101			1.2
20	-FCR20083 - 85	966.634		85	32	51	3	BRG20	1.0
	-120	966.635		120	30	86			1.2
	-135	966.636		135	30	101			1.3
25	-FCR25083 - 85	966.637		85	35	51	3	BRG25	1.0
	-120	966.638		120	45	86			1.2
	-135	966.639		135	35	101			1.4
32	-FCR32103 - 85	966.640	10	85	40	51	3	BRG32	1.1
	-120	966.641		120	50	86			1.4
	-135	966.642		135	40	101			1.5

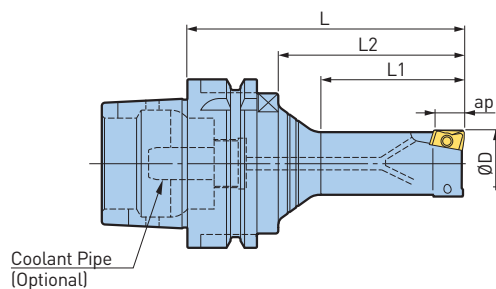
1. Wrench is included.
2. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 459

For Cutting Condition ▶ 460

For Coolant Pipe ▶ 175

**For Long Nose Type with HSK-A**



Cutter Dia. ØD	Model	Order No.	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	HSK -A63 -FCR16082L - 85	966.675	8	85	40	51	2	BRG16	0.9
	-120	966.676		120	45	86			1.0
	-FCR20082L -105	966.677		105	50	71			1.1
20	-FCR25082L -105	966.678		120	60	86		1.2	
	-FCR25082L -105	966.679		105	55	71		1.1	
25	-120	966.680		120	65	86		1.1	
32	-FCR32102L -120	966.681	10	70	86	3	BRG25	1.1	
	-135	966.682		135				80	101
								BRG32	1.4

1. Coolant pipe and inserts are to be ordered separately.

For Insert ▶ 459

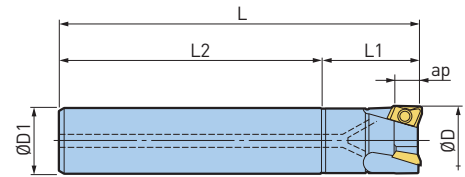
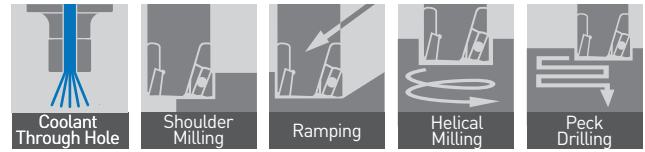
For Cutting Condition ▶ 460

For Coolant Pipe ▶ 175

C.1

## Fullcut Mill FCR

For Oversize Type with Cylindrical Shank.



Cutter Dia. ØD	Model	Order No.	ØD1	ap	L	L1	L2	No. of Inserts	Insert Size	Weight (kg)
16	ST15 -FCR16082 -120	805.849	15	8	120	25	95	2	BRG16	0.2
17	ST16 -FCR17082 -120	802.191	16	8	120	25	95	2	BRG16	0.2
20	ST19 -FCR20082 -165	805.850	19	8	165	30	135	2	BRG20	0.4
	-FCR20083 -135	805.851			135		105			
21	ST20 -FCR21082 -165	802.192	20	8	165	30	135	2	BRG20	0.4
	-FCR21083 -135	802.193			135		105			
25	ST24 -FCR25082 -180	805.852	24	8	180	35	145	2	BRG25	0.7
	-FCR25083 -150	805.853			150		115			
26	ST25 -FCR26082 -165	802.220	25	8	165	38	127	2	BRG25	0.6
	-FCR26083 -150	802.221			150		112			
32	ST28 -FCR32102 -180	805.854	28	10	180	48	132	2	BRG32	1.1
	-FCR32103 -180	805.855			180		132			
33	ST32 -FCR33102 -180	802.225	32	10	180	48	132	2	BRG32	1.1
	-FCR33103 -180	802.226			180		132			

1. Wrench is included. Inserts are to be ordered separately.
2. Lower cutting parameters appropriately for applications with either long projection or 3-flutes models.
3. For medium-heavy or heavy slot milling or ramping with projection longer than 2.5 times of diameter, 2-flutes models are recommended.

For Insert ▶ 459

For Cutting Condition ▶ 460

## Fullcut Mill FCR

### Indexable Inserts



Model	Cutter Dia.	ap	Nose R	P	M	K	N	
				ACZ350S			ACZ310	DS20
BRG160808	Ø16, Ø17	8	0.8	966.651			966.652	966.653
BRG200808	Ø20, Ø21	8	0.8	966.656			800.587	966.658
BRG250808	Ø25, Ø26	8	0.8	966.661			966.662	966.663
BRG321008	Ø32, Ø33	10	0.8	966.666			966.667	966.668
BRG321032		10	3.2	-			-	966.669

1. Inserts are available in packets of 10 pcs.

For Spare Parts ▶ 466

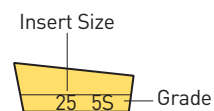
#### Caution

- It is important to use the correct insert for the diameter of Fullcut Mill. Failure to use the correct insert will result in incorrect cutting conditions and poor results.
- There is no compatibility with those of FCM type.

#### Insert classifications

ISO	Grade	Material	Coating
P30	ACZ350S	General steel	TiAlN / TiCN
M30		Stainless steel	
K10	ACZ310	Cast iron	
N20	DS20	Aluminium	DLC

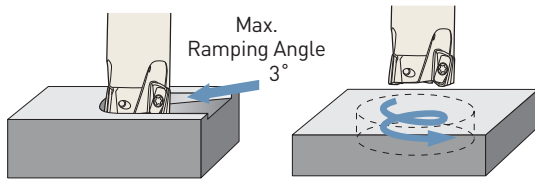
#### Marking Description



- 1: ACZ310  
5S: ACZ350S  
2: DS20

# Fullcut Mill FCR

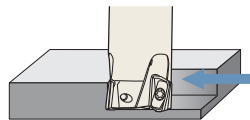
## Recommended Cutting Condition



Cutter Dia.	Flat Bottom		Through Hole
	Max. Hole Dia.	Min. Hole Dia.	Min. Hole Dia.
Ø16	Ø30	Ø27	Ø22
Ø20	Ø38	Ø36	Ø29
Ø25	Ø48	Ø45	Ø39
Ø32	Ø62	Ø59	Ø48

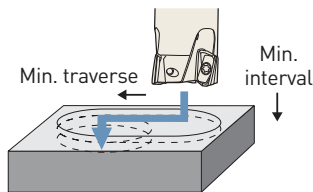
### Ramping and helical interpolation

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Die Steel	Cast Iron	Aluminium
	Insert Grade	ACZ350S					ACZ310	DS20
	Cutting Fluid	Dry		Wet	Dry/Wet	Dry		Dry/Wet
Ø16, Ø17	Speed (m/min)	100 - 200	150 - 220	60 - 80	100 - 150	60 - 80	100 - 180	200 - 1000
	Feed (mm/tooth)	0.06 - 0.12	0.06 - 0.12	0.05 - 0.08	0.08 - 0.16	0.06 - 0.1	0.08 - 0.18	0.06 - 0.24
Ø20, Ø25, Ø26	Speed (m/min)	100 - 200	150 - 200	60 - 100	120 - 150	60 - 100	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.06 - 0.1	0.02 - 0.18	0.1 - 0.35
Ø32, Ø33	Speed (m/min)	100 - 200	150 - 200	60 - 100	120 - 150	60 - 120	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.08 - 0.12	0.06 - 0.2	0.1 - 0.35



### Shoulder milling and slot milling

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Die Steel	Cast Iron	Aluminium
	Insert Grade	ACZ350S					ACZ310	DS20
	Cutting Fluid	Dry		Wet	Dry/Wet	Dry		Dry/Wet
Ø16, Ø20, Ø21	Speed (m/min)	100 - 200	100 - 200	60 - 80	120 - 180	80 - 120	100 - 180	200 - 1000
	Feed (mm/tooth)	0.08 - 0.18	0.08 - 0.18	0.05 - 0.1	0.12 - 0.18	0.08 - 0.12	0.08 - 0.18	0.1 - 0.3
Ø25, Ø32, Ø33	Speed (m/min)	100 - 200	100 - 200	60 - 100	120 - 180	80 - 120	100 - 180	200 - 1500
	Feed (mm/tooth)	0.08 - 0.2	0.08 - 0.2	0.05 - 0.1	0.12 - 0.2	0.08 - 0.12	0.08 - 0.2	0.1 - 0.35



Cutter Dia.	Min. Interval	Min. Traverse
Ø16	0.5	14
Ø20	1	18
Ø25	1	23
Ø32	2	30

### Plunge milling

Cutter Dia.	Work Material	Carbon Steel Alloy Steel	Unalloyed Steel	Prehardened Steel < HRC40	Stainless Steel	Die Steel	Cast Iron	Aluminium
	Insert Grade	ACZ350S					ACZ310	DS20
	Cutting Fluid	Air blow		Wet	Air/Wet	Air blow		Air/Wet
Ø16, Ø17	Speed (m/min)	80 - 120	80 - 120	60	80 - 120	60 - 80	80 - 160	200 - 350
	Feed (mm/tooth)	0.06 - 0.1	0.06 - 0.1	0.04 - 0.06	0.05 - 0.08	0.05 - 0.08	0.06 - 0.1	0.06 - 0.1
Ø20, Ø25, Ø26	Speed (m/min)	100 - 160	100 - 160	60 - 100	100 - 160	60 - 100	80 - 180	200 - 500
	Feed (mm/tooth)	0.1 - 0.25	0.1 - 0.25	0.1 - 0.25	0.12 - 0.25	0.1 - 0.2	0.08 - 0.3	0.1 - 0.3
Ø32, Ø33	Speed (m/min)	100 - 160	100 - 160	60 - 100	100 - 160	60 - 100	80 - 180	200 - 600
	Feed (mm/tooth)	0.1 - 0.3	0.1 - 0.3	0.1 - 0.3	0.12 - 0.3	0.1 - 0.2	0.08 - 0.4	0.1 - 0.3

### Caution

- The table is just a reference to determine cutting conditions. It should be adjusted according to a condition of a machine tool or workpiece.
- Since chips may scatter, utilize safety enclosures.
- Do not use oil-based cutting fluid, or a fire may take place.

C.1

# Fullcut Mill FCR

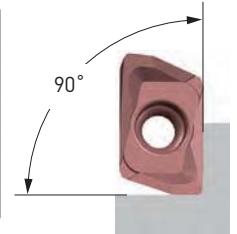
## Application Examples

### Bore

Dia. 38 with Helical milling



Fullcut Mill	BBT40-FCR20083-120
Insert	BRG200808 (ACZ350S)
Work Material	C50 (S50C) / Air blow
Cutting Speed Vc (m/min.)	150
Feed Rate Vf (mm/min.)	1 100
Axial DOC ap (mm)	2 mm x 3 times
Hole dia.	Ø38



For carbon steel of C50, very smooth cutting with feed rate of 1100 mm/min and excellent squareness are achieved.

### Honeycombed

Pocket with Ramping

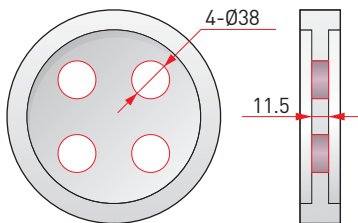


Fullcut Mill	BBT40-FCR20083-85
Insert	BRG200808 (DS20)
Work Material	A2017 Duralumin / Air blow
Cutting Speed Vc (m/min.)	750
Feed Rate Vf (mm/min.)	4 300
Axial DOC ap (mm)	6 mm x 3 times
Radial DOC ae (mm)	max. 20



For less rigid workpiece with 3 mm thickness clamped by a vise, feed rate of 4 300 mm/min on both sides of the workpiece is achieved.

### Helical milling



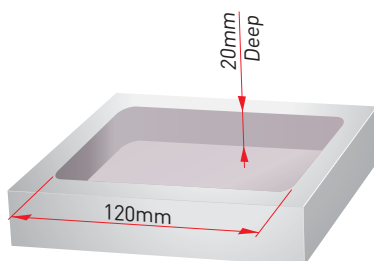
Fullcut Mill	BBT40-FCR20083-120
Insert	BRG200808 (ACZ350S)
Work Material	15CrMo5 (SCM415)
Cutting Speed Vc (m/min.)	150
Feed Rate Vf (mm/min.)	480
Axial DOC ap (mm)	4 mm x 3 times
Hole dia.	Ø38

Compared to another manufacturer

Axial DOC **1.3 times**  
Insert life **2 times**

Stable helical milling with 4 mm axial DOC on less rigid workpiece.

### Ramping



Fullcut Mill	BBT50-BBT40-50 BBT40-FCR16082-120
Insert	BRG160808 (ACZ350S)
Work Material	C50 (S50C)
Cutting Speed Vc (m/min.)	120
Feed Rate Vf (mm/min.)	480
Axial DOC ap (mm)	4 mm x 5 times

Compared to another manufacturer

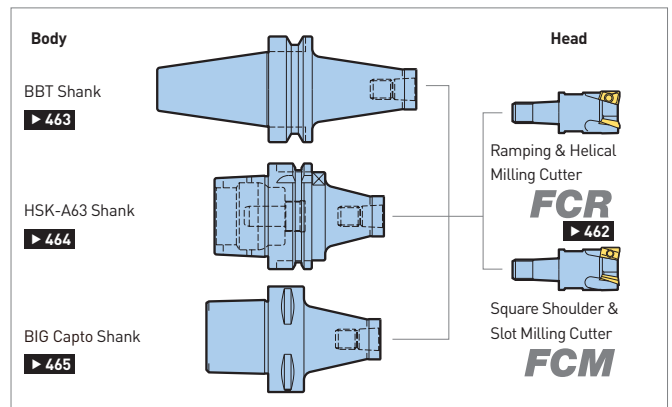
No chatter even at higher resistance corner.

Smooth chip evacuation eliminates re-cutting of the swarf and edge chipping of the inserts.

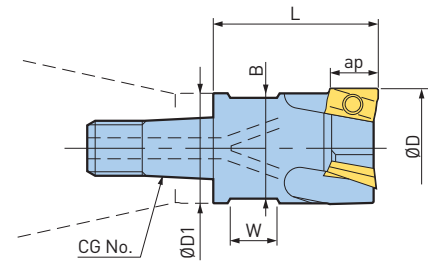
Example of use of BBT50-BBT40 adapter. An improved result is obtained compared to the product from another manufacturer.

## Contact Grip

A threaded coupling with taper and face contact. Improved rigidity and accuracy from the BIG-PLUS dual contact system.



### FCM Head



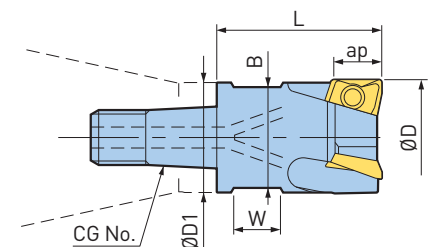
Cutter Dia. ØD	Model	Order No.	CG No.	ØD1	ap	L	No. of Inserts	Spanner Flats		Insert Size	Weight (kg)
								B	W		
16	CG15 -FCM16092 -25	966.701	CG15	15	9	25	2	12	6.2	ARG16	0.03
	CG19 -FCM20092 -32	966.702									
20	-FCM20093 -32	966.703	CG19	19	9	32	2 3	17	8.2	ARG20	0.07
	CG24 -FCM25092 -36	966.704									
25	-FCM25093 -36	966.705	CG24	24	9	36	2 3	22	10.2	ARG25	0.13
	CG31 -FCM32112 -43	966.706									
32	-FCM32113 -43	966.707	CG31	31	11	43	2 3	27	12.2	ARG32	0.26

1. Wrench is included. Inserts are to be ordered separately.
2. Standard single-ended wrench is required to clamp the head.

For Insert ▶ 452

For Cutting Condition ▶ 453

### FCR Head

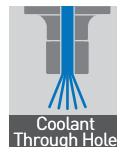


Cutter Dia. ØD	Model	Order No.	CG No.	ØD1	ap	L	No. of Insert	Spanner Flats		Insert Size	Weight (kg)
								B	W		
16	CG15 -FCR16082 -25	966.708	CG15	15	8	25	2	12	6.2	BRG16	0.03
	CG19 -FCR20082 -32	966.709									
20	-FCR20083 -32	966.710	CG19	19	8	32	2 3	17	8.2	BRG20	0.07
	CG24 -FCR25082 -36	966.711									
25	-FCR25083 -36	966.712	CG24	24	8	36	2 3	22	10.2	BRG25	0.13
	CG31 -FCR32102 -43	966.713									
32	-FCR32103 -43	966.714	CG31	31	10	43	2 3	27	12.2	BRG32	0.26

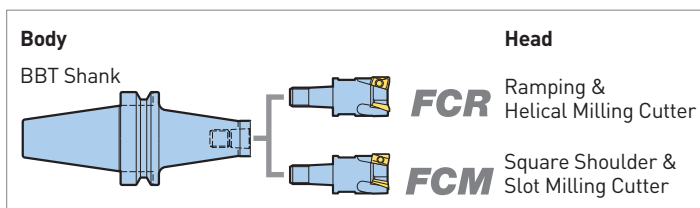
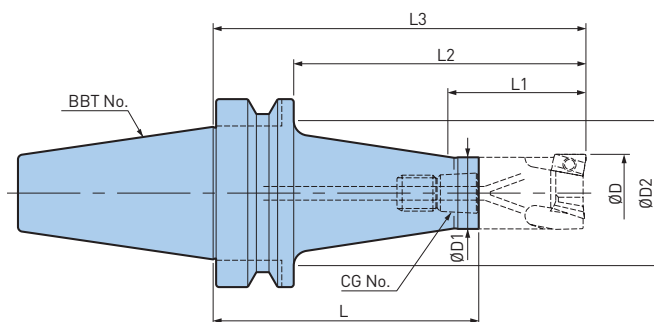
1. Wrench to clamp inserts is included. Inserts are to be ordered separately.
2. Standard single-ended wrench is required to clamp the head.

For Insert ▶ 459

For Cutting Condition ▶ 460



For Contact Grip with BBT



BIG-PLUS tools can be used in machining centers with conventional spindles.

Model	Order No.	ØD	CG No.	ØD1	ØD2	L	L1	L2	L3	Weight (kg)
BBT30	-CG15 - 50	16	CG15	15	40	50	31	53	75	0.5
	- 80					80	32	83	105	0.6
	-CG19 - 43	20	CG19	19	42	43	39	53	75	0.5
	- 73					73	40	83	105	0.6
	-CG24 - 39	25	CG24	24	41	39	45	53	75	0.5
	- 69					69		83	105	0.6
-CG31 - 32	32	CG31	31	41	32	49	53	75	0.5	
- 62					62	53	83	105	0.6	
BBT40	-CG15 - 50	16	CG15	15	46	50	30	48	75	1.1
	- 80				48	80	32	78	105	1.2
	-100				49	100		98	125	1.3
	-CG19 - 43	20	CG19	19	45	43	36	48	75	1.1
	- 73				48	73	40	78	105	1.2
	- 93				49	93		98	125	1.3
	-CG24 - 39	25	CG24	24	39	39	41	48	75	1.0
	- 69				48	69	45	78	105	1.2
	- 89				49	89		98	125	1.3
	-CG31 - 37	32	CG31	31	43	37	48	53	80	1.0
	- 77				57	77	53	93	120	1.4
	- 92				92	108		135	1.5	
BBT50	-CG15 -115	16	CG15	15	90	115	30	102	140	4.4
	-145				80	145	45	132	170	4.4
	-CG19 -108	20	CG19	19	90	108	38	102	140	4.4
	-153				80	153	60	147	185	4.5
	-CG24 -114	25	CG24	24	90	114	42	112	150	4.5
	-164				164	75	162	200	4.9	
	-CG31 -107	32	CG31	31	95	107	50	112	150	4.7
	-157				90	157	90	162	200	5.0

1. Standard single-ended wrench is required to clamp the head.

For FCM/FCR Head ▶ 462

C.1

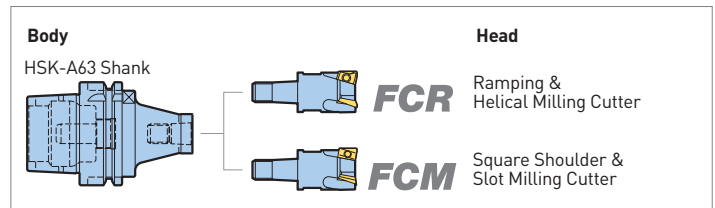
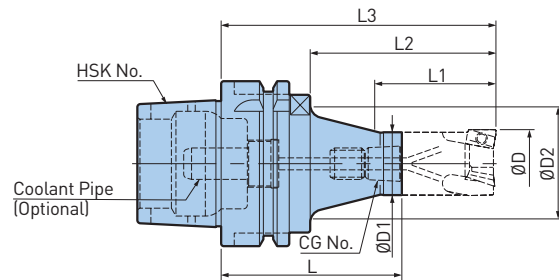


## Contact Grip

A threaded coupling with taper and face contact.



### For Contact Grip with HSK-A



Model	Order No.	ØD	CG No.	ØD1	ØD2	L	L1	L2	L3	Weight (Kg)
HSK-A63 -CG15	- 50	16	CG15	15	36	50	30	41	75	0.8
	- 80					80	31	71	105	
	-100					100	32	91	125	
-CG19	- 73	20	CG19	19	45	73	39	71	105	1.0
	- 93					93	40	91	125	
	-CG24					- 69	25	CG24	24	
- 89	89	45	91	125	1.1					
-CG31	- 77	32	CG31	31	45	77	53	86	120	1.0
	- 92					92		101	135	1.1

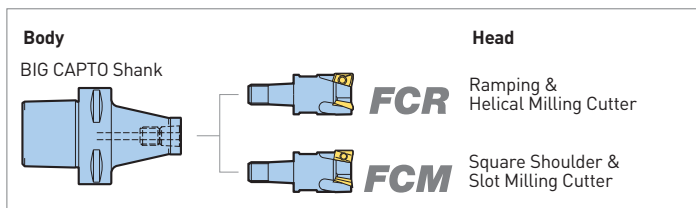
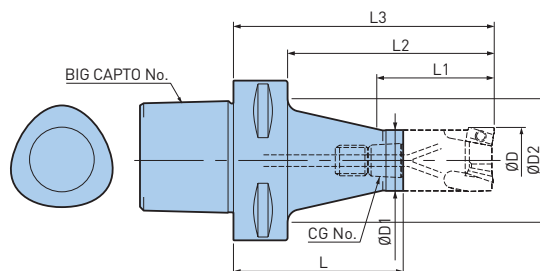
1. Standard single-ended wrench is required to clamp the head.
2. Coolant pipe is to be ordered separately.

For FCM/FCR Head ▶ 462

For Coolant Pipe ▶ 175



For Contact Grip with BIG CAPTO

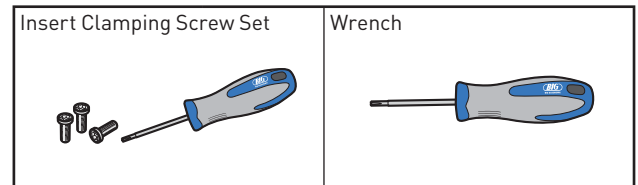


Model	Order No.	ØD	CG No.	ØD1	ØD2	L	L1	L2	L3	Weight (Kg)	
C6 -CG15 - 50	802.822	16	CG15	15	46	50	31	53	75	0.9	
	802.819				48	80		83	105	1.0	
	802.815				49	100		32	103	125	1.1
-CG19 - 43	802.823	20	CG19	19	45	43	39	53	75	0.9	
	802.820				48	73		39	83	105	1.0
	802.816				93	40		103	125	1.1	
-CG24 - 69	802.821	25	CG24	24	49	69	44	83	105	1.0	
	802.817					89	45		103	125	1.1
	802.818					77	53		98	120	1.2
-CG31 - 77	802.814	32	CG31	31	57	92	53	113	135	1.3	

1. Standard single-ended wrench is required to clamp the head.

For FCM/FCR Heads ▶ 462

## Spare Parts for Fullcut Mill, FCM and FCR



FCM		FCR		Model	Order No.	Model	Order No.	Torx Size
Cutter Dia. Ø	Insert	Cutter Dia. Ø	Insert					
12	ARG 1609	-	-	S2505DS	966.271	DA-T8	966.274	T-8
14, 16, 17		16, 17	BRG1608					
20, 21	ARG2009	20, 21	BRG2008	S2506DS	966.272			
25, 26	ARG2509	25, 26	BRG2508	S3508DS	966.273	DA-T15	966.275	T-15
32, 33	ARG3211	32, 33	BRG3210					
40, 50	ARG4011							
63	ARG6311							
80, 100	ARG8011							

1. Insert clamping set contains 10 pcs screw and 1 pcs wrench.

## Torque Wrench for Fullcut Mill

Torque wrench with fix Nm more precision. Ergonomic multi-component handle, particularly light and compact.

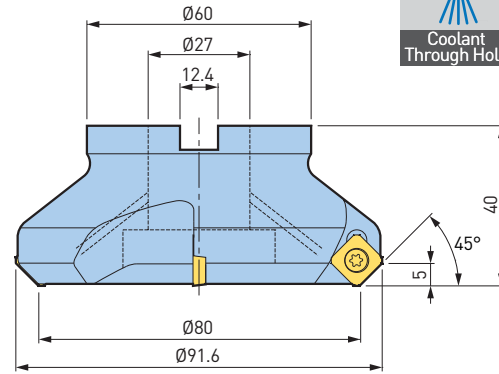
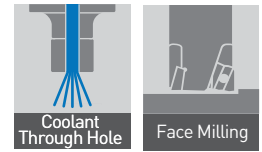


Torx Size	Fixed Torque	Order No.	Order No.	Order No.
T8	0.8 Nm	694.183	694.162	694.169
T15	3.0 Nm	694.186	694.165	694.172

1. Torque wrench set contains 1 pcs wrench body and 1 pcs wrench bit.

## Surface Mill

For superior surface finishing.

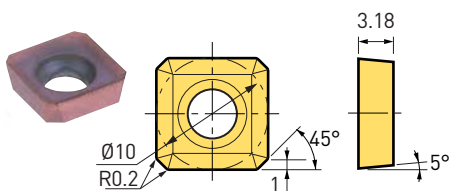


Model	Order No.	No. of Inserts	Weight (kg)	Insert Clamping Screw Set	Order No.
FM27-SFM804-40	805.890	4	0.9	S4S-T15DS	805.897

1. Wrench and screws are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in Insert clamping screw set.
3. MBA - M12H is required to be mounted on FMH.

- For FMH Type BBT ▶ 72
- For FMH Type BDV ▶ 111
- For FMH Type HSK ▶ 148
- For MBA - M12H ▶ 282

## Indexable Inserts



Model	Order No.	Coating
CM10C1 ACP200	966.445	Multi-layer TiAlN & AlCrN for general steel
CM10C1 DS20	966.446	DLC coating for aluminum & non-ferrous

1. Inserts are available in packet of 10 pcs.

## Insert Clamp Screw Set

Insert clamping screw set (10) screws & (1) wrench		Driver-Type Wrench	
Model	Order No.	Model	Order No.
S4S-T15DS	805.897	DA-T15	966.275

## Recommended Cutting Condition

Work Material	Insert Grade	Cutting Speed Vc (m/min)	Feed Rate fz (mm/t)	Axial DOC ap max (mm)
General Steel	ACP200	150-200-250	0.10-0.20-0.30	3
Prehardened Steel		180-240-300	0.10-0.25-0.40	4
Stainless Steel		160-205-250	0.15-0.23-0.30	3
Cast Iron	DS20	100-175-250	0.15-0.23-0.30	4
Aluminium, Non-ferrous		500-750-1000	0.15-0.23-0.30	5

## Application Example

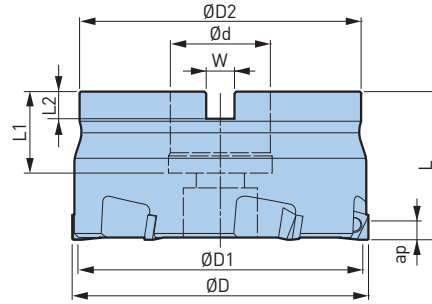
Work Material	C50		
Cutting Speed V (m/min.)	200		
Feed Rate f (mm/min.)	0.2		
Axial DOC ap (mm)	3		
Radial DOC ae (mm)	75		
Coolant	Dry		

Surface Mill  
Rz = 1.42

Other Manufacturer  
Rz = 9.04

## Speed Finisher

Amazing improvement of surface finish at high speed cutting.



Model	Order No.	ØD	ØD1		ØD2	Ød	L	L1	L2	W	No. of Insert	max. min <sup>-1</sup>	Clamp Bolt	Weight (kg)
			DA2200	CBN										
FM22 -PLS505 -35	978.276	50	46.9	44.9	47	22	35	19	6	10.4	5	20 000	M10 Cap Screw	0.4
-PLS636 -35	978.313	63	59.9	57.9	60	22	35	19	6	10.4				6
FM27 -PLS806 -40	978.277	80	76.9	74.9	76	27	40	22	7	12.4	6	16 000	M12 Cap Screw	1.2
-PLS1006 -35 *	805.847	100	69.9	94.9	60	27	35	24	7	12.4		12 800	MBA-M12	1.3
-PLS1256 -35 *	805.848	125	121.9	119.9	60	27	35	24	7	12.4		10 200	MBA-M12	1.9
FM32 -PLS1006 -42	801.684	100	96.9	94.9	96	32	42	24	8	14.4	6	12 800	MBA-M16	2.0
FM40 -PLS1258 -50	805.284	125	121.9	119.9	100	40	50	28	9	16.4	8	10 200	MBA-M20	3.3
-PLS16010 -50	805.283	160	156.9	154.9	100	40	50	28	9	16.4				10

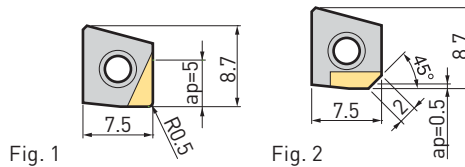
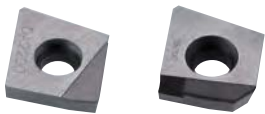
1. Wrench and screws are included. Inserts are to be ordered separately.
2. When using at 12 000 min<sup>-1</sup> or higher speed, contact agent for balancing of the cutter and arbor assembly.
3. Effective cutting edge length ap varies depending on insert models. Refer to the table for insert shown below.
4. Adjusting amount of cutting edge is 0.1 mm. Note this when using reground insert.
5. \* Light weight design exclusive for BT30.

For FMH Type BBT ▶ 72

For FMH Type BDV ▶ 111

For FMH Type HSK ▶ 148

### Indexable Inserts



Insert Model	Order No.	Workpiece	Fig.	Material	Cutting Edge Length
PL0705 DA2200	978.278	Aluminium & nonferrous	1	PCD	5.0
PL0705 CBN	978.820	Cast Iron	2	CBN	0.5

### Insert Grade

DA2200	CBN
High density sintered material made of ultra-micro diamond particles. Superior hardness comparable to carbide alloy and wear resistance.	Newly designed CBN sintered body with high content rate of CBN improves toughness and thermal conductivity.

### Recommended Cutting Condition

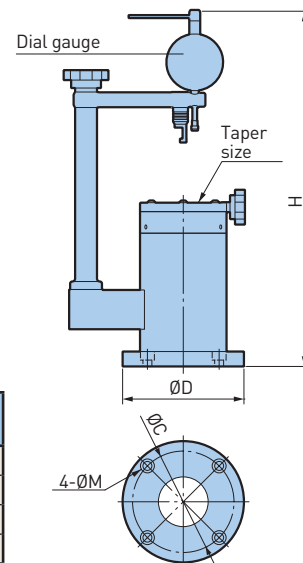
Workpiece Material	Insert Material	Cutting Speed (m/min)	Feed Rate (mm/tooth)	Coolant
Aluminium Alloy	DA2200	2 000 - 4 000	0.05 - 0.2	Wet
		400 - 800		
Copper Alloy	DA2200	500 - 2 500	0.05 - 0.2	Wet
Gray Cast Iron	CBN	800 - 2 000	0.1 - 0.3	Dry

The table is a reference to determine cutting conditions. It should be adjusted according to cutting width, conditions of the machine tool and workpiece.

Spare Parts					
Lifting screw set (1) lifting screw & (1) lifting nut		Insert clamping screw set (10) screws & (1) wrench		Wrench	
Model	Order No.	Model	Order No.	Model	Order No.
LSN35	804.796	S2506DS	966.272	DA-T8	966.274

Insert clamping screws and wrenches are consumables. Regular replacement and storage are recommended.

## Presetter for Speed Finisher

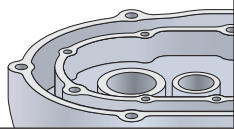
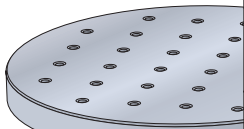
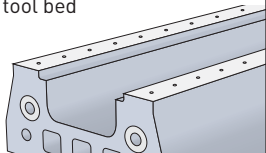


Model	Order No.	Taper Size	H	ØD	ØC	ØM	Max. Tool Length	Weight (kg)
PLP -BBT30	804.644	BBT30	> 417	122	102	9 (for M8)	150	7.5
-BBT40	804.645	BBT40						7.6
-BBT50	804.646	BBT50	> 502	172	149	11 (for M10)	160	17.5
-HSK63	978.275	HSK-A63	> 417	122	102	9 (for M8)	150	7.7

1. Dial gauge and indicator stabilizer (2 pcs. AAA batteries included) are standard accessories.
2. Min. reading of the accessory dial gauge is 0.001mm.
3. BT shank cannot be used.
4. Max. tool length indicated in the table is the dimension from the gauge line of the arbor to the cutting edge.
5. Max. cutter diameter is Ø160mm.

### Application Examples

(Cutter diameter: Ø 80)

Workpiece	Conditions	Surface Roughness	Height Difference	No. of Workpieces	Result
Crankcase ADC12 	Cutting speed: 4 000 m/min Spindle speed: 15 900 min <sup>-1</sup> Feed rate: 9 550 mm/min Depth of cut: 2.5 mm	Ra = 0.08 µm Rz = 0.55 µm	Within 1 µm	24 000	Rough and finish processes are combined in a single operation.
Parts of semiconductor manufacturing equipment A5052 	Cutting speed: 4 000 m/min Spindle speed: 15 900 min <sup>-1</sup> Feed rate: 9 550 mm/min Depth of cut: 2.0 mm	Ra = 0.07 µm Rz = 0.32 µm	Within 1 µm	320	Mirror finish is achieved.
Machine tool bed FC250 	Cutting speed: 1 500 m/min Spindle speed: 6 000 min <sup>-1</sup> Feed rate: 3 600 mm/min Depth of cut: 0.5 mm	Ra = 0.12 µm Rz = 0.67 µm	Within 2 µm	20	1 to 2 µm flatness is obtained.

C.1



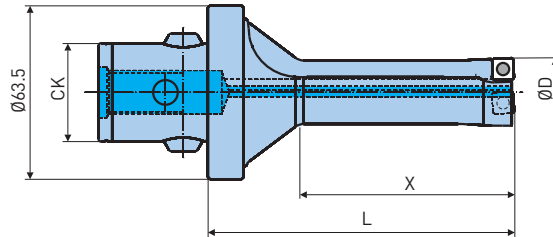
## Indexable Insert Drills and Chamfer Mills

Indexable Insert Drills	472 - 475
C-Cutter Mini	476 - 481
C-Cutter	482 - 485
Chamfer Rings for Boring Heads	486
C-Centering Cutter	487
R-Cutter	488 - 491
Center Boy	492
C-Cutter Boy	493
Slot Milling Cutters	494 - 495
BF-Cutter	496



## Indexable Insert Drills, Ø 16 - 30

The BIG KAISER indexable insert drills series 337 are made with straight flutes. This design guarantees a short distance for chip evacuation and a high radial and torsional rigidity.



L/D = 3 and 4

Bore Dia. ØD	Boring Depth 3 x D				Boring Depth 4 x D				Insert Type	CK No.
	Model	Order No.	X	L	For CKB6 Model	Order No.	X	L		
16	ID16-48CKB6	337.316	48	85	ID16-64CKB6	337.416	64	101	WP 337-1	CKB6
17	ID17-51CKB6	337.317	51	88	ID17-68CKB6	337.417	68	105		
18	ID18-54CKB6	337.318	54	91	ID18-72CKB6	337.418	72	109		
19	ID19-57CKB6	337.319	57	94	ID19-76CKB6	337.419	76	113		
20	ID20-60CKB6	337.320	60	97	ID20-80CKB6	337.420	80	117		
21	ID21-63CKB6	337.321	63	100	ID21-84CKB6	337.421	84	121	WP 337-2	
22	ID22-66CKB6	337.322	66	103	ID22-88CKB6	337.422	88	125		
23	ID23-69CKB6	337.323	69	106	ID23-92CKB6	337.423	92	129		
24	ID24-72CKB6	337.324	72	109	ID24-96CKB6	337.424	96	133		
25	ID25-75CKB6	337.325	75	112	ID25-100CKB6	337.425	100	137	WP 337-3	
26	ID26-78CKB6	337.326	78	118	ID26-104CKB6	337.426	104	146		
27	ID27-81CKB6	337.327	81	121	ID27-108CKB6	337.427	108	150		
28	ID28-84CKB6	337.328	84	124	ID28-112CKB6	337.428	112	154		
29	ID29-87CKB6	337.329	87	127	ID29-116CKB6	337.429	116	158		
30	ID30-90CKB6	337.330	90	130	ID30-120CKB6	337.430	120	162		

1. Inserts are to be ordered separately.
2. Adjustable drill holder is recommended for clamping.

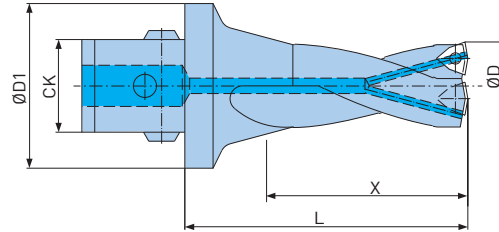
For Spare Parts ▶ 421

For Insert ▶ 401-402

For Drill Holder ▶ 474

## Indexable Insert Drills, Ø 19.5 - 74

Insert drills in two length graduations (2xD and 3xD) with CKB tool connections.



L/D = 2

Bore Dia. ØD	Boring Depth 2 x D				Insert Type		CK No.	ØD1
	Model	Order No.	X	L	Inside	Outside		
19.5	ID19.5-39CKB5	336.171	39	75	WC 04	WC 03	CKB5	50
25.5	ID25.5-56CKB5	336.172	56	90	WC 05	WC 04		
29.5	ID29.5-65CKB5	336.173	65	100	WC 05	WC 05		
34.5	ID34.5-76CKB5	336.174	76	110	WC 06	WC 06		
39.5	ID39.5-87CKB5	336.175	87	125				

1. Inserts are to be ordered separately.
2. Adjustable drill holder is recommended for clamp.

For Spare Parts ▶ 421

For Insert ▶ 403 - 404

For Drill Holder ▶ 474

L/D = 2 and 3

Bore Dia. ØD	Boring Depth 2 x D				Boring Depth 3 x D				Insert Type	CK No.
	Model	Order No.	X	L	Model	Order No.	X	L		
31	ID31-62CKB6	336.631	62	100	ID31-93CKB6	336.731	93	130	WC 06	CKB6
32	ID32-64CKB6	336.632	64	100	ID32-96CKB6	336.732	96	130		
33	ID33-66CKB6	336.633	66	110	ID33-99CKB6	336.733	99	140		
34	ID34-68CKB6	336.634	68	110	ID34-102CKB6	336.734	102	140		
35	ID35-70CKB6	336.635	70	110	ID35-105CKB6	336.735	105	150		
36	ID36-72CKB6	336.636	72	110	ID36-108CKB6	336.736	108	150		
37	ID37-74CKB6	336.637	74	110	ID37-111CKB6	336.737	111	150		
38	ID38-76CKB6	336.638	76	125	ID38-114CKB6	336.738	114	160		
39	ID39-78CKB6	336.639	78	125	ID39-117CKB6	336.739	117	160		
40	ID40-80CKB6	336.640	80	125	ID40-120CKB6	336.740	120	165		
41	ID41-82CKB6	336.641	82	125	ID41-123CKB6	336.741	123	165		
42	ID42-84CKB6	336.642	84	125	ID42-126CKB6	336.742	126	165		
43	ID43-86CKB6	336.643	86	140	ID43-129CKB6	336.743	129	180		
44	ID44-88CKB6	336.644	88	140	ID44-132CKB6	336.744	132	180		
45	ID45-90CKB6	336.645	90	140	ID45-135CKB6	336.745	135	180		
47	ID47-94CKB6	336.647	94	140	ID47-141CKB6	336.747	141	190		
49	ID49-98CKB6	336.649	98	150	ID49-147CKB6	336.749	147	200		
51	ID51-102CKB6	336.651	102	150	ID51-153CKB6	336.751	153	200		
53	ID53-106CKB6	336.653	106	160	ID53-159CKB6	336.753	159	215		
55	ID55-110CKB6	336.655	110	160	ID55-165CK6	336.755	165	215		
57	ID57-114CKB6	336.657	114	165	ID57-171CKB6	336.757	171	220		
59	ID59-118CKB6	336.659	118	165	ID59-177CKB6	336.759	177	220		
61	ID61-122CKB6	336.661	122	165	ID61-183CKB6	336.761	183	220		
69	ID69-153CKB6	336.569	153	200					WC 10	CKB7
65	ID65-153CKB7	336.665	153	210						
74	ID74-153CKB7	336.674	153	210						

1. Inserts are to be ordered separately.
2. Adjustable drill holder is recommended for clamping.

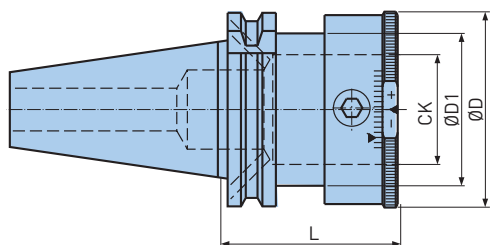
For Insert ▶ 404 - 406

## Adjustable Drill Holders for Indexable Drill

Drill holders in accordance to IT9 quality with double eccentric bush for stepless diameter adjustment of BIG KAISER insert drills with CKB6 tool connection.



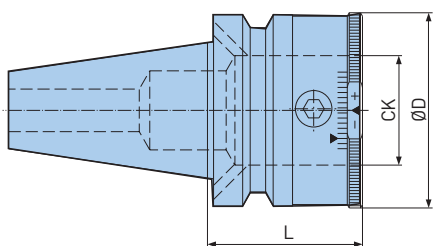
### DV (DIN 69871 Form B/D)



Adjustable range: nominal dia.  $\varnothing + 1.0/-0.2$  mm

Model	Order No.	CK	ØD	ØD1	L	Weight (Kg)
DV40-ADH-CKB6ADF	336.301	CKB6	65	50	59	1.2
DV50-ADH-CKB6ADF	336.303	CKB6	65	-	69	3.3

### BT (MAS 403/BT)

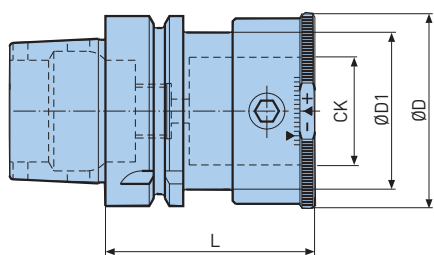


Adjustable range: nominal dia.  $\varnothing + 1.0/-0.2$  mm

Model	Order No.	CK	ØD	L	Weight (Kg)
BT40-ADH-CKB6ADF	336.302	CKB6	65	51	1.1
BT50-ADH-CKB6	336.304	CKB6	65	72	3.9

### C.2

### HSK-A (ISO12164)



Adjustable range: nominal dia.  $\varnothing + 1.0/-0.2$  mm

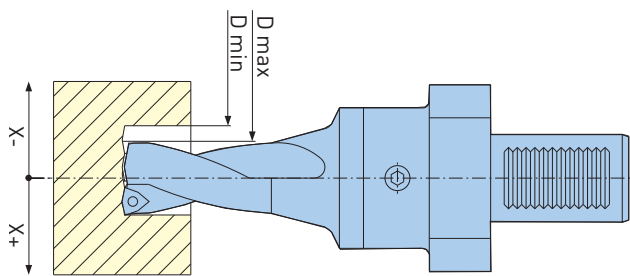
Model	Order No.	CK	ØD	ØD1	L	Weight (Kg)
HSK-A63-ADH-CKB6	336.309	CKB6	65	52.5	70	1.2
HSK-A100-ADH-CKB6	336.310	CKB6	65	-	83	2.9

1. Coolant pipe is to be ordered separately.

For Coolant Pipe ▶ 175

For Spare Parts ▶ 421

## Off-Axis Use Instructions



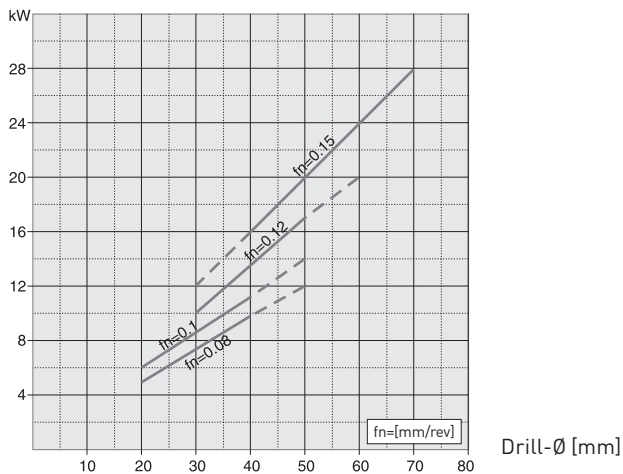
Drill Ø	Difficult work			Favourable work		
	+X	D min.	D max.	+X	D min.	D max.
16	1.0	16.0	18.0	1.7	16.0	19.4
17	0.8	17.0	18.6	1.5	17.0	20.0
18	0.7	18.0	19.4	1.3	18.0	20.6
19	0.5	19.0	20.0	1.0	19.0	20.6
20	0.3	20.0	20.6	0.8	20.0	21.6
21	1.1	21.0	23.2	2.0	21.0	25.0
22	0.9	22.0	23.8	1.7	22.0	25.4
23	0.8	23.0	24.6	1.5	23.0	26.0
24	0.6	24.0	25.2	1.2	24.0	26.4
25	0.4	25.0	25.8	1.0	25.0	27.0
26	1.0	26.0	28.0	1.7	26.0	29.4
27	0.8	27.0	28.6	1.4	27.0	29.8
28	0.6	28.0	29.2	1.2	28.0	30.4
29	0.4	29.0	29.8	0.9	29.0	30.8
30	0.3	30.0	30.6	0.7	30.0	31.4

Drill Ø	Adjustable Range		Boring Dia	
	-X	+X	D min.	D max.
31	0.25	3.5	30.5	38.0
32		3.25	31.5	38.5
33		3.0	32.5	39.0
34		2.75	33.5	39.5
35		2.5	34.5	40.0
36		2.25	35.5	40.5
37		2.0	36.5	41.0
38		1.75	37.5	41.5
39		1.5	38.5	42.0
40		1.25	39.5	42.5
41		1.0	40.5	43.0
42		0.75	41.5	43.5
43	0.5	42.5	44.0	
44	0.25	43.5	44.5	
45	0.5	4.0	44.0	53.0
47		3.5	46.0	54.0
49		3.0	48.0	55.0
51		2.5	50.0	56.0
53		2.0	52.0	57.0
55		1.5	54.0	58.0
57		1.0	56.0	59.0
59		0.5	58.0	60.0
61		3.5	60.0	68.0
65		3.0	64.0	71.0
69	2.0	68.0	73.0	
74	1.0	73.0	76.0	

1. \* Adjustment range with adjustable drill holder or with stationary off axis use.

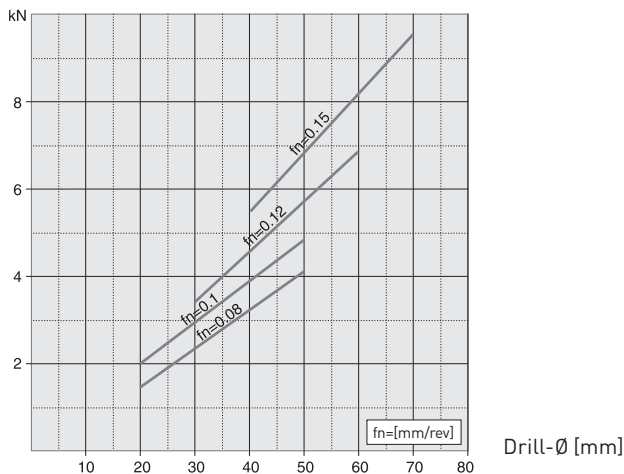
### Driving power

Vc=220 m/min; Material St 60  
kc 1 = 2 110 N/mm<sup>2</sup>



### Feed force

Material St 60  
kc 1 = 2 110 N/mm<sup>2</sup>



# C-Cutter Mini, Multi Insert Type

## Front & Back Chamfering

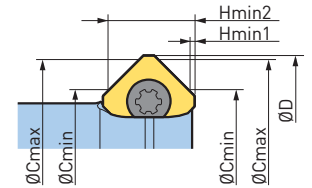
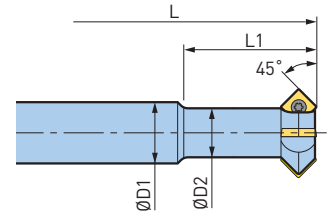
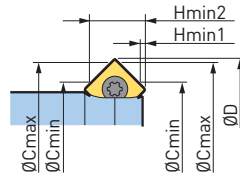
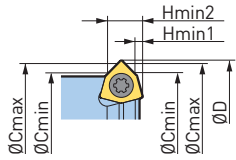
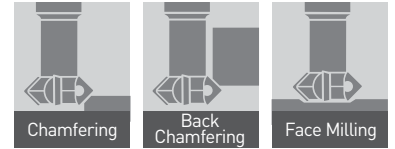


Fig. 1

Fig. 2

Fig. 3

Model	Order No.	Face Milling	Fig.	ØD	ØD1	ØD2	L	L1	ØCmin.	ØCmax.	Hmin1	Hmin2	Insert Model	No. of Insert	
ST12 -C1012 -45B - 20	966.461	-	1	12.7	12	9	93	20	10	12	1.0	3.7	CM04	3	
	966.462	108						35							
	-C1116 -45B - 25	966.433	-	2	17.1	12	9.6	98	25	11	16	0.4	6.2	CM05	4
		966.463	113						40						
ST16 -C1520 -45B - 50	966.464	-	2	20.7	16	13.2	123	50	15	20	0.6	6.3	CM05	4	
ST20 -C1924 -45B - 60	966.465	-	2	24.7	20	17.2	143	60	19	24	0.6	6.3	CM05	4	
	-C2232 -45B - 50	966.434						✓							3
		966.466	130	80											
ST32 -C3242 -45B - 65	966.435	✓	3	42.7	32	30.6	175	65	32	42	0.4	12.4	CM10		4
	-100							966.467						211	

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in Insert clamping screw set.
3. In case of chamfering with 4 insert type, chatter may occur due to increased cutting resistance when plunge cutting. Please try the different types with less inserts, 1 or 2.

For Insert ▶ 480

For Cutting Condition ▶ 480

# C-Cutter Mini, Single Insert Type

## Front & Back Chamfering

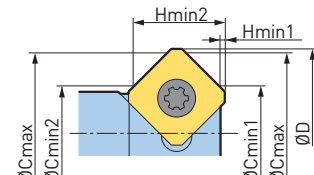
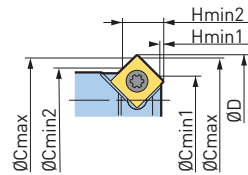
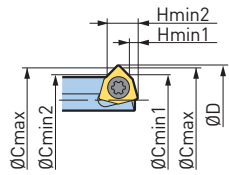
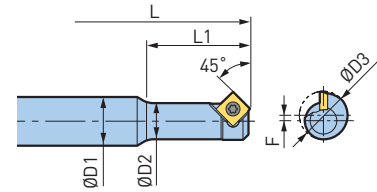
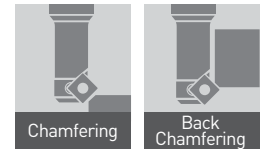


Fig. 1

Fig. 2

Fig. 3

Model	Order No.	Fig.	ØD	ØD1	ØD2	ØD3	L	L1	ØC min1	ØC min2	ØC max.	H min1	H min2	Offset F	Insert Model
ST10 -C0608 -45B - 16	966.468	1	8.8	10	5.7	5.7	78	16	6	6	8	1.0	3.8	1.55	CM04
ST10 -C0409 -45B - 20	966.469	2	9.8	10	5.4	7.7	86	20	4	6	9	0.5	5.4	1.1	CM05
ST10 -C0611 -45B - 20	966.432	2	12.0	10	7.4	9.8	81	20	6	8	11	0.4	5.5	1.1	CM05
- 35	966.470						96	35							
ST16 -C1222 -45B - 40	966.471	3	22.6	16	11.0	16.9	117	40	12	12	22	0.3	12.4	2.9	CM10

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.

For Insert ▶ 480

For Cutting Condition ▶ 480

## Front Chamfering

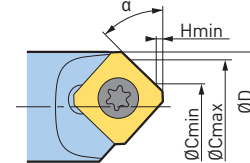
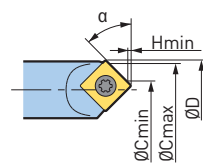
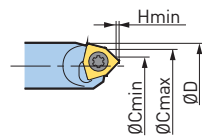
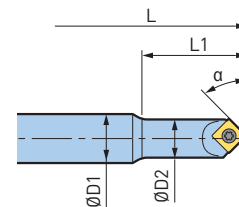


Fig. 1

Fig. 2

Fig. 3

Model	Order No.	Fig.	α	ØD	ØD1	ØD2	L	L1	ØC min.	ØC max.	H min.	Insert Model
ST10 -C0204 -45 - 15	966.486	1	45°	6.3	10	6	78	15	2	4	0.4	CM04
- 25	966.487						88	25				
ST10 -C0207 -45 - 20	966.431	2	45°	8.1	10	7.8	81	20	2	7	0.4	CM05
- 35	966.488						96	35				
ST16 -C0515 -45 - 50	966.489	3	45°	15.8	16	15.2	122	50	5	15	0.4	CM10
ST16 -C0214 -30 - 40	966.436	3	30°	15.9	16	15.4	105	40	2	14	0.2	CM10
ST16 -C0916 -60 - 40	966.437	3	60°	16.5	16	15.6	105	40	9	16	0.8	CM10

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set. Centering is not possible.

For Insert ▶ 480

For Cutting Condition ▶ 480

# C-Cutter Mini, Bolt Hole & Tap Starting Hole

## Front & Back Chamfering

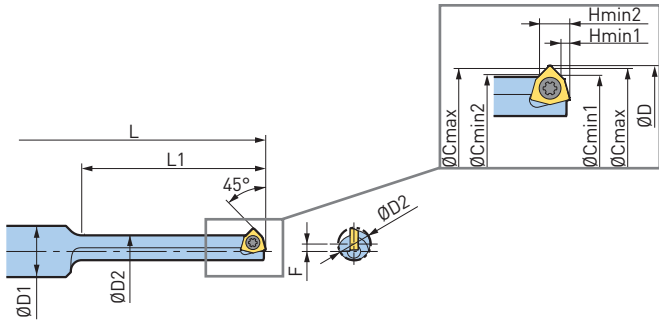


Fig. 1

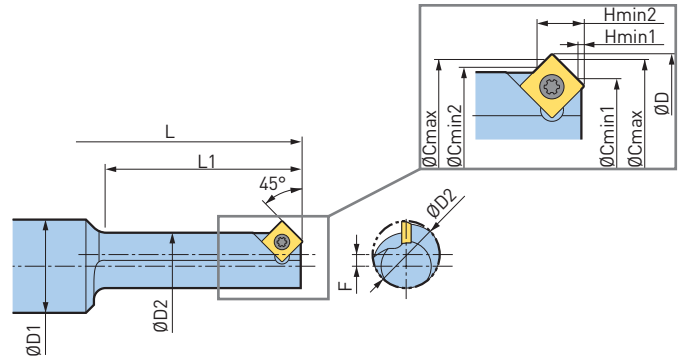


Fig. 2

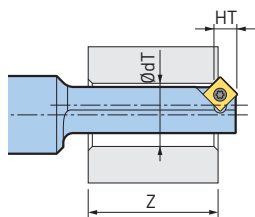
Model	Order No.	Fig.	ØD	ØD1	ØD2	L	L1	ØC min1	ØC min2	ØC max.	H min1	H min2	Offset F	Insert Model				
ST10 -CM08 -45B - 19	966.472	1	9.2	10	6.3	81	19	6.4	6.6	8.4	1.0	3.7	1.45	CM04				
- 35 *	966.473					97	35											
ST10 -CM10 -45B - 25	966.474	2	11.3	12	8.0	99	25	5.5	8.3	10.5	0.5	5.0	1.65		CM05			
- 45 *	966.475					119	45											
ST12 -CM12 -45B - 29	966.476	2	13.4	12	9.7	102	29	7.6	10.0	12.6	0.5	5.2	1.85			CM05		
- 53 *	966.477					126	53											
ST16 -CM14 -45B - 33	966.478	2	15.5	16	11.5	107	33	9.7	11.8	14.7	0.5	5.3	2.00				CM05	
- 61 *	966.479					135	61											
ST16 -CM16 -45B - 37	966.480	2	17.6	16	13.5	110	37	11.8	13.8	16.8	0.5	5.4	2.05					CM05
- 69 *	966.481					142	69											
ST20 -CM18 -45B - 42	966.482	2	19.7	20	14.9	126	42	13.9	15.2	18.9	0.5	5.7	2.40	CM05				
- 78 *	966.483					162	78											
ST20 -CM20 -45B - 46	966.484	2	21.8	20	16.9	129	46	16.0	17.2	21.0	0.5	5.8	2.45		CM05			
- 86 *	966.485					169	86											

1. Wrench and screw are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.
3. For \* long type, standard insert is recommended rather than "SE" sharp edge insert to avoid chipping.

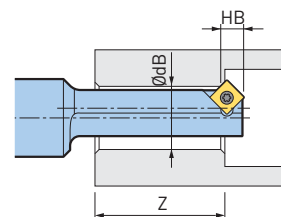
For Insert ▶ 480

For Cutting Condition ▶ 480

### Tap starting hole



### Bolt hole

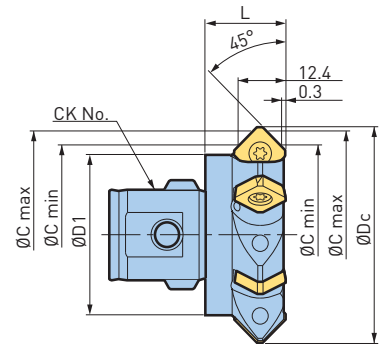
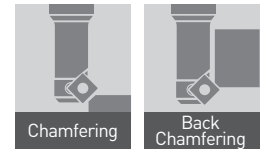


C.2

Cutter Type	Tap Starting Hole		Bolt Hole		Z	
	ØdT	HT	ØdB	HB	Standard Type	Long Type
CM08	6.8 (M8)	3.6	6.6 (M6)	3.7	13	29
CM10	8.5 (M10)	4.9	9 (M8)	4.6	17	37
CM12	10.3 (M12)	5.0	11 (M10)	4.7	21	45
CM14	12.0 (M14)	5.2	-	-	25	53
CM16	14.0 (M16)	5.3	14 (M12)	5.3	29	61
CM18	15.5 (M18)	5.6	16 (M14)	5.3	33	69
CM20	17.5 (M20)	5.6	18 (M16)	5.4	37	77

## C-Cutter Mini CKB Type

The C-Cutter mini is a high performance tool for chamfering, back chamfering and face milling. The large number of cutting edges (4 -6) combined with the small tool diameter permit extremely high feed rates.

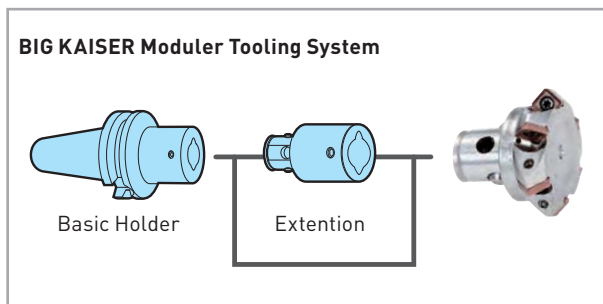


Model	Order No.	Chamfer		CK No.	ØDc	ØD1	L	No. of Inserts	Insert Model
		ØC min	ØC max.						
CKB1-C2232-45B-20	335.070	22	32	CKB1	32.7	19	20	4	CM10
CKB3-C3242-45B-20	335.071	32	42	CKB3	42.7	31	20	4	CM10
-C5262-45B-20	335.072	52	62		6				
CKB4-C4252-45B-20	335.073	42	52	CKB4	52.7	39	20	6	CM10
CKB5-C5262-45B-20	335.074	52	62	CKB5	62.7	51	20	6	CM10

1. A wrench and a screw are included. Inserts are to be ordered separately.
2. Can be used with through coolant.

For Insert ▶ 480

For Cutting Condition ▶ 480





# Indexable Inserts for C-Cutter Mini

## Indexable Inserts

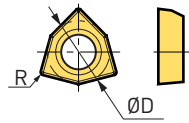


Fig. 1

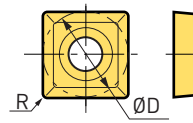


Fig. 2

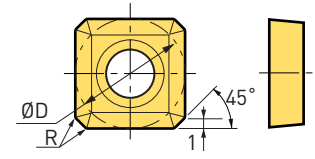


Fig. 3

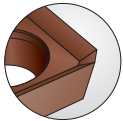
The suffix SE designates a sharp cutting edge version.

Model	Fig.	ØD	Nose R	P	M	K	N	Clamping Screw Set	
				ACP300	ACP200	DS20	Model	Order No.	
CM0402	1	3.97	0.2	966.440	-	-	-	S2SS-T6	966.448
CM0502	2	5	0.2	-	966.441	-	966.442	S2TS-T6	966.449
CM0502SE				800.950	966.443	-			
CM10C1	3	10	0.2	-	966.445	-	966.446	S4S-T15	966.450
CM10C1SE				-	966.447	-			

1. Inserts are available in packets of 10 pcs.
2. It is recommended to regularly replace clamping screws and wrench to ensure the correct clamping force is maintained.

### Sharp cutting edge insert for „SE“ type

Sharp cutting edge minimises the generation of burrs. This is especially beneficial when cutting stainless and mild steel materials.



## Recommended Cutting Condition

### A (Standard conditions)

Work Material	Insert Grade	Cutting Speed Vc (m/min)	Feed Rate fz (mm/tooth)		Coolant
			Chamfering	Face Milling (CM10 insert only)	
General Steel, Alloy Steel, High-Alloy Steel	ACP200 ACP300	100 - 350	0.05 - 0.4	0.05 - 0.2	Dry
Prehardened Steel (Less than HRC40)		60 - 100	0.05 - 0.1	0.05 - 0.1	Wet
Stainless Steel		100 - 250	0.08 - 0.3	0.08 - 0.2	Dry / Wet
Cast Iron		100 - 350	0.1 - 0.5	0.05 - 0.25	Dry
Aluminium, Non-Ferrous	DS20, ACP300	100 - 800	0.1 - 0.5	0.05 - 0.3	Dry / Wet

1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. Wet cutting is recommended to obtain the good surface quality.
3. In case built-up edge occurs when cutting aluminum and stainless steel, use soluble oil.

### B (For long models of „bolt hole and starting hole for tapping type“)

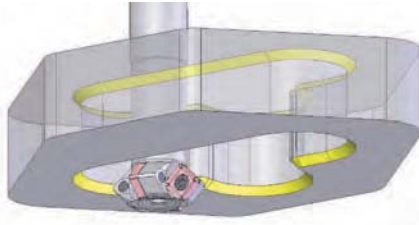
Work Material	Insert Grade	Cutting Speed Vc (m/min)	Feed Rate fz (mm/tooth)	Coolant
General Steel, Alloy Steel, High-Alloy Steel	ACP200	20 - 100	0.03 - 0.12	Wet
Cast Iron	ACP300	50 - 160	0.05 - 0.20	Dry
Aluminium, Non-Ferrous		30 - 100	0.03 - 0.12	Wet

1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. For stainless steel and hardened steel, shorter models are recommended.

C.2

## Application Examples C-Cutter Mini

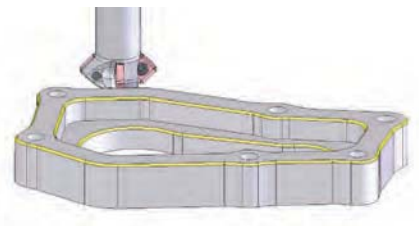
### Front & Back chamfering for stainless steel



Material: X5CrNi18-9  
 Chamfer: 3 mm x 45°  
 Feed: 0.1 mm/tooth

	Competitor's Tool (with TiAlN Coated Carbide Insert)	C-Cutter Mini (ST20-C2232-45B-50)
Chamfering Dia.	Ø 30	Ø 28
Number of Teeth	1	4
Cutting Speed (m/min)	140	180
Spindle Speed (min-1)	1 490	2 050
Feed (mm/min)	149	819
Result	5 times better cutting efficiency	

### Chamfering for aluminium



Material: Al-Si7Mg(Fe)  
 Chamfer: 0.5 mm x 45°  
 Feed: 0.1 mm/tooth

	Competitor's Tool	C-Cutter Mini (ST12-C1116-45B-25)
Chamfering Dia.	Ø 40	Ø 12
Number of Teeth	3	4
Cutting Speed (m/min)	200	600
Spindle Speed (min-1)	1 590	15 920
Feed (mm/min)	477	6 370
Result	13 times better cutting efficiency	

### Front & Back chamfering of starting holes for M8 tapping

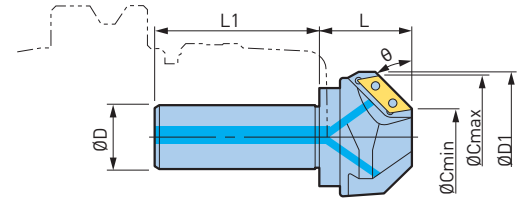
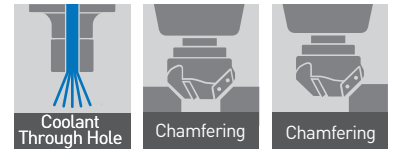


Material: FC250  
 Tapped hole: Ø 6.6  
 Chamfering dia.: Ø 8.4

	Competitor's Tool (with Non-Coated Carbide Insert)	C-Cutter Mini (ST10-CM08-45B-19)
Cutting Speed (m/min)	30	150
Spindle Speed (min-1)	1 140	5 680
Feed per Tooth (mm/rev)	0.05	0.1
Feed (mm/min)	57	568

## C-Cutter Standard Type

One C-Cutter to cover a wide chamfering range.  $\varnothing 5 - \varnothing 25$ ,  $\varnothing 10 - \varnothing 40$ ,  $\varnothing 30 - \varnothing 60$ ,  $\varnothing 50 - \varnothing 100$



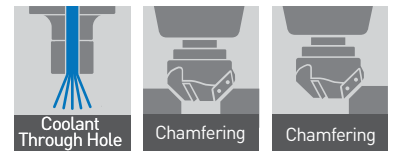
Model	Order No.	Chamfering Angle $\theta$	Chamfer		$\varnothing D$	$\varnothing D1$	L	L1	No. of Inserts	Insert Model	Screw Set	
			$\varnothing C$ min	$\varnothing C$ max							Model	Order No.
ST32 -C1652C -30	978.336	30°	16	52	32	68	48	80	2	CW19	S3S	801.696
ST42 -C5085C -30	802.251		50	85	42	96	52	80	3			
ST20 -C0525C	966.401	45°	5	25	20	33	25	60	1	CW12	S2S-B	978.284
ST25 -C1040C	966.406		10	40	25	45	35	70	2			
ST32 -C3060C	802.224		30	60	32	65	45	80	3	CW19	S3S	801.696
ST42 -C50100C	966.404		50	100	42	106	70	80	3			
ST25 -C1434C -60	966.405	60°	14	34	25	38	37	70	2	CW19	S3S	801.696
ST32 -C3050C -60	978.338		30	50	32	54	45	80	3			
ST32 -C4565C -60	978.339		45	65	32	69	50	80	3			

1. Wrench and screws are included. Inserts are to be ordered separately.
2. 10 screws and 1 wrench are included in insert clamping screw set.

For Insert ▶ 484

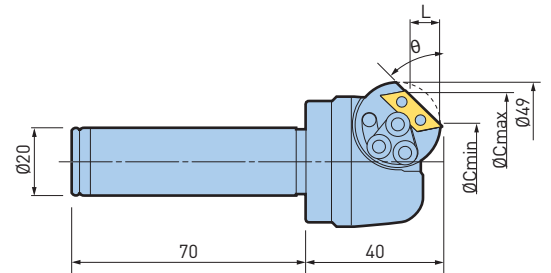
## C-Cutter Universal Type

Chamfering angle adjustment from 5° to 85° with a hex key.



Model	Order No.
ST20-C5/85A-40	966.407

Insert Model: CW12



### C.2

Easy angle adjustment with a hex key.



Chamfering range

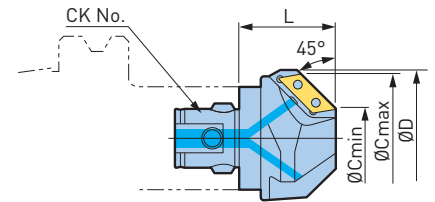
Angle $\theta$	Chamfer		L
	$\varnothing C$ min	$\varnothing C$ max	
5°	5.5	33.5	1.2
10°	7.3	34.7	2.4
15°	9.0	36.2	3.6
20°	11.2	37.4	4.7
25°	13.0	38.6	5.9
30°	15.2	39.6	7.0
35°	17.4	40.5	8.0
40°	19.6	41.2	9.0
45°	21.8	41.8	10.0

Angle $\theta$	Chamfer		L
	$\varnothing C$ min	$\varnothing C$ max	
50°	24.0	42.2	10.8
55°	26.4	42.4	11.4
60°	28.5	42.5	12.1
65°	30.7	42.4	12.5
70°	32.9	42.1	12.6
75°	34.9	41.7	12.7
80°	36.9	41.1	11.9
85°	38.8	40.3	8.6

For Insert ▶ 484

## C-Cutter CKB type

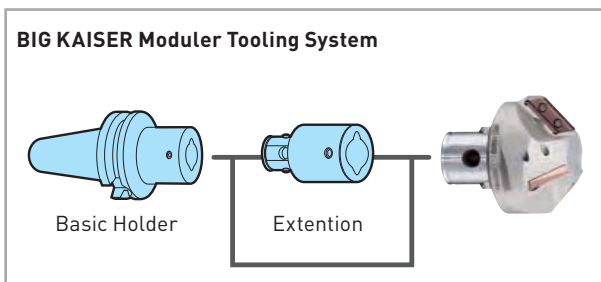
Chamfering mill with indexable inserts for efficient and vibration-free 45° chamfering. The long cutting edge provides a wide chamfering range which reduces the number of tools, tool changes, and magazine pots.



Model	Order No.	Chamfer		CK No.	ØD	L	No. of Inserts	Insert Model	Screw Set	
		ØC min	ØC max						Model	Order No.
CKB2 -C0525C	335.021	5	25	CKB2	28.5	25	1	CW12	S2S-B	978.284
CKB4 -C1040C	335.022	10	40	CKB4	45	35	2	CW19	S3S	801.696
CKB5 -C3060C	335.023	30	60	CKB5	65	40	3			
CKB6 -C50100C	335.024	50	100	CKB6	106	65	3	CW31	S5S	801.699

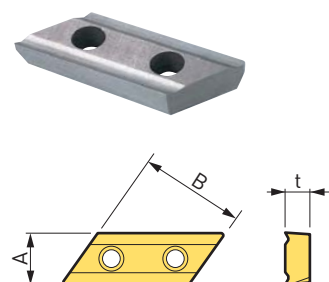
1. A wrench and a screw are included. Inserts must be ordered separately.
2. Can be used with through coolant.

For Insert ▶ 484



## Indexable Inserts for C-Cutter

### Indexable Inserts

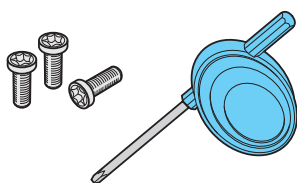


ZX = TiCN+TiAlN multilayer coating

Model	A	B	t	P30	P20	N20
				Non-Coat	ZX	DLC
CW1206A	6.35	12.7	2.7	978.283	800.951	801.753
SCW1206A				802.134	978.918	-
CW1909A	9.525	19.05	4.5	978.817	800.952	801.754
SCW1909A				802.135	802.136	-
CW3115A	15.875	31.75	7.0	978.826	800.953	801.755
SCW3115A				802.137	802.138	-

1. SCW contains 10 pcs of CW inserts in a package (same insert).
2. DLC coated insert is available with 1 pce.

### Insert Clamping Screw Set



Insert	Set Model	Order No.
CW1206A	S2S-B	978.284
CW1909A	S3S	801.696
CW3115A	S5S	801.699

1. The set contains 10 screws and 1 wrench.  
 ※ Wrenches are also available separately.

## C-Cutter

### Recommended Cutting Condition

Cutter Type	Max. Chamfer	Chamfering	General Steel Alloy Steel		Stainless Steel		Cast Iron		Aluminium	
			Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)
ST20-C5/85A-40	2 mm *	Plunge Cutting	50	0.1	30	0.08	40	0.1	80	0.1
		Side Cutting	80	0.15	60	0.1	50	0.15	100	0.2
C0525C	C2	Plunge Cutting	50	0.1	30	0.08	40	0.1	80	0.1
		Side Cutting	80	0.15	60	0.1	50	0.15	100	0.15
C1040C	C3	Plunge Cutting	90	0.15	40	0.12	60	0.15	100	0.2
C1434C-60 C1652C-30	3 mm *	Side Cutting	120	0.3	60	0.2	90	0.3	150	0.3
C3060C / C3060	C4	Plunge Cutting	120	0.3	60	0.18	90	0.25	150	0.3
C3050C-60 C4565C-60 C5085C-30	4 mm *	Side Cutting	150	0.45	60	0.3	120	0.6	200	0.6
C50100C	C4	Plunge Cutting	150	0.4	80	0.25	120	0.35	180	0.4
		Side Cutting	150	0.45	60	0.36	120	0.6	240	0.6

Vc: Cutting speed (m/min.) f: Feed per revolution (mm/rev.)

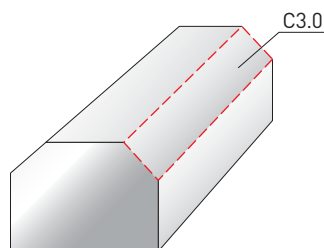
1. Cutting condition is the same for both non-coated and coated inserts. Coated inserts will achieve better surface finish and extended insert life.
2. Peck feed is necessary in case cutting chips are too long.
3. Reduce cutting speed if a larger chamfer than the max. amount shown in the table is required.
4. A high rigidity toolholder is recommended, such as BIG KAISER HMC or MEGA D Chuck.
5. Max. chamfering amount with \* in 30, 60 degree type and Universal type indicates the chamfering length of the longer side.

### Application Example

C3 traverse chamfering. Workmaterial: C55 (S55C)

#### High cutting parameter was achieved without chattering

C-Cutter	ST25-C1040
Insert Model	CW1909A
Spindle speed	3 000 min <sup>-1</sup>
Feed	1 800 mm/min



## Chamfer Rings for Boring Heads

Chamfering rings for single- and rough-cutter boring bars for 30° or 45° chamfering immediately after boring without tool change.

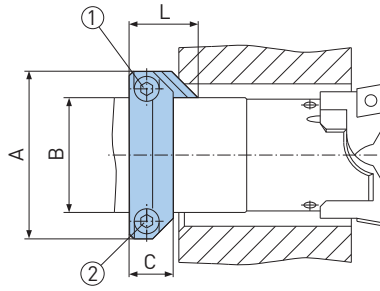


Fig. 1

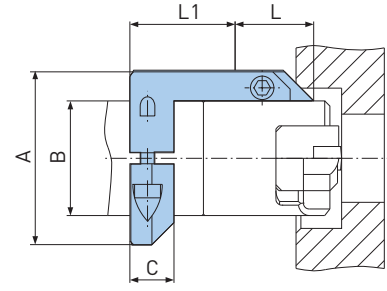


Fig. 2

Bore Ø	Model	Order No.	Fig.	CK No.	A	B	C	L1	Inserts
20 - 35	CR20	663.110	1	CK1	35	19	13	-	CRP 20-45 CRP 20-30
25 - 40	CR25	663.120	1	CK2	42	24	15	-	
	CR25S	663.121	2					27	
32 - 47	CR32	663.130	1	CK3	49	31	15	-	
	CR32S	663.131	2		51			31.5	
41 - 55	CR41	663.140	1	CK4	57	39	15	-	
	CR41S	663.141	2		38.5				
53 - 90	CR53	663.150	1	CK5	85	50	25	-	
	CR53S	663.151	2		90			39	
68 - 104	CR68	663.160	1	CK6	100	64	25	-	
	CR68S	663.161	2		104			53	
90 - 130	CR93-125	663.170	1	CK6	130	64	25	-	CRP 53-45 CRP 53-30

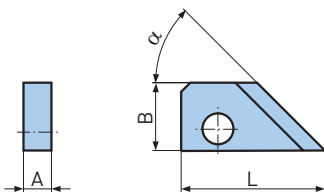
1. Dimension "L" is defined according to the Insert. Please refer to the chart below.

### Assembly instructions:

- Mount both ring parts on tool shank and adjust them in length.
- Assemble cutting insert or insert holder between the ring parts and fasten screw ① tightly.
- Fasten clamp screw ②.

### Inserts 45° and 30°

Carbide inserts with ground chip breaker for machining of cast iron and steel.



$\alpha$	Model	Order No.	Range Ø	A	B	L
45°	CRP20-45	663.191	20 - 55	4	9	23.5
	CRP53-45	663.195	53 - 130	8	20	43
30°	CRP20-30	663.181	20 - 55	4	9	27.5
	CRP53-30	663.185	53 - 100	8	20	52

C.2

### Insert Holder for Indexable Type

For different work piece materials and a quick change of the insert.



Fig. 1



Fig. 2

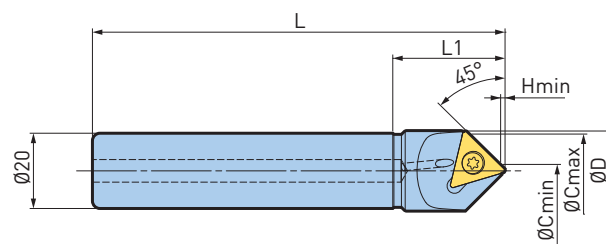
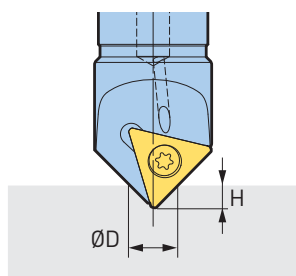
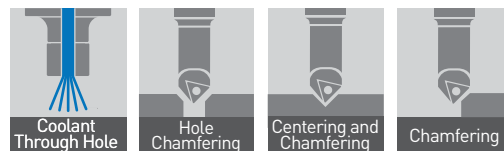
$\alpha$	Model	Order No.	Fig.	Ring Type	Range Ø	Insert
45°	CB2-45CW12A	805.811	1	CR53	55 - 75	CW1206A
				CR68	69 - 89	
				CR93-125	95 - 115	
	CB2-45CW12B	805.812	2	CR53	70 - 90	
				CR68	84 - 105	
				CR93-125	110 - 130	

1. A wrench and screw are included. Inserts to be ordered separately.

For Insert ▶ 484

## C-Centering Cutter

A multifunction cutter capable of both spot drilling and chamfering.

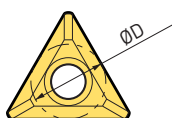


$H = D/2 - 0.7 \text{ mm}$

Model	Order No.	$\varnothing D$	L	L1	$\varnothing C$ min.	$\varnothing C$ max.	H min.	Insert
ST20-CN0220-45-110	806.622	22	110	30	2	20	0.3	CN0906

1. A wrench and a screw are included. Inserts are to be ordered separately.
2. As the insert has a nose radius, spot drilled tip is not acute.
3. Use with hand feed is not recommended.

### Inserts for C-Centering Cutter



Model	Order No.	$\varnothing D$	Screw Set
CN0906 ACZ150	806.623	9.525	S4S-15IP 806.624

1. Insert grade coated carbide P15C.
2. Inserts are available in a packet of 10 pcs.
3. The insert clamping screw set contains 10 screws and 1 wrench.

### Recommended Cutting Condition

Workpiece Material	Cutting Speed Vc (m/min)	Feed (mm/rev)	
		Spot Drilling	Traverse Chamfering
Carbon Steel, Alloy Steel	50 - 150	0.02 - 0.08	0.05 - 0.2
Cast Iron	70 - 200		
Aluminium	100 - 300		

1. The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.



## R-Cutter

Front & back R-chamfering are available. 4 inserts multiply feed rate.



### Front & Back R Chamfering

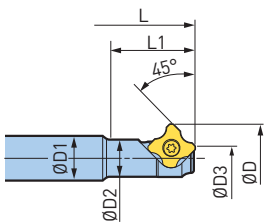


Fig. 1

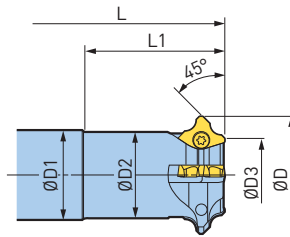
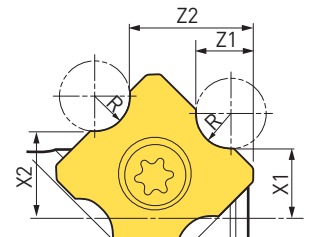


Fig. 2



R-dimensions

Model	Order No.	Fig.	ØD	ØD1	ØD2	ØD3	L	L1	No. of Inserts	R	X1	Z1	X2	Z2	Insert Model
ST10 -RC061B - 15	966.501	1	12.3	10	6.6	4.4	78	15	1	0.5	3.61	1.93	4.30	5.78	RC06
										1	3.35	2.18	4.04	5.53	
										1.5	3.09	2.43	3.78	5.28	
										2	2.83	2.68	3.52	5.03	
ST16 -RC121B - 30	966.502	1	24.4	16	13.3	8.6	103	30	1	1	7.17	3.79	8.56	11.63	RC12
										2	6.65	4.29	8.03	11.13	
										3	6.13	4.79	7.51	10.63	
										4	5.60	5.29	6.99	10.13	
ST16 -RC064B - 30	966.503	2	21	16	15.2	13.2	101	30	4	0.5	7.89	1.93	8.59	5.78	RC06
										1	7.64	2.18	8.34	5.53	
										1.5	7.39	2.43	8.09	5.28	
										2	7.13	2.68	7.84	5.03	
ST32 -RC124B - 50	966.504	2	42	32	30.8	26.3	141	50	4	1	15.85	3.79	17.26	11.63	RC12
										2	15.33	4.29	16.75	11.13	
										3	14.83	4.79	16.24	10.63	
										4	14.31	5.29	15.73	10.13	

1. Wrench and screw are included. Inserts are to be ordered separately.

For Insert ▶ 491



Front R Chamfering

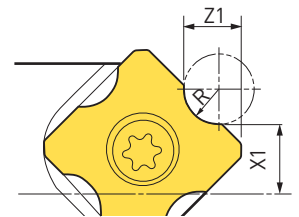
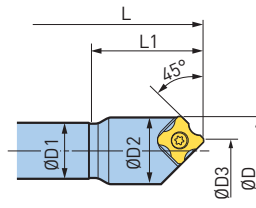
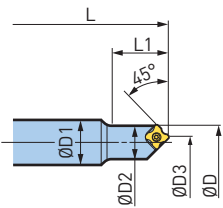


Fig. 1

Fig. 2

R-dimensions

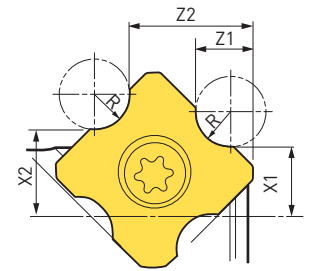
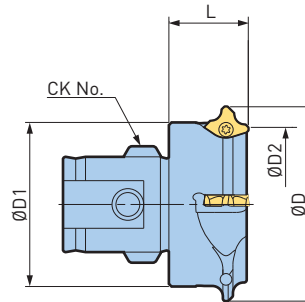
Model	Order No.	Fig.	ØD	ØD1	ØD2	ØD3	L	L1	No. of Inserts	R	X1	Z1	Insert Model
ST16 -RC061 - 20	966.505	1	12.3	16	11.9	4.5	94	20	1	0.5	3.61	1.93	RC06
										1	3.35	2.18	
										1.5	3.09	2.43	
										2	2.83	2.68	
ST20 -RC121 - 40	966.506	2	24.4	20	23.8	8.9	121	40	1	1	7.17	3.79	RC12
										2	6.65	4.29	
										3	6.13	4.79	
										4	5.60	5.29	

1. Wrench and screw are included. Inserts are to be ordered separately.

For Insert ▶ 491

## R-Cutter CKB Type

The C-Cutter mini is a high performance tool for chamfering, back chamfering and face milling. The large number of cutting edges (4 -6). Combined with the small tool diameter permit extremely high feed rates.

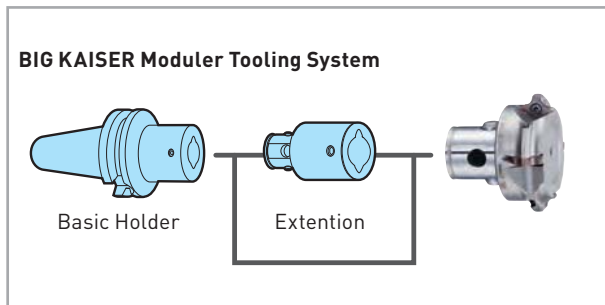


R-Dimensions

Model	Order No.	CKB No.	ØD	ØD1	ØD2	L	R	X1	Z1	X2	Z2	No. of Insert	Insert Model
CKB3-RC064B-15	806.439	CKB3	37	31	29.2	15	0.5	15.9	1.9	16.6	5.8	4	RC06
							1.0	15.6	2.2	16.3	5.5		
							1.5	15.4	2.4	16.1	5.3		
							2.0	15.1	2.7	15.8	5		
CKB5-RC124B-25	806.440	CKB5	62	50	46.3	25	1	25.8	3.8	27.2	11.6	4	RC12
							2	25.3	4.3	26.7	11.1		
							3	24.8	4.8	26.2	10.6		
							4	24.3	5.3	25.7	10.1		

1. A wrench and a screw are included. Inserts are to be ordered separately.
2. Can be used with through coolant.

For Insert ▶ 491



## Indexable Inserts for R-Cutter

### Indexable Inserts



Type	Insert Model	Order No.	Radius	Insert Clamping Screw Set	
				Model	Order No.
RC06	RC06050 ACP300	966.530	R0.5	S2TS-T6	966.449
	RC06100 ACP300	966.531	R1.0		
	RC06150 ACP300	966.532	R1.5		
	RC06200 ACP300	966.533	R2.0		
RC12	RC12100 ACP300	966.534	R1.0	S4S-T15	966.450
	RC12200 ACP300	966.535	R2.0		
	RC12300 ACP300	966.536	R3.0		
	RC12400 ACP300	966.537	R4.0		

1. Inserts are available in packet of 10 pcs.
2. Material is coated carbide.
3. 10 screws and 1 wrench are included in insert clamping screw set.

### Recommended Cutting Condition

Workpiece Material	Cutting Speed (m/min)	Feed Rate (mm/tooth)	Coolant
Structural, Carbon or Alloy Steel	100 - 350	0.05 - 0.2	Dry
Prehardened Steel (less than HRC40)	60 - 80	0.05 - 0.1	Wet
Stainless Steel	100 - 250	0.08 - 0.2	Dry / Wet
Cast Iron	100 - 350	0.05 - 0.25	Dry
Aluminium	100 - 800	0.05 - 0.25	Dry / Wet

1. The table is a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
2. Wet cutting is generally recommended to obtain good surface quality.
3. In case of built-up edge occurs when cutting aluminum and stainless steel, use soluble oil.

## Center Boy

Accurate centering and chamfering can be obtained in a single operation.

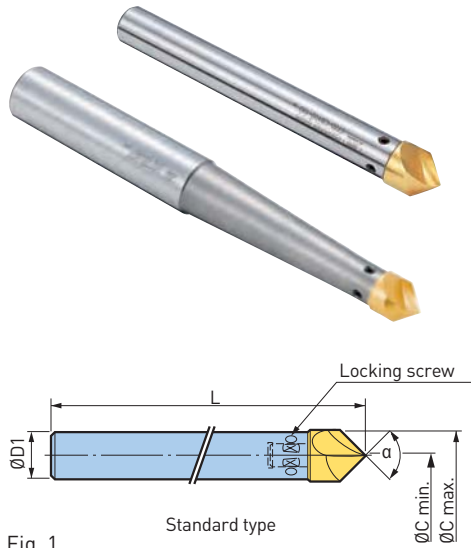


Fig. 1

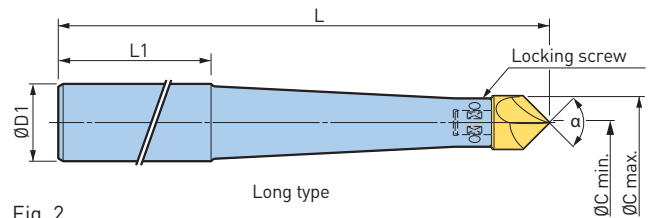
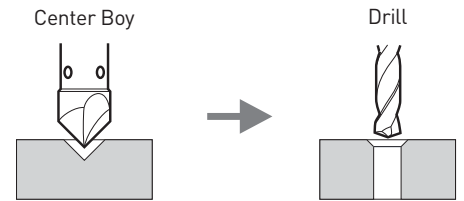


Fig. 2

Model	Order No.	Fig.	Chamfering Angle $\alpha$	Chamfer		$\varnothing D1$	L	L1	Bit Model	Spare Locking Screw
				$\varnothing C$ min.	$\varnothing C$ max.					
ST10 - CBY09010	966.415	1	90°	0.9	10	10	150	-	CBY09010	H0403-5P
ST12 - CBY09013	966.416	1	90°	0.9	13	12	150	-	CBY09013	H0403-5P
ST16 - CBY09016	966.417	1	90°	1.0	16	16	180	-	CBY09016	H0504-5P
ST20 - CBY09022	966.418	1	90°	1.5	22	20	180	-	CBY09022	H0505-5P
ST20 - CBY09013 -220	966.411	2	90°	0.9	13	20	220	120	CBY09013	H0403-5P
-260	966.412						260			
ST32 - CBY09022 -260	966.413	2	90°	1.5	22	32	260	120	CBY09022	H0505-5P
-300	966.414						300			
ST12 - CBY12013	802.756	1	120°	0.9	13	12	150	-	CBY12013	H0403-5P

- 2 pcs of inserts and 2 pcs of locking screws are included as standard accessories.
- Spare locking screws are available in a packet of 5 pcs.

### Indexable Bit for Center Boy



Highly accurate  
Replaceable bit



Bit Model	Chamfering Angle $\alpha$	Order No.
CBY09010	90°	966.422
CBY09013		966.423
CBY09016		966.424
CBY09022		966.425
CBY12013	120°	800.945

Locking Screw Model	Order No.
H0403-5P	978.256
H0504-5P	801.046
H0505-5P	801.047

- Bits are available in packages of 5 pcs.
- Bit grade is HSS with TiN coating.

C.2

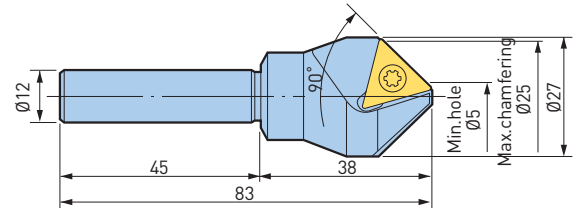
### Recommended Cutting Condition

Workpiece Material	Cutter Type	Chamfering		Centering	
		Vc (m/min)	f (mm/rev)	Vc (m/min)	f (mm/rev)
General Steel Alloy Steel	Standard	20 - 35	0.10	25 - 50	0.08
	long	20 - 35	0.08	20 - 50	0.08
Stainless Steel	Standard	15 - 30	0.08	20 - 40	0.08
	long	15 - 30	0.06	15 - 30	0.06
Cast Iron	Standard	20 - 40	0.12	30 - 45	0.10
	long	20 - 40	0.10	30 - 45	0.10
Aluminium	Standard	45 - 60	0.15	50 - 65	0.15
	long	40 - 60	0.12	40 - 60	0.12

- The table is just a reference to determine cutting conditions. It should be adjusted according to the condition of the machine tool and workpiece.
  - In case vibration occurs, reduce cutting speed V.
  - Projection length should be as short as possible.
- Vc: Cutting speed (m/min.) f: Feed per revolution (mm/rev.)

## C-Cutter Boy

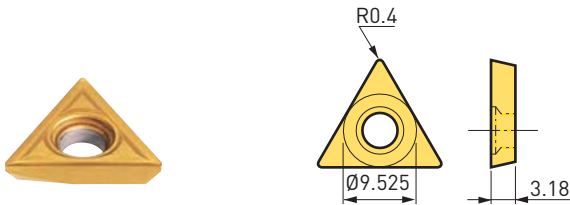
For bench drill machine only. Smooth guide with carbide support pad. Never get irregular chamfering. Long tool life with carbide insert. Economical with its 3 cutting edges.



Model	Order No.
ST12B-C0525	966.408

1. Including 1 pce. of insert.

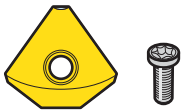
### Indexable Insert for C-Cutter Boy



Model	Order No.
C1603B	966.409

1. Inserts are available in packages of 10 pcs.

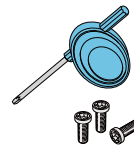
### Guide Pad Set



Set Model	Order No.	Carbide Guide	Thread Size
CG0525S	978.908	CG0525	M4 x 7

1. 1 pce. of carbide set and clamping screw are included.

### Insert Clamping Screw Set



Set Model	Order No.	Thread Size
S4S	806.148	M4 x 8

1. 10 pce. of clamping screw and 1 pce. of wrench are included.

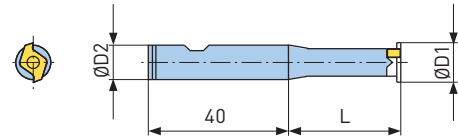
### Recommended Cutting Condition

Hole Dia. Ø	Spindle Speed (min <sup>-1</sup> )		
	Steel	Cast Iron	Aluminium
5	600	800	1000
10	500	600	800
15	400	500	600
20	300	400	500

## Slot Milling Cutter

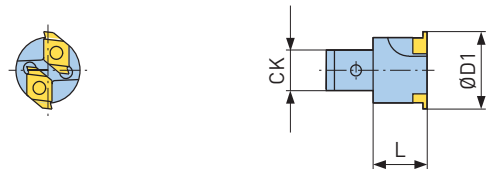
Slot milling cutter with indexable inserts for circlip grooves as per DIN472.

### Cylindrical Shank Type



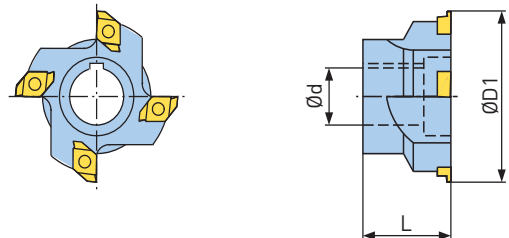
Model	Order No.	Range	ØD1	ØD2	L	Cutting Edges	Insert
DNF12-22XW10	958.008	12 - 24	11.5	10	32	2	Type 0

### CK Shank Type



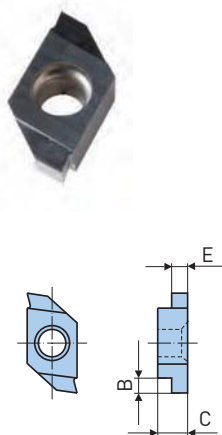
Model	Order No.	Range	CK	ØD1	L	No. of Inserts	Insert
DNF22-34XCK1	958.010	22 - 34	CK1	21	15	2	Type 1
DNF34-50XCK2	958.021	34 - 50	CK2	33	20	3	

### Arbor Type



Model	Order No.	Range	Ød	ØD1	L	No. of Inserts	Insert
DNF50-85XF16	958.031	50 - 85	16	48	26	4	Type 1
DNF85-210XF27	958.041	85 - 210	27	83	32	6	Type 2

## Inserts for Slot Milling Cutter



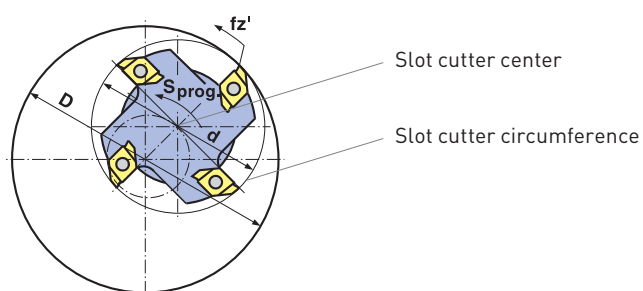
Insert	E	B	C	P20	K20	N10
				Steel	Cast Iron	Aluminium
Type 0	1.15	0.9	4	958.051	958.052	958.053
	1.35	1.3		958.055	958.056	958.057
	Blank			958.314	958.313	
Type 1	1.15	1.1	4	958.061	958.062	958.063
	1.35	1.5		958.065	958.066	958.067
	1.65	1.6		958.071	958.072	958.073
	1.9	2		958.075	958.076	958.077
	2.2	2.2		958.081	958.082	958.083
	2.7	2.6		958.085	958.086	958.087
	Blank			958.158	958.157	
Type 2	3.2	3	6	958.091	958.092	958.093
	4.2	3.5		958.095	958.096	958.097
	Blank			958.156	958.155	

1. Insert type is corresponding to P494.

### Recommended Cutting Condition

These values relate to the milling cutter circumference and apply under normal working conditions. Climb-cut milling is recommended with helical or tangential plunging to groove depth assuming a continuous program cycle without feed interruption.

Work Piece Material	Cutting Speed Vc [m/min]	Feed per Tooth fz [mm]
Cast Iron	80 - 130	0.12 - 0.25
Steel	120 - 200	0.10 - 0.20
Aluminium	200 - 400	0.15 - 0.30



- D Circular slot diameter
- d Slot cutter circumference
- Vf Feed rate at the circumference of the milling cutter
- Vf1 Feed rate at the center of the milling cutter

C.2

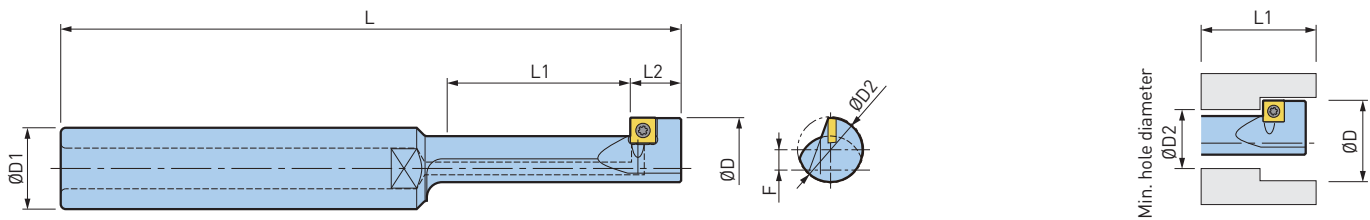
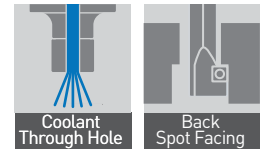
In all circular milling operations the programmed feed rate [Vf1] applies to the centre of the milling cutter. This may be computed as follows:

$$Vf1 = Vf \cdot \frac{D - d}{D}$$



## BF-Cutter

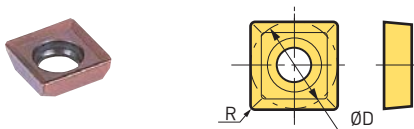
Selected spot facing diameters suitable for cap screws.



Model	Order No.	ØD	ØD1	ØD2	L	L1	L2	Offset F	Insert Model
ST16 -BFM6/11 - 12	802.752	11	16	6.5	102	12	9	2.40	CM0502
-BFM8/14 - 20	802.753	14	16	8.5	108	20	9	2.90	
-BFM10/17.5 - 25	802.750	17.5	16	10.5	112	25	10	3.65	
-BFM12/20 - 36	802.751	20	16	13	122	36	10	3.65	
ST20 -BFM14/23 - 49	802.754	23	20	15	136	49	10	4.15	CM0502
-BFM16/26 - 56	802.755	26	20	17	142	56	10	4.65	

1. Wrench and screw are included. Inserts are to be ordered separately (10/pkg).
2. 10 screws and 1 wrench are included in insert clamping screw set.

### Indexable Inserts for BF-Cutter



Model	ØD	Nose R	P		N
			ACP200	DS20	
CM0502	Ø5	0.2	966.441	966.442	

1. Inserts are available in a packet of 10 pcs.

### Spare Parts

Cutting Type	Insert Clamping Screw Set	Order No.
BFM6/11	S2SS-T6	966.448
BFM8/14		
BFM10/17.5	S2TS-T6	966.449
BFM12/20		
BFM14/23		
BFM16/26		

## C.2

### Recommended Cutting Condition

Workpiece Material	Insert Grade	Cutting Speed (m/min)	Feed Rate (mm/rev)
General Steel, High-Alloy Steel	ACP200	30	0.03
Cast Iron		30	0.03
Aluminium, Non-Ferrous	DS20	30 - 50	0.03

### Insert grade

ACP200	DS20
General steel	Aluminium & non-ferrous
High wear-resistant PVD coating on carbide substrate with ultra multi-layer TiAlN and AlCrN in micron order.	Ultra smooth and low friction DLC coating on carbide substrate having excellent anti-adhesive property.

## Measuring Instruments

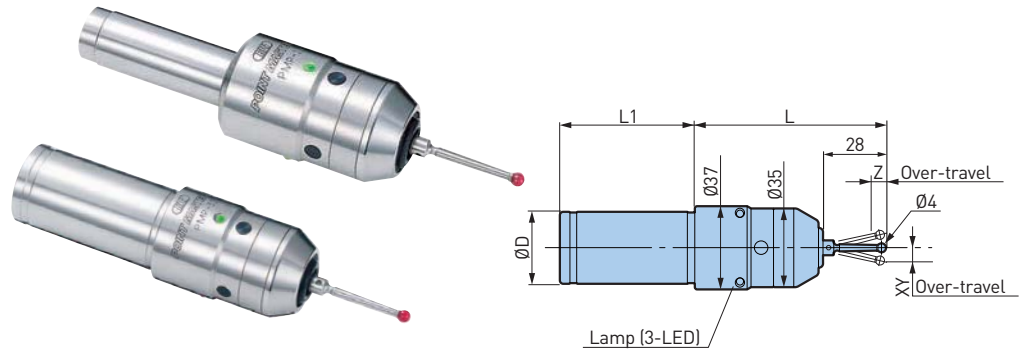
<b>Point Master Series</b>	<b>498 - 500</b>
<b>Base Master Series</b>	<b>501 - 502</b>
<b>Tool Master</b>	<b>503</b>
<b>Accu Center</b>	<b>503</b>
<b>Alignment Tool for ATC Arm</b>	<b>504</b>
<b>Dyna Force</b>	<b>505</b>
<b>Dyna Contact</b>	<b>506</b>
<b>Level Master</b>	<b>507</b>
<b>Centering Tool for Lathe</b>	<b>508</b>

## Point Master Pro Series

Point Master Pro Series is a precision 3-D touch sensor operating in non-conductive as well as conductive applications, resin, ceramic or coated workpieces, machines with ceramic spindle taper or bearings can all be accommodated.

- LED lamp
- Repeatability  $\pm 1 \mu\text{m}$
- For all materials

### Cylindrical Type



Model	Order No.	ØD (h7)	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Standard Stylus (included)	Weight (kg)
					XY	Z	XY	Z			
PMP -10	978.976	10	75	49	$\pm 12$	5	0.4	1.5	Panasonic Lithium BR435x1	ST28-4R	0.4
-20	961.237	20	90	50							0.5

1. PMP-10 has one LED only.
2. Above table indicates the specification when using stylus ST28-4R.
3. There is approx  $5 \mu\text{m}$  lag in X and Y directions and approx.  $2 \mu\text{m}$  lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
4. Battery is not included.

For Stylus ▶ 500

### BBT Type

JIS B 6339 (BIG-PLUS)

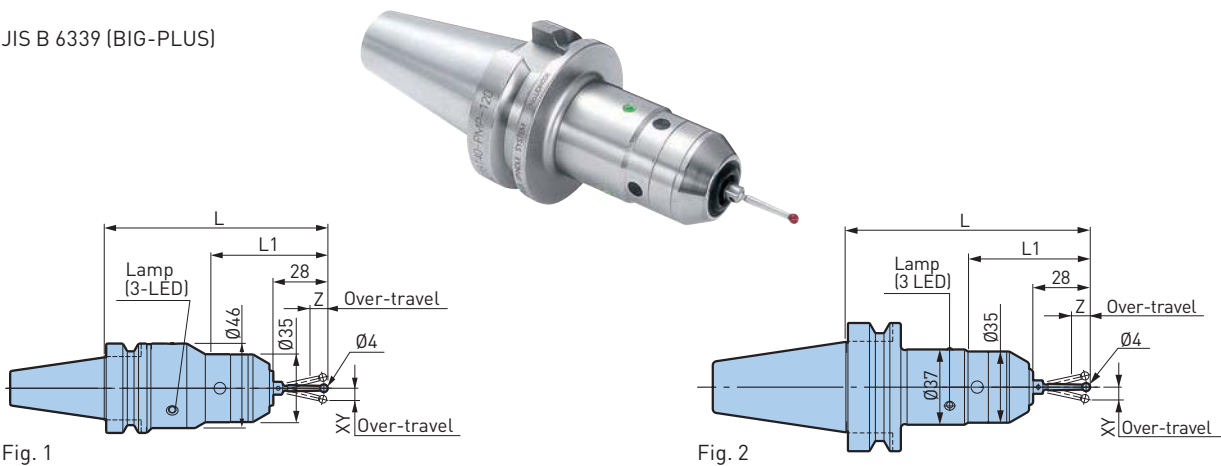


Fig. 1

Fig. 2

D.1 BIG-PLUS tools can be used in machining centers with conventional spindles.

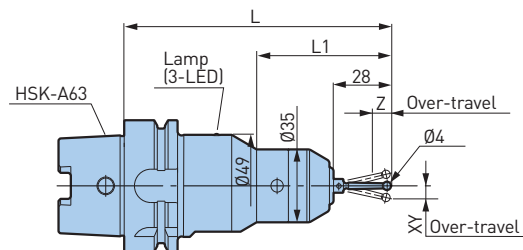
Model	Order No.	Fig.	BBT No.	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Standard Stylus (included)	Weight (kg)
						XY	Z	XY	Z			
BBT30-PMP-115	802.313	1	30	115	63	$\pm 12$	5	0.4	1.5	CR2x1	ST28-4R	0.8
BBT40-PMP-120	804.649	2	40	120	60							LR1x2

1. Above table indicates the specification when using stylus ST28-4R.
2. There is approx  $5 \mu\text{m}$  lag in X and Y directions and approx.  $2 \mu\text{m}$  lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
3. Battery is not included.

For Stylus ▶ 500

### HSK Type

ISO 12164(DIN 69893-1) & DIN 69893-5



Model	Order No.	Fig.	HSK No.	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Standard Stylus (included)	Weight (kg)
						XY	Z	XY	Z			
HSK-A63-PMP-130	804.656	1	HSK-A63	130	65	± 12	5	0.4	1.5	CR2x1	ST28-4R	1.3

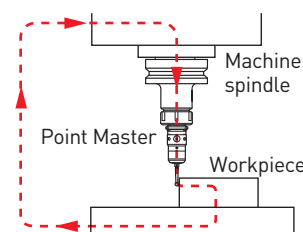
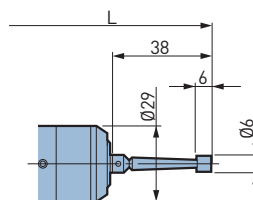
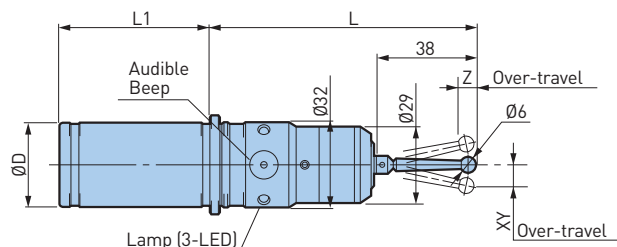
1. There is approx 5 µm lag in X and Y directions and approx. 2 µm lag in Z direction to illuminate LED lamp when stylus touches workpiece surface.
2. Above table indicates the specification when using stylus ST28-4R.
3. Battery is not included.

For Stylus ▶ 500

### Point Master PMC Series

Point Master PMC series is ideal touch sensor for electric conductive materials. LED lamp illuminates when the stylus touches the workpiece. Stroke of stylus provides sufficient over-travel for safety.

- LED lamp + beep sound
- Repeatability ± 1 µm
- For electric conductive materials



With stylus ST38-6P

With stylus ST38-6x6

Model	Order No.	ØD h7	L	L1	Over-Travel		Measuring Pressure (N)		Battery (not included)	Standard Stylus (included)	Weight (kg)
					XY	Z	XY	Z			
PMC-20	961.238	20	110	50	± 12	5	0.6	2.7	LR1x2	ST38-6P	0.4
PMC-20S	804.658									ST38-6x6	0.4

1. Measurement is not possible with non-conductive machine or workpiece.
2. Point Master PMC utilizes conductivity from the machine, toolholder, Point Master through workpiece.
3. Battery is not included.

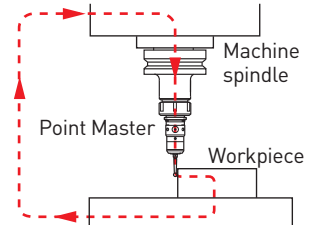
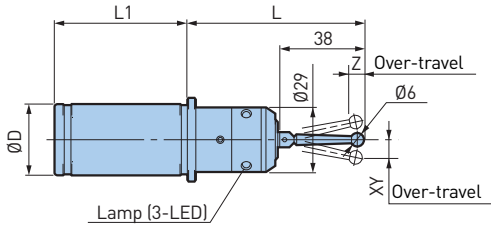
For Stylus ▶ 500

D.1

## Point Master PMG Series

LED lamp illuminates when the stylus touches the workpiece.

- LED lamp
- Repeatability  $\pm 1 \mu\text{m}$
- For electric conductive materials



With stylus ST38-6P

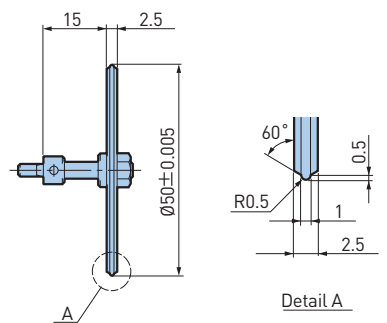
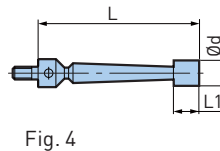
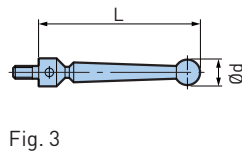
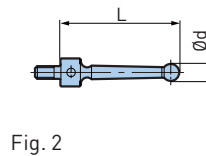
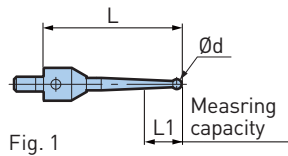
With stylus ST38-6x6

Model	Order No.	ØD h7	L	L1	Over-travel		Measuring Pressure (N)		Battery (not included)	Standard Stylus (included)	Weight (kg)
					XY	Z	XY	Z			
PMG-10	961.200	10	75	50	$\pm 12$	5	0.6	2.7	Panasonic Lythium BR435x1	ST38-6P	0.2
PMG-10S	804.662									ST38-6x6	0.2
PMG-20	961.205	20	90	50	$\pm 12$	5	0.6	2.7	LR1x2	ST38-6P	0.3
PMG-20S	961.206									ST38-6x6	0.3

1. Measurement is not possible with non-conductive machine or workpiece.
2. Point Master PMG utilizes conductivity from the machine, tool holder, point master through workpiece.
3. Battery is not included.

### Alternative Stylus

The stylus (M3 thread) is replaceable. Please replace when different model of stylus required or if damaged.



Model	Order No.	Fig.	L	L1	Ød	Material	Series
ST28 -1P	802.222	1	28	2	1	Carbide	PMC-PMP PMG
-2P	802.223			8	2		
-3P	972.309			-	3		
-4P	972.311						
ST38 -6P	972.304	3	-	-	6	Steel (SUS)	PMC, PMG
ST38 -6x6	972.306	4	38	6	6	Steel (SUS)	PMC PMG
ST28 -4R	972.310	2	28	-	4	Ruby	PMP

Model	Order No.
ST15-50K	804.842

1. Ideal for peculiarly shaped workpiece or tapered portion of plastic mold.
2. PMC-series only.

D.1



## Base Master Series

Base Master Series is a precision touch sensor to determine workpiece offsets and tool length. Mounted on workpiece surface or machine table, LED lamp illuminates immediately when the cutting edge touches the sensor plate and the position is detected.

### Base Master

The most popular Base Master model with 1µm accuracy. Operates when a conductive circuit is completed.

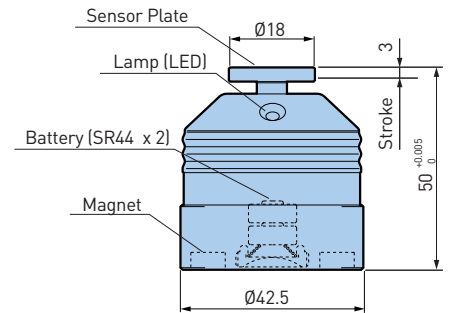
- LED lamp
- For use with conductive cutting tools, workpieces, and machine tools.

Model	Order No.
BM-50	961.201



Height Accuracy	50 <sup>+0.005</sup> <sub>0</sub> mm
Measurable Pressure	3N
Repeatability Accuracy	± 1 µm (2σ)
Min. Measurable Tool Diameter	Ø 1 mm
Battery Life	10 hours (continuous use)
Weight	0.23 kg

1. Battery is not included.



### Base Master Gold

Suitable for various tools and workpieces, including non-conductive materials such as ceramics.

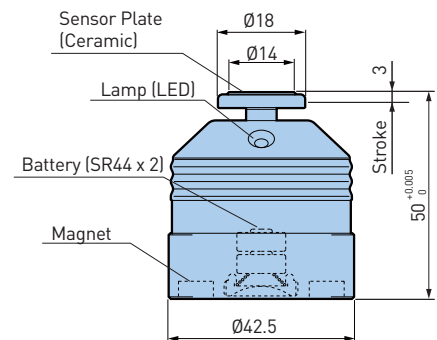
- LED lamp
- For all materials, including non-conductive cutting tools, workpieces, and machine tools

Model	Order No.
BM-50G	961.211



Height Accuracy	50 <sup>+0.005</sup> <sub>0</sub> mm
Measurable Pressure	2N
Repeatability Accuracy	± 1 µm (2σ)
Min. Measurable Tool Diameter	Ø 1 mm
Battery Life	10 hours (continuous use)
Weight	0.24 kg

1. Battery is not included.



### Base Master Micro

Specifically designed for micro cutting tools. Low measuring pressure protects the cutting edge.

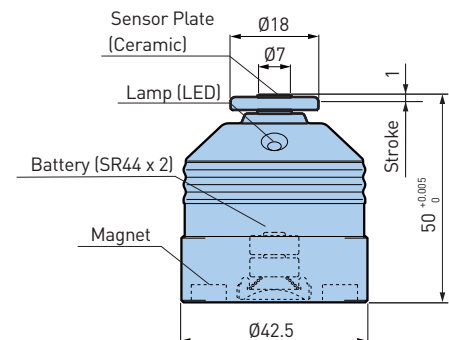
- LED lamp
- For all materials, including non-conductive cutting tools, workpieces, and machine tools

Model	Order No.
BM-50M	961.212



Height Accuracy	50 <sup>+0.005</sup> <sub>0</sub> mm
Measurable Pressure	0.3N
Repeatability Accuracy	± 1 µm (2σ)
Min. Measurable Tool Diameter	Ø 0.05 mm
Battery Life	10 hours (continuous use)
Weight	0.24 kg

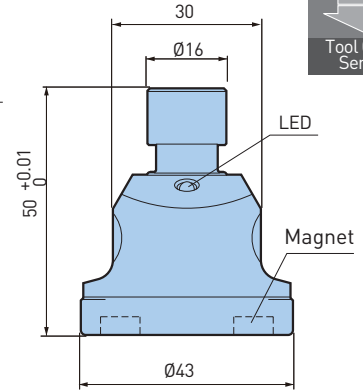
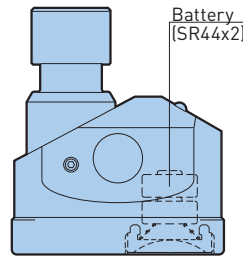
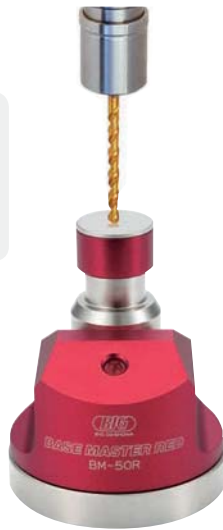
1. Battery is not included.



## Base Master Series

### Base Master Red

- LED lamp
- For all materials, including non-conductive cutting tools, workpieces, and machine tools
- Replaceable sensor plate, BM-MEG, is available as individual part



#### Body Set

Model	Order No.
BM-50R	805.675

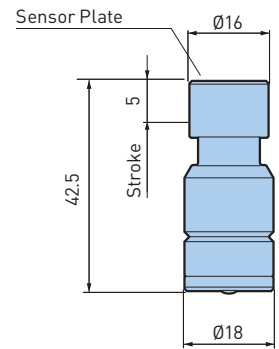
1. BM-MEG is included.

Height Accuracy	50 <sup>+0.01</sup> <sub>0</sub> mm
Repeatability Accuracy	± 1 µm (2 σ)
Min. Measureable Tool Diameter	Ø 1 mm
Measureable Pressure	2 N
Sensor Stroke	5 mm
Signal	LED (red)
Battery	SR44 x 2
Weight	0.2 kg

1. Battery is not included.

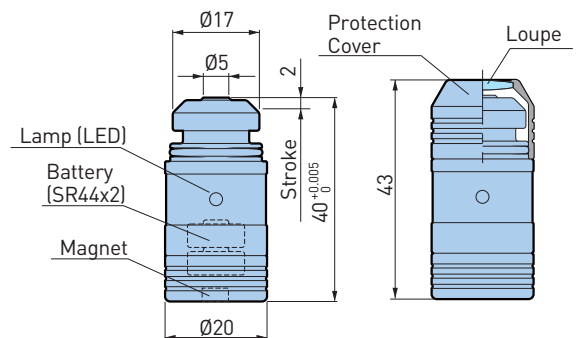
#### Sensor Part

Model	Order No.
BM-MEG	805.674



### Base Master Mini

- LED Lamp
- For all materials, including non-conductive cutting tools, workpieces, and machine tools
- World smallest 20 mm body diameter



Model	Order No.
BMM-20	961.213

1. Protection cover is included.

Protection Cover

D.1

Height Accuracy	40 <sup>+0.005</sup> <sub>0</sub> mm
Measureable Pressure	1.8 N
Repeatability Accuracy	± 1 µm (2σ)
Min. Measureable Tool Diameter	Ø 0.1 mm
Battery	SR44 x 2
Battery Life	10 hours (continuous use)
Weight	55 g

1. Battery is not included.

## Tool Master

Tool Master is a precision touch sensor with a large dial gauge. LED lamp and sound pre-indicate approach to 100 mm height to ease the detecting operation.

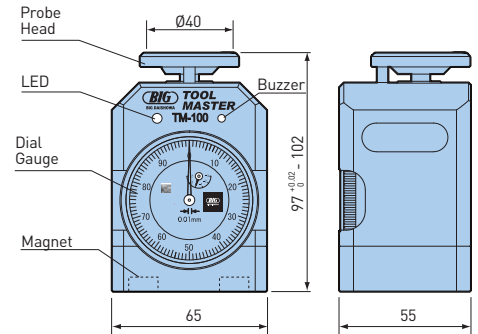


- LED lamp
- Visible dial indicator

Model	Order No.
TM-100	961.347



Height Accuracy	100 $^{+0.02}_0$ mm	
Stroke	5 mm	
Stroke Range	97 - 102 mm	
Measureable Pressure	6N (100 mm)	
Battery	SR44x2	
Weight	1.2 kg	
Dial Gauge	Graduation	0.01 mm
	Indication Tolerance	12 $\mu$ m
	Repeatability	3 $\mu$ m
	Return Tolerance	3 $\mu$ m



1. Dial gauge accuracy in accordance with JISB7503:2011.
2. Battery is not included.

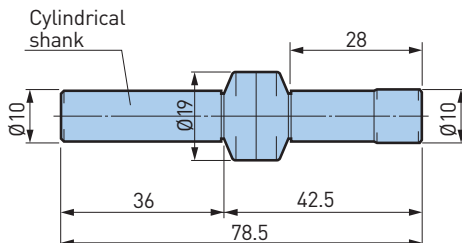
## Accu Center

Accu Center is a simple and precise edge finder offering repeatability within 3  $\mu$ m. Hard chrome plated stylus offers extended life.

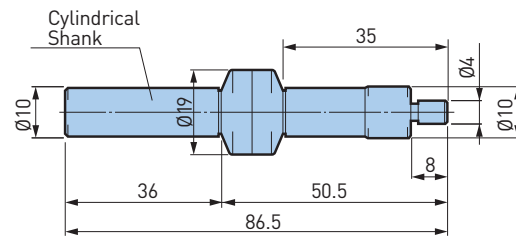
- For all material
- Not for use with horizontal machine tools



Model	Order No.
ACCU-C10	800.483



Model	Order No.
ACCU-C104	800.484





## Alignment Tool for ATC arm

For maintenance of machine tool spindle. Measuring equipment of misalignment between the ATC arm and machine tool spindle or magazine pot center.

### How to use

- Load the AL Shank in the machine spindle and mount the AL Flange on the ATC arm.
- Insert the AL Plug into the AL Flange.
- Rotate the AL Plug and read the highest and lowest values of the dial indicator. This direction is the eccentric direction. Half of the gap of the values is the eccentric amount.
- Adjust the position of the ATC arm so that the front end of the AL Plug will be inserted into the AL Flange fully.

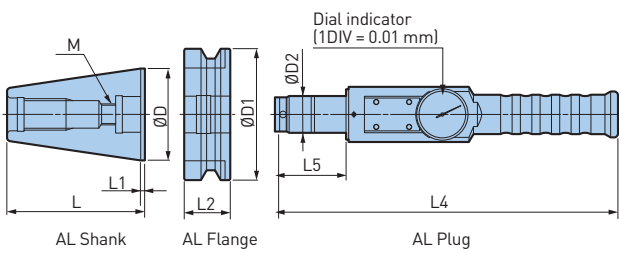
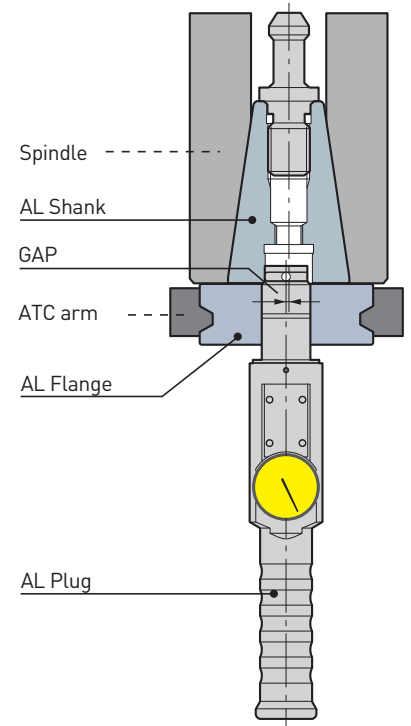


Fig. 1

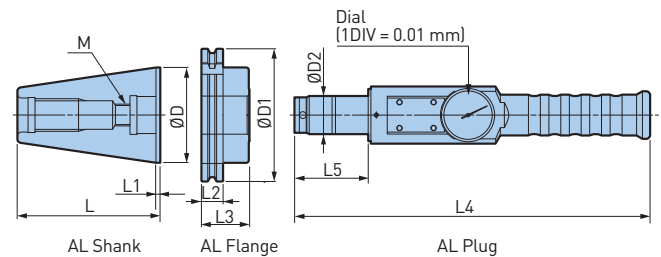


Fig. 2

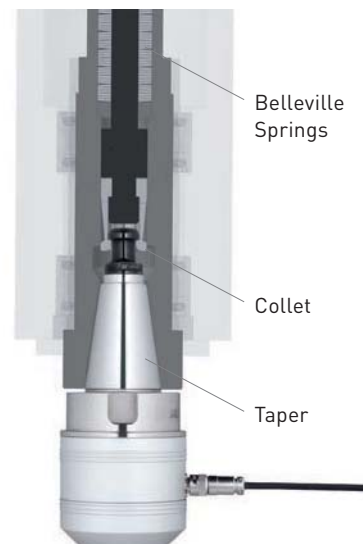
Model	Order No.	Fig.	ØD	D1	D2	L	L1	L2	L3	L4	L5	M
BT30-ATC18	978.238	1	31.75	46.00	18	50.40	2.0	20.0	-	251	44	12
BT40-ATC20	978.237		44.45	63.00	20	67.40	2.0	25.0	-	251	44	12
BT50-ATC28	978.236		69.85	100.00	28	104.80	3.0	35.0	-	261	54	16
DV40-ATC20	801.042	2	44.45	63.55	20	71.60	3.2	15.9	24.3	251	44	12
DV50-ATC28	801.043		69.85	97.50	28	104.95	3.2	15.9	35.3	261	54	16

1. For HSK is also available upon request. Please contact BIG KAISER agency.

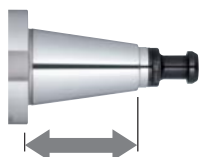
# Dyna Force

Measuring device for pulling force of machine tool spindle.

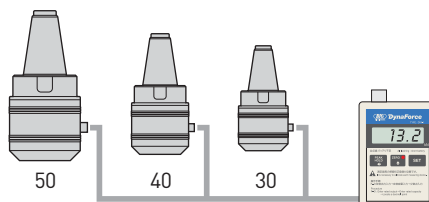
- Periodical measurement avoids reduced rigidity leading to vibrations, loss of machining quality, shortened tool life



**Longer taper shank to enhance reliability**  
Long taper supports itself in long span and stabilizes the value of measurement.



**Only one display for all taper sizes**  
One common display can be used for all taper sizes.



## Specification

Corresponding JIS, DIN, ANSI

### Measuring device

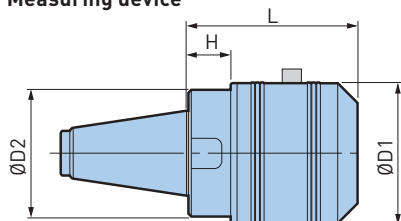


Fig. 1

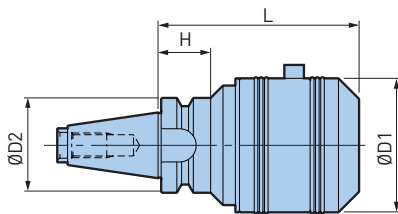


Fig. 2

### Display



### Cable



### Case



Set Model	Order No.	Contents of Set				Taper Size	Rated Capacity	ØD1	ØD2	L	H	Weight (kg)
		Measuring Device	Fig.	Display	Cable							
SNT30 -DF10	805.845	NT30 -DF10	1	DFA-1 (AA batteryx2)	DFC-1 (2 m)	30	10kN (980 kgf)	65	58	80	20	1.5
SBT30 -DF10	805.442	BT30 -DF10	2					46	98	26	1.6	
SNT40 -DF30	804.949	NT40 -DF30	1			73	66	90	24	2.5		
SNT50 -DF50	805.423	NT50 -DF50	1			96	90	110	33	6.0		
-DF30 *	805.846	-DF30	1			73	70	86	20	3.9		

1. Each component is also available separately. Please contact BIG KAISER agent if individual component is required.
2. SBT30-DF10 is designed exclusively for machines not capable of manual tool change.
3. SBT30-DF10 is suitable for BT/BBT30 machines only.
4. Pull stud bolt is to be ordered separately. For DIN, ISO, ANSI & CAT standard machines, exclusive pull stud bolt for dyna force is required.
5. SNT50-DF30 marked with \* is a light-weight model.

## Exclusive pull stud bolts for Dyna Force

An exclusive pull stud bolt is needed for a machine spindle in DIN, ANSI or CAT standard.

Pull stud bolts in MAS and JIS standards can be used. These pull stud bolts are not suitable for the SBT30-DF10.



Standard No.	Shank No. 30		Shank No. 40		Shank No. 50	
	Model	Order No.	Model	Order No.	Model	Order No.
DIN69872	DF-PDV30	804.683	DF-PDV40A	804.685	DF-PDV50A	804.686
ISO7388	Type A	-				
	Type B	-				
ANSI B5.50	DF-PAV30	804.680	DF-PAV40	804.681	DF-PAV50	804.682
ASME B5.50	DF-PCV30	804.684	DF-PCV40	804.687	DF-PCV50	804.688

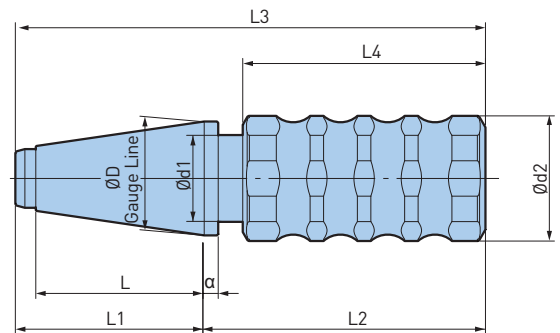
## Dyna Contact

A ceramic taper gauge allowing inspection of machine spindle tapers at a glance.

- Made of ceramic
- Clearly shows up Prussian blue



Taper Angle:  $8^{\circ} 17' 50'' \pm 1''$



Model	Order No.	Taper No.	ØD	Ød1	Ød2	L	L1	L2	L3	L4	α	Weight (Kg)
DC -30P	806.806	30	31.75	23	36	48.4	56.4	106.6	163	93.6	6	0.52
-40P	806.807	40	44.45	34	49	65.4	73.4	110.6	184	95	6	1.22
-50P	806.808	50	69.85	49	49	101.8	111.8	113.2	225	95	8	2.62

1. It can be used for BBT (BT=JISB6339), BDV (DV=DIN69871) and BCV (CV = ANSI)

### Supplied in Aluminium Case



# Level Master

2-axis simultaneous detection leveler. LED displays level conditions for both axis simultaneously. LED and buzzer indication when leveling is completed.



## Standart Type



Model	Order No.
LVM-01	801.673

## Wireless Type



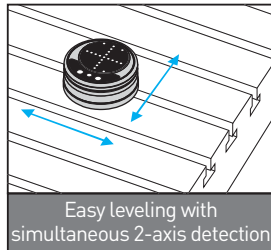
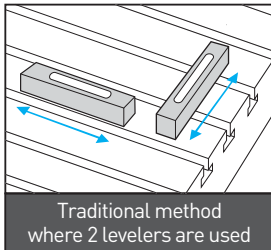
Body

Receiver

Model	Order No.
LVM-WL	806.805

1. Body and receiver are available only as a set.

## Simultaneous 2-axis detection



## LED & buzzer indicate leveling completion

### High Mode

when the required level condition is within 0.01mm/1m

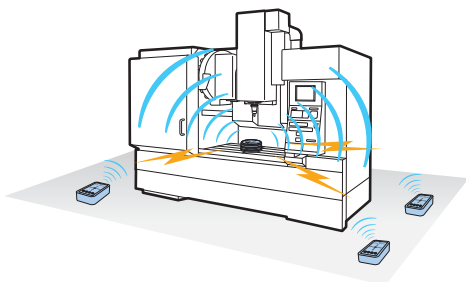
### Low Mode

when the required level condition is within 0.1mm/1m

LED (blue) & buzzer are simultaneously activated

## Remote Work solution Wireless Type

Easy and quick leveling with a single operator.



## Supplied in Aluminium Case



	LVM-01	LVM-WL	
		Body	Receiver
Minimum Read Value	0.01 mm Inclination/m	0.01 mm / 1 m	
Power Source	Alkaline batteries (AAA x 4 pcs)	Alkaline batteries (AAA x 4 pcs)	
Auto Power Off	30 minutes after power is turned on	30 minutes after power is turned on	
Operational Temperature	0-40°C (Recommended 20°C ± 5°)	0-40°C (Recommended 20°C ± 5°)	
Battery Life	50 hours	50 hours	
Dimensions	Ø 109 mm x H46 mm	Ø 109 mm x H43 mm	H141 x W81 x D43 mm
Weight	0.99 Kg	0.99 Kg	0.28 Kg

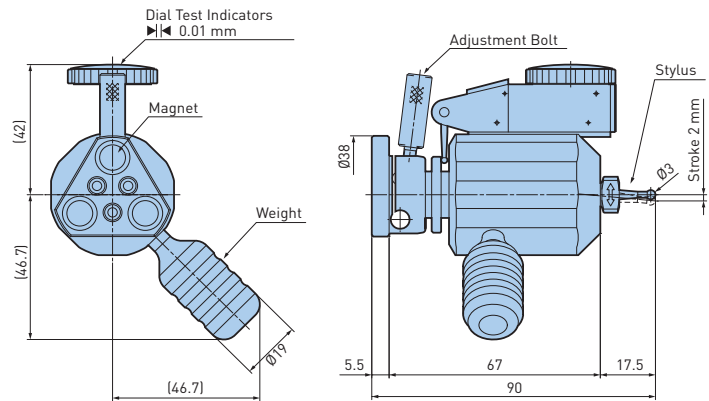
1. Batteries are not included.

Note: In the case of high precision leveling, we recommend to check the Level Master in advance on a reference level, such as a level block.

## Centering Tool for Lathes

### Easy Centering with Static Dial Gauge

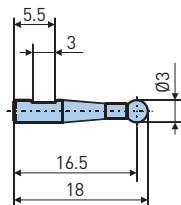
- Centering the tool holder while watching the dial gauge made possible, as the dial position is static at front
- Easy setting with fine adjustment mechanism (adjustment amount: 2mm)
- Magnet base allows for flexible mounting positions



Model	Order No.	Min. Scale	Max. Spindle Speed	Weight (kg)	Stylus
CTL-90	806.436	0.01 mm	100 U/min	0.4 kg	ST3-CT90

1. Stylus is included.

### Stylus for CTL-90



D.1

Model	Order No.	Material
ST3-CT90	806.437	Ruby

1. Longer stylus is also available upon request. Please contact BIG KAISER agency.





# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
112.080	429	0.02	310.865	349	1.650	318.431	375	2.110
112.097A	331	2.150	310.870	349	4.000	318.432	375	2.900
112.107	313	1.370	315.101	306	0.050	318.433	375	3.000
112.108	313	1.100	315.201	306	0.100	318.434	375	3.400
112.110	312	1.300	315.301	306	0.165	318.435	375	4.000
112.121	313	1.770	315.401	306	0.340	318.441	375	1.280
112.122	313	1.890	315.501	306	0.635	318.442	375	1.500
112.123	313	1.710	315.601	306	1.290	318.443	375	1.500
112.126	312	1.700	315.602	306	1.850	318.444	375	1.500
112.205	333	0.260	315.701	306	3.100	319.101	297	0.050
112.206	333	0.265	317.102A	383	1.800	319.201	297	0.110
112.207	333	0.310	317.105	383	1.890	319.301	297	0.190
112.271	340	0.025	317.202	381	2.750	319.401	297	0.360
112.272	340	0.035	317.205	381	0.090	319.501	297	0.660
112.301A	333	0.540	317.206	381	2.750	319.601	297	1.180
112.303A	333	0.880	317.222	381	3.450	319.601N	297	1.180
112.304A	333	0.540	317.223	381	4.900	319.602	297	1.900
112.310	332	0.400	317.224	381	6.200	319.602N	297	1.900
112.353	334	0.048	317.225	381	7.700	319.603	297	2.520
112.385	334	0.096	317.226	381	9.100	319.603N	297	2.520
112.503	346	0.030	317.227	381	10.600	319.604N	298	0.545
112.504	346	0.030	317.231	437	27	319.605N	298	0.850
112.505	344	0.130	317.232	437	29	319.607N	298	1.300
112.506	344	0.150	317.233	437	30	319.650	421	0.005
112.507	345	-	317.234	437	32	319.701	297	3.100
112.508	346	0.030	317.235	437	33	319.701N	297	3.100
112.806	328	0.160	317.236	437	35	319.702	297	4.500
112.837	331	2.570	317.237	437	36	319.702N	297	4.500
112.837A	331	2.570	317.238	437	37	319.703	297	5.600
112.837B	331	2.570	317.252	437	1.24	319.703N	297	5.600
112.837C	331	2.570	317.254	437	2.26	319.705N	298	1.600
112.837E	331	-	317.255	437	2.96	319.706N	298	1.920
188.133	345	0.190	317.256	437	3.27	319.707N	298	2.300
188.134	345	0.190	317.257	437	3.8	319.750	421	0.005
195.001	429	-	317.261	437	1.145	321.451	204	1.000
195.007	429	-	317.285	372	0.846	321.462	204	1.090
309.201	360	0.120	317.286	437	0.009	322.563	204	1.800
309.301	360	0.220	317.287	382	0.012	323.563	204	2.060
309.401	360	0.400	317.289	381	2.200	323.701	115	0.380
309.501	360	0.850	318.101	369	0.820	323.703	115	0.350
309.601	360	1.850	318.104	369	0.800	323.705	76	0.390
310.020	361	0.033	318.105	369	0.840	323.707	76	0.350
310.030	361	0.050	318.107	369	0.830	323.721	115	1.130
310.101	351	0.075	318.201	368	2.750	323.722	115	2.060
310.201	351	0.130	318.201N	368	2.800	323.726N	115	1.120
310.301	351	0.210	318.202	368	2.730	323.728	115	0.820
310.305A	358	0.220	318.202N	368	2.730	323.730	76	1.200
310.401	351	0.400	318.205	368	1.830	323.731	76	1.320
310.405A	358	0.410	318.205N	368	1.830	323.735N	76	1.300
310.501	351	0.825	318.206	368	2.320	323.736N	76	1.300
310.505A	358	0.810	318.206N	368	2.320	323.738	76	0.965
310.601	351	1.650	318.222	368	1.500	323.760	115	3.400
310.602	351	2.400	318.223	368	2.040	323.761	115	4.600
310.605A	358	1.700	318.224	368	2.620	323.765N	115	3.450
310.606A	358	1.730	318.225	368	3.210	323.766N	115	4.750
310.607A	358	1.250	318.226	368	3.900	323.767N	115	4.850
310.608A	358	1.750	318.227	368	4.400	323.768N	115	7.200
310.701	351	3.850	318.240	368	1.100	323.769N	115	13.700
310.705A	358	1.700	318.261	372	1.210	323.770	76	4.000
310.706A	358	1.830	318.421	375	14.660	323.771	76	5.000
310.708	351	5.360	318.422	375	21.450	323.775N	76	3.900
310.840	349	0.400	318.423	375	33.000	323.776N	76	4.950
310.850	349	0.780	318.424	375	55.000	323.777	76	5.400
310.860	349	1.650	318.425	375	90.000	323.780	204	3.000



## List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
323.781	204	3.850	325.952	115	3.800	331.221	197	0.150
323.821N	113	1.100	325.954	115	4.700	331.330	197	0.160
323.825	113	0.920	325.955	115	4.550	331.331	197	0.250
323.826	113	1.150	325.964	115	4.700	331.440	197	0.350
323.831N	74	1.300	325.965	115	5.500	331.445	197	0.470
323.832N	74	0.990	326.005	115	0.600	331.550	197	0.850
323.860N	113	3.350	326.011	115	1.200	331.555	197	1.210
323.861N	113	4.450	326.021	115	1.200	331.660	197	1.360
323.862	113	7.000	326.031	115	1.300	331.660N	197	1.360
323.864N	113	4.920	326.041	115	1.300	331.665	197	2.200
323.865N	113	7.000	326.050	115	0.920	331.665N	197	2.200
323.866N	113	13.200	326.054	115	2.550	331.775	197	4.400
323.868	113	3.250	326.057	115	1.100	331.775N	197	4.400
323.871N	74	4.900	326.064	115	2.750	331.776	197	7.250
323.874N	74	3.950	326.141	76	1.180	331.776N	197	7.250
323.875	74	7.370	326.153	76	1.850	331.860N	198	0.550
324.111F	168	0.220	326.160	76	0.990	331.861N	198	0.800
324.112F	150	0.220	328.032N	192	3.100	331.864N	198	0.450
324.121F	168	0.200	328.033N	192	1.350	331.865N	198	0.950
324.131F	168	0.265	328.034	192	0.970	331.867N	198	0.520
324.132F	150	0.255	328.035	192	0.940	331.868N	198	0.820
324.141F	168	0.364	328.036	192	0.880	331.870N	198	1.410
324.142F	150	0.340	328.037N	192	0.850	331.871N	198	2.190
324.231F	168	0.465	328.053N	192	2.420	331.874N	198	0.950
324.232F	150	0.440	328.086	192	3.700	331.875N	198	2.000
324.241F	168	0.520	328.151F	168	0.220	331.876N	198	3.100
324.242F	150	0.500	328.162	192	3.800	331.877N	198	1.530
324.251F	168	0.710	328.210	192	3.800	331.878N	198	3.000
324.252F	150	0.665	328.211	192	3.740	331.879N	198	2.250
324.312F	150	0.730	328.213	377	7.500	332.210	196	0.090
324.322F	150	0.830	328.214	377	7.500	332.310	196	0.150
324.331	150	0.850	328.215	377	7.500	332.320	196	0.160
324.331F	150	0.850	328.216	377	2.600	332.410	196	0.230
324.332	150	1.120	328.217N	377	4.740	332.420	196	0.250
324.341	150	1.150	328.218F	168	0.400	332.430	196	0.300
324.341F	150	1.150	328.223	192	0.590	332.510	196	0.440
324.342	150	1.305	328.224	192	0.600	332.511	196	0.440
324.352	150	0.960	328.226	192	0.600	332.520	196	0.550
324.352F	150	0.960	328.228	75	7.500	332.521	196	0.420
324.353	150	1.320	328.230	75	12.100	332.530	196	0.670
324.354	150	1.940	328.233	114	7.500	332.531	196	0.435
324.361	150	1.250	328.235	114	12.100	332.541	196	0.540
324.361F	150	1.250	328.238	151	6.800	332.545	196	0.700
324.361N	150	1.250	328.240	151	11.400	332.610	196	0.910
324.362	150	1.820	328.249F	168	0.050	332.611	196	0.790
324.367N	150	3.230	328.257F	168	0.155	332.620	196	0.800
324.461	150	1.950	328.260	74	0.550	332.621	196	0.700
324.531	150	2.450	328.261	74	0.750	332.630	196	0.960
324.541	150	2.870	328.262	74	0.700	332.631	196	0.750
324.551	150	2.905	328.272	74	0.640	332.632	196	1.200
324.552	150	3.770	328.273	192	0.600	332.641	196	0.820
324.561	150	2.900	328.277F	150	0.215	332.642	196	1.450
324.561N	150	2.800	328.278F	150	0.200	332.645	196	1.050
324.563	150	3.450	328.279F	150	0.180	332.651	196	0.840
324.563N	150	3.350	328.280F	168	0.140	332.652	196	1.950
324.566N	150	6.000	328.281F	168	0.075	332.655	196	1.230
324.571	150	4.050	328.289	74	0.890	332.741	196	1.500
324.571N	150	4.100	328.308	74	0.480	332.745	196	1.730
324.572	150	5.800	328.321	192	0.850	332.750	196	2.460
324.572N	150	5.750	328.322	192	0.940	332.751	196	1.650
324.575N	150	11.930	329.866	76	0.480	332.755	196	2.010
325.933	115	3.750	331.110	197	0.050	332.765	196	2.250
325.942	115	3.650	331.111	197	0.070	332.765N	196	2.250
325.944	115	4.250	331.220	197	0.100	332.766	196	2.900

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
332.870N	198	1.110	335.384	362	0.970	336.633	473	1.000
332.875N	198	1.660	335.385	362	1.300	336.634	473	0.980
332.875N	198	1.66	335.386	362	1.050	336.635	473	0.960
335.021	483	0.085	335.387	362	1.530	336.636	473	1.030
335.022	483	0.255	335.388	362	2.050	336.637	473	1.150
335.023	483	0.710	335.389	362	1.230	336.638	473	1.140
335.024	483	2.680	335.390	362	1.770	336.639	473	1.160
335.035	441	0.006	335.391	362	2.400	336.640	473	1.160
335.036	441	0.015	335.420	200	0.265	336.641	473	1.190
335.037	441	0.03	335.421	200	0.350	336.642	473	1.220
335.042	201	1.350	335.423	200	0.420	336.643	473	1.330
335.044	201	1.520	335.424	200	0.510	336.644	473	1.350
335.066	201	1.980	335.425	200	0.640	336.645	473	1.400
335.070	479	0.081	335.430	200	0.700	336.647	473	1.460
335.071	479	0.181	335.430N	200	0.700	336.649	473	1.590
335.072	479	0.311	335.431	200	0.770	336.651	473	1.750
335.073	479	0.281	335.431N	200	0.770	336.653	473	1.770
335.074	479	0.450	335.432	200	0.930	336.655	473	2.150
335.077	201	4.750	335.433	200	1.300	336.657	473	2.000
335.130	202	0.130	335.433N	200	1.300	336.659	473	2.090
335.131	202	0.230	335.434	200	1.750	336.661	473	2.270
335.132	202	0.235	335.434N	200	1.700	336.665	473	4.100
335.140	202	0.590	335.435	200	2.100	336.674	473	5.000
335.142	202	0.740	335.436	200	2.500	336.731	473	0.990
335.164	202	1.150	335.437N	200	1.850	336.732	473	1.010
335.165	202	1.700	335.438N	200	2.350	336.733	473	1.040
335.230	200	0.280	335.531	203	0.440	336.734	473	1.100
335.231	200	0.300	335.532	203	0.560	336.735	473	1.190
335.232	200	0.390	335.541	203	0.820	336.736	473	1.240
335.233	200	0.550	335.542	203	0.940	336.737	473	1.250
335.234	200	0.410	335.551	203	1.700	336.738	473	1.270
335.235	200	0.425	335.552	203	1.850	336.739	473	1.400
335.236	200	0.535	335.561	203	3.300	336.740	473	1.370
335.237	200	0.670	335.562	203	4.050	336.741	473	1.380
335.238	200	0.690	335.563	203	5.800	336.742	473	1.600
335.239	200	0.790	335.571	203	9.500	336.743	473	1.520
335.240	200	0.610	335.625	285	-	336.744	473	1.560
335.241	200	0.630	335.762	203	0.870	336.745	473	1.600
335.242	200	0.690	335.763	203	1.550	336.747	473	1.750
335.243	200	0.820	335.764	203	0.500	336.749	473	1.920
335.244	200	0.840	335.768	203	0.780	336.751	473	2.000
335.245	200	0.900	335.769	203	1.000	336.753	473	2.400
335.246	200	0.920	335.902	357	2.750	336.755	473	2.430
335.247	200	1.050	335.903	357	2.100	336.757	473	2.600
335.248	200	1.660	335.904	357	1.750	336.759	473	2.950
335.249	200	0.800	335.905	357	1.450	336.761	473	2.840
335.250	200	2.900	335.906	357	2.700	336.905	441	0.02
335.251	200	3.400	335.912	357	0.850	337.316	472	0.740
335.320	362	0.470	335.913	357	0.400	337.317	472	0.750
335.321	362	0.740	335.915	357	0.200	337.318	472	0.760
335.322	362	0.950	336.171	473	0.410	337.319	472	0.765
335.323	362	0.860	336.172	473	0.485	337.320	472	0.785
335.324	362	1.100	336.173	473	0.580	337.321	472	0.785
335.325	362	1.750	336.174	473	0.690	337.322	472	0.795
335.326	362	1.810	336.175	473	0.845	337.323	472	0.820
335.327	362	3.650	336.301	474	1.160	337.324	472	0.840
335.328	362	3.690	336.302	474	1.070	337.325	472	0.855
335.329	362	5.400	336.303	474	3.330	337.326	472	0.885
335.330	362	7.150	336.304	474	3.850	337.327	472	0.920
335.331	362	2.500	336.309	474	1.195	337.328	472	0.935
335.380	362	0.570	336.310	474	2.900	337.329	472	0.960
335.381	362	0.810	336.569	473	3.300	337.330	472	0.990
335.382	362	1.005	336.631	473	0.930	337.416	472	0.750
335.383	362	0.700	336.632	473	0.920	337.417	472	0.750

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
337.418	472	0.780	490.225	109	3.850	613.202	340	0.012
337.419	472	0.790	490.232	109	4.500	613.203	340	0.011
337.420	472	0.800	490.240	109	5.500	613.204	340	0.012
337.421	472	0.805	490.506	107	0.990	613.205	340	0.010
337.422	472	0.830	490.508	107	0.985	613.206	340	0.009
337.423	472	0.855	490.510	107	1.050	613.207	340	0.007
337.424	472	0.875	490.512	107	1.035	613.208	340	0.005
337.425	472	0.905	490.514	107	1.085	613.304	334	0.020
337.426	472	0.960	490.516	107	1.065	613.305	334	0.020
337.427	472	0.995	490.518	107	1.250	613.306	334	0.019
337.428	472	1.020	490.520	107	1.175	613.307	334	0.019
337.429	472	1.055	490.556	107	1.150	613.308	334	0.015
337.430	472	1.095	490.558	107	1.145	613.309	336	0.019
389.221	437	0.140	490.560	107	1.290	613.310	336	0.008
389.365	197	1.250	490.562	107	1.250	613.323	334	0.065
389.366	197	2.550	490.566	107	1.310	613.324	334	0.065
389.367	197	5.180	490.570	107	1.560	613.325	334	0.060
389.395	350	2.350	490.606	107	2.725	613.326	334	0.060
389.396	350	5.000	490.608	107	2.715	613.327	334	0.060
389.397	350	8.520	490.610	107	2.780	613.404	314	0.050
389.405	299	2.400	490.612	107	2.770	613.405	314	0.050
389.406	299	5.000	490.614	107	2.820	613.406	314	0.045
389.407	299	8.600	490.616	107	2.800	613.407	314	0.045
470.103	332	0.900	490.618	107	2.940	613.408	314	0.040
470.108	313	1.800	490.620	107	2.915	613.409	314	0.040
470.109	320	1.800	490.625	107	3.500	613.410	314	0.035
470.301	352	0.295	490.656	107	3.500	613.411	316	0.029
470.401	352	0.585	490.658	107	3.500	613.412	318	0.025
470.501	352	1.125	490.660	107	3.500	613.413	316	0.018
470.601	352	2.190	490.662	107	3.500	613.414	318	0.015
470.602	352	2.890	490.664	107	3.600	613.422	314	0.125
470.606	359	2.200	490.666	107	3.600	613.423	314	0.120
470.609	359	1.380	490.668	107	3.900	613.424	314	0.130
470.721	205	0.300	490.670	107	3.900	613.425	314	0.130
470.723	205	0.300	490.675	107	4.710	613.426	314	0.120
470.731	205	0.300	611.115	414	0.003	613.427	314	0.120
470.733	205	0.300	611.116	414	0.004	613.428	314	0.150
470.742	205	0.300	611.117	414	0.004	613.429	314	0.120
470.744	205	0.300	611.152	414	0.002	613.430	314	0.130
470.752	205	0.300	611.153	414	0.003	615.080	315	0.010
470.754	205	0.300	611.154	414	0.003	615.081	315	0.010
470.801	352	5.200	611.155	315	0.003	615.082	315	0.020
472.051	296	0.260	611.156	315	0.004	615.083	315	0.020
472.052	296	0.005	611.157	414	0.004	615.084	315	0.030
472.061	296	0.280	611.212	414	0.015	615.085	315	0.030
472.062	296	0.007	611.213	414	0.020	615.086	315	0.030
490.106	109	0.880	611.214	414	0.025	615.087	321	0.050
490.108	109	0.905	611.215	414	0.040	615.089	430	0.050
490.110	109	0.980	611.252	414	0.015	615.201	315	0.020
490.112	109	1.070	611.253	414	0.020	615.202	315	0.040
490.114	109	1.085	611.254	414	0.025	615.203	315	0.008
490.116	109	1.270	611.255	414	0.040	615.203A	315	0.008
490.118	109	1.285	612.110	414	0.002	615.204	315	0.015
490.120	109	1.315	612.111	414	0.002	615.204A	315	0.016
490.125	109	2.410	612.112	414	0.002	615.205	315	0.020
490.132	109	2.600	612.113	414	0.003	615.206	315	0.115
490.206	109	2.670	612.114	414	0.003	615.207	315	0.045
490.208	109	2.710	612.116	414	0.004	615.208	315	0.085
490.210	109	2.810	612.117	414	0.004	615.209	319	0.160
490.212	109	2.940	612.213	414	0.020	615.210	319	0.235
490.214	109	2.975	612.215	414	0.040	615.211	315	0.016
490.216	109	3.040	612.253	414	0.020	615.212	315	0.045
490.218	109	3.050	612.254	414	0.025	615.213	315	0.035
490.220	109	3.110	612.255	414	0.040	615.214	315	0.025

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
615.215	315	0.070	615.374	317	0.070	615.572	346	0.003
615.216	343	0.025	615.375	317	0.100	615.573	346	0.003
615.217	343	0.040	615.376	317	0.130	615.574	346	0.004
615.218	319	0.060	615.377	317	0.170	615.575	346	0.004
615.219	319	0.140	615.378	317	0.220	615.590	345	0.003
615.220	327	0.015	615.387B	326	0.140	625.020	361	0.007
615.221	319	0.300	615.388	329	0.040	626.111	353	0.007
615.223	315	0.100	615.390	330	0.340	626.112	353	0.007
615.224	319	0.200	615.392	328	0.012	626.113	353	0.008
615.225	319	0.140	615.394	326	0.050	626.121	353	0.007
615.226	319	0.125	615.395	326	0.050	626.122	353	0.008
615.227	319	0.260	615.401	327	0.015	626.123	353	0.009
615.228	327	0.035	615.402	327	0.015	626.131	353	0.009
615.229	319	0.400	615.403	327	0.015	626.132	353	0.010
615.230	327	0.030	615.404	327	0.015	626.133	353	0.010
615.231	327	0.035	615.405	327	0.015	626.141	353	0.013
615.232	319	0.093	615.406	327	0.015	626.142	353	0.015
615.233	319	0.250	615.407	327	0.015	626.143	353	0.018
615.234	339	0.065	615.408	327	0.015	626.151	353	0.020
615.239	339	0.170	615.409	327	0.015	626.152	353	0.025
615.240	339	0.215	615.420	326	0.015	626.153	353	0.030
615.243	339	0.135	615.421	326	0.015	626.161	353	0.045
615.250	319	0.140	615.422	326	0.015	626.162	353	0.070
615.251	319	0.250	615.423	326	0.015	626.163	353	0.080
615.252	317	0.300	615.424	326	0.020	626.231	432	0.008
615.253	317	0.450	615.425	326	0.020	626.241	432	0.014
615.257	326	0.370	615.426	326	0.020	626.251	432	0.022
615.258	326	0.520	615.427	326	0.020	626.261	432	0.035
615.262	317	0.140	615.428	326	0.020	626.271	369	0.040
615.264	326	0.240	615.429	326	0.020	626.272	369	0.050
615.265	317	0.210	615.501	344	0.022	626.273	369	0.060
615.266	317	0.370	615.502	344	0.021	626.322	354	0.008
615.267	326	0.290	615.503	344	0.021	626.323	354	0.009
615.268	319	0.220	615.504	344	0.021	626.331	354	0.014
615.269	319	0.350	615.505	344	0.020	626.332	354	0.011
615.271	315	0.010	615.506	344	0.022	626.333	354	0.013
615.272	315	0.012	615.507	344	0.023	626.341	354	0.010
615.273	319	0.015	615.508	344	0.023	626.342	354	0.015
615.280	319	0.015	615.509	344	0.024	626.343	354	0.020
615.281	319	0.019	615.511	344	0.030	626.351	354	0.020
615.282	319	0.025	615.522	344	0.020	626.352	354	0.030
615.283	319	0.030	615.524	344	0.020	626.353	354	0.035
615.284	319	0.035	615.525	344	0.020	626.361	354	0.030
615.285	319	0.040	615.530	344	0.020	626.362	354	0.060
615.286	319	0.040	615.531	344	0.030	626.363	354	0.090
615.287	319	0.050	615.541	346	0.003	626.371	369	0.045
615.288	319	0.030	615.542	346	0.003	626.372	369	0.062
615.289	319	0.030	615.543	346	0.003	626.422	355	0.005
615.290	319	0.030	615.544	346	0.003	626.423	355	0.011
615.291	319	0.030	615.545	346	0.003	626.432	355	0.014
615.292	319	0.035	615.546	346	0.004	626.433	355	0.013
615.300	317	0.016	615.547	346	0.004	626.442	355	0.012
615.301	317	0.015	615.551	346	0.003	626.443	355	0.019
615.302	317	0.018	615.552	346	0.003	626.452	355	0.025
615.303	317	0.020	615.553	346	0.003	626.453	355	0.025
615.304	326	0.055	615.554	346	0.003	626.462	355	0.052
615.305	326	0.060	615.555	346	0.003	626.463	355	0.040
615.306	326	0.080	615.561	346	0.003	626.472	369	0.045
615.365	317	0.005	615.562	346	0.003	626.473	369	0.055
615.366	317	0.010	615.563	346	0.003	626.901	354	0.005
615.367	317	0.015	615.564	346	0.003	626.902	354	0.008
615.369	317	0.105	615.565	346	0.003	626.903	354	0.013
615.371	317	0.170	615.566	346	0.003	626.904	354	0.027
615.373	317	0.260	615.571	346	0.003	626.905	354	0.042

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
626.906	354	0.130	638.151	425	0.190	639.277	302	1.080
626.907	328	0.025	638.152	425	0.270	639.283	302	1.160
626.908	328	0.055	638.161	425	0.340	639.287	302	1.300
626.909	328	0.090	638.162	425	0.470	639.403	304	0.120
626.910	328	0.110	638.171	425	0.580	639.404	304	0.840
626.916	354	0.244	638.172	425	0.830	639.405	304	0.170
626.917	369	0.187	638.241	425	0.110	639.406	304	0.380
626.935	356	0.060	638.251	425	0.200	639.407	304	0.660
626.936	356	0.110	638.252	425	0.225	639.408	304	0.770
626.937	356	0.130	638.261	425	0.350	639.409	304	1.040
626.938	356	0.090	638.262	425	0.450	639.410	304	1.155
626.945	356	0.060	638.271	425	0.605	639.413	300	0.020
626.946	356	0.110	638.272	425	0.805	639.417	300	0.040
626.947	356	0.130	638.411	306	0.014	639.423	300	0.040
626.948	439	0.150	638.412	306	0.018	639.427	300	0.040
627.121	433	0.020	638.421	306	0.022	639.433	300	0.060
627.131	433	0.050	638.422	306	0.028	639.437	300	0.060
627.141	433	0.050	638.431	306	0.050	639.443	300	0.060
627.151	433	0.050	638.432	306	0.070	639.447	300	0.060
627.161	433	0.050	638.441	306	0.095	639.453	300	0.190
637.421	427	0.028	638.442	306	0.130	639.457	300	0.190
637.422	427	0.025	638.451	306	0.175	639.463	300	0.400
637.431	427	0.040	638.452	306	0.250	639.467	300	0.400
637.432	427	0.060	638.461	306	0.325	639.473	300	0.820
637.441	427	0.080	638.462	306	0.450	639.477	300	0.820
637.442	427	0.090	638.471	306	0.560	639.483	300	1.100
637.451	427	0.150	638.472	306	0.780	639.487	300	1.300
637.452	427	0.170	638.561	424	0.320	639.490	423	0.200
637.461	427	0.300	638.562	424	0.450	639.491	423	0.300
637.462	427	0.350	639.104	303	0.100	639.492	423	0.400
637.463	427	0.450	639.105	303	0.185	639.493	423	0.500
637.464	427	0.550	639.106	303	0.385	639.494	423	0.600
637.561	427	0.300	639.107	303	0.110	639.495	423	0.600
637.562	427	0.350	639.108	303	0.775	639.496	423	0.800
637.563	427	0.450	639.109	303	1.050	639.497	423	0.800
637.564	427	0.550	639.110	303	1.150	639.563	300	0.400
637.811	437	0.800	639.113	301	0.020	639.567	300	0.500
637.813	437	0.750	639.123	301	0.020	639.573	300	0.770
637.814	381	0.850	639.133	301	0.060	639.577	300	0.930
637.830	381	0.853	639.137	301	0.080	639.583	300	1.090
637.833	437	0.725	639.143	301	0.090	639.587	300	1.290
637.834	381	0.850	639.147	301	0.120	639.653	305	0.330
637.842	437	0.750	639.153	301	0.200	639.654	305	0.220
637.845	437	0.720	639.157	301	0.260	639.663	305	0.610
637.846	381	0.860	639.163	301	0.430	639.664	305	0.440
637.940	368	0.710	639.167	301	0.550	639.667	305	0.550
637.941	368	0.710	639.173	301	0.810	639.668	305	0.770
637.942	368	0.747	639.177	301	1.100	639.673	305	0.805
637.943	368	0.700	639.183	301	1.100	639.674	305	0.805
637.951	368	0.750	639.187	301	1.320	639.677	305	1.360
637.953	368	0.750	639.191	423	0.100	639.678	305	0.950
637.959	373	0.385	639.192	423	0.150	639.683	305	1.460
637.961	373	0.591	639.193	423	0.200	639.684	305	1.210
638.104	442	0.070	639.194	423	0.300	639.687	305	1.740
638.105	442	0.125	639.195	423	0.350	639.688	305	1.350
638.106	442	0.195	639.196	423	0.400	639.913	423	0.050
638.107	442	0.315	639.197	423	0.450	639.914	423	0.080
638.108	442	0.425	639.243	302	0.110	639.915	423	0.100
638.111	425	0.015	639.253	302	0.240	639.916	423	0.150
638.121	425	0.022	639.255	422	0.120	639.917	423	0.260
638.131	425	0.053	639.257	302	0.240	639.918	423	0.400
638.132	425	0.074	639.263	302	0.450	651.623	389	0.001
638.141	425	0.100	639.267	302	0.550	651.632	389	0.001
638.142	425	0.140	639.273	302	0.850	651.702	389	0.001

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
651.713	389	0.001	654.959	394	0.003	655.384	392	0.002
651.723	389	0.001	654.964	395	0.004	655.385	391	0.001
651.725	389	0.001	654.965	395	0.004	655.386	391	0.001
651.734	389	0.001	654.968	395	0.004	655.387	391	0.001
651.735	389	0.001	654.969	395	0.004	655.388	391	0.001
651.736	389	0.001	654.977	394	0.004	655.389	391	0.001
651.737	389	0.001	654.978	395	0.003	655.390	391	0.001
651.738	389	0.001	654.979	395	0.003	655.393	391	0.001
651.802	389	0.001	654.980	395	0.008	655.395	391	0.001
651.813	389	0.001	654.983	396	0.016	655.397	391	0.002
651.823	389	0.001	654.986	396	0.015	655.398	391	0.001
651.824	389	0.001	654.987	394	0.004	655.399	391	0.001
651.825	389	0.001	654.988	395	0.007	655.600	388	0.001
651.833	389	0.001	654.989	395	0.009	655.601	388	0.001
651.834	389	0.001	654.990A	395	0.009	655.602	388	0.001
651.835	389	0.001	654.991	395	0.009	655.603	388	0.001
651.837	389	0.001	654.992	395	0.009	655.604	388	0.001
651.838	389	0.002	654.993A	395	0.009	655.605	388	0.001
651.839	389	0.002	654.995	395	0.003	655.606	388	0.001
654.128	397	0.002	654.996	396	0.016	655.620	403	0.001
654.150	397	0.001	654.997	396	0.016	655.621	403	0.001
654.152	397	0.001	654.998	396	0.016	655.622	403	0.001
654.158	397	0.002	655.301A	390	0.001	655.630	403	0.001
654.168	397	0.001	655.301B	390	0.001	655.631	403	0.001
654.183	397	0.002	655.302A	390	0.001	655.632	403	0.001
654.240	398	0.004	655.302B	390	0.001	655.640	404	0.002
654.250	398	0.004	655.303A	390	0.002	655.641	404	0.002
654.251	398	0.003	655.303B	390	0.002	655.642	404	0.002
654.259	398	0.004	655.305	390	0.001	655.644	404	0.002
654.277	398	0.004	655.306	390	0.001	655.650	404	0.004
654.287	398	0.004	655.310	392	0.002	655.651	404	0.004
654.340	399	0.008	655.311A	390	0.001	655.652	404	0.004
654.350	399	0.008	655.313	391	0.001	655.654	404	0.004
654.351	399	0.008	655.314	391	0.001	655.660	405	0.009
654.354	399	0.008	655.315	392	0.001	655.661	405	0.009
654.387	399	0.008	655.316	390	0.001	655.662	405	0.010
654.650	432	0.006	655.317	392	0.001	655.664	405	0.009
654.837	393	0.001	655.318	391	0.001	655.670	406	0.016
654.840A	393	0.001	655.319	391	0.001	655.671	406	0.017
654.846	393	0.001	655.320	391	0.001	655.910	401	0.002
654.847	393	0.001	655.321A	390	0.001	655.911	401	0.002
654.850A	393	0.001	655.322	390	0.001	655.912	401	0.002
654.851A	393	0.001	655.324	390	0.001	655.913	401	0.002
654.852	393	0.001	655.326	390	0.003	655.920	401	0.002
654.853	393	0.001	655.327	391	-	655.921	401	0.002
654.856	393	0.001	655.328	391	-	655.922	401	0.002
654.858	393	0.001	655.331A	390	0.001	655.923	401	0.002
654.877	393	0.001	655.332	390	0.001	655.930	402	0.003
654.879	393	0.001	655.334	390	0.001	655.931	402	0.003
654.888	393	0.001	655.354	390	0.001	655.932	402	0.003
654.889	393	0.001	655.363	391	0.001	655.933	402	0.003
654.930A	394	0.004	655.364	390	0.001	655.940	296	0.001
654.935	394	0.004	655.369	391	0.001	655.941	296	0.001
654.937	394	0.004	655.370	391	0.001	655.942	296	0.001
654.940A	394	0.004	655.371	391	0.001	658.049	441	-
654.941	394	0.001	655.372	391	0.001	662.600	418	13.300
654.942	394	0.004	655.373	391	0.001	663.110	486	0.045
654.945	394	0.004	655.374	392	0.002	663.120	486	0.070
654.947	394	0.004	655.375	391	0.001	663.121	486	0.140
654.949	394	0.004	655.378	391	0.001	663.130	486	0.090
654.950	394	0.003	655.379	391	0.002	663.131	486	0.180
654.952	394	0.004	655.380	391	0.001	663.140	486	0.100
654.955	394	0.003	655.381	391	0.001	663.141	486	0.210
654.957	394	0.003	655.383	391	0.001	663.150	486	0.500

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
663.151	486	0.950	690.193	421	0.009	690.576	420	0.008
663.160	486	0.640	690.194	421	0.010	690.577	432	0.010
663.161	486	1.250	690.195	421	0.014	690.578	432	0.010
663.170	486	0.600	690.196	421	0.017	690.579	432	0.014
663.181	486	0.010	690.197	421	0.020	690.580	432	0.020
663.185	486	0.040	690.208	429	0.001	690.582	429	0.007
663.191	486	0.005	690.320	429	0.009	690.583	424	0.002
663.195	486	0.030	690.323	431	0.070	690.585	424	0.004
688.599	400	0.002	690.324	431	0.070	690.586	424	0.003
688.619	400	0.002	690.410	432	0.001	690.591	433	0.005
689.001	355	0.020	690.413	426	0.020	690.594	418	0.004
689.007	355	0.050	690.414	433	0.001	690.595	429	0.003
689.189	369	0.030	690.416	433	0.001	690.596	436	0.020
689.197	355	0.020	690.417	429	0.001	690.603	427	0.003
689.198	355	0.020	690.418	420	0.001	690.604	427	0.007
689.290	345	-	690.419	420	0.001	690.605	427	0.010
690.101	421	0.002	690.421	429	0.001	690.606	427	0.025
690.102	428	0.004	690.425	427	0.001	690.607	427	0.040
690.103	428	0.004	690.431	418	0.001	690.611	429	0.001
690.104	428	0.005	690.432	418	0.001	690.614	429	0.001
690.105	421	0.025	690.433	418	0.002	690.654	419	0.010
690.106	421	0.030	690.434	418	0.003	690.655	419	0.030
690.107	431	0.005	690.435	418	0.003	690.656	419	0.035
690.108	421	0.005	690.436	418	0.010	690.657	419	0.080
690.113	431	0.004	690.437	418	0.050	690.658	433	0.005
690.115	433	0.003	690.440	429	0.001	690.666	419	0.005
690.121	434	0.053	690.449	429	0.002	690.667	419	0.030
690.124	434	0.005	690.451	420	0.001	690.668	426	0.040
690.126	419	0.030	690.452	420	0.005	690.703	440	0.020
690.127	419	0.055	690.457	429	0.003	690.704	440	0.045
690.128	419	0.100	690.459	430	0.001	690.705	440	0.080
690.129	419	0.095	690.460	420	0.002	690.706	440	0.140
690.130	419	0.240	690.462	427	0.001	690.707	440	0.240
690.131	420	0.010	690.464	427	0.002	690.716	438	0.019
690.132	435	0.010	690.465	427	0.002	690.800	424	0.001
690.135	432	0.001	690.466	427	0.001	690.801	418	0.001
690.136	432	0.001	690.467	427	0.001	690.802	418	0.001
690.137	432	0.003	690.469	420	0.005	690.803	418	0.005
690.138	432	0.004	690.477	440	0.002	690.804	331	0.010
690.139	432	0.002	690.478	440	0.003	690.805	418	0.018
690.140	432	0.004	690.479	440	0.006	690.806	331	0.030
690.141	432	0.007	690.480	440	0.010	690.807	421	0.060
690.150	431	0.005	690.481	440	0.017	690.808	418	0.160
690.156	331	0.005	690.482	440	0.020	690.809	440	0.170
690.157	421	0.005	690.483	440	0.035	690.810	419	0.100
690.159	426	0.100	690.484	420	0.045	690.811	421	0.014
690.163	421	0.020	690.486	430	0.001	690.812	421	0.015
690.167	419	0.105	690.487A	430	0.008	690.813	421	0.016
690.168	419	0.250	690.488	430	0.007	690.814	421	0.020
690.172	420	0.019	690.489	429	0.001	690.816	331	0.050
690.173	421	0.007	690.510	440	0.010	690.817	440	0.045
690.176	433	0.005	690.512	440	0.002	690.819	421	0.050
690.177	433	0.005	690.513	440	0.003	690.832	435	0.001
690.178	433	0.005	690.514	440	0.004	690.833	427	0.001
690.179	433	0.001	690.515	440	0.008	690.834	413	0.002
690.180	433	0.003	690.529	424	0.001	690.836	429	0.004
690.182	433	0.003	690.538	424	0.001	690.837	413	0.010
690.183	431	0.020	690.541	424	0.010	690.838	413	0.010
690.184	421	0.007	690.549	432	0.001	690.843	429	0.010
690.186	405	0.008	690.550	432	0.001	690.845	436	0.040
690.188	421	0.014	690.551	432	0.001	690.847	419	0.125
690.189	421	0.010	690.552	432	0.004	690.848	419	0.170
690.191	421	0.005	690.553	432	0.005	690.849	419	0.220
690.192	421	0.007	690.573	421	0.001	690.850	419	0.300

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
690.851	419	0.110	691.756	423	0.015	694.170	441	0.017
690.852	419	0.200	691.757	423	0.015	694.171	441	0.017
690.853	419	0.325	692.270	418	0.050	694.172	441	0.017
690.854	419	0.680	692.271	418	0.050	694.173	441	0.017
690.855	419	0.250	692.272	418	0.050	694.174	441	0.017
690.861	435	0.800	692.286	418	0.050	694.175	441	0.017
690.899	423	0.005	692.295	434	0.005	694.176	441	0.017
690.900	424	0.001	692.296	429	0.005	694.177	441	0.017
690.901	424	0.001	692.298	435	0.001	694.178	441	0.017
690.902	424	0.002	692.381	429	0.010	694.179	441	0.017
690.903	424	0.002	692.404A	442	0.370	694.180	441	0.017
690.904	424	0.003	692.406	421	0.003	694.181	441	0.105
690.905	424	0.003	692.409	421	0.002	694.182	441	0.105
690.906	424	0.003	692.415	369	0.010	694.183	441	0.105
690.907	424	0.003	693.131	428	0.001	694.184	441	0.105
690.908	426	0.004	693.175	421	0.001	694.185	441	0.105
690.925	429	0.004	693.176	421	0.001	694.186	441	0.105
690.940	433	0.001	693.177	421	0.001	694.187	441	0.105
690.943	433	0.005	693.178	421	0.001	694.188	441	0.105
690.947	429	0.005	693.179	421	0.001	694.189	441	0.105
690.953	433	0.005	693.180	424	0.001	694.190	441	0.105
690.954	433	0.005	693.181	424	0.003	694.191	441	0.105
690.964	431	0.003	693.182	424	0.004	694.192	441	0.105
690.965	431	0.001	693.183	424	0.017	694.193	441	0.105
690.970	421	0.003	693.184	424	0.024	694.194	441	0.105
690.978	429	0.001	693.185	424	0.004	694.806	426	0.002
690.981	429	0.003	693.186	426	0.001	694.807	331	0.004
690.984	435	0.050	693.187	421	0.001	694.808	429	0.004
690.987	435	0.030	693.289	433	0.001	694.809	421	0.004
690.989	435	0.020	693.304	418	0.325	694.810	421	0.009
690.990	435	0.010	693.305	418	0.325	694.815	421	0.009
690.991	435	0.010	693.306	418	0.325	694.820	421	0.010
690.994	429	0.040	694.101	388	0.005	695.101	423	0.020
690.995	429	0.003	694.102	389	0.005	695.102	423	0.020
690.996	429	0.010	694.103	389	0.005	800.001	63	4.060
690.997	432	0.010	694.105	426	0.005	800.002	63	4.040
691.315	440	0.001	694.110	403	0.005	800.008	63	4.340
691.316	440	0.001	694.120	433	0.005	800.015	63	4.260
691.318	440	0.001	694.121	397	0.005	800.023	63	3.860
691.369	427	0.001	694.122	391	0.005	800.027	63	3.920
691.370	427	0.001	694.123	401	0.005	800.029	56	1.250
691.371	427	0.001	694.124	403	0.005	800.031	56	0.563
691.372	427	0.001	694.125	431	0.005	800.045	193	0.600
691.373	436	0.005	694.130	401	0.005	800.046	452	0.010
691.390	434	0.002	694.131	404	0.005	800.047	452	0.010
691.501	418	0.001	694.136	402	0.005	800.048	452	0.002
691.502	418	0.002	694.137	404	0.005	800.049	452	0.010
691.503	418	0.006	694.138	423	0.005	800.050	452	0.005
691.504	418	0.011	694.141	394	0.005	800.051	452	0.005
691.505	418	0.021	694.142	399	0.005	800.052	452	0.005
691.506	418	0.050	694.143	405	0.005	800.053	452	-
691.507	418	0.110	694.144	399	0.005	800.054	93	3.580
691.600	440	0.001	694.145	423	0.005	800.058	47	0.457
691.601	440	0.004	694.150	395	0.005	800.063	64	0.526
691.602	440	0.005	694.160	441	0.090	800.065	93	2.800
691.603	440	0.010	694.161	441	0.090	800.066	72	1.110
691.604	440	0.006	694.162	441	0.090	800.074	72	1.820
691.605	440	0.015	694.163	441	0.090	800.075	72	1.720
691.606	440	0.022	694.164	441	0.090	800.079	72	1.750
691.607	440	0.045	694.165	441	0.090	800.080	72	2.000
691.608	440	0.075	694.166	441	0.090	800.081	72	2.776
691.609	440	0.075	694.167	441	0.017	800.085	63	1.500
691.637	420	0.088	694.168	441	0.017	800.088	63	1.180
691.755	423	0.015	694.169	441	0.017	800.093	63	1.520



# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
800.096	63	1.340	800.350	65	4.020	800.672	274	0.550
800.111	63	1.380	800.351	65	4.060	800.673	274	0.375
800.112	63	1.680	800.352	65	4.400	800.674	274	0.575
800.115	63	1.420	800.354	65	3.780	800.675	274	0.588
800.116	63	1.600	800.355	65	3.900	800.678	182	0.568
800.128	63	1.480	800.369	69	4.140	800.679	183	0.717
800.131	63	1.180	800.374	69	4.100	800.681	183	0.690
800.144	58	1.820	800.375	69	4.180	800.687	188	0.654
800.146	58	2.780	800.380	69	4.720	800.688	188	0.657
800.147	58	2.260	800.385	69	4.680	800.689	188	0.800
800.148	58	3.200	800.403	262	0.054	800.695	190	1.200
800.158	70	1.280	800.404	262	-	800.698	190	1.600
800.159	70	1.420	800.405	262	0.054	800.703	186	0.875
800.160	70	1.660	800.406	262	0.054	800.708	186	0.870
800.163	64	1.160	800.407	262	0.054	800.712	186	1.100
800.164	65	1.784	800.408	262	0.052	800.717	186	1.200
800.165	65	2.065	800.409	262	0.052	800.722	186	1.020
800.168	64	1.030	800.410	262	-	800.723	186	1.700
800.175	69	1.700	800.411	262	-	800.726	186	0.843
800.177	69	1.640	800.412	262	-	800.731	186	0.861
800.179	69	1.550	800.413	262	-	800.734	185	0.773
800.184	93	5.200	800.414	262	0.083	800.735	185	1.400
800.185	463	4.380	800.415	262	0.083	800.746	178	0.643
800.186	463	4.340	800.416	262	0.083	800.765	187	0.830
800.187	463	4.480	800.417	262	0.080	800.766	187	1.380
800.188	463	4.640	800.418	262	-	800.767	187	0.754
800.204	72	4.080	800.419	262	0.080	800.775	188	1.500
800.205	72	4.420	800.420	263	0.115	800.776	234	2.470
800.206	72	4.800	800.421	263	-	800.777	234	-
800.207	72	3.740	800.422	263	-	800.778	234	-
800.221	72	6.320	800.423	263	0.115	800.779	234	2.600
800.224	72	6.020	800.424	263	-	800.783	190	2.460
800.235	72	7.100	800.425	263	0.117	800.787	190	2.800
800.236	72	9.240	800.426	263	-	800.788	190	1.800
800.237	72	3.840	800.427	263	-	800.789	190	2.100
800.249	58	9.960	800.428	263	-	800.790	190	2.300
800.256	72	19.000	800.429	263	0.117	800.795	186	1.156
800.264	63	3.880	800.430	263	0.133	800.799	186	1.440
800.268	63	3.900	800.431	263	0.133	800.802	186	1.180
800.272	63	4.000	800.432	263	-	800.806	186	1.900
800.278	58	4.160	800.433	263	0.133	800.812	186	2.000
800.279	58	4.500	800.434	263	-	800.815	186	2.000
800.280	58	4.930	800.435	263	-	800.816	186	2.000
800.281	58	5.600	800.436	263	-	800.819	186	2.100
800.282	58	4.320	800.437	263	0.135	800.822	186	1.320
800.283	58	4.800	800.438	263	-	800.823	186	2.380
800.284	58	5.300	800.439	263	0.135	800.825	186	1.740
800.285	58	5.940	800.450	288	0.028	800.826	186	2.440
800.287	58	4.600	800.463	288	0.086	800.831	186	1.120
800.288	58	5.160	800.464	288	0.071	800.838	186	1.140
800.289	58	5.840	800.468	289	0.226	800.842	185	1.140
800.290	58	6.800	800.472	289	0.200	800.843	185	1.720
800.291	58	4.640	800.483	503	0.053	800.844	185	2.500
800.292	58	5.440	800.484	503	0.056	800.845	185	1.380
800.293	58	6.380	800.488	452	-	800.846	185	2.060
800.294	58	7.440	800.557	178	1.400	800.847	185	3.100
800.323	67	7.080	800.587	459	0.002	800.848	185	1.520
800.325	70	3.870	800.597	56	0.787	800.849	185	2.200
800.329	70	3.900	800.664	274	0.028	800.850	185	2.870
800.330	70	4.020	800.665	274	0.615	800.851	185	1.920
800.335	70	3.490	800.666	274	0.604	800.887	189	1.780
800.336	70	4.410	800.668	274	0.596	800.888	189	2.200
800.341	70	3.460	800.670	274	0.574	800.889	234	-
800.347	70	3.580	800.671	274	0.502	800.903	190	3.450

## List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
800.904	190	4.400	801.221	143	1.380	801.431	279	0.958
800.910	190	5.100	801.222	143	0.970	801.432	279	1.140
800.911	190	6.800	801.252	145	1.200	801.433	279	0.527
800.933	187	2.080	801.253	144	0.916	801.434	279	-
800.934	187	2.480	801.254	144	1.200	801.435	279	0.935
800.935	187	2.020	801.255	145	1.300	801.436	279	1.120
800.940	189	2.840	801.256	144	1.000	801.437	279	0.516
800.942	189	3.280	801.257	144	1.200	801.438	279	-
800.945	492	0.056	801.258	145	1.220	801.439	279	0.914
800.949	203	6.800	801.259	145	1.900	801.440	279	1.100
800.950	480	0.003	801.260	145	1.040	801.441	279	0.502
800.951	484	0.002	801.262	145	0.900	801.442	279	0.760
800.952	484	0.009	801.263	145	1.100	801.443	279	-
800.953	484	0.040	801.264	144	0.900	801.444	279	1.080
800.972	104	1.960	801.265	144	0.951	801.445	279	0.492
800.973	104	2.000	801.266	145	1.120	801.446	279	0.751
800.974	104	2.010	801.267	144	0.873	801.447	279	0.876
800.975	104	1.820	801.268	144	1.020	801.448	279	1.040
800.976	104	2.105	801.280	175	0.016	801.449	279	0.481
800.977	104	2.780	801.283	171	1.080	801.450	279	0.728
801.013	267	-	801.287	171	0.770	801.451	280	0.001
801.014	223	-	801.289	225	3.180	801.452	279	0.932
801.015	223	-	801.290	225	3.180	801.453	279	1.120
801.037	275	0.190	801.294	224	-	801.454	279	0.512
801.038	275	0.290	801.296	224	3.160	801.455	279	0.775
801.039	275	0.365	801.297	224	3.860	801.456	279	-
801.040	121	3.100	801.298	226	0.839	801.457	279	1.080
801.042	504	-	801.299	222	3.120	801.458	279	0.495
801.043	504	-	801.300	222	4.080	801.459	279	0.753
801.046	492	0.002	801.301	222	1.200	801.460	279	0.526
801.047	492	0.003	801.302	220	1.760	801.461	279	-
801.071	175	0.020	801.303	220	-	801.462	279	0.508
801.073	174	8.710	801.313	264	0.038	801.463	279	-
801.092	148	3.880	801.314	264	0.032	801.464	281	-
801.093	148	4.840	801.315	264	0.051	801.465	279	0.490
801.094	148	5.920	801.316	264	0.058	801.466	279	1.220
801.102	148	3.500	801.317	264	-	801.467	279	1.340
801.103	148	3.590	801.318	270	0.153	801.468	279	1.396
801.105	148	3.300	801.405	278	0.343	801.469	279	1.560
801.106	148	4.360	801.406	278	0.459	801.470	280	-
801.118	148	3.700	801.407	278	-	801.471	279	-
801.119	148	5.280	801.408	278	0.271	801.472	279	-
801.124	148	6.670	801.409	278	0.334	801.473	279	-
801.125	148	4.900	801.410	278	0.570	801.474	280	-
801.126	143	2.550	801.411	278	0.265	801.475	281	-
801.129	143	2.580	801.412	278	-	801.476	281	-
801.133	143	2.840	801.413	278	0.464	801.477	281	-
801.136	143	2.940	801.414	278	0.581	801.478	280	-
801.139	143	3.520	801.415	278	0.275	801.479	278	0.221
801.143	143	2.550	801.416	278	0.344	801.480	278	-
801.146	132	2.380	801.417	278	0.463	801.481	278	0.174
801.147	132	2.460	801.418	278	-	801.482	278	0.217
801.164	147	7.950	801.419	278	0.274	801.483	278	0.293
801.169	174	4.900	801.420	280	0.001	801.484	278	0.111
801.179	130	0.795	801.421	278	-	801.485	278	0.172
801.188	148	2.380	801.422	278	-	801.486	278	0.211
801.189	148	1.190	801.423	278	-	801.487	278	-
801.196	143	1.020	801.424	278	0.179	801.488	278	0.360
801.201	143	1.060	801.425	278	0.274	801.489	278	0.109
801.205	143	1.320	801.426	278	0.336	801.490	278	0.167
801.208	143	1.500	801.427	278	0.455	801.491	278	0.212
801.215	143	1.160	801.428	278	0.572	801.492	278	0.283
801.217	143	1.180	801.429	278	0.175	801.493	278	0.359
801.219	143	2.140	801.430	278	0.267	801.494	278	0.108

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
801.495	278	0.167	801.681	123	4.000	801.771	273	0.463
801.496	278	0.211	801.682	253	0.049	801.772	273	0.360
801.497	278	0.284	801.684	468	2.100	801.773	273	0.340
801.498	278	-	801.685	272	0.125	801.774	273	0.665
801.499	278	0.108	801.688	136	1.000	801.775	273	0.660
801.500	278	0.167	801.690	175	0.018	801.785	288	0.028
801.501	280	0.001	801.694	251	-	801.787	288	0.029
801.507	288	0.065	801.695	251	0.074	801.807	288	0.074
801.509	289	0.223	801.696	484	0.005	801.808	288	0.070
801.517	289	0.195	801.697	251	0.073	801.810	288	0.070
801.524	260	0.069	801.698	251	0.073	801.812	288	0.069
801.525	260	0.070	801.699	484	0.028	801.813	288	0.070
801.526	260	0.070	801.700	251	0.074	801.814	288	0.072
801.527	260	0.070	801.701	251	0.073	801.831	288	0.074
801.528	260	0.068	801.702	248	0.011	801.832	288	0.070
801.529	260	0.102	801.703	248	0.010	801.833	288	0.070
801.530	260	0.102	801.704	248	0.008	801.834	288	-
801.531	260	0.102	801.705	271	0.097	801.860	289	0.246
801.532	260	-	801.709	248	0.004	801.861	289	0.261
801.533	260	0.102	801.711	53	1.480	801.867	289	-
801.534	260	0.099	801.712	54	1.480	801.868	289	-
801.535	261	0.145	801.713	54	2.320	801.873	289	0.258
801.536	261	0.155	801.714	241	0.097	801.883	289	-
801.537	261	0.155	801.718	252	0.097	801.885	289	0.258
801.538	261	0.146	801.719	252	0.098	801.889	289	0.257
801.539	261	-	801.720	46	1.080	801.898	289	0.278
801.540	261	0.147	801.721	253	0.116	801.925	289	0.246
801.541	261	-	801.722	252	0.098	801.927	289	0.259
801.542	261	-	801.723	252	0.097	801.929	289	0.260
801.543	261	-	801.724	128	0.858	801.930	289	-
801.544	261	0.147	801.725	253	0.116	801.931	289	-
801.545	261	0.168	801.726	252	0.099	801.938	289	0.244
801.546	261	0.168	801.727	252	0.099	801.942	289	0.275
801.547	261	0.168	801.729	253	0.116	801.944	289	0.257
801.548	261	-	801.730	53	2.100	801.948	289	0.257
801.549	261	0.010	801.731	53	1.640	801.982	272	0.592
801.550	261	0.170	801.733	253	0.116	801.983	272	0.556
801.551	261	0.010	801.734	135	1.400	801.984	272	0.481
801.552	261	-	801.737	135	1.420	801.985	272	0.353
801.651	250	0.023	801.738	250	0.004	802.001	288	0.028
801.652	250	0.022	801.740	136	1.940	802.023	288	0.073
801.653	234	-	801.742	248	0.012	802.046	289	0.258
801.654	253	0.025	801.743	248	0.004	802.063	273	0.280
801.655	250	0.022	801.744	250	0.009	802.064	273	0.250
801.656	250	0.022	801.746	248	0.010	802.065	273	0.242
801.657	232	0.492	801.747	273	0.215	802.066	273	0.226
801.658	253	0.026	801.748	273	0.210	802.067	273	0.215
801.659	250	0.023	801.750	250	-	802.112	288	0.051
801.660	250	0.022	801.751	250	-	802.120	289	0.194
801.662	253	0.026	801.752	273	0.189	802.129	221	-
801.663	235	2.580	801.753	484	0.003	802.130	221	-
801.664	234	4.100	801.754	484	0.011	802.131	227	-
801.665	234	-	801.755	484	0.052	802.133	227	-
801.666	183	4.500	801.759	93	-	802.134	484	0.010
801.671	251	0.005	801.760	93	-	802.135	484	0.080
801.672	251	0.040	801.761	93	-	802.136	484	0.100
801.673	507	1.044	801.762	93	-	802.137	484	-
801.674	253	0.048	801.763	93	5.520	802.138	484	-
801.675	251	0.005	801.764	273	0.660	802.152	239	0.118
801.676	251	0.041	801.765	273	0.660	802.153	239	-
801.677	171	0.858	801.767	273	0.640	802.154	239	0.068
801.678	253	0.049	801.768	273	0.617	802.155	239	0.112
801.679	251	0.041	801.769	273	0.600	802.156	239	0.073
801.680	251	0.040	801.770	273	0.480	802.157	239	-

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
802.158	239	0.109	802.234	213	1.199	802.435	81	0.876
802.159	239	0.178	802.238	213	0.550	802.436	81	1.000
802.160	239	0.186	802.239	213	0.759	802.442	84	-
802.161	239	0.254	802.240	213	1.200	802.449	78	5.500
802.162	239	0.101	802.241	213	1.238	802.451	78	5.300
802.163	239	0.169	802.245	213	0.579	802.453	78	5.500
802.164	239	-	802.246	213	0.850	802.455	78	5.500
802.165	239	0.175	802.247	213	1.274	802.457	78	5.900
802.166	239	0.382	802.248	213	0.588	802.459	78	6.300
802.167	239	0.274	802.249	213	0.850	802.462	78	6.200
802.168	239	0.391	802.250	213	1.300	802.463	78	5.100
802.169	239	0.284	802.251	482	2.680	802.465	78	5.300
802.170	239	0.504	802.307	283	6.670	802.467	78	5.500
802.171	239	0.395	802.308	283	-	802.469	78	5.700
802.172	239	-	802.313	498	-	802.473	84	5.600
802.173	239	-	802.314	175	0.051	802.474	84	5.700
802.174	239	-	802.315	175	0.101	802.475	84	5.800
802.175	239	0.270	802.316	175	0.187	802.476	84	5.700
802.176	239	0.564	802.318	85	22.800	802.477	84	5.900
802.177	239	0.816	802.329	291	1.590	802.478	84	6.100
802.178	239	0.538	802.337	282	0.017	802.480	85	9.700
802.179	239	0.788	802.350	191	1.005	802.481	86	6.900
802.180	239	0.505	802.351	175	0.058	802.482	83	6.000
802.181	239	0.758	802.355	128	0.330	802.489	80	17.400
802.183	256	0.640	802.356	128	0.349	802.490	80	17.100
802.184	256	1.115	802.357	128	0.363	802.492	82	17.800
802.185	256	2.320	802.383	282	-	802.493	82	19.000
802.187	256	0.310	802.384	282	-	802.494	78	13.000
802.188	256	0.003	802.385	282	-	802.497	78	13.400
802.189	212	0.068	802.386	282	-	802.500	78	13.700
802.190	212	0.073	802.387	282	-	802.503	78	13.100
802.191	458	0.163	802.389	282	-	802.506	78	13.500
802.192	458	0.400	802.390	282	-	802.509	78	13.800
802.193	458	0.290	802.391	282	-	802.512	78	14.660
802.194	213	0.250	802.393	282	-	802.515	78	12.600
802.195	213	0.337	802.394	282	-	802.518	78	12.800
802.196	213	0.426	802.395	89	3.350	802.521	78	13.000
802.197	212	0.200	802.396	90	2.700	802.524	78	13.200
802.198	212	0.350	802.398	89	5.000	802.529	84	12.500
802.199	212	0.400	802.399	90	5.500	802.531	84	12.600
802.200	212	0.227	802.403	88	4.100	802.533	84	12.700
802.201	212	0.318	802.404	89	4.370	802.535	84	12.600
802.202	212	0.410	802.405	90	4.000	802.537	84	12.800
802.205	212	0.241	802.409	88	3.100	802.539	84	13.000
802.209	212	0.205	802.411	89	9.700	802.544	86	16.100
802.210	212	0.281	802.412	90	5.000	802.545	83	9.2
802.211	212	0.300	802.415	88	7.300	802.546	116	5.500
802.212	212	0.372	802.416	89	8.700	802.547	116	5.900
802.213	212	0.400	802.417	90	8.700	802.548	116	6.200
802.214	213	0.250	802.420	88	3.100	802.549	116	5.800
802.215	213	0.350	802.421	123	9.700	802.550	116	6.000
802.216	213	0.388	802.422	121	6.800	802.551	116	6.300
802.217	212	0.250	802.423	123	8.700	802.552	116	8.000
802.218	212	0.300	802.424	121	5.800	802.553	116	5.100
802.219	212	0.400	802.425	161	9.400	802.554	116	5.300
802.220	458	0.582	802.426	162	9.400	802.555	116	5.500
802.221	458	0.519	802.427	160	5.900	802.556	116	5.700
802.222	500	0.003	802.428	161	8.400	802.557	120	9.700
802.223	500	0.003	802.429	162	8.400	802.558	117	-
802.224	482	1.040	802.430	160	4.900	802.559	117	-
802.225	458	1.110	802.431	161	4.800	802.560	119	16.800
802.226	458	1.040	802.432	162	4.800	802.561	119	18.100
802.232	213	0.500	802.433	161	3.800	802.562	116	13.000
802.233	213	0.750	802.434	162	3.800	802.563	116	13.400

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
802.564	116	13.570	802.758	282	-	802.847	266	0.008
802.565	116	13.100	802.759	282	-	802.848	266	-
802.566	116	13.500	802.760	282	-	802.942	284	2.268
802.567	116	13.800	802.761	282	-	802.943	284	1.328
802.568	116	14.200	802.762	282	-	802.944	284	-
802.569	116	5.100	802.767	282	-	802.945	284	-
802.570	116	5.300	802.768	282	-	802.946	284	-
802.571	116	5.500	802.769	282	-	802.947	284	-
802.572	116	5.700	802.781	286	0.015	802.948	284	-
802.573	120	20.800	802.782	286	0.027	802.949	284	-
802.639	153	14.200	802.783	286	-	802.950	284	-
802.640	153	15.500	802.785	285	1.550	802.963	450	1.080
802.642	157	16.000	802.787	285	-	802.964	92	4.000
802.645	152	12.200	802.788	287	-	802.968	92	11.110
802.648	152	12.600	802.789	287	-	802.970	92	9.350
802.651	152	12.900	802.790	287	-	802.975	125	5.000
802.654	152	12.300	802.791	287	-	802.976	125	-
802.657	152	12.700	802.792	287	-	802.977	125	9.000
802.660	152	13.000	802.793	287	0.070	803.041	185	1.700
802.663	152	13.400	802.794	287	-	803.043	185	1.200
802.666	152	11.800	802.795	287	-	803.051	60	0.666
802.669	152	12.000	802.796	287	-	803.052	60	0.682
802.672	152	12.200	802.797	287	-	803.053	60	0.480
802.675	152	12.400	802.798	287	-	803.054	60	0.620
802.680	156	11.700	802.799	287	-	803.055	60	0.641
802.682	156	11.800	802.800	287	-	803.056	60	1.320
802.684	156	11.900	802.801	287	-	803.057	60	1.640
802.686	156	11.800	802.802	287	-	803.058	60	1.360
802.688	156	12.000	802.803	287	-	803.059	60	1.700
802.690	156	12.200	802.805	286	-	803.060	60	1.050
802.695	158	20.000	802.807	286	-	803.061	60	1.140
802.696	159	15.300	802.808	286	-	803.062	60	1.240
802.697	155	5.900	802.809	286	-	803.063	60	1.540
802.702	152	5.400	802.810	286	-	803.064	60	1.280
802.704	152	5.800	802.811	286	-	803.065	60	1.600
802.706	152	6.100	802.812	286	-	803.066	60	4.160
802.708	152	5.500	802.814	465	-	803.067	60	4.220
802.710	152	5.900	802.815	465	-	803.068	60	4.020
802.712	152	6.200	802.816	465	1.086	803.069	60	4.100
802.716	152	7.900	802.817	465	-	803.070	141	1.170
802.717	152	5.000	802.818	465	-	803.071	141	1.160
802.719	152	5.200	802.819	465	-	803.072	141	0.907
802.721	152	5.400	802.820	465	-	803.073	141	1.060
802.723	152	5.600	802.821	465	-	803.074	141	1.100
802.727	156	5.500	802.822	465	-	803.075	100	1.640
802.728	156	5.600	802.823	465	-	803.076	100	2.100
802.729	156	5.700	802.824	175	-	803.077	100	2.080
802.730	156	5.600	802.825	175	-	803.078	100	2.120
802.731	156	5.800	802.827	175	0.034	803.080	135	2.020
802.732	156	6.000	802.828	175	0.038	803.081	136	2.040
802.734	158	9.600	802.831	174	2.000	803.082	173	2.040
802.735	159	6.800	802.832	174	4.100	803.083	173	2.030
802.736	155	8.400	802.834	126	7.000	803.085	135	1.000
802.740	81	0.780	802.836	266	-	803.088	136	0.971
802.741	81	0.780	802.837	266	-	803.089	136	1.240
802.742	81	1.200	802.838	266	-	803.090	136	1.440
802.750	496	0.100	802.839	266	-	803.092	173	1.200
802.751	496	0.114	802.840	266	0.006	803.093	173	1.400
802.752	496	0.092	802.841	266	-	803.095	173	1.240
802.753	496	-	802.842	266	-	803.096	173	1.800
802.754	496	0.198	802.843	266	-	803.101	135	1.840
802.755	496	0.220	802.844	266	-	803.102	136	1.840
802.756	492	0.129	802.845	266	0.008	803.103	173	1.840
802.757	282	-	802.846	266	0.008	803.104	173	2.000

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
803.105	135	0.691	803.557	241	-	803.749	282	-
803.106	136	0.750	803.558	241	-	803.750	282	-
803.108	184	1.100	803.559	241	-	803.751	282	-
803.110	183	4.200	803.560	241	-	803.752	282	-
803.112	184	2.520	803.561	241	-	803.754	282	-
803.113	184	2.000	803.562	241	-	803.755	282	-
803.114	184	1.640	803.563	241	-	803.757	282	-
803.116	53	2.060	803.564	241	-	803.759	282	-
803.117	54	2.620	803.565	241	-	803.760	282	-
803.118	54	2.060	803.566	241	-	803.761	282	-
803.119	54	1.640	803.567	241	0.301	803.762	282	-
803.120	183	3.400	803.568	241	0.195	803.763	282	-
803.121	184	3.400	803.569	241	-	804.108	249	-
803.123	183	1.700	803.570	241	0.269	804.109	249	-
803.125	184	1.700	803.571	240	-	804.110	249	-
803.126	183	2.240	803.572	240	-	804.111	249	-
803.127	183	2.010	803.573	240	-	804.112	249	-
803.128	184	2.240	803.574	240	-	804.113	249	-
803.129	184	2.020	803.575	240	-	804.114	249	-
803.131	53	2.360	803.576	240	-	804.115	242	-
803.132	54	2.630	803.577	240	-	804.117	271	-
803.133	54	2.360	803.578	240	-	804.119	271	-
803.135	53	3.050	803.579	240	0.680	804.121	271	-
803.136	54	3.200	803.580	240	-	804.128	279	-
803.137	54	3.060	803.581	268	-	804.129	279	-
803.141	184	0.800	803.582	268	0.050	804.130	279	-
803.144	184	1.300	803.583	268	-	804.131	279	-
803.145	184	1.280	803.584	268	0.110	804.132	248	0.012
803.147	184	1.320	803.585	268	0.150	804.134	248	0.012
803.148	53	1.450	803.589	170	0.675	804.135	248	0.012
803.149	54	1.100	803.591	170	0.710	804.136	248	0.012
803.150	54	1.480	803.592	170	0.800	804.137	248	0.012
803.161	54	3.220	803.593	242	-	804.138	248	0.012
803.162	54	2.600	803.594	242	-	804.139	248	0.012
803.163	54	3.740	803.595	242	0.095	804.140	248	0.012
803.164	183	5.000	803.596	208	0.192	804.141	248	0.012
803.166	184	3.000	803.597	46	1.200	804.142	248	0.012
803.167	184	2.900	803.598	46	0.585	804.143	248	0.012
803.177	184	1.940	803.599	47	1.050	804.144	248	0.012
803.179	184	1.700	803.600	129	0.900	804.145	248	0.012
803.182	183	1.420	803.601	46	1.200	804.146	248	0.012
803.183	184	1.340	803.602	242	0.164	804.147	248	0.012
803.184	184	1.990	803.603	128	0.980	804.148	248	-
803.185	184	1.420	803.604	163	0.200	804.149	248	0.011
803.187	54	4.500	803.608	47	0.530	804.150	248	0.011
803.189	54	3.920	803.619	130	1.260	804.151	248	0.011
803.194	183	2.940	803.620	130	1.040	804.152	248	0.011
803.195	184	2.400	803.622	130	0.860	804.153	248	0.011
803.198	53	2.320	803.623	130	0.938	804.154	248	0.011
803.199	53	2.060	803.624	130	1.360	804.155	248	0.011
803.200	54	3.180	803.629	130	0.770	804.156	248	0.011
803.201	54	2.340	803.730	445	2.650	804.157	248	0.011
803.202	54	2.060	803.731	445	5.070	804.158	248	0.011
803.206	184	1.680	803.736	191	4.000	804.159	248	0.011
803.213	172	1.600	803.737	191	0.500	804.160	248	0.010
803.214	172	0.771	803.738	191	2.050	804.161	248	0.010
803.216	172	1.900	803.739	191	0.800	804.162	248	0.010
803.218	172	0.800	803.740	191	3.600	804.163	248	0.010
803.220	134	1.100	803.742	282	-	804.164	248	0.010
803.222	134	0.646	803.743	282	-	804.165	248	0.010
803.226	169	0.450	803.745	282	-	804.166	248	0.009
803.554	241	-	803.746	282	-	804.167	248	0.010
803.555	241	-	803.747	282	-	804.168	248	0.009
803.556	241	-	803.748	282	-	804.169	248	0.009

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
804.170	248	0.009	804.687	505	-	804.972	73	4.880
804.171	248	-	804.688	505	-	804.973	73	6.880
804.172	248	-	804.749	64	1.260	804.974	73	7.800
804.173	248	-	804.750	64	1.400	804.975	73	4.100
804.174	248	-	804.751	64	1.300	804.976	149	4.400
804.175	248	-	804.752	64	1.300	804.977	149	5.580
804.176	248	-	804.753	64	4.140	804.978	149	5.000
804.177	248	-	804.754	64	4.300	804.979	149	6.500
804.266	84	-	804.755	64	4.100	804.995	104	4.130
804.267	239	-	804.756	64	4.200	805.002	108	8.500
804.268	239	-	804.757	71	4.700	805.016	96	0.405
804.269	239	0.142	804.758	71	5.100	805.035	79	18.900
804.270	239	0.219	804.759	71	5.740	805.036	79	19.100
804.271	239	-	804.760	71	1.960	805.037	79	19.300
804.272	239	-	804.761	71	2.360	805.038	79	19.500
804.273	239	-	804.762	71	2.300	805.039	79	23.300
804.274	239	0.217	804.763	71	5.100	805.040	79	23.500
804.275	239	-	804.764	71	5.700	805.041	79	23.700
804.276	239	0.283	804.765	71	6.580	805.042	79	23.900
804.277	239	-	804.771	275	0.530	805.043	79	27.700
804.278	239	0.293	804.772	274	-	805.044	79	27.900
804.279	239	-	804.773	274	0.040	805.045	79	28.100
804.280	239	0.404	804.796	468	0.002	805.046	79	28.300
804.281	239	-	804.821	227	-	805.047	79	19.300
804.282	239	-	804.827	273	0.090	805.048	79	19.700
804.283	239	-	804.828	273	0.076	805.049	79	20.000
804.284	239	-	804.829	273	0.348	805.050	79	23.700
804.285	238	0.256	804.830	273	0.340	805.051	79	24.100
804.286	238	0.446	804.831	273	0.340	805.052	79	24.400
804.287	238	-	804.832	273	0.323	805.053	79	28.100
804.288	238	0.436	804.833	273	0.310	805.054	79	28.500
804.289	238	0.601	804.834	272	-	805.055	79	28.800
804.290	238	-	804.835	272	0.074	805.057	79	19.400
804.291	238	0.412	804.842	500	-	805.058	79	19.800
804.292	238	-	804.844	259	-	805.060	79	20.100
804.293	238	-	804.845	259	-	805.061	79	23.800
804.294	238	0.758	804.846	259	-	805.062	79	24.200
804.295	238	0.902	804.847	259	-	805.063	79	24.500
804.296	238	-	804.848	259	-	805.064	79	28.200
804.297	238	0.693	804.849	259	-	805.065	79	28.600
804.298	238	0.976	804.850	259	-	805.066	79	28.900
804.644	469	-	804.851	259	-	805.067	79	20.500
804.645	469	-	804.852	259	-	805.069	79	24.900
804.646	469	-	804.853	259	-	805.070	79	29.300
804.649	498	1.330	804.854	259	-	805.077	61	0.505
804.656	499	1.180	804.855	259	-	805.078	61	0.655
804.658	499	-	804.856	259	-	805.079	61	0.670
804.662	500	-	804.857	259	-	805.080	61	0.699
804.666	84	0.003	804.858	259	-	805.081	61	0.718
804.667	84	-	804.860	259	-	805.082	61	1.180
804.668	84	-	804.883	89	1.700	805.083	61	1.150
804.669	84	0.007	804.885	89	3.000	805.084	61	1.450
804.670	84	0.007	804.886	90	1.700	805.085	61	1.200
804.671	84	0.006	804.887	90	2.700	805.086	61	1.500
804.672	84	0.005	804.890	88	0.700	805.087	61	1.200
804.678	69	0.660	804.891	88	1.300	805.088	61	1.540
804.679	69	0.600	804.904	183	1.640	805.089	61	1.240
804.680	505	-	804.917	139	3.820	805.090	61	1.600
804.681	505	-	804.945	287	-	805.091	61	3.940
804.682	505	-	804.949	505	2.500	805.092	61	3.960
804.683	505	-	804.962	171	0.935	805.093	61	4.000
804.684	505	-	804.969	73	0.450	805.094	61	4.100
804.685	505	-	804.970	73	6.300	805.096	142	1.120
804.686	505	0.225	804.971	73	4.500	805.097	142	1.140

## List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
805.098	142	1.180	805.305	225	7.500	805.539	226	3.900
805.099	142	1.300	805.306	225	7.400	805.540	226	5.070
805.100	139	1.398	805.356	273	0.280	805.542	147	1.000
805.101	139	1.020	805.412	208	0.430	805.544	289	0.307
805.102	139	1.780	805.413	273	0.198	805.548	141	0.800
805.103	139	2.420	805.423	505	7.660	805.549	61	1.440
805.104	139	2.560	805.424	104	4.040	805.550	62	1.020
805.105	139	1.398	805.430	104	3.790	805.551	62	0.977
805.106	139	1.398	805.431	104	4.780	805.553	271	0.242
805.107	139	1.398	805.433	104	4.720	805.560	210	0.976
805.108	139	4.020	805.435	104	5.960	805.569	72	0.860
805.110	139	3.240	805.436	104	5.980	805.570	83	1.900
805.111	139	4.660	805.438	104	6.020	805.571	83	1.980
805.112	139	3.700	805.442	505	1.500	805.573	148	1.340
805.113	139	4.160	805.449	55	4.600	805.574	148	1.590
805.114	139	5.140	805.450	55	5.720	805.575	208	0.244
805.115	139	6.160	805.451	55	5.100	805.576	170	0.700
805.117	139	1.398	805.452	55	6.900	805.584	111	1.200
805.156	273	0.069	805.453	55	5.400	805.585	111	1.780
805.157	273	0.064	805.454	55	7.640	805.586	111	1.500
805.158	273	0.053	805.455	55	5.600	805.590	148	5.100
805.159	273	0.039	805.456	55	8.420	805.591	148	4.800
805.172	277	1.040	805.457	137	3.980	805.592	148	17.100
805.173	277	0.478	805.458	137	4.220	805.593	148	0.090
805.174	129	0.180	805.459	137	4.760	805.595	210	0.915
805.194	178	0.289	805.460	271	0.162	805.596	100	2.100
805.238	277	0.110	805.461	451	1.820	805.597	100	2.100
805.239	277	0.110	805.462	60	0.624	805.598	100	2.100
805.240	277	0.110	805.463	60	1.180	805.600	100	2.100
805.241	277	0.110	805.464	60	1.400	805.601	100	2.100
805.242	277	0.110	805.465	141	0.943	805.604	111	1.240
805.243	69	1.340	805.466	141	1.060	805.605	111	1.240
805.244	273	0.164	805.471	167	0.181	805.606	111	1.240
805.245	273	0.127	805.472	167	0.181	805.608	111	1.240
805.246	96	0.480	805.473	167	0.187	805.609	111	1.240
805.247	97	0.580	805.474	167	0.288	805.610	111	1.240
805.250	129	0.488	805.475	167	0.286	805.611	111	1.240
805.251	128	0.576	805.476	167	0.292	805.623	111	3.720
805.252	130	0.530	805.477	142	0.905	805.624	111	1.240
805.253	130	0.610	805.478	142	1.360	805.626	111	1.240
805.254	130	0.655	805.479	142	1.400	805.627	111	1.240
805.255	130	0.724	805.480	61	0.822	805.628	111	1.240
805.256	130	0.650	805.481	61	0.920	805.629	111	1.240
805.257	129	0.800	805.482	61	1.340	805.630	111	1.240
805.258	129	0.821	805.483	61	1.760	805.631	111	1.240
805.259	128	0.791	805.484	61	1.340	805.632	111	1.240
805.260	128	0.826	805.485	61	1.840	805.633	111	1.240
805.261	128	0.917	805.486	61	4.240	805.635	111	1.240
805.262	131	0.865	805.487	61	4.320	805.636	111	1.240
805.263	131	0.916	805.489	283	2.900	805.637	111	1.240
805.264	131	1.090	805.492	55	0.019	805.638	111	1.240
805.265	131	0.980	805.493	55	0.019	805.639	111	1.240
805.266	131	1.200	805.494	55	0.019	805.640	111	1.240
805.267	131	1.040	805.495	55	0.019	805.641	111	1.240
805.268	131	1.320	805.496	55	0.019	805.642	111	1.240
805.269	131	1.140	805.497	55	0.019	805.643	111	4.540
805.270	131	1.220	805.498	55	0.019	805.644	111	1.240
805.271	131	1.710	805.499	55	0.019	805.645	111	1.240
805.283	468	5.120	805.527	141	0.320	805.646	148	1.240
805.284	468	3.240	805.530	230	2.100	805.655	146	4.100
805.290	133	4.700	805.535	225	9.300	805.656	146	4.700
805.296	112	4.900	805.536	225	9.950	805.657	147	10.100
805.298	112	6.200	805.537	224	6.560	805.658	136	6.400
805.299	112	7.300	805.538	226	3.450	805.659	136	7.600



# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
805.660	136	6.840	805.833	148	0.800	806.245	226	1.270
805.661	136	8.820	805.834	148	1.000	806.246	224	2.200
805.662	136	7.600	805.835	210	0.414	806.247	225	7.500
805.663	268	1.000	805.836	210	0.434	806.248	225	7.500
805.664	268	1.000	805.837	210	0.485	806.249	225	3.100
805.665	268	1.000	805.838	210	0.517	806.250	225	9.700
805.666	268	1.000	805.839	210	0.570	806.252	225	3.010
805.668	258	0.090	805.840	210	1.220	806.253	235	3.010
805.669	258	0.090	805.841	210	1.280	806.254	235	3.010
805.670	258	0.090	805.842	211	0.643	806.255	225	3.010
805.671	258	0.090	805.843	211	0.850	806.256	235	-
805.672	258	0.090	805.844	211	1.080	806.257	452	0.001
805.673	258	0.090	805.845	505	1.500	806.258	452	0.001
805.674	502	0.052	805.846	505	1.600	806.284	74	1.600
805.675	502	0.200	805.847	468	1.300	806.347	106	1.160
805.677	61	1.720	805.848	468	1.900	806.348	106	1.160
805.678	61	2.100	805.849	458	0.200	806.349	106	1.200
805.679	61	4.900	805.850	458	0.325	806.350	106	1.220
805.680	61	5.000	805.851	458	0.258	806.351	106	1.240
805.684	175	0.096	805.852	458	0.700	806.352	106	1.300
805.723	67	1.080	805.853	458	0.600	806.353	106	1.300
805.724	221	1.635	805.854	458	1.100	806.354	106	1.300
805.728	282	0.130	805.855	458	1.000	806.355	106	1.300
805.733	282	0.019	805.856	446	-	806.356	106	1.300
805.734	282	0.112	805.857	446	-	806.357	106	1.300
805.735	282	0.097	805.858	449	0.500	806.358	106	1.380
805.736	282	0.057	805.859	449	0.600	806.359	106	1.380
805.737	282	0.019	805.860	449	0.500	806.360	106	3.140
805.738	282	0.019	805.861	449	0.600	806.361	106	3.300
805.739	282	0.358	805.862	449	0.600	806.362	55	1.700
805.740	282	0.294	805.863	449	0.700	806.363	55	2.100
805.741	465	1.100	805.864	449	0.788	806.364	137	1.600
805.747	90	-	805.865	449	0.600	806.365	137	2.100
805.748	161	3.000	805.866	449	1.000	806.370	130	1.300
805.749	160	1.600	805.867	449	0.700	806.371	131	1.800
805.750	136	7.440	805.868	449	1.000	806.372	131	2.200
805.753	100	4.900	805.869	452	0.001	806.373	132	3.800
805.758	111	1.240	805.870	452	0.001	806.374	132	1.300
805.781	227	0.017	805.871	452	0.001	806.375	97	1.800
805.802	249	0.230	805.872	452	0.001	806.376	97	2.300
805.808	101	5.100	805.873	452	0.001	806.377	98	4.000
805.809	101	5.400	805.874	220	1.400	806.378	98	4.600
805.810	101	5.900	805.875	220	1.840	806.379	48	0.950
805.811	486	0.210	805.876	220	3.700	806.380	49	1.600
805.812	486	0.210	805.877	220	4.000	806.381	49	1.900
805.814	59	0.555	805.878	222	4.200	806.382	49	2.200
805.815	59	1.320	805.879	222	6.100	806.383	49	2.500
805.816	59	1.560	805.880	226	2.700	806.384	51	4.300
805.817	59	3.950	805.881	226	3.200	806.385	51	4.900
805.818	59	4.280	805.882	272	0.029	806.386	51	5.800
805.819	59	4.600	805.883	272	0.024	806.387	51	6.240
805.820	60	0.510	805.884	272	-	806.388	258	-
805.821	60	0.620	805.885	288	0.070	806.389	258	-
805.822	60	4.520	805.886	289	0.557	806.390	252	-
805.823	60	4.640	805.887	289	-	806.391	252	0.196
805.824	60	4.760	805.888	289	-	806.392	252	0.194
805.825	60	4.860	805.889	289	-	806.393	252	0.191
805.826	63	1.760	805.890	467	0.900	806.394	252	0.188
805.827	286	-	805.894	284	-	806.395	252	0.184
805.828	128	0.520	806.148	484	-	806.396	252	0.180
805.829	140	1.060	806.197	274	-	806.397	252	0.177
805.830	140	1.400	806.198	274	0.089	806.398	252	-
805.831	142	2.100	806.243	226	1.760	806.399	252	0.167
805.832	142	2.300	806.244	226	2.282	806.400	252	0.164

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
806.401	252	0.159	806.608	110	1.000	806.734	167	0.110
806.402	252	-	806.609	110	1.100	806.737	284	8.000
806.403	252	0.149	806.622	487	0.222	806.738	284	8.000
806.404	252	0.144	806.623	487	0.003	806.739	255	-
806.405	252	0.139	806.627	137	6.800	806.742	350	2.300
806.406	252	0.134	806.628	137	7.200	806.743	350	4.400
806.407	252	0.129	806.629	137	7.900	806.744	350	8.300
806.408	252	-	806.630	149	6.900	806.747	96	1.000
806.409	252	0.117	806.631	149	8.000	806.800	130	0.230
806.412	255	-	806.656	256	-	806.802	237	0.104
806.413	255	-	806.657	256	-	806.803	237	0.104
806.414	255	-	806.671	204	0.340	806.804	128	0.170
806.415	255	-	806.680	74	1.200	806.805	507	1.270
806.416	255	-	806.681	74	1.500	806.806	506	0.600
806.417	255	-	806.682	74	2.100	806.807	506	1.300
806.418	255	-	806.683	74	4.300	806.808	506	2.700
806.419	255	-	806.684	74	5.900	806.810	105	1.400
806.420	255	-	806.685	74	7.000	806.811	105	1.600
806.421	255	-	806.686	74	8.200	806.812	105	3.500
806.422	237	2.300	806.687	74	9.700	806.813	105	3.800
806.423	237	4.460	806.688	74	9.900	869.002	74	4.000
806.424	237	0.104	806.689	74	12.700	869.011	74	4.000
806.425	237	0.104	806.690	75	5.500	869.015	74	4.900
806.426	237	0.097	806.692	75	6.100	869.017	74	1.100
806.427	237	0.169	806.693	75	8.100	869.018	75	12.000
806.428	237	0.166	806.694	75	9.500	869.024	150	4.900
806.429	237	0.157	806.695	75	10.300	869.025	150	7.500
806.430	167	0.090	806.696	75	12.900	938.834	409	0.001
806.431	167	0.090	806.697	75	15.200	938.835	410	0.004
806.436	243	0.395	806.698	192	0.400	938.837	408	0.001
806.437	243	-	806.699	192	0.400	938.840	408	0.001
806.439	490	-	806.700	192	0.500	938.841	409	0.001
806.440	490	-	806.701	192	0.500	938.862	410	0.008
806.441	106	-	806.702	192	0.500	938.866	410	0.001
806.442	273	0.143	806.703	192	2.400	938.867	410	0.001
806.443	273	0.090	806.704	192	3.000	938.868	410	0.004
806.444	143	1.700	806.705	192	2.700	938.869	410	0.004
806.462	275	0.190	806.706	192	3.800	938.870	410	0.008
806.465	274	0.140	806.707	192	4.800	938.871	410	0.008
806.466	274	0.050	806.708	192	5.600	938.876	409	0.002
806.467	274	0.044	806.709	58	5.200	938.878	409	0.002
806.468	274	0.035	806.710	162	2.700	938.879	408	0.001
806.476	274	0.090	806.712	204	0.460	938.880	408	0.001
806.477	274	0.113	806.713	204	0.560	938.883	407	0.001
806.478	274	0.139	806.714	204	0.740	938.884	407	0.001
806.541	482	0.255	806.715	204	0.650	938.885	407	0.001
806.575	133	5.200	806.716	204	0.780	948.101	407	0.001
806.579	73	6.880	806.717	204	0.860	948.201	408	0.001
806.580	73	6.880	806.718	204	0.970	948.202	408	-
806.581	73	6.880	806.719	204	1.100	948.203	408	-
806.582	73	6.880	806.720	204	1.600	948.210	408	0.010
806.585	148	4.000	806.721	204	2.200	948.211	408	0.010
806.586	148	4.800	806.722	204	2.400	948.230	408	0.010
806.587	148	5.400	806.723	204	2.500	948.231	408	0.010
806.588	148	6.700	806.724	204	5.100	948.251A	408	0.001
806.589	148	5.100	806.725	214	0.700	948.252	408	0.001
806.595	139	1.500	806.726	214	0.800	948.253	408	0.001
806.601	71	0.442	806.727	214	0.900	948.270	408	0.001
806.602	71	0.443	806.728	214	1.000	948.271	408	0.001
806.603	71	0.408	806.729	214	1.000	948.301	409	0.010
806.604	71	1.080	806.730	214	1.100	948.302	409	0.001
806.605	71	1.100	806.731	214	1.200	948.310	409	0.001
806.606	71	1.120	806.732	214	1.300	948.311	409	0.001
806.607	110	1.000	806.733	214	1.800	948.312	409	0.001

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
948.330	409	0.001	958.490	356	0.004	961.272	283	2.900
948.331	409	0.001	958.501	329	0.001	961.273	283	2.900
948.332	409	0.001	958.502	329	0.001	961.276	287	0.015
948.350A	409	0.001	958.503	329	0.001	961.277	287	0.015
948.351A	409	0.001	958.601	305	0.021	961.278	286	0.003
948.352A	409	0.001	958.602	305	0.021	961.279	286	0.005
948.370	409	0.001	958.603	305	0.022	961.280	286	0.005
948.371	409	0.001	958.604	305	0.023	961.281	286	0.005
948.372	409	0.001	958.611	305	0.020	961.282	286	0.005
948.373	409	-	958.612	305	0.021	961.283	286	0.009
948.374	409	-	958.613	305	0.022	961.284	286	0.009
951.108	420	0.430	958.614	305	0.023	961.285	286	0.005
951.128	420	-	961.120	250	0.023	961.286	286	0.005
951.149	420	0.310	961.127	251	0.041	961.287	286	0.005
958.008	494	0.045	961.146	253	0.002	961.288	286	0.010
958.010	494	0.035	961.147	253	0.040	961.289	286	0.010
958.021	494	0.080	961.148	253	0.004	961.290	286	0.005
958.031	494	0.110	961.149	253	0.004	961.291	283	0.724
958.041	494	0.500	961.150	253	0.004	961.292	283	0.880
958.051	495	0.002	961.151	253	0.002	961.293	283	1.100
958.052	495	0.002	961.152	253	0.009	961.294	283	1.500
958.053	495	0.002	961.153	253	0.010	961.295	283	2.040
958.055	495	0.002	961.154	253	0.008	961.296	283	3.380
958.056	495	0.002	961.155	253	0.008	961.297	283	-
958.057	495	0.002	961.156	253	0.004	961.331	289	0.271
958.061	495	0.002	961.160	253	0.024	961.332	289	0.260
958.062	495	0.002	961.161	253	0.020	961.333	289	0.243
958.063	495	0.002	961.165	253	0.047	961.336	289	0.244
958.065	495	0.002	961.166	253	0.044	961.338	283	2.600
958.066	495	0.002	961.167	253	0.032	961.339	283	2.900
958.067	495	0.002	961.168	253	0.087	961.342	283	2.950
958.071	495	0.002	961.169	253	0.085	961.346	283	2.600
958.072	495	0.002	961.170	253	0.085	961.347	503	1.200
958.073	495	0.002	961.171	253	0.085	961.362	68	1.360
958.075	495	0.002	961.172	253	0.085	961.363	68	1.480
958.076	495	0.002	961.173	253	0.080	961.364	68	1.550
958.077	495	0.002	961.174	253	0.070	961.365	68	2.160
958.081	495	0.002	961.175	253	0.064	961.366	68	1.370
958.082	495	0.002	961.176	253	0.050	961.367	68	4.080
958.083	495	0.002	961.180	253	0.117	961.368	68	4.160
958.085	495	0.002	961.182	253	0.113	961.369	68	4.860
958.086	495	0.002	961.183	253	0.105	961.371	72	6.180
958.087	495	0.002	961.184	253	0.091	961.372	72	8.040
958.091	495	0.010	961.185	253	0.086	961.394	68	0.493
958.092	495	0.010	961.186	253	0.050	961.395	68	0.521
958.093	495	0.010	961.200	500	-	961.396	68	0.610
958.095	495	0.010	961.201	501	0.200	961.397	68	0.704
958.096	495	0.010	961.205	500	0.265	961.401	260	0.028
958.097	495	0.010	961.206	500	-	961.402	260	0.028
958.155	495	0.012	961.211	501	0.200	961.403	260	0.028
958.156	495	0.013	961.212	501	-	961.404	260	0.047
958.157	495	0.002	961.213	502	-	961.405	260	0.045
958.158	495	0.003	961.237	498	0.440	961.406	260	0.047
958.313	495	0.002	961.238	499	0.400	961.407	260	0.045
958.314	495	0.002	961.252	285	-	961.408	260	0.046
958.425	356	0.004	961.253	285	0.380	961.409	262	0.020
958.430	356	0.004	961.254	285	-	961.410	262	0.020
958.433	356	0.004	961.255	285	-	961.411	262	0.020
958.435	356	0.004	961.256	285	-	961.412	262	0.035
958.440	356	0.004	961.257	285	9.500	961.413	262	0.035
958.475	356	0.004	961.264	93	7.500	961.414	262	0.037
958.480	356	0.004	961.269	126	9.140	961.415	262	0.035
958.483	356	0.004	961.270	283	2.900	961.416	262	0.035
958.485	356	0.004	961.271	283	2.370	961.417	260	0.102

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
961.418	260	0.102	961.548	271	0.038	961.615	251	0.071
961.420	260	0.099	961.549	259	0.025	961.616	251	0.065
961.462	247	0.003	961.550	258	0.001	961.617	251	0.068
961.464	247	0.003	961.551	250	0.022	961.618	251	0.067
961.466	247	0.003	961.552	250	0.023	961.619	251	0.064
961.468	247	0.003	961.553	250	0.023	961.620	251	0.064
961.470	247	0.002	961.554	250	0.023	961.621	251	0.063
961.472	247	0.003	961.555	250	0.023	961.622	251	0.061
961.474	247	0.002	961.556	250	0.023	961.623	251	0.060
961.477	248	0.005	961.557	250	0.022	961.624	251	0.057
961.479	248	0.005	961.558	250	0.023	961.625	251	0.055
961.481	248	0.005	961.559	250	0.022	961.626	251	0.052
961.483	248	0.005	961.560	250	0.021	961.627	251	0.049
961.485	248	0.005	961.561	250	0.021	961.629	256	0.730
961.487	248	0.005	961.562	250	0.020	961.630	271	0.080
961.489	248	0.005	961.563	250	0.020	961.631	259	0.075
961.491	248	0.005	961.564	250	0.019	961.632	258	0.005
961.493	248	0.004	961.565	250	0.018	961.641	252	0.098
961.495	248	0.004	961.566	250	0.017	961.642	252	0.097
961.497	248	0.003	961.567	250	0.013	961.643	252	0.098
961.498	249	0.305	961.569	256	0.360	961.644	252	0.097
961.500	250	0.005	961.570	271	0.045	961.645	252	0.099
961.501	250	0.004	961.571	259	0.042	961.646	252	0.099
961.502	250	0.005	961.572	258	0.007	961.647	252	0.101
961.503	250	0.005	961.573	251	0.042	961.648	252	0.100
961.504	250	0.004	961.574	251	0.041	961.649	252	0.099
961.505	250	0.005	961.575	251	0.041	961.650	252	0.100
961.506	250	0.005	961.576	251	0.040	961.651	252	0.100
961.507	250	0.004	961.577	251	0.041	961.652	252	0.102
961.508	250	0.005	961.578	251	0.041	961.653	252	0.100
961.509	250	0.003	961.579	251	0.041	961.654	252	0.100
961.510	250	0.004	961.580	251	0.040	961.655	252	0.099
961.511	250	0.003	961.581	251	0.040	961.656	252	0.098
961.512	250	0.004	961.582	251	0.039	961.657	252	0.096
961.513	250	0.003	961.583	251	0.039	961.658	252	0.096
961.514	250	0.004	961.584	251	0.038	961.659	252	0.093
961.515	250	0.003	961.585	251	0.036	961.660	252	0.092
961.516	250	0.003	961.586	251	0.034	961.661	252	0.091
961.517	250	0.003	961.587	251	0.036	961.662	252	0.089
961.518	250	0.003	961.588	251	0.035	961.663	252	0.087
961.519	250	0.003	961.589	251	0.033	961.664	252	0.085
961.520	250	0.003	961.590	251	0.031	961.665	252	0.083
961.521	250	0.003	961.591	251	0.030	961.666	252	0.081
961.522	250	0.003	961.592	251	0.027	961.667	252	0.082
961.524	256	0.220	961.593	251	0.026	961.668	252	0.077
961.525	271	0.018	961.595	256	0.350	961.669	252	0.074
961.526	259	0.013	961.596	271	0.085	961.670	252	0.071
961.527	258	0.003	961.597	259	0.055	961.671	252	0.068
961.531	250	0.009	961.598	258	0.016	961.672	252	0.064
961.532	250	0.009	961.599	250	0.022	961.673	252	0.056
961.533	250	0.010	961.601	251	0.074	961.674	252	0.055
961.534	250	0.010	961.602	251	0.075	961.675	252	0.050
961.535	250	0.010	961.603	251	0.070	961.676	256	3.960
961.536	250	0.009	961.604	251	0.074	961.677	256	0.920
961.537	250	0.009	961.605	251	0.074	961.678	271	0.100
961.538	250	0.009	961.606	251	0.073	961.679	259	0.085
961.539	250	0.010	961.607	251	0.074	961.680	258	0.006
961.540	250	0.009	961.608	251	0.075	961.681	259	-
961.541	250	0.008	961.609	251	0.074	961.683	259	-
961.542	250	0.007	961.610	251	0.074	961.684	259	-
961.543	250	0.004	961.611	251	0.070	961.685	259	-
961.544	250	0.006	961.612	251	0.073	961.701	209	0.230
961.545	250	0.005	961.613	251	0.073	961.702	209	0.326
961.547	256	0.230	961.614	251	0.072	961.703	209	0.519

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
961.706	209	0.252	961.941	56	1.270	962.403	273	0.101
961.707	209	0.346	961.942	56	1.550	962.404	273	0.089
961.708	209	0.537	961.944	56	1.360	962.405	273	0.052
961.711	209	0.273	961.945	56	1.810	962.406	273	0.150
961.712	209	0.365	961.946	56	1.100	962.407	273	0.097
961.713	209	0.551	961.947	56	1.440	962.408	273	0.374
961.714	209	0.921	961.948	56	1.975	962.409	273	0.372
961.721	209	0.522	961.959	56	2.310	962.410	273	0.366
961.722	209	0.670	961.962	57	3.680	962.411	273	0.362
961.723	209	0.530	961.963	57	3.740	962.412	273	0.358
961.726	209	0.540	961.964	57	3.820	962.413	273	0.351
961.727	209	0.691	961.966	57	3.740	962.414	273	0.343
961.728	209	0.845	961.967	57	3.880	962.415	273	0.332
961.731	209	0.580	961.970	57	3.840	962.416	273	0.293
961.732	209	0.728	961.971	57	4.060	962.417	273	0.284
961.733	209	0.879	961.972	57	4.220	962.418	273	0.272
961.741	209	0.797	961.975	57	3.800	962.419	273	0.262
961.746	209	0.825	961.976	57	3.960	962.420	273	0.350
961.747	209	1.080	961.977	57	4.240	962.421	273	0.239
961.748	209	1.550	961.978	57	4.450	962.422	273	0.226
961.749	209	2.200	961.983	57	4.120	962.423	273	0.202
961.751	209	0.850	961.984	57	4.500	962.424	273	0.192
961.752	209	1.120	961.985	57	5.200	962.437	273	0.120
961.753	209	1.358	961.988	57	3.920	962.438	273	0.118
961.754	209	1.624	961.989	57	4.200	962.439	273	0.117
961.756	209	0.900	961.990	57	4.660	962.440	273	0.120
961.757	209	1.140	961.991	57	5.030	962.441	273	-
961.758	209	1.633	961.992	57	5.980	962.442	273	0.115
961.761	209	0.898	962.121S	104	1.480	962.443	273	0.111
961.762	209	1.120	962.124S	104	1.900	962.444	273	0.106
961.763	209	1.618	962.205	274	0.064	962.445	273	-
961.773	208	0.095	962.248	274	0.253	962.446	273	0.099
961.774	208	0.144	962.249	274	0.219	962.447	273	0.085
961.775	208	0.390	962.250	274	0.190	962.448	273	0.067
961.776	208	0.430	962.260	274	0.091	962.457	273	0.348
961.777	208	0.059	962.262	274	0.087	962.458	273	0.344
961.778	208	0.117	962.263	274	0.087	962.459	273	0.342
961.779	208	0.180	962.264	274	0.078	962.460	273	0.332
961.831	102	1.010	962.265	274	0.068	962.461	273	0.313
961.833	102	1.000	962.266	274	0.054	962.462	273	0.306
961.835	102	1.120	962.271	274	0.165	962.463	273	0.292
961.839	102	1.370	962.272	274	0.161	962.464	273	0.267
961.876	103	3.200	962.273	274	0.160	962.465	273	0.194
961.889	103	3.450	962.274	274	0.152	962.468	272	0.066
961.902	56	0.468	962.276	274	0.130	962.469	272	0.059
961.908	56	0.555	962.278	274	0.090	962.470	272	0.054
961.915	56	0.560	962.281	274	0.294	962.471	272	0.043
961.916	56	0.915	962.282	274	0.290	962.472	272	0.105
961.917	56	0.443	962.283	274	0.296	962.473	272	0.108
961.918	56	0.485	962.284	274	0.288	962.474	272	0.106
961.919	56	0.474	962.285	274	0.274	962.475	272	0.110
961.920	56	0.570	962.286	274	0.270	962.476	272	0.109
961.921	56	0.510	962.287	274	0.264	962.477	272	0.106
961.922	56	0.646	962.288	274	0.242	962.478	272	0.103
961.923	56	0.522	962.289	274	0.175	962.479	272	0.098
961.924	56	0.718	962.291	275	0.210	962.480	272	0.093
961.925	56	0.540	962.292	275	0.380	962.481	272	0.092
961.926	56	0.830	962.293	275	0.400	962.483	272	0.063
961.932	56	1.060	962.294	275	0.170	962.484	272	0.184
961.933	56	1.130	962.311	274	0.023	962.485	272	0.180
961.935	56	1.150	962.312	274	0.023	962.486	272	0.173
961.936	56	1.270	962.313	274	-	962.487	272	0.166
961.938	56	1.200	962.401	273	0.118	962.488	272	0.082
961.939	56	1.390	962.402	273	0.112	962.489	272	0.141

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
962.491	272	0.102	963.631	276	0.360	963.702	280	0.021
962.492	272	0.327	963.632	276	0.105	963.703	280	0.140
962.493	272	0.320	963.633	276	0.165	963.711	280	0.011
962.494	272	0.321	963.634	276	0.210	963.713	280	0.023
962.495	272	0.310	963.635	276	0.284	963.721	280	0.005
962.496	272	0.290	963.636	276	0.360	963.722	280	0.010
962.497	272	0.286	963.637	276	0.180	963.723	280	0.020
962.499	272	0.250	963.638	276	0.275	964.101S	58	0.730
962.500	272	0.186	963.639	276	0.345	964.102S	58	0.885
962.571	291	0.370	963.640	276	0.465	964.103S	58	1.040
962.572	291	0.310	963.641	276	0.850	964.190S	58	1.320
962.574	291	0.170	963.642	276	0.180	964.191S	58	1.400
962.581	69	-	963.643	276	0.275	964.192S	58	1.540
962.582	69	-	963.644	276	0.345	964.194S	58	1.840
962.586	69	0.320	963.645	276	0.465	964.195S	58	2.140
962.596	69	0.155	963.646	276	0.580	964.196S	58	2.070
962.597	69	0.118	963.647	276	0.177	965.400	67	0.460
962.598	69	0.290	963.648	276	0.272	965.401	66	0.665
962.599	69	0.200	963.649	276	0.345	965.402	66	0.710
962.642	121	4.100	963.650	276	0.460	965.403	66	1.430
962.649	123	5.000	963.651	276	0.580	965.404	66	1.230
962.661	90	1.920	963.652	276	0.170	965.405	66	1.300
962.667	122	4.000	963.653	276	0.265	965.406	66	1.740
962.668	122	4.850	963.654	276	0.336	965.407	66	3.820
962.669	122	8.700	963.655	276	0.455	965.408	66	3.920
962.670	122	9.700	963.656	276	0.570	965.409	66	4.300
962.785	81	0.600	963.657	276	0.170	965.505	160	3.500
962.786	81	0.700	963.658	276	0.265	965.506	160	3.900
962.793	81	0.530	963.659	276	0.335	965.511S	139	1.400
962.794	81	0.700	963.660	276	0.450	965.523	148	3.190
962.795	81	0.750	963.661	276	0.570	965.601	146	0.532
962.796	81	0.750	963.662	277	0.524	965.602	146	0.700
963.399	278	0.452	963.663	277	0.795	965.603	146	0.800
963.400	278	0.112	963.664	277	0.950	965.604	146	0.822
963.401	108	1.280	963.665	277	1.150	965.606	146	1.000
963.402	108	1.320	963.666	277	0.517	965.607	146	1.080
963.403	108	1.815	963.667	277	0.779	965.608	146	1.660
963.404	108	3.420	963.668	277	0.940	965.609	146	2.410
963.405	108	3.480	963.669	277	1.120	965.610	146	2.506
963.406	108	4.060	963.670	277	0.510	965.611	146	3.100
963.432	280	0.011	963.671	277	0.780	966.081	445	0.520
963.601	215	0.510	963.672	277	0.930	966.082	445	0.620
963.602	215	0.750	963.673	277	1.110	966.083	445	0.620
963.603	215	1.476	963.674	277	0.509	966.084	445	0.710
963.611	276	0.110	963.675	277	0.800	966.085	445	1.300
963.612	276	0.175	963.676	277	0.950	966.086	445	1.320
963.613	276	0.220	963.677	277	1.150	966.087	445	1.400
963.614	276	0.300	963.678	277	0.509	966.088	445	1.500
963.615	276	0.112	963.679	277	0.800	966.089	445	1.440
963.616	276	0.175	963.680	277	0.928	966.090	445	1.580
963.617	276	0.220	963.681	277	1.100	966.091	445	1.700
963.618	276	0.300	963.682	277	0.500	966.092	445	1.740
963.619	276	0.110	963.683	277	0.760	966.093	448	0.900
963.620	276	0.170	963.684	277	0.910	966.094	448	1.000
963.621	276	0.215	963.685	277	1.090	966.095	448	1.000
963.622	276	0.295	963.686	277	0.493	966.096	448	1.200
963.623	276	0.110	963.687	277	0.750	966.097	448	1.100
963.624	276	0.170	963.688	277	0.900	966.098	448	1.130
963.625	276	0.215	963.689	277	1.090	966.099	448	1.300
963.626	276	0.295	963.690	277	0.500	966.100	448	1.000
963.627	276	0.107	963.691	277	0.750	966.101	447	0.317
963.628	276	0.167	963.692	277	0.900	966.102	447	0.336
963.629	276	0.215	963.693	277	1.080	966.103	447	0.400
963.630	276	0.285	963.700	280	0.015	966.104	447	0.385

## List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
966.105	447	0.600	966.185	450	0.524	966.281	452	0.002
966.106	447	0.583	966.186	450	1.220	966.283	452	0.005
966.107	447	0.600	966.187	450	1.000	966.284	452	0.005
966.108	447	0.600	966.206	446	1.200	966.285	452	0.005
966.109	447	0.600	966.207	446	1.250	966.286	452	0.005
966.110	447	0.700	966.208	446	1.330	966.288	452	0.002
966.111	447	0.722	966.209	446	1.300	966.289	452	0.002
966.112	447	1.000	966.210	446	1.360	966.341	68	0.985
966.115	448	0.269	966.211	446	1.400	966.401	482	0.214
966.120	444	0.643	966.212	451	0.320	966.404	482	3.200
966.121	444	1.260	966.213	451	0.499	966.405	482	0.400
966.122	444	1.360	966.214	451	1.120	966.406	482	0.426
966.123	444	1.700	966.216	444	0.550	966.407	482	0.390
966.124	444	1.280	966.217	444	0.481	966.408	493	0.134
966.125	444	1.400	966.218	444	0.518	966.409	493	0.004
966.126	444	1.750	966.219	444	0.563	966.411	492	0.418
966.127	444	1.420	966.220	444	0.540	966.412	492	0.475
966.128	444	1.540	966.221	444	1.220	966.413	492	1.120
966.129	444	1.900	966.222	444	1.160	966.414	492	1.280
966.130	444	1.520	966.223	444	1.200	966.415	492	0.089
966.131	444	1.680	966.224	444	1.260	966.416	492	0.127
966.132	444	2.100	966.225	444	1.460	966.417	492	0.269
966.133	444	1.790	966.226	444	1.400	966.418	492	0.418
966.134	444	2.000	966.231	447	0.900	966.422	492	0.027
966.135	444	2.400	966.232	447	0.888	966.423	492	0.050
966.136	444	2.140	966.233	447	0.929	966.424	492	0.090
966.137	444	2.400	966.234	447	1.000	966.425	492	0.250
966.138	444	2.940	966.235	447	1.100	966.431	477	0.042
966.141	447	0.800	966.236	447	1.160	966.432	477	0.044
966.142	447	1.100	966.237	450	0.113	966.433	476	0.077
966.143	447	1.300	966.238	450	0.118	966.434	476	0.304
966.144	447	1.000	966.239	450	0.117	966.435	476	1.040
966.145	447	1.200	966.240	450	0.227	966.436	477	0.147
966.146	447	1.400	966.241	450	0.405	966.437	477	0.148
966.147	447	1.100	966.242	450	0.697	966.440	480	0.001
966.148	447	1.230	966.243	450	0.797	966.441	480	0.001
966.149	447	1.500	966.244	450	0.965	966.442	480	0.001
966.150	447	1.220	966.245	452	0.001	966.443	480	0.001
966.151	447	1.220	966.246	452	0.002	966.445	480	0.001
966.152	447	1.700	966.248	452	0.002	966.446	480	0.001
966.153	447	1.300	966.249	452	0.002	966.447	480	0.002
966.154	447	1.650	966.250	452	0.001	966.448	480	0.018
966.155	447	1.860	966.251	452	0.002	966.449	480	0.007
966.156	447	1.840	966.253	452	0.002	966.450	480	0.047
966.157	447	2.040	966.254	452	0.003	966.461	476	0.072
966.158	447	2.800	966.255	452	0.001	966.462	476	0.080
966.161	446	1.300	966.256	452	0.002	966.463	476	0.086
966.162	446	1.400	966.258	452	0.002	966.464	476	0.165
966.163	446	1.100	966.259	452	0.003	966.465	476	0.308
966.164	446	1.300	966.260	452	0.001	966.466	476	0.370
966.165	446	1.200	966.261	452	0.005	966.467	476	1.240
966.166	446	1.600	966.263	452	0.005	966.468	477	0.038
966.167	446	1.500	966.264	452	0.005	966.469	477	0.042
966.168	446	1.700	966.265	452	0.005	966.470	477	0.048
966.169	446	1.700	966.266	452	0.005	966.471	477	0.145
966.170	446	2.000	966.268	452	0.005	966.472	478	0.040
966.171	446	2.200	966.269	452	0.005	966.473	478	0.043
966.172	446	2.400	966.270	452	0.005	966.474	478	0.069
966.173	448	1.300	966.271	466	-	966.475	478	0.074
966.174	448	0.161	966.272	466	0.040	966.476	478	0.074
966.181	450	0.164	966.273	227	0.047	966.477	478	0.085
966.182	450	0.250	966.274	466	0.040	966.478	478	0.132
966.183	450	0.290	966.275	466	0.041	966.479	478	0.150
966.184	450	0.600	966.280	452	0.005	966.480	478	0.143

## List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
966.481	478	0.172	966.661	459	0.001	966.738	463	1.160
966.482	478	-	966.662	459	0.001	966.739	463	-
966.483	478	0.283	966.663	459	0.001	966.740	463	-
966.484	478	0.264	966.666	459	0.001	966.741	463	1.330
966.485	478	0.321	966.667	459	0.001	966.742	463	1.460
966.486	477	0.040	966.668	459	0.001	966.746	463	-
966.487	477	0.042	966.669	459	0.005	966.747	463	4.500
966.488	477	0.048	966.671	457	-	966.748	463	4.940
966.489	477	0.183	966.672	457	-	966.749	463	4.950
966.501	488	0.040	966.673	457	0.600	966.751	464	-
966.502	488	0.136	966.674	457	-	966.752	464	-
966.503	488	0.160	966.675	457	0.823	966.753	464	-
966.504	488	0.813	966.676	457	1.000	966.754	464	1.900
966.505	489	0.125	966.677	457	-	966.755	464	-
966.506	489	0.290	966.678	457	0.991	966.756	464	-
966.530	491	0.001	966.679	457	-	966.757	464	-
966.531	491	0.001	966.680	457	1.060	966.758	464	-
966.532	491	0.001	966.681	457	1.260	966.759	464	1.115
966.533	491	0.001	966.682	457	1.315	967.501	266	0.026
966.534	491	0.001	966.683	455	0.512	967.502	266	-
966.535	491	0.001	966.684	455	-	967.503	266	-
966.536	491	0.001	966.685	455	0.520	967.504	266	-
966.537	491	0.001	966.686	455	0.578	967.505	266	-
966.601	456	1.100	966.687	455	0.515	967.506	266	-
966.602	456	1.500	966.688	455	0.640	967.507	266	-
966.603	456	1.600	966.689	455	0.553	967.508	266	-
966.604	456	0.950	966.690	455	-	967.509	266	-
966.605	456	1.300	966.691	455	1.200	967.510	266	-
966.606	456	1.700	966.692	455	1.320	967.511	266	0.023
966.607	456	1.100	966.693	455	1.300	967.512	266	-
966.608	456	1.320	966.694	455	1.475	967.513	266	-
966.609	456	1.800	966.695	455	1.440	967.514	266	-
966.610	456	1.220	966.696	455	1.580	967.515	266	0.023
966.611	456	1.452	966.697	455	1.670	967.516	266	-
966.612	456	1.610	966.698	455	1.785	967.517	266	-
966.616	455	1.220	966.701	462	-	967.518	266	-
966.617	455	1.420	966.702	462	0.065	967.519	266	0.023
966.618	455	1.600	966.703	462	0.060	967.520	266	-
966.619	455	1.160	966.704	462	0.126	967.521	266	-
966.620	455	1.530	966.705	462	0.119	967.522	266	-
966.621	455	1.600	966.706	462	0.252	967.523	266	0.022
966.622	455	1.200	966.707	462	0.233	967.524	266	-
966.623	455	1.480	966.708	462	-	967.525	266	0.021
966.624	455	1.800	966.709	462	-	967.526	266	-
966.625	455	1.260	966.710	462	0.100	967.527	266	0.020
966.626	455	1.500	966.711	462	-	967.528	266	-
966.627	455	1.900	966.712	462	-	967.529	266	0.018
966.631	457	0.870	966.713	462	0.280	967.530	266	-
966.632	457	1.080	966.714	462	0.228	967.531	266	0.015
966.633	457	-	966.721	463	-	967.532	266	-
966.634	457	0.900	966.722	463	-	967.533	266	-
966.635	457	-	966.723	463	-	967.534	266	-
966.636	457	1.200	966.724	463	-	967.535	266	-
966.637	457	0.925	966.725	463	-	967.536	266	-
966.638	457	1.120	966.726	463	0.588	967.537	266	-
966.639	457	-	966.727	463	-	967.538	266	-
966.640	457	-	966.728	463	0.576	967.539	266	-
966.641	457	1.280	966.731	463	-	967.540	266	-
966.642	457	-	966.732	463	-	967.541	266	-
966.651	459	0.001	966.733	463	-	967.542	266	-
966.652	459	0.001	966.734	463	1.000	967.543	266	-
966.653	459	0.003	966.735	463	1.150	967.544	266	-
966.656	459	0.003	966.736	463	1.200	967.545	266	-
966.658	459	0.001	966.737	463	-	967.546	266	-



# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
967.547	266	-	967.611	267	-	967.885	270	-
967.548	266	-	967.612	267	0.143	967.886	270	-
967.549	266	-	967.613	267	-	967.887	270	-
967.550	266	-	967.614	267	0.142	967.888	270	-
967.551	266	-	967.615	267	-	967.889	270	-
967.552	266	-	967.616	267	0.140	967.890	270	-
967.553	266	-	967.617	267	-	967.891	270	0.150
967.554	266	-	967.618	267	0.137	967.892	270	-
967.555	266	-	967.619	267	0.135	967.893	270	-
967.556	266	-	967.620	267	0.134	967.894	270	-
967.557	266	-	967.621	267	-	967.895	270	0.150
967.558	266	-	967.622	267	0.130	967.896	270	-
967.559	267	-	967.623	267	-	967.897	270	-
967.560	267	-	967.624	267	0.126	967.898	270	-
967.561	267	-	967.625	267	-	967.899	270	0.150
967.562	267	-	967.627	267	-	967.900	270	-
967.563	267	0.074	967.628	267	0.110	967.901	270	-
967.564	267	-	967.629	267	-	967.902	270	0.159
967.565	267	-	967.630	267	0.108	967.903	270	0.155
967.566	267	-	967.631	267	-	967.904	270	0.154
967.567	267	0.050	967.632	267	0.100	967.905	270	-
967.568	267	-	967.801	268	0.068	967.906	270	0.150
967.569	267	-	967.802	268	-	967.908	270	0.219
967.570	267	-	967.803	268	0.135	967.909	270	-
967.571	267	0.073	967.804	268	0.135	967.910	270	-
967.572	267	-	967.810	286	0.005	967.911	270	-
967.573	267	0.074	967.811	286	0.011	967.912	270	-
967.574	267	-	967.812	286	0.014	967.913	270	-
967.575	267	0.073	967.813	286	0.020	967.914	270	-
967.576	267	-	967.814	286	0.029	967.915	270	-
967.577	267	0.072	967.850	269	0.077	967.916	270	-
967.578	267	-	967.851	269	0.077	967.917	270	-
967.579	267	0.070	967.852	269	0.077	967.918	270	-
967.580	267	-	967.853	269	-	967.919	270	-
967.581	267	0.067	967.854	269	-	967.920	270	-
967.582	267	-	967.855	269	-	967.921	270	-
967.583	267	0.065	967.856	269	0.077	967.922	270	-
967.584	267	-	967.857	269	-	967.923	270	-
967.585	267	0.059	967.858	269	-	967.924	270	-
967.586	267	-	967.859	269	-	967.925	270	0.224
967.587	267	-	967.861	269	0.076	967.926	270	-
967.588	267	-	967.862	269	-	967.927	270	0.218
967.589	267	0.051	967.863	269	-	967.928	270	-
967.590	267	-	967.864	269	-	967.929	270	-
967.591	267	0.048	967.865	269	-	967.930	270	-
967.592	267	0.140	967.866	269	-	967.931	270	-
967.593	267	-	967.867	269	-	967.932	270	-
967.594	267	-	967.868	269	-	967.933	270	-
967.595	267	-	967.869	269	-	967.934	270	0.217
967.596	267	0.135	967.870	269	0.112	968.033	53	7.460
967.597	267	-	967.871	269	-	968.037	53	8.300
967.598	267	-	967.872	269	-	968.038	53	9.560
967.599	267	-	967.873	269	-	968.059	100	5.020
967.600	267	0.143	967.874	269	0.114	968.060	100	5.120
967.601	267	-	967.875	269	-	968.061	100	4.500
967.602	267	0.142	967.876	269	-	968.076	54	5.160
967.603	267	-	967.877	269	0.113	968.077	54	5.700
967.604	267	0.145	967.878	269	-	968.080	54	6.770
967.605	267	0.144	967.879	269	0.109	968.083	54	7.480
967.606	267	0.145	967.880	269	-	968.086	54	4.800
967.607	267	-	967.881	269	-	968.087	54	8.320
967.608	267	0.145	967.882	269	-	968.088	54	9.580
967.609	267	-	967.883	269	-	968.105	135	3.970
967.610	267	0.145	967.884	269	-	968.108	135	3.900

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
968.111	135	4.760	968.243	134	0.543	968.347	247	0.003
968.112	135	5.800	968.247	134	0.800	968.348	247	0.003
968.121	136	3.980	968.248	134	0.975	968.349	247	0.003
968.122	136	4.880	968.249	134	1.100	968.350	247	0.003
968.123	136	5.780	968.252	134	0.896	968.351	247	0.003
968.124	136	4.240	968.253	134	1.050	968.352	247	0.002
968.125	136	5.360	968.254	134	1.180	968.353	247	0.003
968.127	136	4.780	968.257	134	1.000	968.354	247	0.003
968.128	136	5.540	968.258	134	1.140	968.355	247	0.002
968.129	136	6.840	968.259	134	1.290	968.356	247	0.003
968.130	136	5.500	968.260	134	1.480	968.357	247	0.002
968.131	136	3.280	968.262	134	1.150	968.358	247	0.002
968.136S	139	1.720	968.263	134	1.320	968.359	247	0.002
968.137S	139	2.000	968.264	134	1.480	968.360	247	0.002
968.142	99	1.114	968.265	134	1.670	968.361	247	0.003
968.144	99	1.200	968.266	134	1.830	968.362	247	0.002
968.145	99	1.300	968.287	134	2.760	968.363	247	0.003
968.147	99	1.300	968.288	134	3.000	968.364	249	0.115
968.148	99	1.400	968.289	134	3.360	968.369	248	0.004
968.150	99	1.100	968.290	134	3.420	968.370	248	0.004
968.151	99	1.700	968.291	134	4.000	968.371	248	0.004
968.152	99	1.910	968.301	247	0.002	968.372	248	0.005
968.154	99	3.300	968.302	247	0.002	968.373	248	0.005
968.156	99	3.340	968.303	247	0.002	968.374	248	0.004
968.159	99	3.600	968.304	247	0.002	968.375	248	0.004
968.161	99	3.600	968.305	247	0.002	968.376	248	0.004
968.162	99	3.800	968.306	247	0.002	968.377	248	0.004
968.163	99	4.400	968.307	247	0.002	968.378	248	0.004
968.167	52	0.580	968.308	247	0.002	968.379	248	0.005
968.170	52	0.495	968.309	247	0.002	968.380	248	0.005
968.171	52	0.620	968.310	247	0.002	968.381	248	0.005
968.174	52	0.525	968.311	247	0.002	968.382	248	0.005
968.175	52	0.800	968.312	247	0.002	968.383	248	0.005
968.178	52	0.560	968.313	247	0.002	968.384	248	0.005
968.179	52	0.590	968.314	247	0.002	968.385	248	0.005
968.180	52	0.965	968.315	247	0.002	968.386	248	0.005
968.181	52	1.120	968.316	247	0.002	968.387	248	0.005
968.183	52	1.080	968.317	247	0.002	968.388	248	0.005
968.185	52	1.200	968.318	247	0.002	968.389	248	0.005
968.188	52	1.560	968.319	247	0.002	968.390	248	0.005
968.191	52	1.120	968.320	247	0.002	968.391	248	0.005
968.193	52	1.300	968.321	247	0.002	968.392	248	0.005
968.196	52	1.730	968.322	247	0.002	968.393	248	0.005
968.199	52	1.140	968.323	247	0.002	968.394	248	0.005
968.201	52	1.400	968.324	247	0.001	968.395	248	0.005
968.204	52	1.940	968.325	247	0.001	968.396	248	0.004
968.207	52	1.200	968.326	247	0.002	968.397	248	0.004
968.208	52	1.380	968.327	247	0.001	968.398	248	0.004
968.209	52	1.568	968.328	247	0.002	968.399	248	0.005
968.210	52	1.780	968.329	247	0.005	968.400	248	0.005
968.211	52	2.020	968.330	249	0.111	968.401	248	0.004
968.212	52	2.280	968.334	247	0.003	968.402	248	0.004
968.213	52	2.740	968.335	247	0.003	968.403	248	0.004
968.214	52	3.700	968.336	247	0.003	968.404	248	0.004
968.217	52	3.920	968.337	247	0.003	968.405	248	0.004
968.221	52	4.040	968.338	247	0.003	968.406	248	0.004
968.225	52	4.160	968.339	247	0.003	968.408	248	0.004
968.228	52	4.020	968.340	247	0.002	968.409	248	0.004
968.229	52	4.410	968.341	247	0.003	968.410	248	0.004
968.230	52	5.230	968.342	247	0.003	968.411	248	0.004
968.235	134	0.350	968.343	247	0.003	968.412	248	0.004
968.238	134	0.407	968.344	247	0.003	968.413	248	0.004
968.241	134	0.473	968.345	247	0.003	968.414	248	0.003
968.242	134	0.670	968.346	247	0.003	968.415	248	0.004

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
968.421	264	0.014	968.588	138	3.320	968.815	131	0.869
968.423	264	0.013	968.593	138	3.000	968.816	131	0.945
968.424	264	0.012	968.594	138	3.800	968.818	131	1.150
968.425	264	0.010	968.604	56	1.340	968.819	131	0.910
968.427	264	0.020	968.610	56	1.660	968.820	131	1.050
968.429	264	0.025	968.613	56	1.770	968.822	131	1.350
968.430	264	0.023	968.708	54	4.600	968.823	131	0.960
968.431	264	0.020	968.709	54	5.030	968.824	131	1.120
968.433	264	0.018	968.710	54	5.920	968.826	131	1.540
968.434	264	0.043	968.711	54	5.360	968.827	131	1.020
968.436	264	0.043	968.712	54	6.500	968.828	131	1.280
968.437	264	0.042	968.713	54	5.460	968.829	131	1.576
968.438	264	0.041	968.714	54	6.890	968.830	131	1.860
968.440	264	0.036	968.716	164	0.216	968.831	131	2.400
968.442	264	0.028	968.717	165	0.250	968.832	131	1.060
968.443	264	0.067	968.718	165	0.303	968.833	131	1.380
968.445	264	0.067	968.719	165	0.292	968.835	131	2.040
968.446	264	0.068	968.720	165	0.356	968.836	131	2.500
968.447	264	0.066	968.721	165	0.349	968.841	132	2.440
968.448	264	0.060	968.722	165	0.487	968.842	132	2.400
968.449	264	0.062	968.723	165	0.474	968.843	132	2.520
968.451	264	0.056	968.728	166	0.489	968.844	132	2.400
968.453	264	0.046	968.729	166	0.496	968.845	132	2.500
968.461	264	0.044	968.730	166	0.600	968.846	132	2.700
968.462	264	0.066	968.731	166	0.540	968.847	132	2.590
968.463	264	1.070	968.733	166	0.623	968.848	132	2.600
968.464	264	0.150	968.734	166	0.746	968.849	132	2.840
968.468	265	0.048	968.736	166	0.878	968.850	132	2.540
968.469	265	0.048	968.738	130	0.567	968.851	132	2.720
968.470	265	0.048	968.742	130	1.010	968.852	132	2.990
968.471	265	0.049	968.745	130	0.659	968.853	132	3.280
968.472	265	0.074	968.752	165	0.089	968.854	132	2.620
968.473	265	0.074	968.753	165	0.120	968.855	132	2.900
968.474	265	0.074	968.754	165	0.180	968.856	132	3.320
968.475	265	0.074	968.757	164	0.231	968.857	132	3.680
968.476	265	-	968.760	164	0.460	968.858	132	2.700
968.477	265	0.073	968.764	166	0.772	968.859	132	3.000
968.478	265	0.096	968.771	138	0.900	968.860	132	3.500
968.479	265	0.096	968.772	138	0.900	968.861	132	3.920
968.480	265	-	968.773	138	0.956	968.868	164	0.064
968.481	265	0.096	968.775	138	0.865	968.869	164	0.079
968.482	265	-	968.776	138	0.975	968.870	163	0.155
968.483	265	0.097	968.777	138	1.080	968.871	163	0.077
968.484	265	0.096	968.779	138	0.905	968.874	163	0.070
968.485	265	0.096	968.780	138	1.050	968.875	163	0.090
968.486	265	0.150	968.781	138	1.200	968.876	164	0.136
968.487	265	0.150	968.783	138	0.943	968.877	164	0.150
968.488	265	0.150	968.784	138	1.133	968.878	164	0.138
968.489	265	0.151	968.785	138	1.310	968.879	164	0.153
968.490	265	0.151	968.787	138	1.100	968.880	163	0.136
968.491	265	0.152	968.788	138	1.290	968.881	163	0.155
968.492	265	0.152	968.789	138	1.580	968.882	163	0.139
968.493	265	0.153	968.790	138	1.850	968.883	163	0.160
968.494	265	0.151	968.791	138	2.200	968.884	165	0.160
968.495	265	0.151	968.792	138	1.070	968.885	165	0.192
968.572	138	2.500	968.793	138	1.380	968.886	165	0.197
968.573	138	2.600	968.794	138	1.650	968.890	163	0.230
968.575	138	2.600	968.795	138	2.300	968.891	163	0.260
968.578	138	2.660	968.796	138	2.470	968.892	163	0.240
968.580	138	2.610	968.803	129	0.787	968.893	163	0.270
968.581	138	2.840	968.811	131	0.870	968.894	163	0.312
968.583	138	2.720	968.812	131	0.895	968.895	165	0.272
968.584	138	3.020	968.813	131	0.940	968.896	165	0.335
968.587	138	2.890	968.814	131	0.885	968.897	165	0.399

## List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
968.899	165	0.418	969.037	102	1.040	969.268	98	3.400
968.900	165	0.417	969.038	102	1.170	969.269	98	3.700
968.901	165	0.566	969.040	102	0.900	969.274	98	3.230
968.905	165	0.543	969.041	102	1.230	969.275	98	3.458
968.907	163	0.460	969.042	102	1.500	969.276	98	3.840
968.910	166	1.146	969.043	102	1.040	969.277	98	4.400
968.911	166	1.020	969.044	102	1.360	969.280	98	3.280
968.914	164	0.131	969.045	102	1.670	969.281	98	3.580
968.915	164	0.221	969.046	102	1.015	969.282	98	4.040
968.917	163	0.148	969.047	102	1.340	969.283	98	4.600
968.919	163	0.315	969.048	102	1.870	969.302	96	1.000
968.920	163	0.247	969.059	102	2.300	969.305	96	0.928
968.925	128	0.256	969.060	102	2.400	969.307	96	0.900
968.926	128	0.282	969.062	103	2.720	969.308	96	0.970
968.927	128	0.310	969.063	103	3.100	969.309	96	1.070
968.929	129	0.253	969.066	103	3.200	969.319	46	0.440
968.930	129	0.280	969.067	103	3.000	969.322	46	0.985
968.931	129	0.249	969.069	103	2.800	969.323	46	1.080
968.932	129	0.260	969.070	103	3.105	969.324	46	0.980
968.933	129	0.240	969.071	103	3.300	969.326	46	1.000
968.934	128	0.255	969.075	103	4.200	969.328	46	1.115
968.936	128	0.260	969.077	103	3.500	969.330	46	0.989
968.937	128	0.290	969.082	103	3.000	969.331	46	1.000
968.940	130	0.283	969.083	103	3.415	969.332	46	1.030
968.941	130	0.340	969.084	103	4.300	969.333	46	1.060
968.942	130	0.346	969.085	103	4.000	969.334	46	1.120
968.943	130	0.314	969.087	103	2.980	969.335	46	1.200
968.945	130	0.413	969.088	103	3.200	969.341	48	0.480
968.946	130	0.350	969.090	103	4.000	969.342	48	0.540
968.948	130	0.494	969.091	103	4.340	969.343	48	0.550
968.949	130	0.458	969.208	96	1.100	969.344	48	0.527
968.950	130	0.460	969.209	46	0.385	969.345	48	0.622
968.951	130	0.517	969.210	46	0.405	969.346	48	0.668
968.952	130	0.780	969.211	46	0.480	969.347	48	0.570
968.953	130	0.696	969.214	46	0.435	969.348	48	0.725
968.961	128	0.771	969.215	46	0.470	969.349	48	0.631
968.963	128	0.858	969.218	46	0.395	969.350	48	0.815
968.965	129	0.780	969.220	46	0.470	969.351	48	0.700
968.966	128	0.818	969.221	46	0.505	969.352	48	1.000
968.970	128	0.774	969.222	46	0.585	969.353	48	0.720
968.971	128	0.795	969.224	97	0.990	969.354	48	1.080
968.973	128	0.860	969.225	97	1.080	969.361	49	1.050
968.975	128	0.980	969.229	97	1.060	969.362	49	1.100
968.981	131	0.905	969.230	97	1.330	969.363	49	1.140
968.982	131	1.000	969.234	97	1.250	969.364	49	1.080
968.983	131	1.120	969.235	97	1.340	969.365	49	1.180
968.984	131	1.240	969.239	97	1.200	969.366	49	1.210
968.985	131	1.040	969.240	97	1.480	969.367	49	1.160
968.986	131	1.500	969.241	97	1.660	969.368	49	1.280
968.989	132	2.460	969.244	97	1.317	969.369	49	1.350
968.990	132	2.700	969.245	97	1.800	969.370	49	1.200
968.991	132	2.520	969.246	97	2.010	969.371	49	1.380
968.992	132	2.700	969.248	97	1.100	969.372	49	1.460
968.993	132	2.620	969.249	97	1.365	969.373	49	1.250
968.994	132	2.820	969.250	97	1.900	969.374	49	1.520
968.995	132	2.760	969.251	97	2.400	969.375	49	1.680
968.996	132	3.040	969.252	97	0.350	969.376	49	1.270
968.997	132	2.860	969.253	98	3.000	969.377	49	1.600
968.998	132	3.300	969.254	98	3.800	969.378	49	1.780
969.023	100	3.340	969.255	98	1.310	969.446	271	0.094
969.025	100	4.580	969.261	98	3.200	969.447	271	0.239
969.032	102	1.070	969.262	98	3.160	969.448	271	0.533
969.034	102	1.030	969.263	98	3.360	969.449	271	0.068
969.036	102	1.260	969.267	98	3.200	969.450	271	0.860

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
969.451	271	0.178	969.528	49	1.060	969.604	254	0.003
969.452	271	0.091	969.529	49	1.140	969.605	254	0.004
969.453	271	0.184	969.530	49	1.260	969.606	254	0.003
969.454	271	0.117	969.531	49	1.380	969.607	254	0.003
969.455	271	0.203	969.532	49	1.500	969.608	254	0.003
969.456	271	0.180	969.533	49	1.080	969.609	254	0.003
969.457	271	0.300	969.534	48	0.655	969.610	254	0.003
969.458	271	0.250	969.535	49	1.420	969.611	254	0.003
969.459	271	0.396	969.536	49	1.560	969.612	254	0.003
969.460	271	0.312	969.537	49	1.720	969.613	254	0.003
969.460L	271	0.200	969.538	49	1.100	969.615	254	0.010
969.461	271	0.563	969.539	49	1.280	969.616	254	0.009
969.462	271	0.358	969.540	49	1.560	969.617	254	0.009
969.462L	271	0.570	969.541	49	1.760	969.618	254	0.008
969.463	271	0.520	969.542	49	1.960	969.619	254	0.008
969.464L	271	0.784	969.543	49	1.100	969.620	254	0.008
969.465	271	0.368	969.544	49	1.400	969.621	254	0.008
969.465L	275	0.640	969.545	49	1.810	969.622	254	-
969.466	271	0.790	969.546	49	2.100	969.623	254	0.007
969.468L	271	0.963	969.547	49	2.427	969.624	254	-
969.469L	275	0.979	969.548	49	1.100	969.625	254	0.006
969.470L	275	1.040	969.549	49	1.460	969.627	254	0.026
969.471L	275	1.300	969.550	49	1.940	969.628	254	0.026
969.472L	275	1.700	969.551	49	2.290	969.629	254	0.027
969.475	175	0.029	969.552	49	2.690	969.630	254	0.025
969.480	249	0.004	969.553	50	3.640	969.631	254	0.025
969.481	249	0.006	969.554	50	3.700	969.632	254	0.024
969.482	249	0.075	969.555	50	3.800	969.633	254	0.022
969.483	258	0.025	969.556	50	3.870	969.634	254	0.025
969.484	258	0.040	969.557	50	3.680	969.635	254	0.021
969.485	258	0.060	969.558	50	3.790	969.636	254	0.021
969.486	258	0.090	969.559	50	3.940	969.637	254	0.020
969.487	258	0.120	969.560	50	4.040	969.638	254	0.020
969.488	258	0.140	969.561	50	3.750	969.639	254	0.018
969.491	257	0.019	969.562	50	3.880	969.640	254	0.016
969.492	257	0.050	969.563	50	4.100	969.641	254	0.016
969.493	257	0.030	969.564	50	4.260	969.643	254	0.045
969.494	257	0.036	969.565	50	4.500	969.644	254	0.047
969.495	257	0.100	969.566	50	4.720	969.645	254	0.047
969.496	257	0.028	969.567	50	3.840	969.646	254	0.045
969.497	257	0.029	969.568	50	4.000	969.647	254	0.044
969.498	257	0.036	969.569	50	4.270	969.648	254	0.044
969.499	257	0.037	969.570	50	4.480	969.649	254	0.043
969.504	47	0.430	969.571	50	4.780	969.650	254	0.043
969.506	47	0.975	969.572	50	5.080	969.651	254	0.042
969.508	47	1.000	969.573	51	3.770	969.652	254	0.010
969.509	48	0.450	969.574	51	3.920	969.653	254	0.041
969.510	48	0.510	969.575	51	4.160	969.654	254	0.038
969.511	48	0.460	969.576	51	4.520	969.655	254	0.038
969.512	48	0.531	969.577	51	4.850	969.656	254	0.037
969.513	48	0.515	969.578	51	5.240	969.657	254	0.036
969.514	49	1.220	969.579	51	3.800	969.658	254	0.034
969.516	48	0.515	969.580	51	3.950	969.659	254	0.033
969.517	48	0.735	969.581	51	4.260	969.660	254	0.032
969.518	48	0.930	969.582	51	4.680	969.661	254	0.030
969.519	48	0.565	969.583	51	5.060	969.662	254	0.028
969.520	48	0.850	969.584	51	5.560	969.663	254	0.026
969.521	48	0.600	969.593	53	5.060	969.669	255	0.082
969.522	48	0.900	969.595	53	5.360	969.670	255	0.082
969.523	49	1.030	969.596	53	6.490	969.671	255	0.082
969.524	49	1.070	969.597	53	5.460	969.672	255	0.082
969.525	49	1.150	969.601	254	0.004	969.673	255	0.079
969.526	49	1.230	969.602	254	0.003	969.674	255	-
969.527	49	1.320	969.603	254	0.003	969.675	255	0.078

# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
969.676	255	-	969.878	260	0.102	969.947	263	0.115
969.677	255	0.078	969.879	260	0.102	969.948	263	0.116
969.678	255	-	969.880	260	0.102	969.949	263	0.116
969.679	255	0.075	969.881	260	0.102	969.950	263	0.116
969.680	255	0.073	969.882	260	0.102	969.951	263	0.117
969.681	255	0.072	969.883	260	0.100	969.952	263	0.117
969.682	255	-	969.884	260	0.099	969.953	263	0.320
969.683	255	0.067	969.885	260	0.099	969.954	263	0.117
969.684	255	-	969.886	261	0.145	969.955	263	0.116
969.685	255	0.063	969.887	261	0.145	969.956	263	0.111
969.686	255	-	969.888	261	0.145	969.957	263	0.112
969.687	255	0.059	969.889	261	0.150	969.958	263	0.112
969.688	255	-	969.890	261	0.147	969.959	263	0.132
969.689	255	0.055	969.891	261	0.148	969.960	263	0.133
969.690	255	-	969.892	261	0.148	969.961	263	0.133
969.691	255	0.049	969.893	261	0.150	969.962	263	0.133
969.697	255	0.117	969.894	261	0.147	969.963	263	0.133
969.698	255	0.116	969.895	261	0.147	969.964	263	0.135
969.699	255	0.116	969.896	261	0.143	969.965	263	0.135
969.700	255	0.115	969.897	261	0.143	969.966	263	0.135
969.701	255	0.112	969.898	261	0.142	969.967	263	0.134
969.702	255	0.113	969.899	261	0.167	969.968	263	0.136
969.703	255	0.112	969.900	261	0.168	969.969	263	0.135
969.704	255	0.112	969.901	261	0.168	969.970	263	0.133
969.705	255	0.110	969.902	261	0.168	969.971	263	0.133
969.706	255	0.108	969.903	261	0.168	969.972	263	0.129
969.707	255	0.108	969.904	261	0.170	969.973	263	0.128
969.708	255	0.105	969.905	261	0.170	969.974	263	0.128
969.709	255	0.104	969.906	261	0.170	969.975	263	0.129
969.710	255	0.101	969.907	261	0.170	969.981	261	0.002
969.711	255	0.100	969.908	261	0.170	969.982	261	0.002
969.712	255	0.098	969.909	261	0.168	969.983	261	0.002
969.713	255	0.094	969.910	261	0.169	969.984	261	0.005
969.714	255	0.093	969.911	261	0.169	969.985	261	0.004
969.715	255	0.091	969.912	261	0.163	969.986	261	0.005
969.716	255	0.088	969.913	261	0.164	969.987	261	0.004
969.717	255	0.085	969.914	261	0.164	969.988	261	0.010
969.718	255	0.083	969.915	261	0.163	969.989	261	0.006
969.719	255	0.080	969.921	262	0.020	969.990	261	0.005
969.720	255	0.077	969.922	262	0.020	969.991	261	0.001
969.721	255	0.074	969.923	262	0.020	969.992	261	0.010
969.722	255	0.071	969.924	262	0.036	969.993	261	0.010
969.723	255	0.680	969.925	262	0.036	969.994	261	0.002
969.724	255	0.063	969.926	262	0.037	969.995	261	0.002
969.725	255	0.060	969.927	262	0.035	969.996	261	0.002
969.726	255	0.056	969.928	262	0.035	969.997	261	0.010
969.727	255	0.051	969.929	262	0.054	972.304	500	0.005
969.861	260	0.028	969.930	262	0.054	972.306	500	0.005
969.862	260	0.028	969.931	262	0.054	972.309	500	0.003
969.863	260	0.028	969.932	262	0.054	972.310	500	0.003
969.864	260	0.047	969.933	262	0.054	972.311	500	0.003
969.865	260	0.047	969.934	262	0.052	972.321	274	-
969.866	260	0.047	969.935	262	0.052	972.322	274	0.029
969.867	260	0.045	969.936	262	-	972.331	284	0.950
969.868	260	0.045	969.937	262	0.080	973.001	230	0.550
969.869	260	0.070	969.938	262	0.083	973.002	230	0.761
969.870	260	0.070	969.939	262	0.083	973.003	230	1.060
969.871	260	0.070	969.940	262	0.083	973.006	230	1.480
969.872	260	0.070	969.941	262	0.083	973.007	230	1.920
969.873	260	0.070	969.942	262	0.083	973.011	230	1.350
969.874	260	0.070	969.943	262	0.080	973.013	230	-
969.875	260	0.069	969.944	262	0.080	973.014	221	0.470
969.876	260	0.102	969.945	262	0.080	973.015	221	0.491
969.877	260	0.101	969.946	263	0.115	973.016	221	1.352

## List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
973.017	221	0.465	973.093	236	1.280	973.235	179	0.700
973.018	221	0.464	973.094	236	1.540	973.236	179	0.802
973.019	221	0.740	973.095	236	2.040	973.237	179	0.932
973.020	221	0.740	973.096	236	-	973.241	179	0.710
973.021	221	1.352	973.097	236	-	973.242	179	0.800
973.022	221	0.684	973.098	236	0.952	973.243	179	1.000
973.023	221	0.683	973.099	236	0.960	973.247	180	0.822
973.024	221	0.440	973.100	236	1.100	973.248	180	0.857
973.025	221	1.635	973.101	236	1.280	973.249	180	0.888
973.026	234	1.140	973.102	236	1.580	973.250	180	1.300
973.027	234	-	973.103	236	1.840	973.251	180	0.946
973.028	234	1.270	973.104	236	2.350	973.252	180	1.200
973.030	234	-	973.105	236	3.720	973.253	180	1.070
973.031	234	6.620	973.110	236	-	973.254	180	0.854
973.032	235	-	973.111	236	-	973.255	180	1.300
973.033	235	1.600	973.112	236	2.820	973.256	180	0.965
973.034	235	3.100	973.113	236	3.320	973.257	180	1.000
973.035	235	3.100	973.114	236	1.820	973.258	180	1.060
973.038	235	-	973.115	188	0.880	973.259	180	1.100
973.039	235	5.940	973.116	188	0.840	973.260	180	1.200
973.040	235	-	973.117	188	0.935	973.261	180	0.893
973.041	235	2.560	973.119	188	1.700	973.262	180	1.400
973.045	235	-	973.120	188	1.260	973.263	180	1.040
973.046	235	-	973.121	188	1.180	973.264	180	1.110
973.047	235	-	973.122	188	1.580	973.265	180	1.180
973.052	232	0.850	973.123	188	1.780	973.266	180	1.248
973.053	232	1.380	973.124	188	3.100	973.267	180	1.380
973.054	232	-	973.125	188	0.820	973.269	180	0.930
973.055	232	0.950	973.126	188	3.000	973.270	180	1.050
973.056	232	1.998	973.127	188	1.380	973.271	180	1.120
973.057	232	-	973.128	188	3.500	973.272	180	0.900
973.058	232	3.320	973.181	227	-	973.273	180	1.300
973.059	232	4.280	973.182	227	1.635	973.274	180	1.400
973.060	232	-	973.183	227	-	973.275	180	1.580
973.061	232	3.720	973.184	227	-	973.277	180	1.040
973.062	232	4.750	973.185	227	0.011	973.278	180	1.120
973.063	232	5.700	973.186	227	0.017	973.279	180	1.260
973.064	232	0.240	973.187	227	0.013	973.280	180	1.400
973.065	232	0.700	973.188	227	0.017	973.281	180	1.520
973.066	232	-	973.194	287	0.007	973.282	180	1.650
973.067	232	-	973.195	287	0.015	973.283	180	2.400
973.068	232	-	973.196	287	0.011	973.285	180	1.140
973.069	232	-	973.197	287	0.015	973.286	180	1.180
973.070	232	0.210	973.198	287	0.020	973.287	180	1.340
973.071	232	0.210	973.203	178	0.580	973.288	180	1.500
973.072	232	-	973.204	178	0.892	973.289	180	1.640
973.073	232	-	973.205	178	0.940	973.290	180	2.300
973.076	223	0.338	973.206	178	0.961	973.291	180	2.600
973.077	223	0.700	973.209	178	0.468	973.292	180	2.900
973.078	223	-	973.210	178	0.782	973.293	181	1.860
973.079	223	-	973.211	178	0.801	973.295	181	1.900
973.080	223	0.330	973.212	178	0.800	973.297	181	2.020
973.081	223	0.700	973.213	179	0.497	973.298	181	2.600
973.082	223	0.380	973.214	179	0.400	973.300	181	2.700
973.083	223	0.700	973.215	179	0.560	973.302	181	2.200
973.084	223	0.406	973.218	179	0.534	973.304	181	2.010
973.085	223	0.700	973.219	179	0.500	973.306	181	2.140
973.086	223	0.258	973.220	179	0.630	973.308	181	2.380
973.087	223	0.276	973.223	179	0.550	973.311	181	2.040
973.088	236	0.646	973.224	179	0.645	973.313	181	2.220
973.089	236	0.644	973.225	179	0.715	973.315	181	3.200
973.090	236	0.647	973.229	179	0.579	973.316	181	2.720
973.091	236	0.786	973.230	179	0.707	973.318	181	2.160
973.092	236	0.974	973.231	179	0.799	973.320	181	2.420



## List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
973.322	181	2.800	973.579	189	2.800	978.034	62	0.645
973.325	181	2.220	973.580	189	2.420	978.035	72	2.380
973.327	181	2.520	973.598	191	1.000	978.038	62	0.805
973.329	181	3.040	973.600	191	1.200	978.042	189	1.440
973.330	181	3.410	973.601	191	1.700	978.046	63	1.160
973.347	182	0.756	973.602	191	3.600	978.047	171	1.040
973.348	182	0.900	973.603	191	3.600	978.054	189	1.820
973.349	182	1.080	973.604	191	3.500	978.056	65	1.020
973.354	182	0.951	973.605	191	3.620	978.057	65	1.060
973.355	182	1.040	973.609	449	1.017	978.058	65	1.132
973.356	182	1.140	973.680	185	2.500	978.059	65	1.150
973.357	182	1.280	973.682	185	4.700	978.060	65	1.170
973.361	182	1.020	973.684	185	3.500	978.061	65	1.252
973.362	182	1.140	973.686	185	3.650	978.071	62	0.580
973.363	182	1.280	973.688	185	3.550	978.073	62	0.781
973.364	182	1.800	973.690	185	4.780	978.075	62	0.578
973.368	182	1.500	973.718	190	1.000	978.076	62	0.652
973.369	182	1.250	973.720	190	1.180	978.078	62	0.810
973.370	182	1.800	973.721	190	1.110	978.080	62	0.566
973.371	182	2.000	973.722	190	1.800	978.081	62	0.764
973.374	182	1.120	973.723	190	2.200	978.083	62	0.876
973.376	182	1.440	973.724	190	1.800	978.085	62	0.620
973.377	182	1.660	973.725	190	2.100	978.086	62	0.710
973.378	182	1.900	973.726	190	2.300	978.088	62	0.940
973.379	182	2.600	973.727	190	2.900	978.092	62	0.512
973.380	182	2.800	973.728	190	3.500	978.095	62	0.736
973.382	182	2.600	973.729	190	4.100	978.097	62	1.520
973.385	182	2.300	973.730	190	3.200	978.100	164	0.440
973.388	182	2.700	973.731	190	3.450	978.102	171	0.980
973.391	182	3.200	973.732	190	5.200	978.103	189	2.190
973.394	182	2.150	973.737	193	2.800	978.104	129	0.226
973.396	182	3.200	973.738	193	3.770	978.105	65	3.580
973.397	182	2.680	973.740	193	7.000	978.107	65	3.630
973.400	182	2.300	973.753	235	-	978.109	65	3.680
973.402	182	2.750	973.754	187	1.110	978.111	65	3.700
973.403	182	3.400	973.755	187	1.180	978.113	65	3.740
973.404	182	4.300	973.756	187	1.722	978.114	65	4.180
973.427	183	2.180	973.954	178	0.272	978.115	65	3.840
973.428	183	2.800	973.955	178	0.289	978.119	93	7.150
973.431	183	2.585	974.006	220	1.300	978.120	148	3.780
973.432	183	4.200	974.028	224	2.500	978.121	148	4.410
973.433	183	4.380	974.056	222	1.800	978.124	171	1.340
973.435	183	2.705	974.057	222	2.400	978.128	72	2.390
973.436	183	3.340	974.100	226	1.050	978.129	72	3.840
973.438	183	6.400	974.102	226	1.540	978.130	72	4.480
973.440	183	4.800	978.001	65	0.418	978.131	72	5.060
973.441	183	5.250	978.002	65	0.445	978.132	72	4.160
973.465	184	2.180	978.003	65	0.479	978.133	72	6.610
973.466	184	2.920	978.004	65	0.530	978.134	178	1.040
973.469	184	2.570	978.005	65	0.520	978.135	226	1.270
973.471	184	3.000	978.006	65	0.555	978.136	64	1.160
973.473	184	2.700	978.007	64	0.550	978.137	64	1.220
973.475	184	4.740	978.010	134	0.790	978.138	64	1.240
973.476	184	5.780	978.011	135	0.962	978.139	64	1.380
973.477	184	3.350	978.017	68	5.020	978.140	189	0.697
973.478	184	3.940	978.018	68	6.450	978.143	72	9.920
973.480	184	6.500	978.025	62	0.735	978.145	72	1.240
973.572	189	0.660	978.027	63	1.340	978.146	171	0.920
973.573	189	0.900	978.028	63	1.360	978.147	171	1.200
973.574	189	1.200	978.029	72	8.180	978.148	72	5.700
973.575	189	0.990	978.030	54	0.723	978.149	72	4.430
973.576	189	1.150	978.031	130	0.586	978.151	171	1.120
973.577	189	0.990	978.032	189	1.090	978.152	171	1.060
973.578	189	2.600	978.033	189	3.000	978.164	70	0.980



# List with Order Numbers and Weights

Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)	Order No.	Page	Weight (kg)
978.165	70	1.360	978.313	468	0.616	978.828	452	0.004
978.167	72	5.040	978.314	69	0.950	978.901	286	0.015
978.170	134	0.800	978.315	69	0.930	978.902	286	0.012
978.174	72	4.730	978.317	69	2.320	978.903	286	0.027
978.175	72	6.040	978.318	69	2.380	978.904	286	0.043
978.178	174	1.100	978.324	72	1.440	978.905	286	-
978.179	64	0.449	978.325	146	1.540	978.907	175	0.009
978.180	64	1.150	978.326	72	0.513	978.908	493	0.013
978.181S	58	1.340	978.330	279	0.180	978.909	175	0.006
978.183	72	12.760	978.331	279	0.180	978.910	175	0.026
978.184	54	0.779	978.336	482	1.240	978.911	175	0.130
978.185	148	1.380	978.338	482	0.930	978.913	175	0.010
978.186	148	1.600	978.339	482	-	978.918	484	0.010
978.190	171	0.890	978.343	63	1.300	978.921	175	-
978.192	63	1.340	978.356	215	0.172	978.951	288	0.027
978.193	63	1.400	978.357	214	1.500	978.953	288	0.029
978.194	63	1.420	978.367	64	1.120	978.954	288	0.071
978.196	179	0.350	978.368	72	1.400	978.955	288	0.070
978.197	179	0.524	978.370	128	0.171	978.956	288	0.028
978.198	174	1.900	978.372	128	10.800	978.958	288	0.082
978.199	171	1.040	978.378	72	2.600	978.965	289	0.275
978.201	179	0.408	978.379	271	0.181	978.966	289	0.214
978.202	179	0.465	978.399	70	1.005	978.967	289	0.277
978.203	179	0.451	978.400	70	1.170	978.971	288	0.068
978.204	179	0.526	978.402	143	1.180	978.972	288	0.025
978.205	64	1.060	978.403	72	4.060	978.975	288	0.070
978.207	48	0.780	978.404	143	-	978.976	498	0.263
978.208	72	2.355	978.406	214	0.900	978.977	288	0.070
978.215	171	1.000	978.413	214	0.700	978.978	288	0.030
978.219	72	1.420	978.476	234	1.360	978.979	288	0.030
978.222	174	3.900	978.499	250	0.008	979.010	130	0.235
978.226	111	4.940	978.500	250	0.009	979.140	174	1.600
978.236	504	-	978.501	273	0.074	979.194	148	0.873
978.237	504	-	978.504	261	0.167	979.196	148	1.880
978.238	504	-	978.505	250	0.009	979.198	226	-
978.239	130	0.650	978.506	250	0.010	979.199	226	0.890
978.253	93	7.150	978.507	250	0.008	979.202	143	1.200
978.254	70	2.050	978.508	250	0.075	979.203	143	1.260
978.255	70	2.050	978.509	250	0.022	979.204	143	1.280
978.256	492	0.002	978.511	249	0.008	979.206	143	1.480
978.259	72	0.725	978.512	261	0.170	979.986	260	0.070
978.261	130	0.705	978.513	249	0.008	979.987	260	0.068
978.273	72	0.902	978.516	249	0.010	979.995	287	-
978.274	70	2.050	978.517	249	0.009	979.996	287	-
978.275	469	-	978.518	260	0.099	979.997	287	-
978.276	468	0.378	978.801	452	0.002	979.998	287	-
978.277	468	-	978.803	452	0.003			
978.278	468	0.001	978.804	452	0.001			
978.279S	58	1.960	978.805	452	0.002			
978.283	484	0.002	978.806	452	0.002			
978.284	484	0.006	978.807	452	0.002			
978.286	278	0.180	978.808	452	0.002			
978.287	278	0.179	978.809	452	0.002			
978.288	278	0.177	978.810	452	0.002			
978.289	278	0.172	978.811	452	0.002			
978.290	93	7.150	978.812	452	0.002			
978.291	65	0.990	978.813	452	0.003			
978.294	68	6.450	978.814	452	0.003			
978.295	145	0.900	978.817	484	0.009			
978.296	145	1.000	978.819	452	0.001			
978.297	145	0.918	978.820	468	0.001			
978.298	145	0.933	978.821	452	0.005			
978.299	145	0.966	978.826	484	0.042			
978.307	174	0.450	978.827	452	0.002			



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**BIG KAISER Precision Tooling Ltd.**

Glattalstrasse 516 | CH-8153 Rümlang | T: +41 44 817 92 00 | F: +41 44 817 92 01 | info@ch.bigkaiser.com | www.bigkaiser.com