# Tooling technology

Angle Heads

**METAL MACHINING**

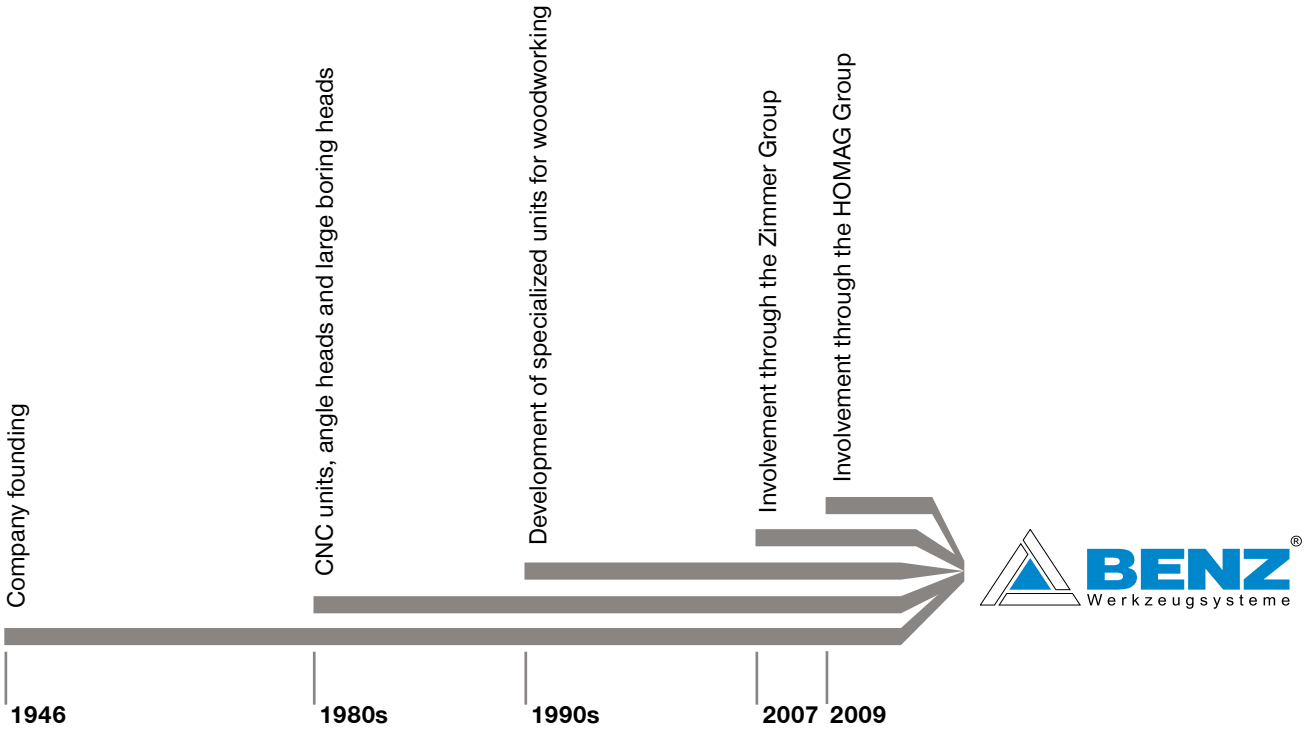
www.benz-tools.com

BENZ® Werkzeugsysteme

**AT BENZ WERKZEUGSYSTEME, OUR MAXIM, “INNOVATION. PRECISION. PASSION.” IS FAR MORE THAN JUST A MARKETING FORMULA. RATHER, IT DESCRIBES THE CORE GOALS OF OUR BUSINESS WHILE ALSO OUTLINING THE REASONS WHY WE HAVE BEEN ABLE TO COMPETE IN THE MARKET SUCCESSFULLY WITH TOOL SYSTEMS FOR WOODWORKING, METAL MACHINING AND COMPOSITE MATERIAL PROCESSING FOR MORE THAN 30 YEARS.**

**INNOVATIONS ARE IMPORTANT TO US. BUT WE ALSO RECOGNIZE THAT THEY CAN BE SUCCESSFUL ONLY IF THEY PRECISELY MEET THE NEEDS OF OUR CUSTOMERS. THIS IS WHY WE HAVE MAINTAINED A STRICT FOCUS ON OUR CUSTOMERS FOR MANY YEARS. WE ENSURE THAT OUR DEVELOPMENTS AND INNOVATIONS SIMPLIFY YOUR PRODUCTION PROCESSES AND LOWER YOUR MANUFACTURING COSTS - AND ULTIMATELY IMPROVE YOUR COMPETITIVENESS AS A RESULT.**

# BENZ GMBH
# WERKZEUGSYSTEME




**BENZ PRECISION PRODUCTS PROVIDE REFINED SOLUTIONS, INNOVATIVE TECHNOLOGY AND THE HIGHEST LEVEL OF QUALITY. WHAT IS THE SECRET TO THIS SUCCESS? OUR EMPLOYEES AND THEIR INVALUABLE EXPERTISE MAKE THE DIFFERENCE.**

**Innovation.** With an eye on what is currently within the bounds of feasibility, we strive to always make use of innovative technologies. And we keep in close contact with our customers to ensure we already know today what our customers will need tomorrow. Technical progress is ingrained into our very identity, which means you can always find smart, detailed solutions in our product range.

**Precision.** We ensure our products have the highest level of precision and reliability. This is vital in our industry. Our customers also rely on absolute precision during production—and need to be able to put all their trust in us. But production is not the only area where we strive for precision. We also seek minimal tolerances and maximum accuracy in other areas as well—from development to sales to delivery.

**Passion.** BENZ precision products are composed of a vast array of different individual parts. They are the result of great care that starts in the design phase and even includes the selection of raw materials. Primarily, however, they are the expression of our employee's experience and passion to do good work. We are tool specialists through and through and we are willing to move mountains to reach the perfect solution and to ensure the satisfaction of our customers.

# PRODUCT GROUPS

## TOOLING AND MACHINE TOOLING TECHNOLOGY

**TOOLING TECHNOLOGY**








### LIVE TOOLS/ TOOL HOLDERS

+ Radial heads 90°
+ Radial heads ≠ 90°
+ Axial heads
+ Swivel heads
+ Multi-spindle heads
+ Broaching units
+ Rotating tool holders
+ Static tool holders

**Components.** Our comprehensive tool concepts for turning centers and milling centers are ideal for nearly every application. Providing a technological advantage is our goal.

**Specific to the customer.** Our modular approach enables customized configurations.

**Systems.** We develop special customer-specific tools for OEM and end customers on request.

### EXCHANGEABLE UNITS

+ Angle heads 90°
+ Angle heads ≠ 90°
+ Swivel heads
+ Multi-spindle heads
+ Broaching units
+ High-speed spindles

**Knowledge and experience.** Our knowledge of the metalworking industry and decades of development partnership make us ideal for new tasks anywhere in the world.

**Components.** We deliver a vast array of standard components from stock and develop innovative, customized systems for OEM and end customers.

**Variety.** Whether in machining centers in the automotive, aerospace or wind energy industries, units from Benz can be used anywhere. Numerous customers choose us as their systems and innovation partner.

### EXCHANGEABLE UNITS

+ Angle heads 90°
+ Swivel heads
+ Multi-spindle heads
+ Multi-axis heads
+ Sanding units
+ Floating head units

**For any application.** Cost-effectively process and machine wood, composites and aluminium: We provide series production angle heads for drilling, milling, sawing and grinding in addition to other units for special applications.

**From basic to high-end.** Benz units are available in a variety of performance classes, making them ideal for everything from light machining to high-performance continuous operation.

**Systems.** We have the solution for your special applications: Customized Benz units for machining centers. Put us to the test!

METAL

WOOD/COMPOSITE MATERIALS

## MACHINE TOOLING TECHNOLOGY

# MULTI-SPINDLE HEADS AND LARGE DRILL HEADS

+ Large angle heads
+ Large drill heads
+ XXL multi-spindle heads

**Development partner.** We accompany you from brainstorming to inspection of the final machine, always to your expectations. Our assortment ranges from compact heads to XXL units.

**Systems.** Benz stands for high-end solutions in the fields of machine tooling technology, specialty solutions, custom assemblies and mechanical modules. We manufacture and configure multiple-spindle and large-angle heads as well as large drill heads.

**Components.** Attachment units complete our range.

# SYSTEM TECHNOLOGY

+ Multiple-spindle drill heads
+ Motor spindles
+ Motors
+ 5-axis technology
+ C-axes
+ Swivel axes
+ Rotary distributors
+ Z-axes

**Components.** Our range includes standard products in an assortment of shapes and sizes.

**The perfect addition.** Our system additions provide you with even more efficiency. Perfect your existing solutions with Benz products!

**Systems.** We develop the technology of tomorrow. Your individual requirements for the efficiency of your machine tools and the suitability of the tools in use provide our benchmark for new, innovative solutions.

# SERVICE

+ Repair service
+ ExpressService
+ Customized crash package
+ Preventive maintenance
+ Spare part management
+ Global service
+ Service hotline

**Do not lose a second.** Speed is the order of the day when unexpected breakdowns occur. Our service center ensures Immediate assistance around the world. We ensure your machine has as little downtime as possible.

**Service quality.** We guarantee top service quality reflecting our expertise as a manufacturer.

**Foresight.** We go one step further: Preventive maintenance, customized crash packages and our spare part management service ensure you have the best setup to face any emergency. We look to the future to keep you at your peak.

# TOOLING TECHNOLOGY
## METAL MACHINING

## EXCHANGEABLE UNITS

# ANGLE HEADS
## IN OVERVIEW



### SYSTEM DESIGN

1 Page 8

### DESIGN OVERVIEW

2 Page 15

### CUSTOMISED SPECIAL SOLUTIONS

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### EQUIPMENT VERSIONS

4 Page 72

### ACCESSORIES

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### SERVICE

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### PLEASE CHECK:

### INQUIRY FORM

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# ANGLE HEADS
# SYSTEM DESIGN

## ▶ ECONOMICAL COMPLETE MACHINING FOR ALL SECTORS

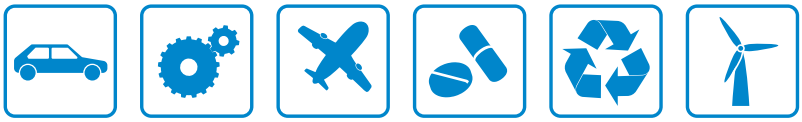
**Angle heads suitable for your individual application**
Do you have an application for which an angle head is worth considering for machining a workpiece? Then you are right to come to BENZ. Why?

As a partner working with CNC machining, we have many years of experience in the manufacture of CNC machining units for machining centres. We know what we are talking about. And we implement what we say. This is reflected in the angle heads that feature high performance, machining precision and quality.

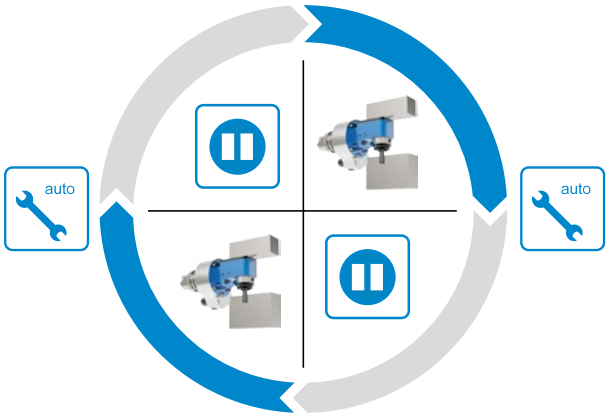
Our objective is to optimize your production sequence. BENZ angle heads assist you in the economic complete machining of your workpieces by minimising the number of tool clampings and machining time and therefore reducing your production costs.

We develop a suitable solution in close cooperation with you as the customer. Together with an extensive standard program, we also offer you individual special solutions. We maintain close contact with machinery manufacturers and therefore have the necessary know-how to develop the exceptional. Challenge us!

**BENZ solutions for all sectors**

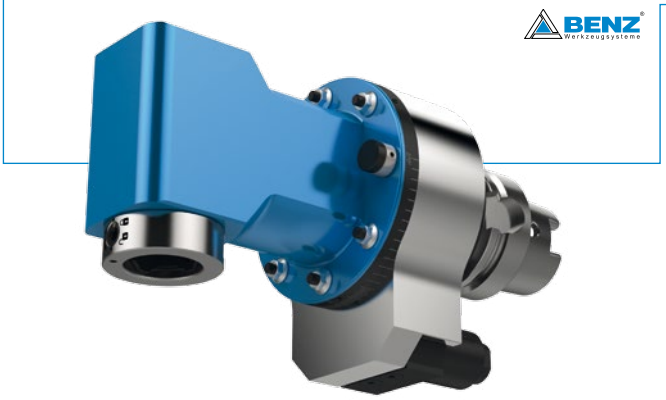


## ▶ ADDED VALUE FOR YOUR MACHINE




▶ **Angle head additional module**
Angle heads are additional modules that extend the functionality of your tool machine. They are typically used cyclically in the machining process. As a rule unit is at rest after a machining step while the unit is changed and further processing is performed with another tool.

## ▶ ADVANTAGES OF ANGLE HEADS

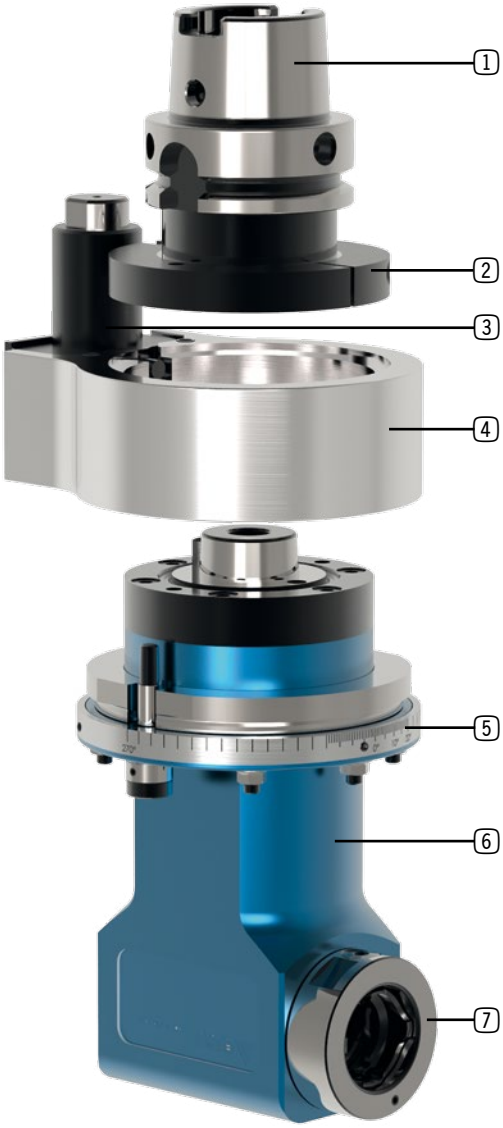


- **Reduction of machining time / production costs**
  BENZ angle heads enable the complete machining of complex workpieces on a machine. Repeated tool clamping is dispensed with. This reduces the machining time and therefore the costs and increases accuracy.
- **Efficiency increase / Internal machining**
  Even locations on workpieces that are difficult to access or were previously inaccessible can be machined with angle heads.
- **Simplification of the machining procedure**
  Elaborate and complicated machining procedures can be simplified considerably by using BENZ angle heads.
- **Usable in all common machine concepts**
  BENZ angle heads are designed for use in all common machining centres with automatic or manual tool change.
- **Optimally designed for the machining task**
  BENZ angle heads are perfectly matched by our specialists to your individual requirements. We have a suitable solution for every challenge!
- **High torque transmission / fewer wear parts**
  The transmission of high torques and fewer wear parts are realised by using angular gears made up of a crown wheel and spur wheel.
- **Compact, modular design**
  BENZ angle heads have an extremely compact design and consist of components including the output spindle (tool holding/clamping system), angle head, torque support and drive cone. Together we prepare the angle head suitable for your work task.

# ANGLE HEADS
## SYSTEM DESIGN



### ▶ SYSTEM DESIGN - GENERAL




1 **Drive cone / Machine interface**
- For holding the angle head in the machine
- All common drive cones available:. see P. 11

2 **Locking disc**
- Ensures the exact angle setting of the drive cone for the torque support in combination with the locking sleeve and locking pin

3 **Lock**
- The lock of the drive cone - together with the locking disc - prevents the drive turning when it is not changed. This enables precise depositing in the tool change magazine. When change the angle head in the machine, the lock is activated by the stop block and the drive is released

4 **Torque support**
- Secures the angle head against turning during machining by fixing it to the machine spindle
- As a rule it is adapted to the relevant machine type: see P. 11
- Alternative: Standard torque support from BENZ

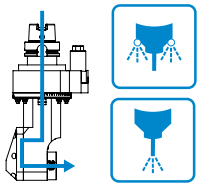
5 **Scale ring (360°)**
- For manual, stepless turning of the angle head at a desired working angle
- Fixing using clamping screws

6 **Housing / Angle head body**
- Different types and sizes of design available for delivery according to application: see P. 15ff.

7 **Output spindle (tool holding / clamping system)**
- For holding the tool
- All common clamping systems can be realised: see P. 11

## Optional: Equipment versions

**COOLANT SUPPLY**



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**ADDITIONAL SUPPORT**

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**STOP BLOCK**

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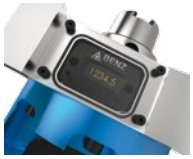
**OPERATING HOURS COUNTER**



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**C-AXIS FUNCTIONALITY**

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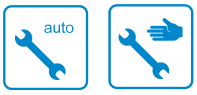
## ▶ MODULAR DESIGN

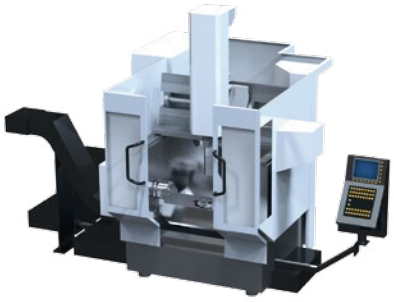
### REQUIREMENTS

**CHANGE THE ANGLE HEAD**

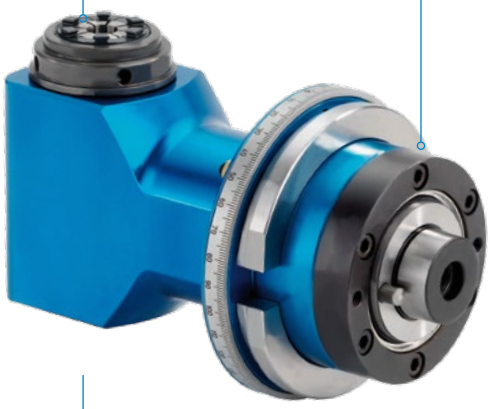



**MACHINING CASE**

**MACHINE TYPE**



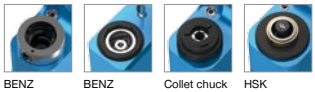
**OUTPUT SPINDLE**
(TOOL HOLDING / CLAMPING SYSTEM)



### ANGLE HEAD COMPONENTS

**OUTPUT SPINDLE / CLAMPING SYSTEM**

all common output spindles can be realised


BENZ Solidfix®


BENZ CAPTO™


Collet chuck


HSK


Milling arbor


Weldon


Whistle Notch


KM™

**DESIGN / SIZE**

the design and size are matched with the respective machining case

**Design - from P. 15**

**Sizes**

04 | 05 | 07 | 15 | 20

**TORQUE SUPPORT**

primarily a machine-related design

alternative: BENZ standard torque support

**DRIVE CONE**

all common drive cones can be realised


SK DIN 69871


MAS BT


CAT


HSK DIN 69893


Coromant Capto®


KM™

i Individual customer requirements, e.g. drive cones, output spindles, etc. not listed here, can be realised on request. Please contact us!

# ANGLE HEADS
## SYSTEM DESIGN

### ▶ PICTOGRAM AND ABBREVIATION OVERVIEW

| Pictogram | ▶ Angle head specifications | | | |
|---|---|---|---|---|
| **Change the unit** |  **Automatic** BENZ standard angle heads can generally be automatically changed |  **Manual** The angle heads can also be manually changed as an option | | |
| **Machining** |  **Drilling** The angle head is suitable for drilling operations |  **Milling** The angle head is suitable for milling operations |  **Threading** The angle head is suitable for threading operations | |
| **Number of output spindles** |  **1** The angle head has an output spindle |  **2** The angle head has two output spindles |  **X** The angle head has X output spindles (multi-spindle head) | |
| **Axis angle** |  **90°** Angle head for machining tasks at 90° angle |  **≠ 90°** Angle head for machining tasks in fixed angular position |  **0-90°** Angle head for machining tasks at flexible angle. Any angle can be set. |  **0-120°** Angle head for machining tasks at flexible angle. Any angle can be set. |
| **Coolant feed for cutting edge** |  **External (EC)** The tool is cooled via an external line (spray nozzle) |  **Internal (IC)** The tool is cooled using an internal line directly through the spindle |  **Combination** The cooling of the tool is combined - internally and externally |  **No cooling** The angle head does not have a coolant feed as standard |
| **Types of cooling (coolants)** |  **Water cooling** The tool cutting edge is cooled with water |  **Oil cooling** The tool cutting edge is cooled with oil |  **MQL** The tool cutting edge is cooled with minimal quantity lubrication (oil/air) |  **Air cooling** The tool cutting edge is cooled with air |

## General specifications

| Pictogram | |
|---|---|
| **Information** | **Important Information**<br>Caution! Important Note. Please read this carefully. |
| **Pause** | **Pause**<br>The angle head is not used for machining. |
| **Weight** | **Weight (in kg)**<br>Approx. weight specification (for HSK 63). The weights change depending on the desired drive cone. |
| **Sectors** | **Automotive** **Machine construction** **Aerospace**<br>**Medical** **Plastics technology** **Wind power** |
| **Services** | **Service**<br>Services, e.g. repair, preventative maintenance, etc. |

## Abbreviations

| | |
|---|---|
| $M_{max}$ | Maximum torque |
| i | Transmission ratio |
| $n_{max}$ | Maximum speed |
| $p_{max}$ | Maximum pressure (bar) |
| EC | External cooling |
| IC | Internal cooling |
| P. | Page |
| ✔ | possible |
| - | not possible |
| - / ✔ | for EC: without cooling as standard, with external cooling as an option |
| pc. | Piece |
| SW | Wrench size |

# ANGLE HEADS
## ORDER INFORMATION

| M | A | T | S | L |
|---|---|---|---|---|
| Machine | Drive cone | Type | Output spindle | Length |

### Selection of angle heads

- According to design, size, drive cone, output spindle
- Please inform us of this information in your request

**L** Length

**S** Output spindle (Tool holding / clamping system)


BENZ Solidfix®


BENZ CAPTO™


Collet chuck


HSK


Milling arbor


Weldon


Whistle Notch


KM™

**Type** Design

**A** Drive cone


SK DIN 69871

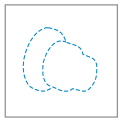

MAS BT


CAT


HSK DIN 69893


Coromant Capto®


KM™


More

**Machine**
**BENZ standard**
**Individual**

**Manufacturer and type**
Standard torque support from BENZ
Torque support adapted to machine type

**Optional**

+ Equipment versions*
+ Accessories*

* not included in scope of delivery

**Note:**

- The products represented in this catalogue use standard components. We will gladly develop suitable solutions for your individual requirements together with you.

# ANGLE HEADS
## IN OVERVIEW

**DESIGN**



### MONO WSX

16

Angle head 90°
Machining: without spatial constraint
Optional: with EC

### DUO WZX

24

Angle head 90° - output spindle on both sides
Machining: in opposite direction / with different tools
Optional: with EC

### FORTE WWX

32

Angle head 90° - reset output spindle / tool holding fixture
Machining: for spatial constraint / maximum useable tool length
Optional: with EC, IC or EC/IC combination

### SLIM WGX / SLIM WGX-S

40

Angle head 90° - narrow or extremely narrow design
Machining: for extreme spatial constraint / maximum useable tool length
Optional: with EC

### FIX WFX

52

Angle head ≠ 90° - with fixed angle
Machining: special machining at fixed angle
Optional: with IC

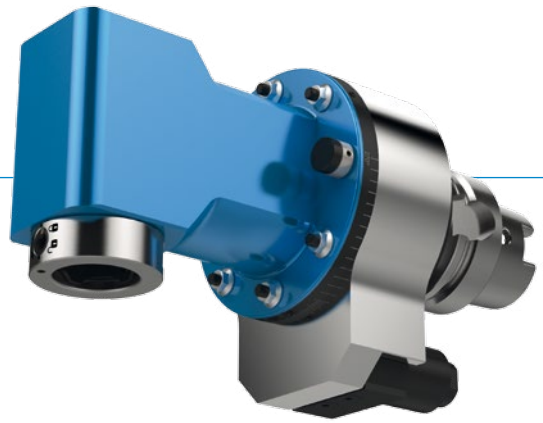
### FLEX WDX

60

Angle head 0-100° - with flexible angle / stepless adjustment
Machining: in any variable position
Optional: with IC

# ANGLE HEAD
## MONO WSX

### ▶ MODULAR DESIGN



### ▶ ANGLE HEAD BODY (SIZE)

04 | 05 | 07 | 15 | 20

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM


BENZ Solidfix®


BENZ CAPTO™


Collet chuck


HSK


Milling arbor


Weldon


Whistle Notch


KM™

### ▶ DRIVE CONE


SK


MAS BT


CAT


HSK DIN 69893


Coromant Capto®

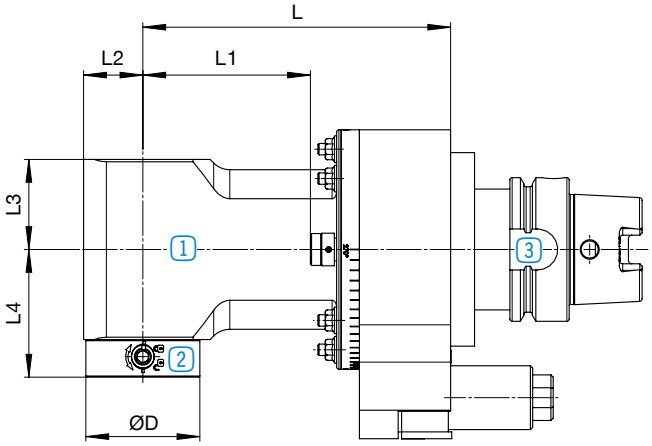

KM™

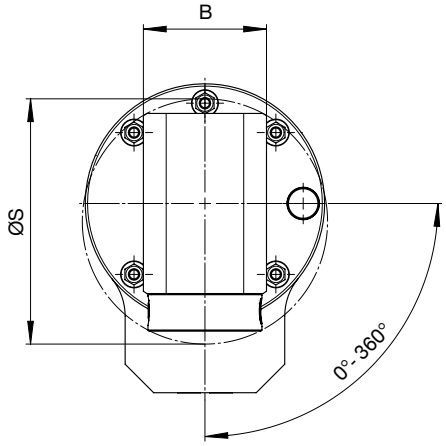
### ▶ Specifications

MONO WSX

| Change the angle head | Machining | Number of output spindles | Axis angle | Coolant feed for cutting edge |
|---|---|---|---|---|
| auto | | 1 | 90° | |
| | | | | Option |

## Angle head without IC




1 Angle head body
P. 18

2 Output spindle / clamping system
P. 20

3 Drive cone
P. 22

Other dimensions for angle heads with BENZ CAPTO™ output spindle. Dimensions available on request.

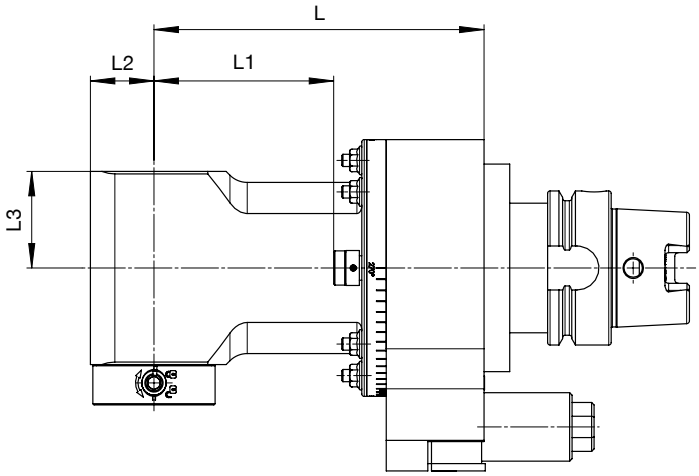
# ANGLE HEAD
## MONO WSX

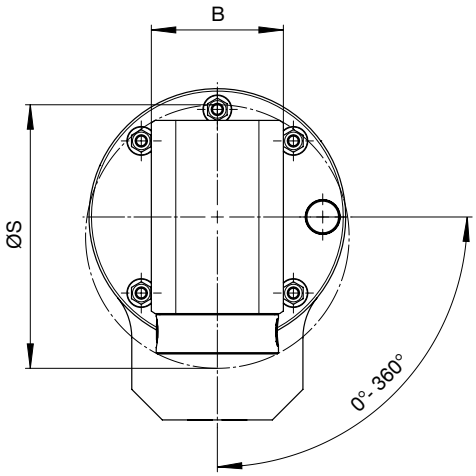


### ▶ ANGLE HEAD BODY (SIZE)

More sizes on request.
Higher speeds are possible as an option.

### ▶ Angle head without IC



## Size 04

| | |
|---|---|
| $M_{max}$ | = 15 Nm |
| i | = 1:1 |
| $n_{max}$ | = 10,000 min$^{-1}$ |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|
| 43.5 | | | | | 95 | | | 4 |
| 93.5 | 24 | 35.5 | 46 | 95 | 145 | - | - | 4.3 |
| 123.5 | | | | | 175 | | | 4.5 |

## Size 05

| | |
|---|---|
| $M_{max}$ | = 30 Nm |
| i | = 1:1 |
| $n_{max}$ | = 8,000 min$^{-1}$ |
| $p_{max}$ | = 70 bar* |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|
| 26.5 | | | | | 88 | - | | 5 |
| 73.5 | 26 | 39.5 | 54 | 108 | 135 | - / ✔ | - | 5.5 |
| 133.5 | | | | | 195 | - / ✔ | | 6.5 |

## Size 07

| | |
|---|---|
| $M_{max}$ | = 70 Nm |
| i | = 1:1 |
| $n_{max}$ | = 6,000 min$^{-1}$ |
| $p_{max}$ | = 70 bar* |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|
| 43.5 | | | | | 105 | - | | 8.5 |
| 88.5 | 35 | 51 | 80 | 141 | 150 | - / ✔ | - | 9.5 |
| 153.5 | | | | | 215 | - / ✔ | | 11 |

## Size 15

| | |
|---|---|
| $M_{max}$ | = 150 Nm |
| i | = 1:1 |
| $n_{max}$ | = 4,000 min$^{-1}$ |
| $p_{max}$ | = 70 bar* |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|
| 85.5 | | | | | 155 | - | | 14.5 |
| 155.5 | 40 | 63 | 92 | 169 | 225 | - / ✔ | - | 17 |
| 228.5 | | | | | 298 | - / ✔ | | 19.5 |

## Size 20

| | |
|---|---|
| $M_{max}$ | = 230 Nm |
| i | = 1:1 |
| $n_{max}$ | = 3,000 min$^{-1}$ |
| $p_{max}$ | = 70 bar* |

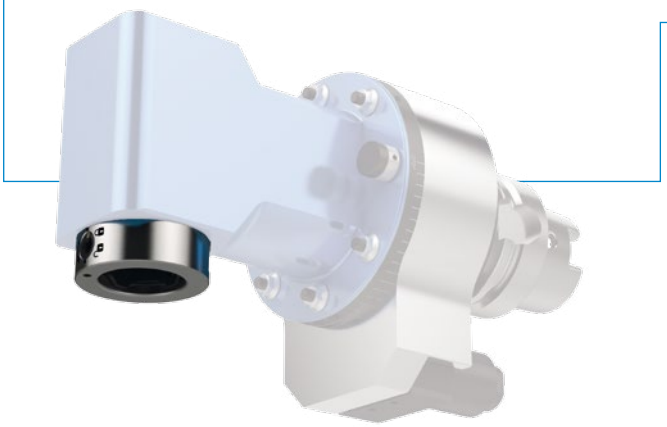
**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|
| 101 | | | | | 171 | - | | 16.5 |
| 171 | 45 | 63 | 100 | 182 | 241 | - / ✔ | - | 19 |
| 241 | | | | | 311 | - / ✔ | | 21.5 |

*Optional: EC via spray nozzle

# ANGLE HEAD
## MONO WSX

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM



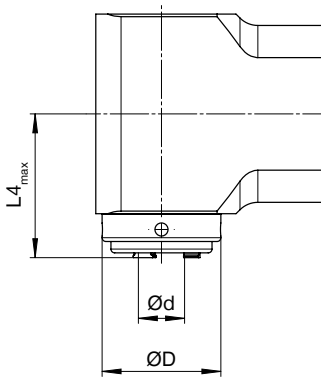
i Technical data for other output spindles / clamping systems on request:


Weldon


Whistle Notch

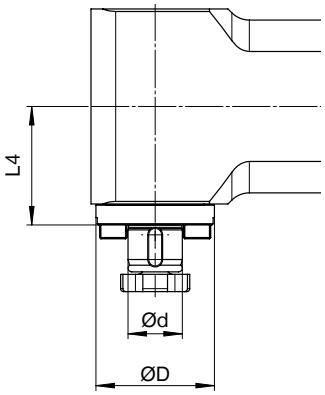

KM™

i We show you **preferable sizes** in the following tables. Smaller output spindles are possible at any time as an option.



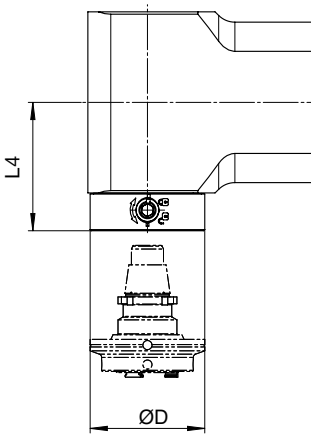

▶ **Technical data**

| Collet chuck | Size | L4max [mm] | ØD [mm] | Ødmax [mm] |
|---|---|---|---|---|
| **ER16A** | 04 | 46 | 44 | 10 |
| **ER20A** | 04 | 54 | 44 | 13 |
| **ER25A** | 05 | 57 | 47 | 16 |
| **ER32A** | 07 | 69 | 55 | 20 |
| **ER40A** | 15 | 82 | 70 | 30 |




▶ **Technical data**

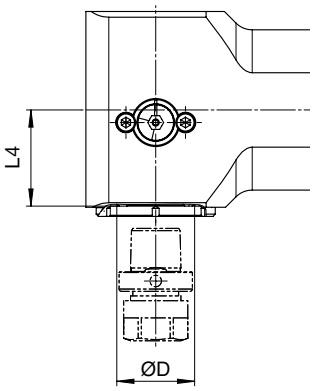
| Milling arbor | Size | L4 [mm] | ØD [mm] | Ød [mm] |
|---|---|---|---|---|
| **22** | 05 | 48 | 48 | 22 |
| **27** | 07 | 62.5 | 60 | 27 |
| **32** | 15 | 76 | 75 | 32 |
| **40** | 15 | 77.5 | 90 | 40 |




For adapters and dimensions, see catalogue BENZ Modular Tool Systems

**Technical data**

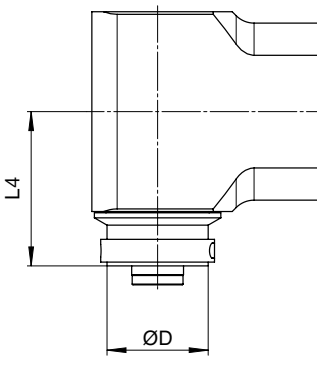
| BENZ Solidfix® | Size | L4 [mm] | ØD [mm] |
|---|---|---|---|
| **S2** | 04 | 49.5 | 40 |
| **S3** | 05 | 56 | 50 |
| **S4** | 07 | 72 | 63 |
| **S5** | 15 | 86 | 75 |




For adapters and dimensions, see catalogue BENZ Modular Tool Systems

**Technical data**

| BENZ CAPTO™ | Size | L4 [mm] | ØD [mm] |
|---|---|---|---|
| **C3** | 05 | 42 | 32 |
| **C4** | 07 | 52 | 40 |
| **C5** | 15 | 60 | 50 |
| **C6** | 20 | 75 | 63 |

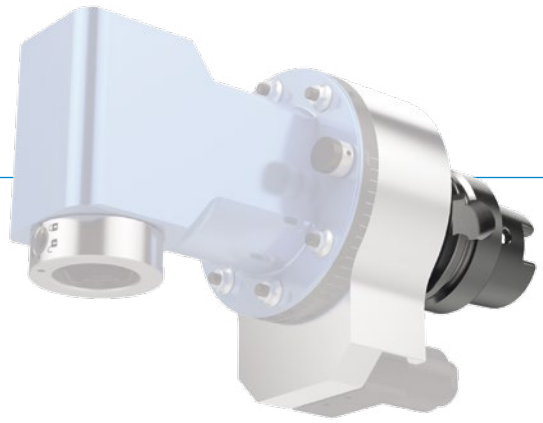



**Technical data**

| HSK | Size | L4 [mm] | ØD [mm] |
|---|---|---|---|
| **HSK 40** | 05 | 59 | 40 |
| **HSK 50** | 07 | 68 | 50 |
| **HSK 63** | 15 | 93 | 65 |

# ANGLE HEAD
## MONO WSX

### ▶ DRIVE CONE



Technical data for other machine interfaces on request.

### Type: Steep taper

| SK DIN 69871 | ▶ Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| SK 40 | ✔ | ✔ | ✔ | - | - |
| SK 50 | ✔ | ✔ | ✔ | ✔ | ✔ |

| MAS BT | ▶ Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| BT 40 | ✔ | ✔ | ✔ | - | - |
| BT 50 | ✔ | ✔ | ✔ | ✔ | ✔ |

| CAT | ▶ Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| CAT 40 | ✔ | ✔ | ✔ | - | - |
| CAT 50 | ✔ | ✔ | ✔ | ✔ | ✔ |

## Type: Hollow shank taper

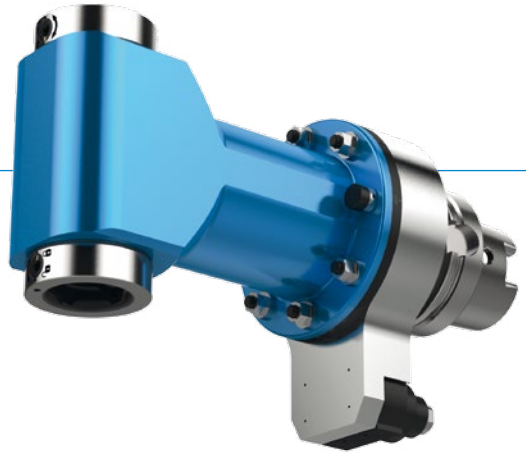
| HSK DIN 69893 | Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| HSK 40 | ✔ | - | - | - | - |
| HSK 50 | ✔ | ✔ | - | - | - |
| HSK 63 | ✔ | ✔ | ✔ | - | - |
| HSK 80 | ✔ | ✔ | ✔ | ✔ | - |
| HSK 100 | ✔ | ✔ | ✔ | ✔ | ✔ |

| Coromant Capto® | Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| C3 | ✔ | - | - | - | - |
| C4 | ✔ | ✔ | - | - | - |
| C5 | ✔ | ✔ | ✔ | ✔ | - |
| C6 | ✔ | ✔ | ✔ | ✔ | ✔ |
| C8 | ✔ | ✔ | ✔ | ✔ | ✔ |

| Kennametal™ | Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| KM 40 | ✔ | - | - | - | - |
| KM 50 | ✔ | ✔ | - | - | - |
| KM 63 | ✔ | ✔ | ✔ | - | - |
| KM 80 | ✔ | ✔ | ✔ | ✔ | - |
| KM 100 | ✔ | ✔ | ✔ | ✔ | ✔ |

# ANGLE HEAD
## DUO WZX

### ▶ MODULAR DESIGN



### ▶ ANGLE HEAD BODY (SIZE)

04 | 05 | 07 | 15 | 20

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM


BENZ Solidfix®


Collet chuck


HSK


Milling arbor


Weldon


Whistle Notch


KM™

### ▶ DRIVE CONE


SK DIN 69871


MAS BT


CAT


HSK DIN 69893


Coromant Capto®

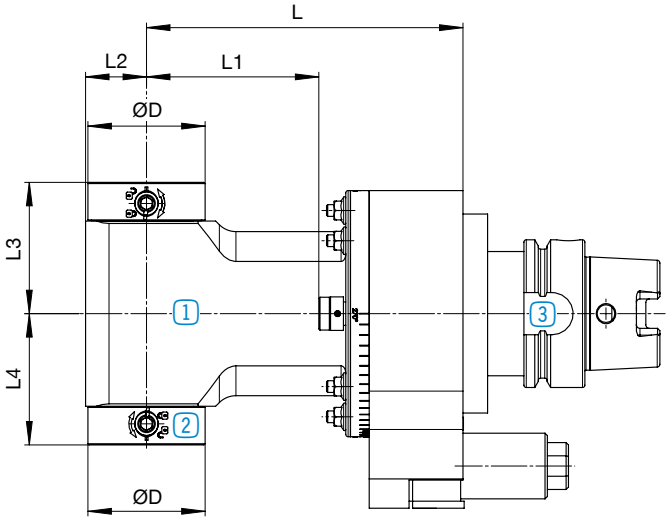

KM™

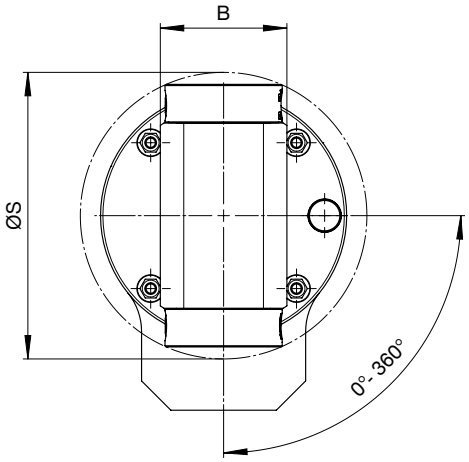
### ▶ Specifications

DUO WZX

| Change the angle head | Machining | Number of output spindles | Axis angle | Coolant feed for cutting edge |
|---|---|---|---|---|
| auto | | 2 | 90° | |
| | | | | Option |
| | | | | |

## Angle head without IC




1 Angle head body
P. 26

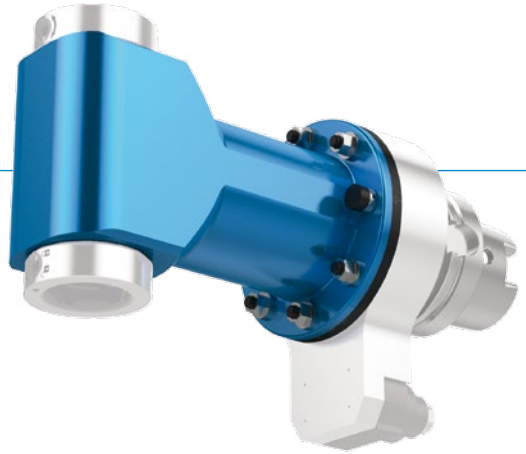
2 Output spindle / clamping system
P. 28

3 Drive cone
P. 30

# ANGLE HEAD
## DUO WZX

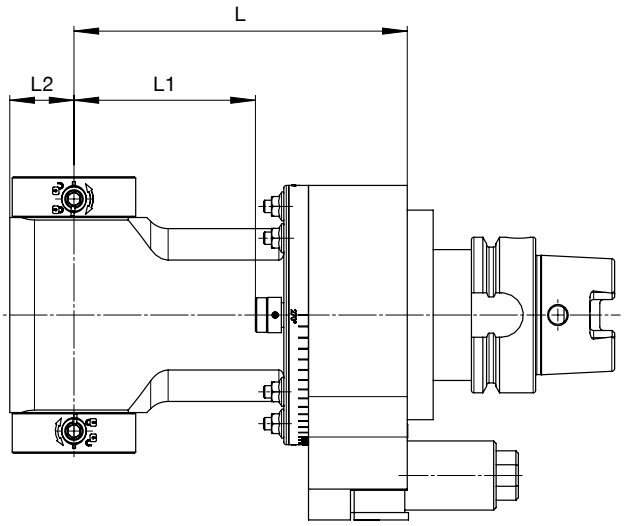


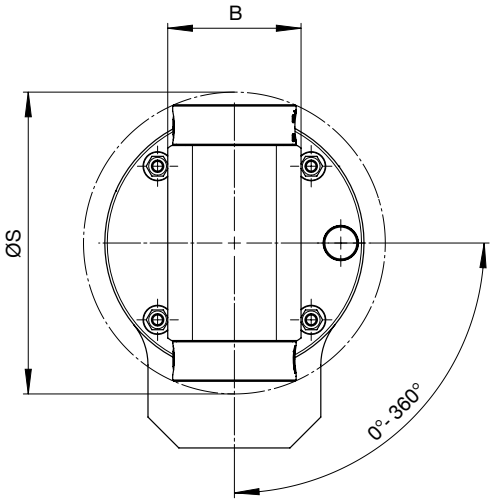
### ▶ ANGLE HEAD BODY (SIZE)



More sizes on request.
Higher speeds are possible as an option.

### ▶ Angle head without IC



## Size 04

| | |
|---|---|
| $M_{max}$ | = 15 Nm |
| i | = 1:1 |
| $n_{max}$ | = 10,000 rpm |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|
| 43.5 | | | | | 95 | | | 4 |
| 93.5 | 24 | - | 46 | 107 | 145 | - | - | 4.3 |
| 123.5 | | | | | 175 | | | 4.5 |

## Size 05

| | |
|---|---|
| $M_{max}$ | = 30 Nm |
| i | = 1:1 |
| $n_{max}$ | = 8,000 rpm |
| $p_{max}$ | = 70 bar* |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|
| 26.5 | | | | | 88 | - | | 5 |
| 73.5 | 26 | - | 54 | 123 | 135 | - / ✔ | - | 5.5 |
| 133.5 | | | | | 195 | - / ✔ | | 6.5 |

## Size 07

| | |
|---|---|
| $M_{max}$ | = 70 Nm |
| i | = 1:1 |
| $n_{max}$ | = 6,000 rpm |
| $p_{max}$ | = 70 bar* |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|
| 43.5 | | | | | 105 | - | | 8.5 |
| 88.5 | 35 | - | 80 | 157 | 150 | - / ✔ | - | 9.5 |
| 153.5 | | | | | 215 | - / ✔ | | 11 |

## Size 15

| | |
|---|---|
| $M_{max}$ | = 150 Nm |
| i | = 1:1 |
| $n_{max}$ | = 4,000 rpm |
| $p_{max}$ | = 70 bar* |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|
| 85.5 | | | | | 155 | - | | 14.5 |
| 155.5 | 40 | - | 92 | 188 | 225 | - / ✔ | - | 17 |
| 228.5 | | | | | 298 | - / ✔ | | 19.5 |

## Size 20

| | |
|---|---|
| $M_{max}$ | = 230 Nm |
| i | = 1:1 |
| $n_{max}$ | = 3,000 rpm |
| $p_{max}$ | = 70 bar* |

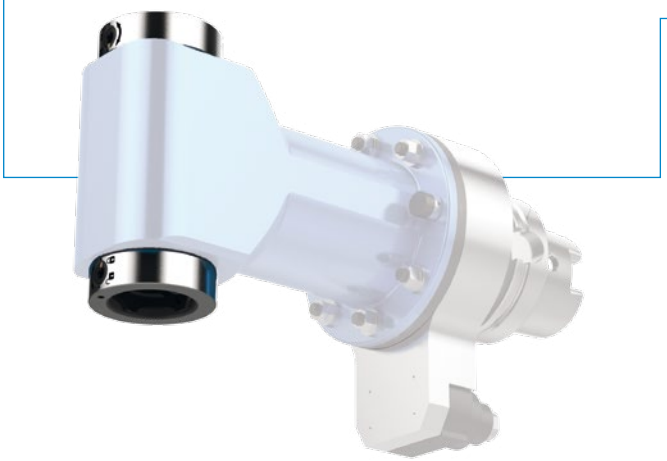
**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|
| 101 | | | | | 171 | - | | 16.5 |
| 171 | 45 | - | 100 | 205 | 241 | - / ✔ | - | 19 |
| 241 | | | | | 311 | - / ✔ | | 21.5 |

*Optional: EC via spray nozzle

# ANGLE HEAD
## DUO WZX

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM



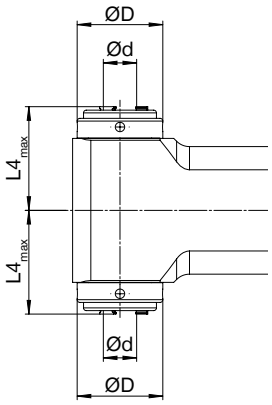
i Technical data for other output spindles / clamping systems on request:


Weldon


Whistle Notch

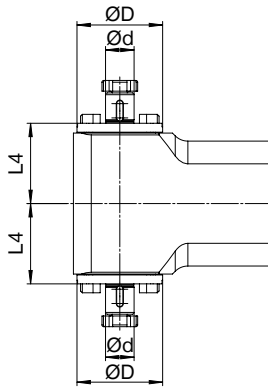

KM™

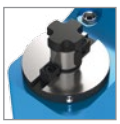
i We show you **preferable sizes** in the following tables. Smaller output spindles are possible at any time as an option.




▶ **Technical data**

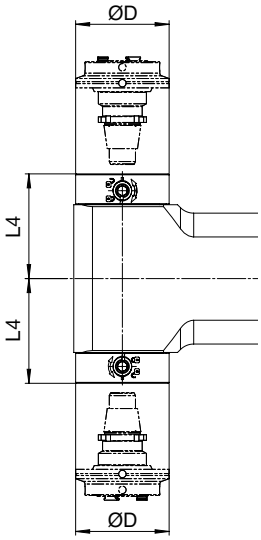
| Collet chuck | Size | $L4_{max}$ [mm] | ØD [mm] | $Ød_{max}$ [mm] |
|---|---|---|---|---|
| **ER16A** | 04 | 46 | 44 | 10 |
| **ER20A** | 04 | 54 | 44 | 13 |
| **ER25A** | 05 | 57 | 47 | 16 |
| **ER32A** | 07 | 69 | 55 | 20 |
| **ER40A** | 15 | 82 | 70 | 30 |

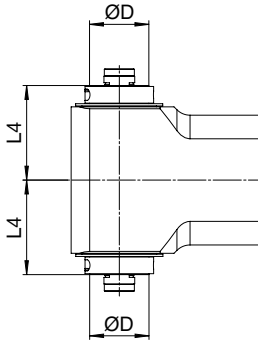


▶ **Technical data**

| Milling arbor | Size | L4 [mm] | ØD [mm] | Ød [mm] |
|---|---|---|---|---|
| **22** | 05 | 48 | 48 | 22 |
| **27** | 07 | 62.5 | 60 | 27 |
| **32** | 15 | 76 | 75 | 32 |
| **40** | 15 | 77.5 | 90 | 40 |




For adapters and dimensions, see catalogue BENZ Modular Tool Systems

▶ **Technical data**

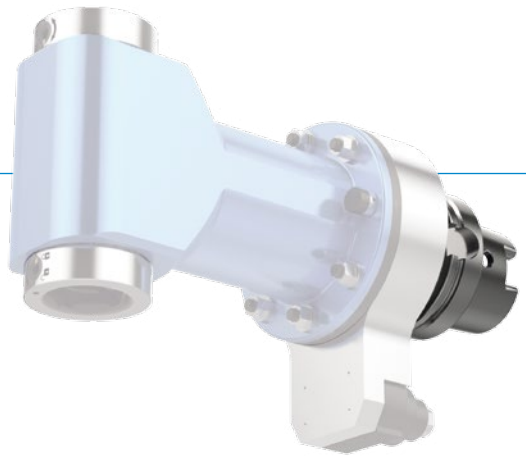
| BENZ Solidfix® | Size | L4 [mm] | ØD [mm] |
|---|---|---|---|
| **S2** | 04 | 49.5 | 40 |
| **S3** | 05 | 56 | 50 |
| **S4** | 07 | 72 | 63 |
| **S5** | 15 | 86 | 75 |

▶ **Technical data**

| HSK | Size | L4 [mm] | ØD [mm] |
|---|---|---|---|
| **HSK 40** | 05 | 59 | 40 |
| **HSK 50** | 07 | 68 | 50 |
| **HSK 63** | 15 | 93 | 65 |

# ANGLE HEAD
## DUO WZX

### ▶ DRIVE CONE



Technical data for other machine interfaces on request.

### Type: Steep taper

| SK DIN 69871 | ▶ Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| SK 40 | ✔ | ✔ | ✔ | - | - |
| SK 50 | ✔ | ✔ | ✔ | ✔ | ✔ |

| MAS BT | ▶ Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| BT 40 | ✔ | ✔ | ✔ | - | - |
| BT 50 | ✔ | ✔ | ✔ | ✔ | ✔ |

| CAT | ▶ Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| CAT 40 | ✔ | ✔ | ✔ | - | - |
| CAT 50 | ✔ | ✔ | ✔ | ✔ | ✔ |

## Type: Hollow shank taper

| HSK DIN 69893 | Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| HSK 40 | ✔ | - | - | - | - |
| HSK 50 | ✔ | ✔ | - | - | - |
| HSK 63 | ✔ | ✔ | ✔ | - | - |
| HSK 80 | ✔ | ✔ | ✔ | ✔ | - |
| HSK 100 | ✔ | ✔ | ✔ | ✔ | ✔ |

| Coromant Capto® | Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| C3 | ✔ | - | - | - | - |
| C4 | ✔ | ✔ | - | - | - |
| C5 | ✔ | ✔ | ✔ | ✔ | - |
| C6 | ✔ | ✔ | ✔ | ✔ | ✔ |
| C8 | ✔ | ✔ | ✔ | ✔ | ✔ |

| Kennametal™ | Size 04 | 05 | 07 | 15 | 20 |
|---|---|---|---|---|---|
| KM 40 | ✔ | - | - | - | - |
| KM 50 | ✔ | ✔ | - | - | - |
| KM 63 | ✔ | ✔ | ✔ | - | - |
| KM 80 | ✔ | ✔ | ✔ | ✔ | - |
| KM 100 | ✔ | ✔ | ✔ | ✔ | ✔ |

# ANGLE HEAD
# FORTE WWX

## ▶ MODULAR DESIGN

### ▶ ANGLE HEAD BODY (SIZE)

05 | 07 | 15 | 20

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM


BENZ Solidfix®


BENZ CAPTO™


Collet chuck


HSK


Milling arbor


Weldon


Whistle Notch


KM™

### ▶ DRIVE CONE


SK DIN 69871


MAS BT


CAT


HSK DIN 69893


Coromant Capto®

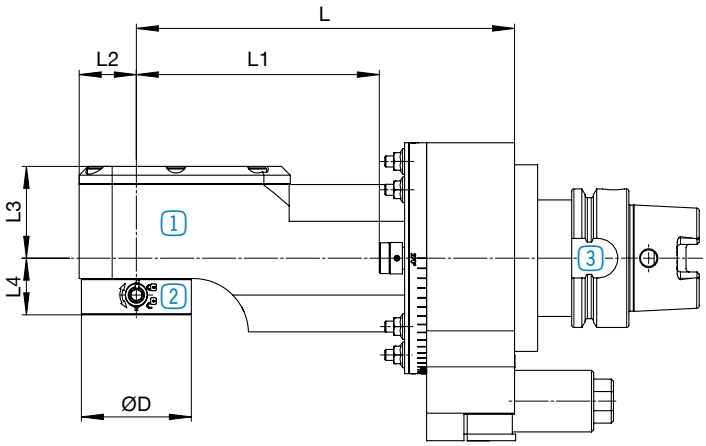

KM™

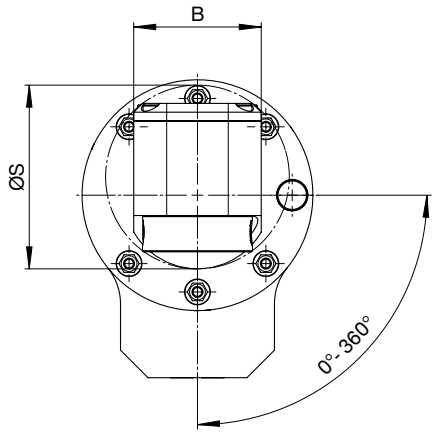
### ▶ Specifications

FORTE WWX

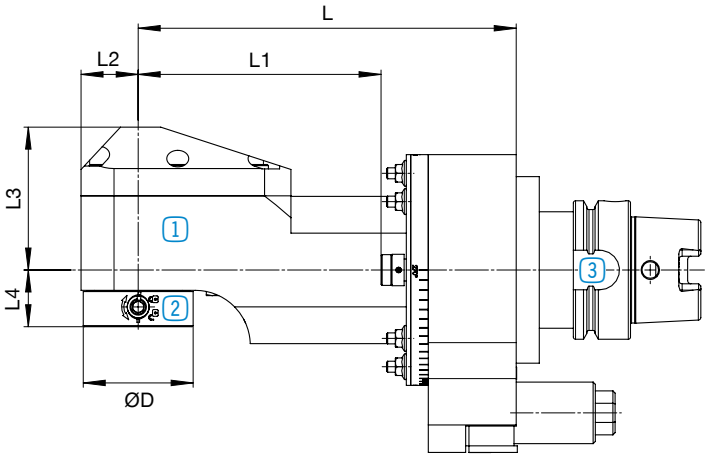
| Change the angle head | Machining | Number of output spindles | Axis angle | Coolant feed for cutting edge |
|---|---|---|---|---|
|  |  |  |  |  |
| |  | | |  |
| |  | | |  |

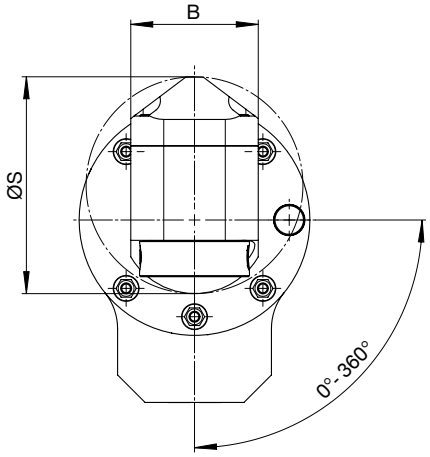
## Angle head without IC




## Angle head with IC




1 Angle head body
P. 34

2 Output spindle / clamping system
P. 36

3 Drive cone
P. 38

i Other dimensions for angle heads with BENZ CAPTO™ output spindle. Dimensions available on request.

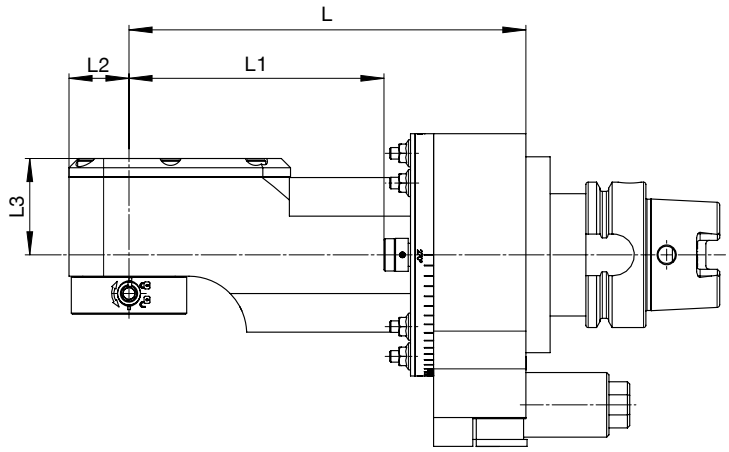
# ANGLE HEAD
## FORTE WWX

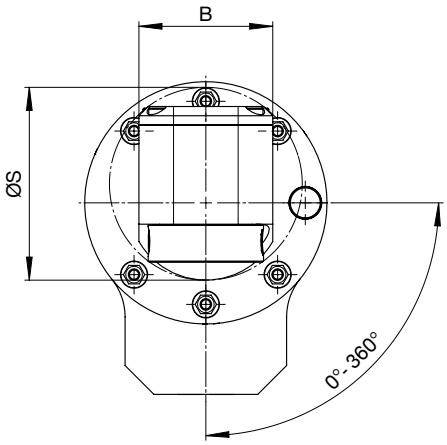


### ▶ ANGLE HEAD BODY (SIZE)

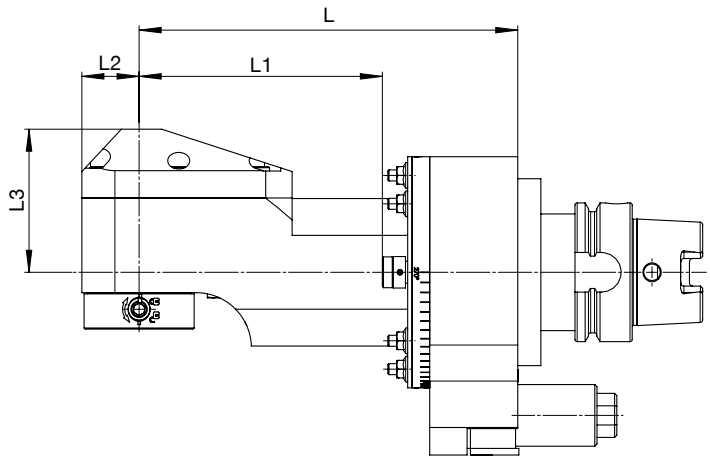
More sizes on request.
Higher speeds are possible as an option.

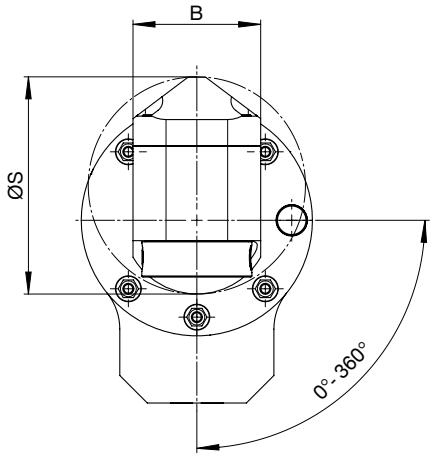
**▶ Angle head without IC**




**▶ Angle head with IC**



## Size 05

| | |
|---|---|
| $M_{max}$ | = 30 Nm |
| i | = 1:1 |
| $n_{max}$ | = 8,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] EK | L3 [mm] IK | B [mm] | ØS [mm] EK | ØS [mm] IK | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 63,5 | 26 | 42 | 65 | 58 | 84 | 81 | 125 | ✔ | ✔ | 5 |
| 110,5 | | | | | | | 172 | ✔ | ✔ | 6 |
| 170,5 | | | | | | | 232 | ✔ | ✔ | 7 |

## Size 07

| | |
|---|---|
| $M_{max}$ | = 70 Nm |
| i | = 1:1 |
| $n_{max}$ | = 6,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] EK | L3 [mm] IK | B [mm] | ØS [mm] EK | ØS [mm] IK | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 93,5 | 35 | 55 | 77 | 70 | 109 | 122 | 155 | ✔ | ✔ | 8.5 |
| 138,5 | | | | | | | 200 | ✔ | ✔ | 9.5 |
| 191,5 | | | | | | | 253 | ✔ | ✔ | 10.5 |

## Size 15

| | |
|---|---|
| $M_{max}$ | = 150 Nm |
| i | = 1:1 |
| $n_{max}$ | = 4,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] EK | L3 [mm] IK | B [mm] | ØS [mm] EK | ØS [mm] IK | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 125,5 | 40 | 66 | 88,5 | 90 | 129 | 139 | 195 | ✔ | ✔ | 14 |
| 162,5 | | | | | | | 232 | ✔ | ✔ | 15 |
| 262,5 | | | | | | | 332 | ✔ | ✔ | 17,5 |

## Size 20

| | |
|---|---|
| $M_{max}$ | = 230 Nm |
| i | = 1:1 |
| $n_{max}$ | = 3,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

**Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] EK | L3 [mm] IK | B [mm] | ØS [mm] EK | ØS [mm] IK | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 135,5 | 45 | 65,5 | 88,5 | 90 | 130 | 141 | 200 | ✔ | ✔ | 17 |
| 172,5 | | | | | | | 237 | ✔ | ✔ | 18 |
| 272,5 | | | | | | | 337 | ✔ | ✔ | 21,5 |

*Optional: EC via spray nozzle

# ANGLE HEAD
## FORTE WWX

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM

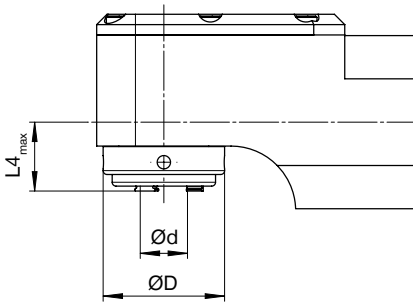
Technical data for other output spindles / clamping systems on request:


Weldon


Whistle Notch

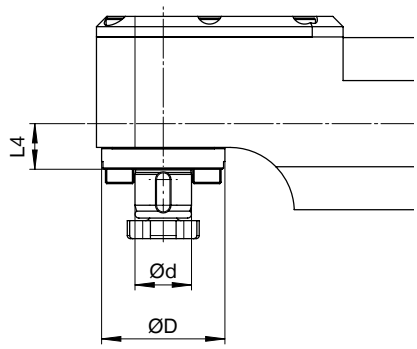

KM™

We show you **preferable sizes** in the following tables. Smaller output spindles are possible at any time as an option.



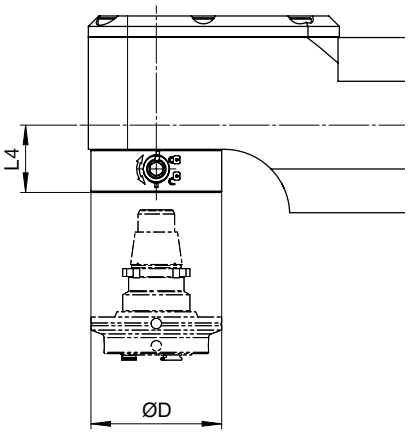

▶ **Technical data**

| Collet chuck | Size | $L4_{max}$ [mm] | | ØD [mm] | $Ød_{max}$ [mm] |
|---|---|---|---|---|---|
| | | EC | IC | | |
| **ER25A** | 05 | 20.75 | 25.75 | 47 | 16 |
| **ER32A** | 07 | 23.9 | 28.9 | 55 | 20 |
| **ER40A** | 15 | 31 | 35.9 | 70 | 30 |




▶ **Technical data**

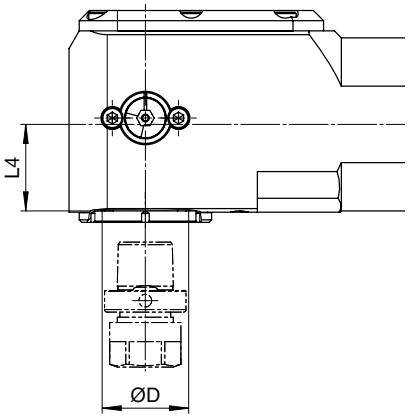
| Milling arbor | Size | L4 [mm] | | ØD [mm] | Ød [mm] |
|---|---|---|---|---|---|
| | | EC | IC | | |
| **22** | 05 | 17.75 | | 48 | 22 |
| **27** | 07 | 21.5 | | 60 | 27 |
| **32** | 15 | 32.5 | | 75 | 32 |




For adapters and dimensions, see catalogue BENZ Modular Tool Systems

**Technical data**

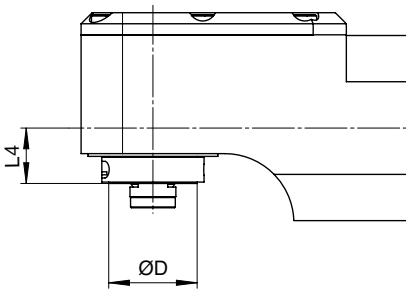
| BENZ Solidfix® | Size | L4 [mm] EC | L4 [mm] IC | ØD [mm] |
|---|---|---|---|---|
| **S3** | 05 | 25.75 | | 50 |
| **S4** | 07 | 31 | | 63 |
| **S5** | 15 | 35.5 | | 75 |




For adapters and dimensions, see catalogue BENZ Modular Tool Systems

**Technical data**

| BENZ CAPTO™ | Size | L4 [mm] EC | L4 [mm] IC | ØD [mm] |
|---|---|---|---|---|
| **C3** | 05 | 34 | | 32 |
| **C4** | 07 | 32 | | 40 |
| **C5** | 15 | 39 | | 50 |
| **C6** | 20 | 54 | | 63 |




**Technical data**

| HSK | Size | L4 [mm] EC | L4 [mm] IC | ØD [mm] |
|---|---|---|---|---|
| **HSK 32** | 05 | 20 | | 32 |
| **HSK 40** | 07 | 24 | | 40 |
| **HSK 50** | 15 | 35 | | 50 |
| **HSK 63** | 15 | 42 | | 63 |

# ANGLE HEAD
## FORTE WWX

### ▶ DRIVE CONE

Technical data for other machine interfaces on request.

## Type: Steep taper

| SK DIN 69871 | ▶ Size 05 | 07 | 15 | 20 |
|---|---|---|---|---|
| SK 40 | ✔ | ✔ | - | - |
| SK 50 | ✔ | ✔ | ✔ | ✔ |

| MAS BT | ▶ Size 05 | 07 | 15 | 20 |
|---|---|---|---|---|
| BT 40 | ✔ | ✔ | - | - |
| BT 50 | ✔ | ✔ | ✔ | ✔ |

| CAT | ▶ Size 05 | 07 | 15 | 20 |
|---|---|---|---|---|
| CAT 40 | ✔ | ✔ | - | - |
| CAT 50 | ✔ | ✔ | ✔ | ✔ |

## Type: Hollow shank taper

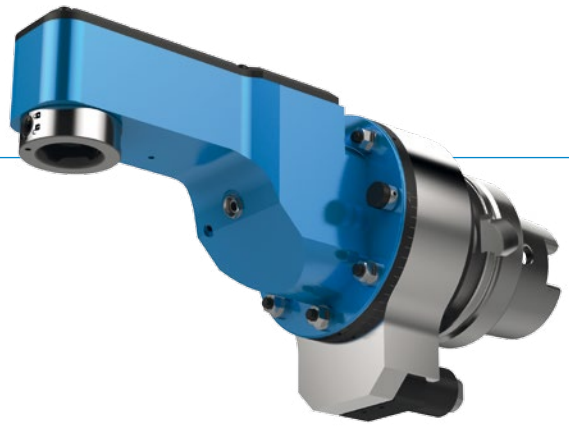
| HSK DIN 69893 | Size 05 | 07 | 15 | 20 |
|---|---|---|---|---|
| HSK 40 | - | - | - | - |
| HSK 50 | ✔ | - | - | - |
| HSK 63 | ✔ | ✔ | - | - |
| HSK 80 | ✔ | ✔ | ✔ | - |
| HSK 100 | ✔ | ✔ | ✔ | ✔ |

| Coromant Capto® | Size 05 | 07 | 15 | 20 |
|---|---|---|---|---|
| C3 | - | - | - | - |
| C4 | ✔ | - | - | - |
| C5 | ✔ | ✔ | ✔ | - |
| C6 | ✔ | ✔ | ✔ | ✔ |
| C8 | ✔ | ✔ | ✔ | ✔ |

| Kennametal™ | Size 05 | 07 | 15 | 20 |
|---|---|---|---|---|
| KM 40 | - | - | - | - |
| KM 50 | ✔ | - | - | - |
| KM 63 | ✔ | ✔ | - | - |
| KM 80 | ✔ | ✔ | ✔ | - |
| KM 100 | ✔ | ✔ | ✔ | ✔ |

# ANGLE HEAD
## SLIM WGX

### ▶ MODULAR DESIGN



### ▶ ANGLE HEAD BODY (SIZE)

**05** **07**

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM

BENZ Solidfix®

Collet chuck

### ▶ DRIVE CONE

SK DIN 69871

MAS BT

CAT

HSK DIN 69893

Coromant Capto®

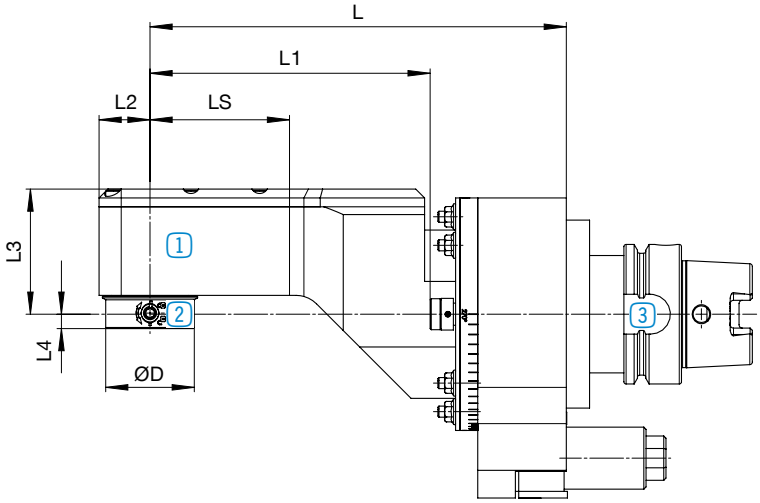
KM™

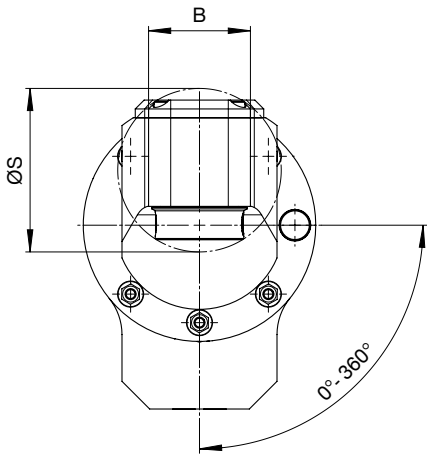
### ▶ Specifications

SLIM WGX

| Change the angle head | Machining | Number of output spindles | Axis angle | Coolant feed for cutting edge |
|---|---|---|---|---|
| auto | | 1 | 90° | |
| | | | | Option |
| | | | | |

## Angle head without IC




[1] Angle head body
P. 42

extremely narrow design
P. 46

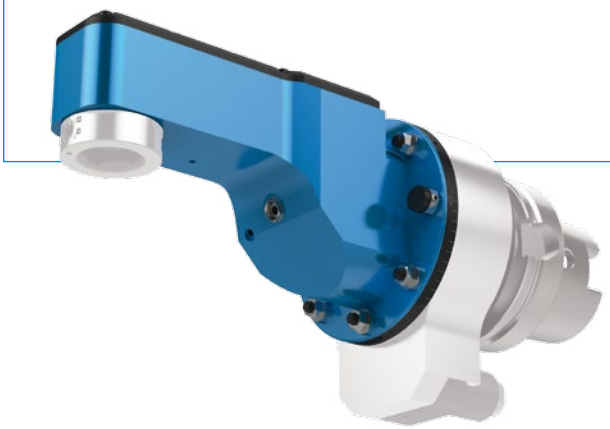
[2] Output spindle / clamping system
P. 44

[3] Drive cone
P. 50

# ANGLE HEAD
## SLIM WGX

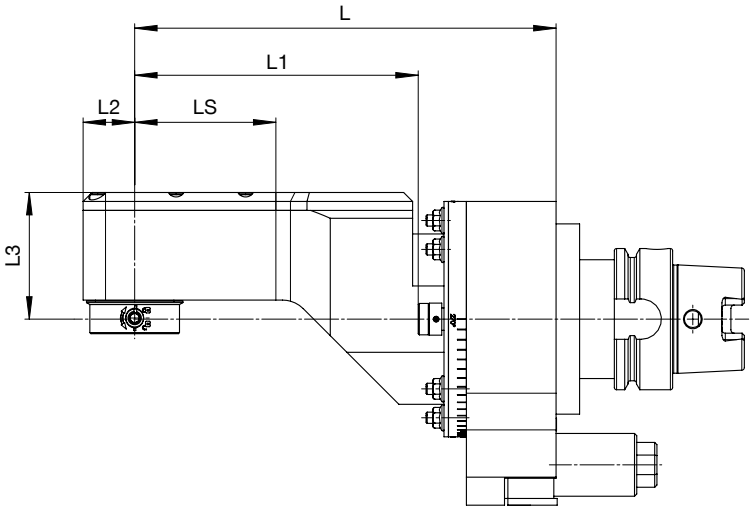


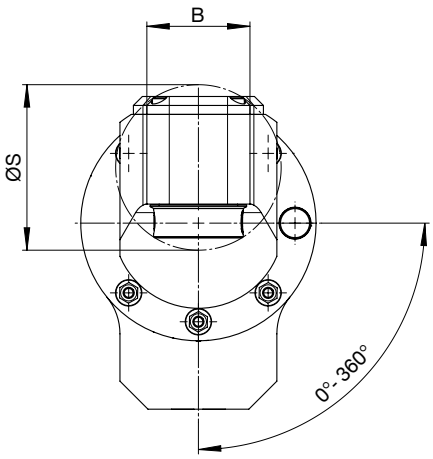
### ▶ ANGLE HEAD BODY (SIZE)



More sizes on request.
Higher speeds are possible as an option.

**▶ Angle head without IC**



## Size 05 / L2=16

| | |
|---|---|
| $M_{max}$ | =12 Nm |
| i | =1:1,607 |
| $n_{max}$ | = 8,000 $min^{-1}$ |
| $p_{max}$ | =100 bar |

**Technical data**

| L1 [mm] | LS [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|
| | 24.2 | | | | | 149.2 | - / ✔ | | 5 |
| - | 56.2 | 16 | 56 | 40 | 63 | 181.2 | - / ✔ | - | 5.2 |
| | 88.2 | | | | | 213.2 | - / ✔ | | 5.4 |

## Size 05 / L2=18

| | |
|---|---|
| $M_{max}$ | = 15 Nm |
| i | = 1:1,452 |
| $n_{max}$ | = 8,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

**Technical data**

| L1 [mm] | LS [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|
| | 25.4 | | | | | 150.4 | - / ✔ | | 5.2 |
| - | 57.4 | 18 | 58.5 | 40 | 71 | 182.4 | - / ✔ | - | 5.3 |
| | 89.4 | | | | | 213.4 | - / ✔ | | 5.4 |

## Size 05 / L2=23

| | |
|---|---|
| $M_{max}$ | = 15 Nm |
| i | = 1:1 |
| $n_{max}$ | = 8,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

**Technical data**

| L1 [mm] | LS [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|
| | 31 | | | | | 156 | - / ✔ | | 5.4 |
| - | 63 | 23 | 56.5 | 46 | 74 | 188 | - / ✔ | - | 5.5 |
| | 95 | | | | | 220 | - / ✔ | | 5.7 |

## Size 07

| | |
|---|---|
| $M_{max}$ | = 35 Nm |
| i | = 1:1 |
| $n_{max}$ | = 6,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

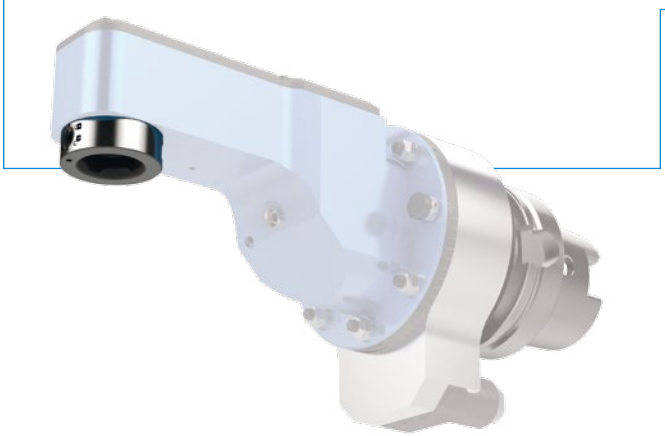
**Technical data**

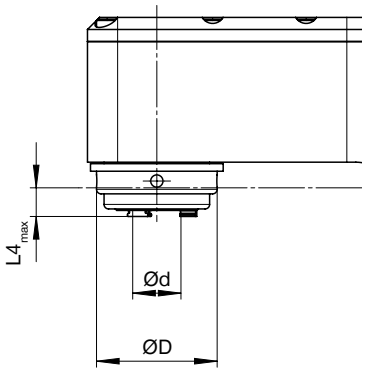
| L1 [mm] | LS [mm] | L2 [mm] | L3 [mm] | B [mm] | ØS [mm] | L [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|
| | 54 | | | | | 178 | - / ✔ | | 9 |
| - | 85 | 26 | 65 | 52 | 78 | 215 | - / ✔ | - | 9.5 |
| | 160 | | | | | 290 | - / ✔ | | 10 |

*Optional: EC via spray nozzle

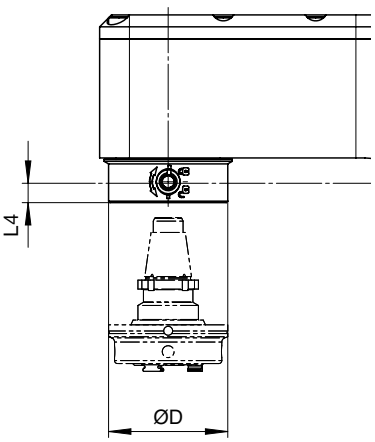
# ANGLE HEAD
## SLIM WGX

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM






| Collet chuck | ▶ Technical data | | | |
|---|---|---|---|---|
| | Size | $L4_{max}$ [mm] | ØD [mm] | $Ød_{max}$ [mm] |
| **ER16A** | 05 / L2=18 | 7 | 44 | 10 |
| **ER20A** | 05 / L2=23 | 10 | 44 | 13 |
| **ER25A** | 07 | 4 | 47 | 16 |




For adapters and dimensions, see catalogue BENZ Modular Tool Systems

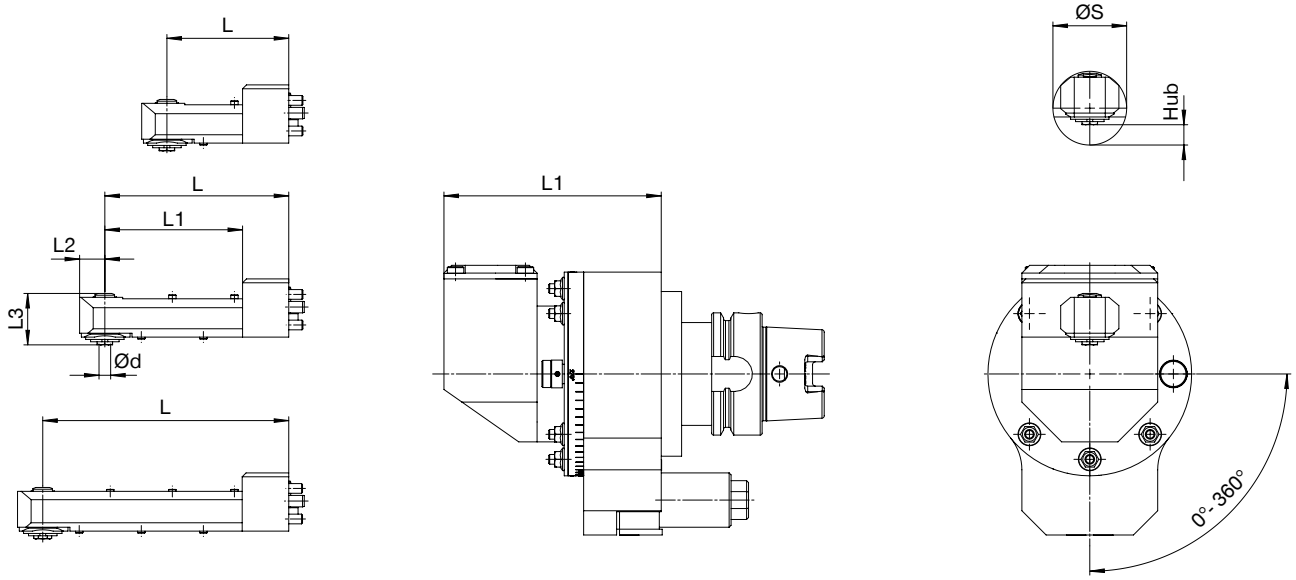
| BENZ Solidfix® | ▶ Technical data | | |
|---|---|---|---|
| | Size | L4 [mm] | ØD [mm] |
| **S2** | 05 | 6.5 | 40 |
| **S3** | 07 | 2.5 | 50 |


**BENZ ANGLE HEAD FOR MACHINING CENTRES WITH BENZ SOLIDFIX® TOOL HOLDING FIXTURE**

# ANGLE HEAD
## SLIM WGX-S

### ▶ EXTREMELY NARROW DESIGN

#### ▶ Angle head without IC




**Size 05 / ØS=25**

| | |
|---|---|
| $M_{max}$ | = 3 Nm |
| i | = 1:2,22 |
| $n_{max}$ | = 8,000 min$^{-1}$ |
| $p_{max}$ | = 100 bar |

▶ **Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | L5 [mm] | Ød [mm] | ØS [mm] | L [mm] | Hub [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 39 | | | 39 | | | 63 | | - / ✔ | | 3.7 |
| 71 | 13 | 20 | 71 | 4 Special | 25 | 95 | 4 | - / ✔ | - | 3.8 |
| 103 | | | 103 | | | 127 | | - / ✔ | | 3.9 |

**Size 05 / ØS=29**

| | |
|---|---|
| $M_{max}$ | = 3 Nm |
| i | = 1:2,22 |
| $n_{max}$ | = 8,000 min$^{-1}$ |
| $p_{max}$ | = 100 bar |

▶ **Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | L5 [mm] | Ød [mm] | ØS [mm] | L [mm] | Hub [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 39 | | | | | | 63 | | - / ✔ | | 3.8 |
| 71 | 13 | 20 | 14 | 4 Special | 29 | 95 | 6 | - / ✔ | - | 3.9 |
| 103 | | | | | | 127 | | - / ✔ | | 4.0 |

**Size 05 / ØS=32**

| | |
|---|---|
| $M_{max}$ | = 5 Nm |
| i | = 1:1,2 |
| $n_{max}$ | = 8,000 min$^{-1}$ |
| $p_{max}$ | = 100 bar |

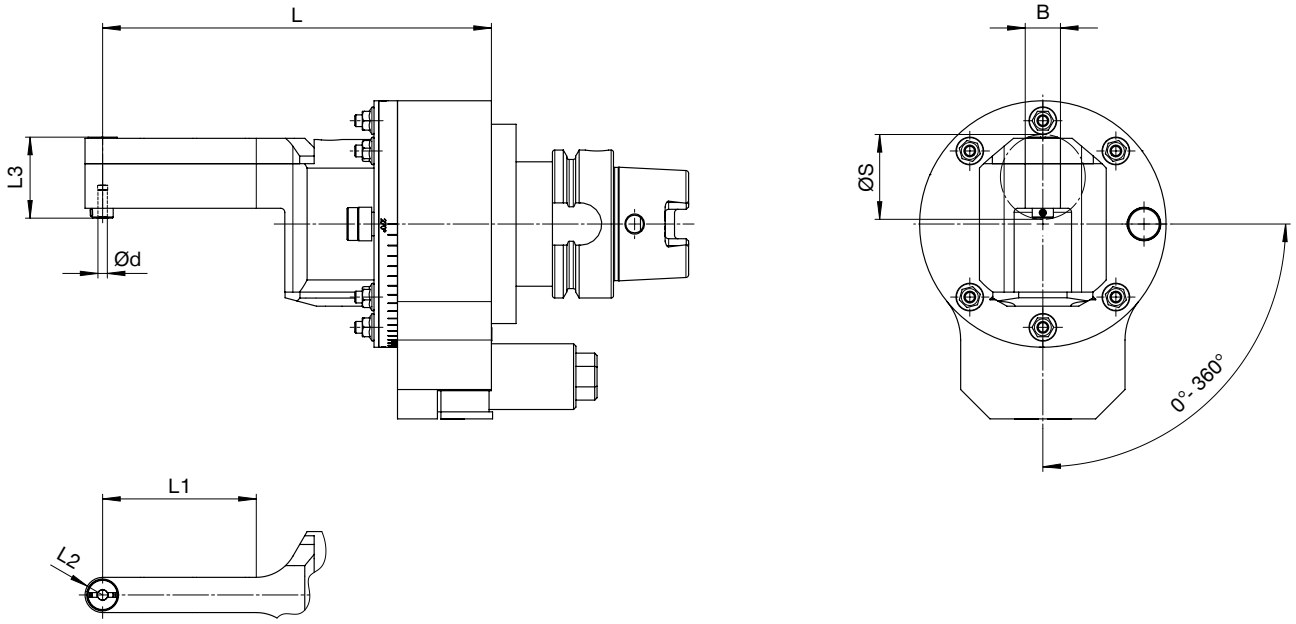
▶ **Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | L5 [mm] | Ød [mm] | ØS [mm] | L [mm] | Hub [mm] | EC* | IC | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 39 | | | | | | 63 | | - / ✔ | | 3.8 |
| 71 | 13 | 27 | 14 | 5 Special | 32 | 95 | 9 | - / ✔ | - | 4 |
| 103 | | | | | | 127 | | - / ✔ | | 4.2 |

*Optional: EC via spray nozzle

## ▶ EXTREMELY NARROW DESIGN

### ▶ Angle head without IC




| Size 04 / L2=7,5 | |
|---|---|
| $M_{max}$ | = 3 Nm |
| i | = 1:2,07 |
| $n_{max}$ | = 8,000 $min^{-1}$ |
| $p_{max}$ | = 50 bar |

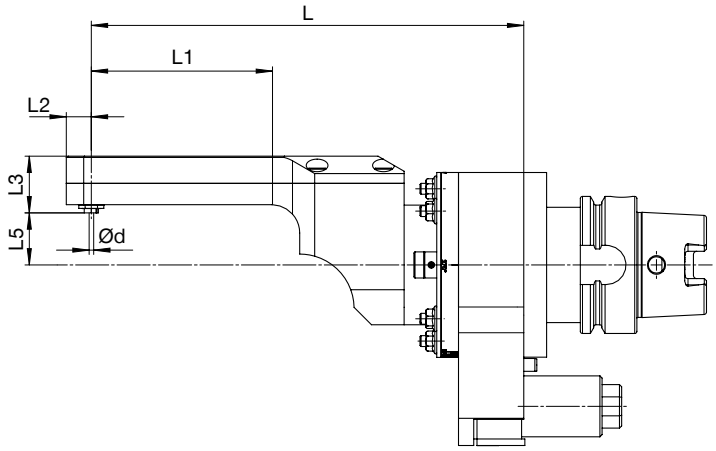
▶ **Technical data**

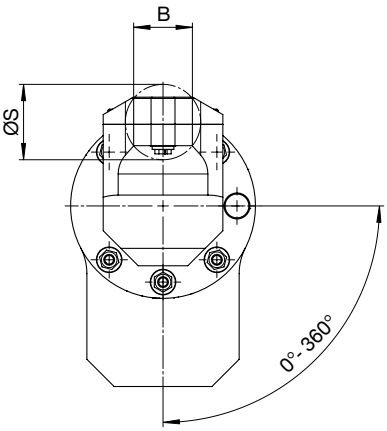
| L1 [mm] | L2 [mm] | L3 [mm] | Ød [mm] | B [mm] | ØS [mm] | L [mm] | EC | IC | kg |
|---|---|---|---|---|---|---|---|---|---|
| 66 | 7.5 | 35 | 4<br>DIN 1835E | 15 | 37 | 166 | - | - | 5.4 |

# ANGLE HEAD
## SLIM WGX-S

### ▶ EXTREMELY NARROW DESIGN

#### ▶ Angle head without IC




| Size 04 / L2=11,5 | |
|---|---|
| $M_{max}$ | = 8 Nm |
| i | = 1:1,708 |
| $n_{max}$ | = 10,000 min$^{-1}$ |
| $p_{max}$ | = 50 bar |

▶ **Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | L5 [mm] | B [mm] | Ød [mm] | ØS [mm] | L [mm] | EK* | IK | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 38.5 | 11.5 | 32 | 20 | 27 | Nann collet chuck 6043E | 37 | 154 | - / ✔ | - | 3.7 |
| 83.5 | | | | | | | 199 | - / ✔ | | 3.8 |
| 128 | | | | | | | 244 | - / ✔ | | 3.9 |

| Size 04 / L2=14 | |
|---|---|
| $M_{max}$ | = 10 Nm |
| i | = 1:1,367 |
| $n_{max}$ | = 8,000 min$^{-1}$ |
| $p_{max}$ | = 50 bar |

▶ **Technical data**

| L1 [mm] | L2 [mm] | L3 [mm] | L5 [mm] | B [mm] | Ød [mm] | ØS [mm] | L [mm] | EK* | IK | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 43 | 14 | 38 | 14 | 30 | Nann collet chuck 603E | 42 | 158 | - / ✔ | - | 3.8 |
| 89 | | | | | | | 205 | - / ✔ | | 4 |
| 135 | | | | | | | 251 | - / ✔ | | 4.2 |

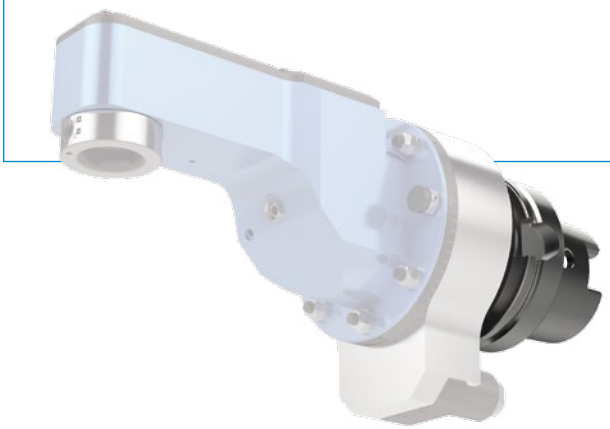
*Optional: EC via spray nozzle

**BENZ ANGLE HEADS ARE DESIGNED FOR DEMANDING MACHINING WORK**

# ANGLE HEAD
## SLIM WGX



### ▶ DRIVE CONE



Technical data for other machine interfaces on request.

### Type: Steep taper

| SK DIN 69871 | ▶ Size 04 | 05 | 07 | 15 |
|---|---|---|---|---|
| SK 40 | ✔ | ✔ | ✔ | - |
| SK 50 | ✔ | ✔ | ✔ | ✔ |

| MAS BT | ▶ Size 04 | 05 | 07 | 15 |
|---|---|---|---|---|
| BT 40 | ✔ | ✔ | ✔ | - |
| BT 50 | ✔ | ✔ | ✔ | ✔ |

| CAT | ▶ Size 04 | 05 | 07 | 15 |
|---|---|---|---|---|
| CAT 40 | ✔ | ✔ | ✔ | - |
| CAT 50 | ✔ | ✔ | ✔ | ✔ |

## Type: Hollow shank taper

| HSK DIN 69893 | ▶ Size 04 | 05 | 07 | 15 |
|---|---|---|---|---|
| HSK 40 | ✔ | - | - | - |
| HSK 50 | ✔ | ✔ | - | - |
| HSK 63 | ✔ | ✔ | ✔ | - |
| HSK 80 | ✔ | ✔ | ✔ | ✔ |
| HSK 100 | ✔ | ✔ | ✔ | ✔ |

| Coromant Capto® | ▶ Size 04 | 05 | 07 | 15 |
|---|---|---|---|---|
| C3 | ✔ | - | - | - |
| C4 | ✔ | ✔ | - | - |
| C5 | ✔ | ✔ | ✔ | ✔ |
| C6 | ✔ | ✔ | ✔ | ✔ |
| C8 | ✔ | ✔ | ✔ | ✔ |

| Kennametal™ | ▶ Size 04 | 05 | 07 | 15 |
|---|---|---|---|---|
| KM 40 | ✔ | - | - | - |
| KM 50 | ✔ | ✔ | - | - |
| KM 63 | ✔ | ✔ | ✔ | - |
| KM 80 | ✔ | ✔ | ✔ | ✔ |
| KM 100 | ✔ | ✔ | ✔ | ✔ |

# ANGLE HEAD
## FIX WFX

### ▶ MODULAR DESIGN

### ▶ ANGLE HEAD BODY (SIZE)

05 | 07 | 15 | 20

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM


BENZ Solidfix®


BENZ CAPTO™


Collet chuck


HSK


Milling arbor


Weldon


Whistle Notch


KM™

### ▶ DRIVE CONE


SK DIN 69871


MAS BT


CAT


HSK DIN 69893


Coromant Capto®

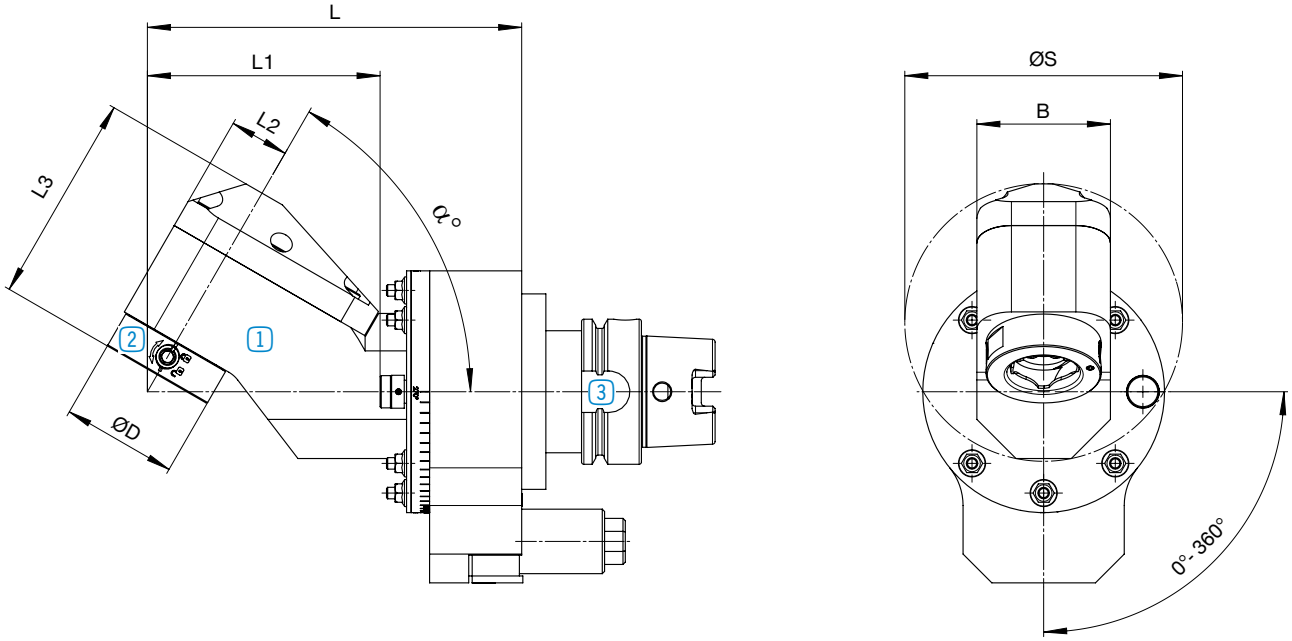

KM™

### ▶ Specifications

FIX WFX

| Change the angle head | Machining | Number of output spindles | Axis angle | Coolant feed for cutting edge |
|---|---|---|---|---|
| auto | | 1 | 0° 120° | |
| | | | | |
| | | | | |

## Angle head with IC




1 Angle head body
P. 54

2 Output spindle / clamping system
P. 56

3 Drive cone
P. 58

i Other dimensions for angle heads with BENZ CAPTO™ output spindle. Dimensions available on request.

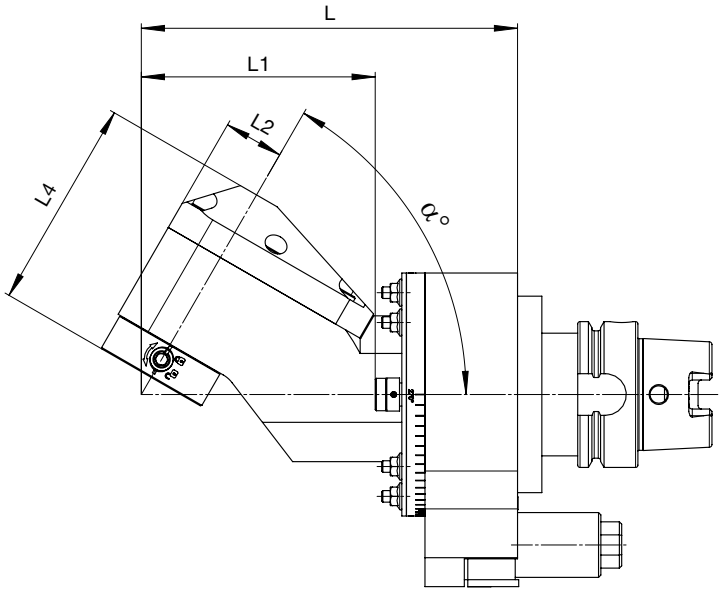
# ANGLE HEAD
## FIX WFX

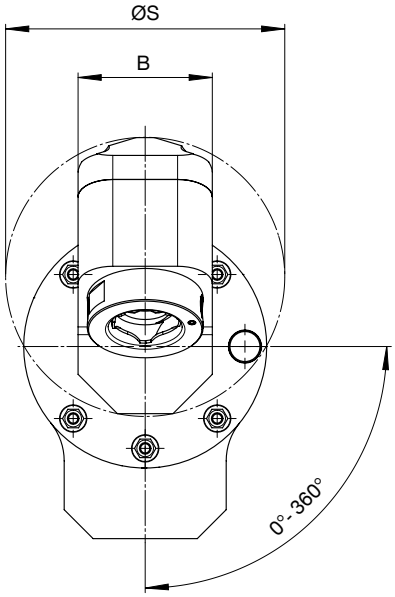


### ▶ ANGLE HEAD BODY (SIZE)

More sizes on request.
Higher speeds are possible as an option.

**▶ Angle head with IC**



| Size 05 | |
|---|---|
| $M_{max}$ | = 30 Nm |
| i | = 1:1 |
| $n_{max}$ | = 8,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

**Technical data**

| α [°] | L1 [mm] | L2 [mm] | L4* [mm] | B [mm] | ØS [mm] | L** [mm] | EC | IC | kg |
|---|---|---|---|---|---|---|---|---|---|
| 0-120° | 138 | 26 | 91 | 54 | approx. 108 | approx. 200 | - | ✔ | 4 |

| Size 07 | |
|---|---|
| $M_{max}$ | = 70 Nm |
| i | = 1:1 |
| $n_{max}$ | = 6,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

**Technical data**

| α [°] | L1 [mm] | L2 [mm] | L4* [mm] | B [mm] | ØS [mm] | L** [mm] | EC | IC | kg |
|---|---|---|---|---|---|---|---|---|---|
| 0-120° | 163 | 35 | 108 | 80 | approx. 141 | approx. 225 | - | ✔ | 9.5 |

| Size 15 | |
|---|---|
| $M_{max}$ | = 150 Nm |
| i | = 1:1 |
| $n_{max}$ | = 4,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

**Technical data**

| α [°] | L1 [mm] | L2 [mm] | L4* [mm] | B [mm] | ØS [mm] | L** [mm] | EC | IC | kg |
|---|---|---|---|---|---|---|---|---|---|
| 0-120° | 165 | 40 | 125 | 92 | approx. 170 | approx. 235 | - | ✔ | 13 |

| Size 20 | |
|---|---|
| $M_{max}$ | = 230 Nm |
| i | = 1:1 |
| $n_{max}$ | = 3,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

**Technical data**

| α [°] | L1 [mm] | L2 [mm] | L4* [mm] | B [mm] | ØS [mm] | L** [mm] | EC | IC | kg |
|---|---|---|---|---|---|---|---|---|---|
| 0-120° | 180 | 40 | 125 | 100 | approx. 182 | approx. 250 | - | ✔ | 16 |

*Value refers to an angle head with BENZ Solidfix® output spindle

**depending on angle α°

# ANGLE HEAD
## FIX WFX

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM

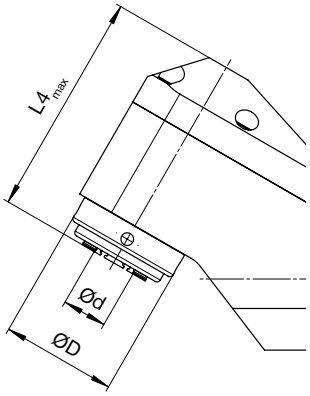
i Technical data for other output spindles / clamping systems on request:


Weldon

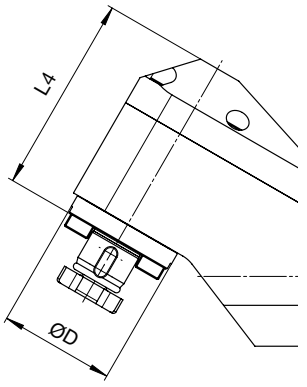

Whistle Notch


KM™

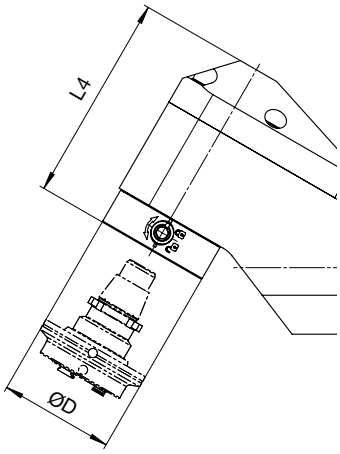
i We show you **preferable sizes** in the following tables. Smaller output spindles are possible at any time as an option.




| Collet chuck | ▶ Technical data | | | |
|---|---|---|---|---|
| | Size | $L4_{max}$ [mm] | ØD [mm] | $Ød_{max}$ [mm] |
| **ER25A** | 05 | 91 | 47 | 16 |
| **ER32A** | 07 | 106 | 55 | 20 |
| **ER40A** | 15 | 125 | 70 | 30 |



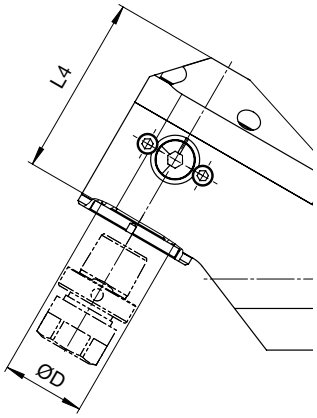

| Milling arbor | ▶ Technical data | | | |
|---|---|---|---|---|
| | Size | L4 [mm] | ØD [mm] | Ød [mm] |
| **22** | 05 | 83 | 48 | 22 |
| **27** | 07 | 98 | 60 | 27 |
| **32** | 15 | 122 | 75 | 32 |
| **40** | 15 | 125 | 90 | 40 |




For adapters and dimensions, see catalogue BENZ Modular Tool Systems

**Technical data**

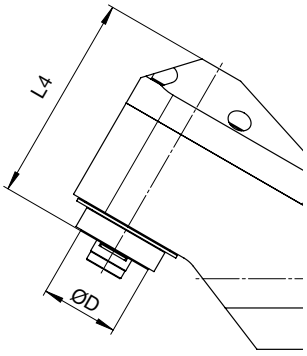
| BENZ Solidfix® | Size | L4 [mm] | ØD [mm] |
|---|---|---|---|
| **S3** | 05 | 91 | 50 |
| **S4** | 07 | 108 | 63 |
| **S5** | 15 | 125 | 75 |




For adapters and dimensions, see catalogue BENZ Modular Tool Systems

**Technical data**

| BENZ CAPTO™ | Size | L4 [mm] | ØD [mm] |
|---|---|---|---|
| **C3** | 05 | 100 | 32 |
| **C4** | 07 | 108 | 40 |
| **C5** | 15 | 129 | 50 |
| **C6** | 20 | 135 | 63 |



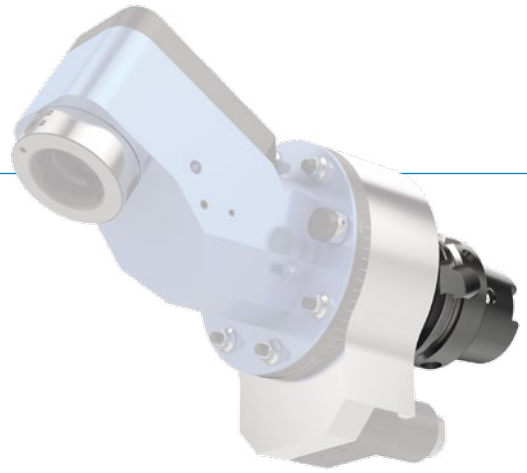

**Technical data**

| HSK | Size | L4 [mm] | ØD [mm] |
|---|---|---|---|
| **HSK 32** | 05 | 85 | 32 |
| **HSK 40** | 07 | 101 | 40 |
| **HSK 50** | 15 | 124 | 50 |
| **HSK 63** | 15 | 131 | 63 |

# ANGLE HEAD
## FIX WFX



### ▶ DRIVE CONE



Technical data for other machine interfaces on request.

### Type: Steep taper

| SK DIN 69871 | ▶ Size 05 | 07 | 15 |
|---|---|---|---|
| SK 40 | ✔ | ✔ | - |
| SK 50 | ✔ | ✔ | ✔ |

| MAS BT | ▶ Size 05 | 07 | 15 |
|---|---|---|---|
| BT 40 | ✔ | ✔ | - |
| BT 50 | ✔ | ✔ | ✔ |

| CAT | ▶ Size 05 | 07 | 15 |
|---|---|---|---|
| CAT 40 | ✔ | ✔ | - |
| CAT 50 | ✔ | ✔ | ✔ |

## Type: Hollow shank taper

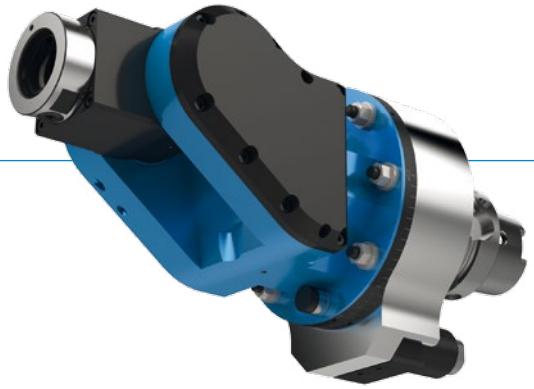
| HSK DIN 69893 | ▶ Size | | |
|---|---|---|---|
| | 05 | 07 | 15 |
| HSK 40 | - | - | - |
| HSK 50 | ✔ | - | - |
| HSK 63 | ✔ | ✔ | - |
| HSK 80 | ✔ | ✔ | ✔ |
| HSK 100 | ✔ | ✔ | ✔ |

| Coromant Capto® | ▶ Size | | |
|---|---|---|---|
| | 05 | 07 | 15 |
| C3 | - | - | - |
| C4 | ✔ | - | - |
| C5 | ✔ | ✔ | ✔ |
| C6 | ✔ | ✔ | ✔ |
| C8 | ✔ | ✔ | ✔ |

| Kennametal™ | ▶ Size | | |
|---|---|---|---|
| | 05 | 07 | 15 |
| KM 40 | - | - | - |
| KM 50 | ✔ | - | - |
| KM 63 | ✔ | ✔ | - |
| KM 80 | ✔ | ✔ | ✔ |
| KM 100 | ✔ | ✔ | ✔ |

# ANGLE HEAD
## FLEX WDX

### ▶ MODULAR DESIGN



### ▶ ANGLE HEAD BODY (SIZE)

05 | 07 | 15

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM


BENZ Solidfix®


Collet chuck


HSK


Weldon


Whistle Notch


KM™

### ▶ DRIVE CONE


SK DIN 69871


MAS BT


CAT


HSK DIN 69893


Coromant Capto®

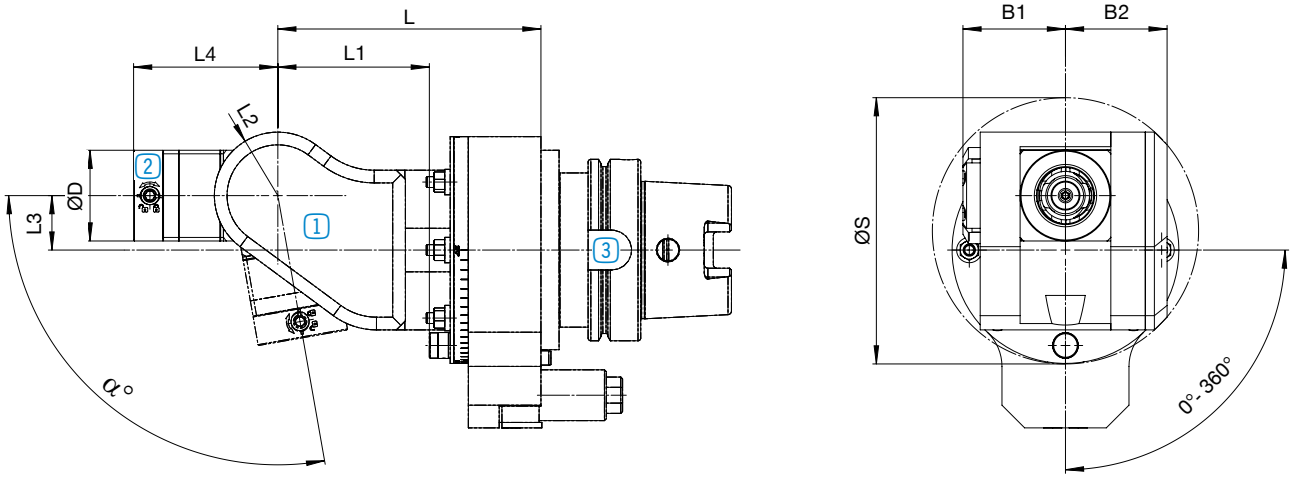

KM™

### ▶ Specifications

FLEX WDX

| Change the angle head | Machining | Number of output spindles | Axis angle | Coolant feed for cutting edge |
|---|---|---|---|---|
| auto | | 1 | 0° 90° | |
| | | | | |
| | | | | |

## Angle head with IC




1 Angle head body
P. 62

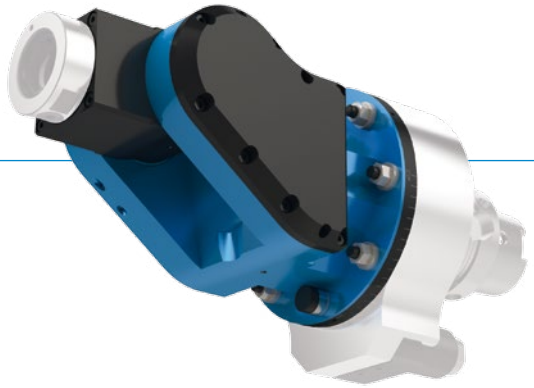
2 Output spindle / clamping system
P. 64

3 Drive cone
P. 66

# ANGLE HEAD
## FLEX WDX

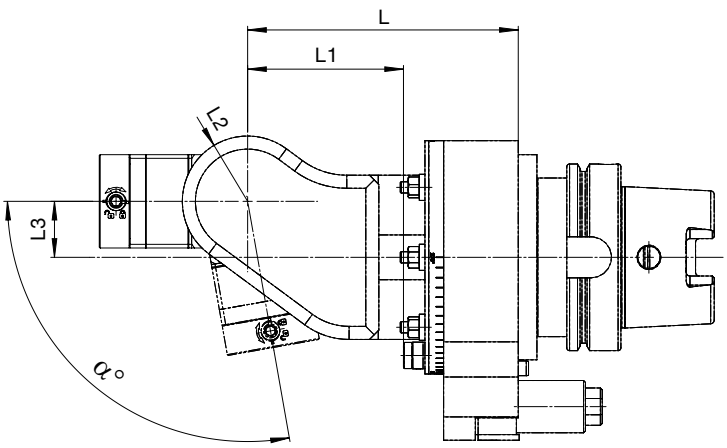


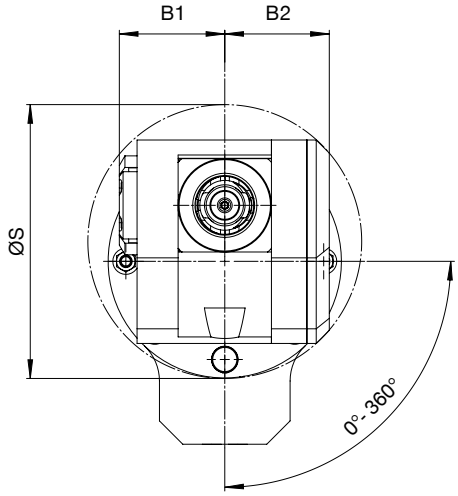
### ▶ ANGLE HEAD BODY (SIZE)



More sizes on request.
Higher speeds are possible as an option.

**▶ Angle head with IC**



## Size 05

| | |
|---|---|
| $M_{max}$ | = 15 Nm |
| i | = 1:1 |
| $n_{max}$ | = 8,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

▶ **Technical data**

| α [°] | L1 [mm] | L2 [mm] | L3 [mm] | B1 [mm] | B2 [mm] | ØS [mm] | L [mm] | EC | IC | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 0-90° | 72.5 | 35 | 25 | 49.5 | 49.5 | 127 | 134 | - | ✔ | 7 |

## Size 07

| | |
|---|---|
| $M_{max}$ | = 35 Nm |
| i | = 1:1 |
| $n_{max}$ | = 6,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

▶ **Technical data**

| α [°] | L1 [mm] | L2 [mm] | L3 [mm] | B1 [mm] | B2 [mm] | ØS [mm] | L [mm] | EC | IC | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 0-100° | 83.5 | 35 | 30 | 56.5 | 56 | 147 | 145 | - | ✔ | 10 |

## Size 15

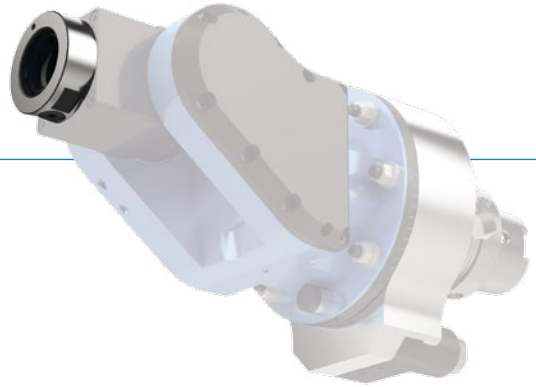
| | |
|---|---|
| $M_{max}$ | = 70 Nm |
| i | = 1:1 |
| $n_{max}$ | = 4,000 $min^{-1}$ |
| $p_{max}$ | = 100 bar |

▶ **Technical data**

| α [°] | L1 [mm] | L2 [mm] | L3 [mm] | B1 [mm] | B2 [mm] | ØS [mm] | L [mm] | EC | IC | kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 0-90° | 136.5 | 50 | 35 | 64.5 | 67 | 178 | 205 | - | ✔ | 18 |

# ANGLE HEAD
## FLEX WDX

### ▶ OUTPUT SPINDLE / CLAMPING SYSTEM



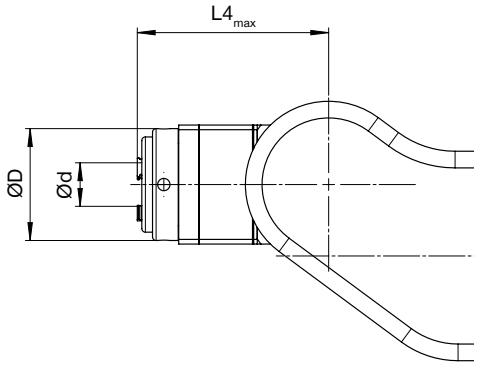
Technical data for other toutput spindles / clamping systems on request:


Weldon


Whistle Notch

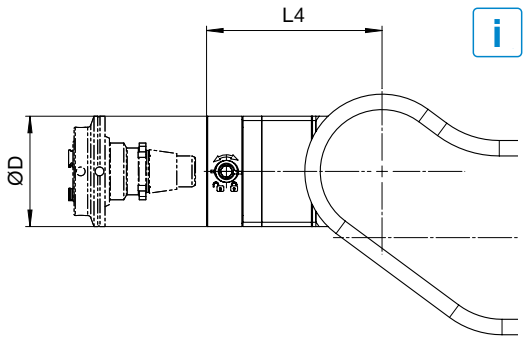

KM™

We show you **preferable sizes** in the following tables. Smaller output spindles are possible at any time as an option.




| Collet chuck | Size | $L4_{max}$ [mm] | ØD [mm] | $Ød_{max}$ [mm] |
|---|---|---|---|---|
| **ER20A** | 05 | 80 | 44 | 16 |
| **ER25A** | 07 | 85 | 47 | 20 |
| **ER32A** | 15 | 106 | 55 | 30 |

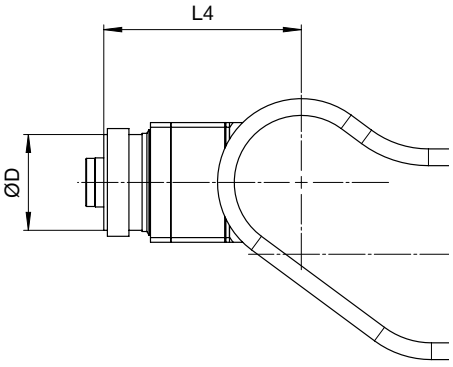
▶ **Technical data**




For adapters and dimensions, see catalogue BENZ Modular Tool Systems

▶ **Technical data**

| BENZ Solidfix® | Size | L4 [mm] | ØD [mm] |
|---|---|---|---|
| **S2** | 05 | 75 | 50 |
| **S3** | 07 | 80 | 63 |
| **S4** | 15 | 102 | 75 |



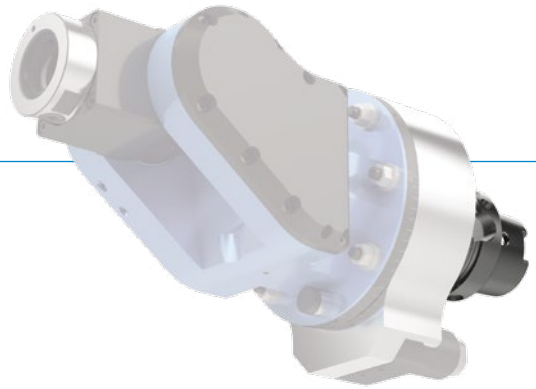

▶ **Technical data**

| HSK | Size | L4 [mm] | ØD [mm] |
|---|---|---|---|
| **HSK 32** | 05 | 74 | 32 |
| **HSK 40** | 07 | 84 | 40 |
| **HSK 50** | 15 | 103 | 50 |

# ANGLE HEAD
## FLEX WDX



### ▶ DRIVE CONE



Technical data for other machine interfaces on request.

### Type: Steep taper

| SK DIN 69871 | ▶ Size 05 | 07 | 15 |
|---|---|---|---|
| SK 40 | ✔ | ✔ | - |
| SK 50 | ✔ | ✔ | ✔ |

| MAS BT | ▶ Size 05 | 07 | 15 |
|---|---|---|---|
| BT 40 | ✔ | ✔ | - |
| BT 50 | ✔ | ✔ | ✔ |

| CAT | ▶ Size 05 | 07 | 15 |
|---|---|---|---|
| CAT 40 | ✔ | ✔ | - |
| CAT 50 | ✔ | ✔ | ✔ |

## Type: Hollow shank taper

| HSK DIN 69893 | Size 05 | 07 | 15 |
|---|---|---|---|
| HSK 40 | - | - | - |
| HSK 50 | ✔ | - | - |
| HSK 63 | ✔ | ✔ | - |
| HSK 80 | ✔ | ✔ | ✔ |
| HSK 100 | ✔ | ✔ | ✔ |

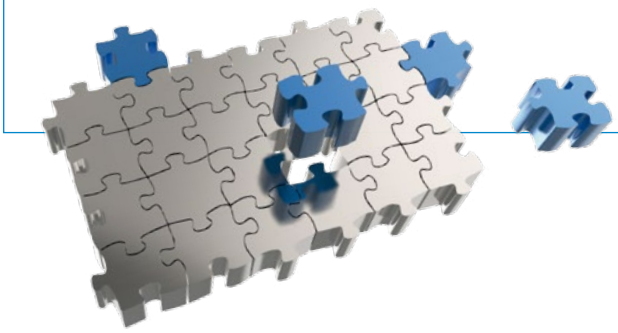
| Coromant Capto® | Size 05 | 07 | 15 |
|---|---|---|---|
| C3 | - | - | - |
| C4 | ✔ | - | - |
| C5 | ✔ | ✔ | ✔ |
| C6 | ✔ | ✔ | ✔ |
| C8 | ✔ | ✔ | ✔ |

| Kennametal™ | Size 05 | 07 | 15 |
|---|---|---|---|
| KM 40 | - | - | - |
| KM 50 | ✔ | - | - |
| KM 63 | ✔ | ✔ | - |
| KM 80 | ✔ | ✔ | ✔ |
| KM 100 | ✔ | ✔ | ✔ |

# ANGLE HEADS
## CUSTOMISED SPECIAL SOLUTIONS



### ▶ YOUR CUSTOM ANGLE HEAD

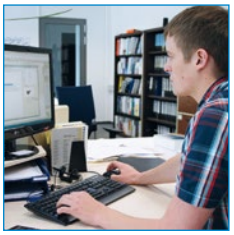


**We love the challenge and the exceptional!**

▶ Do you need an angle head that does not match any standard parameters? No problem! We develop and produce your angle head made to measure exactly according to your specifications. Small adaptations to standard products and highly complex new developments are our strength - prompt, affordable and with the usual BENZ quality thanks to our modular kits. Extreme conditions anywhere in the world: our tried and tested components and systems provide you with limitless possibilities.

## FROM THE CUSTOMER REQUIREMENT TO THE INDIVIDUAL SOLUTION

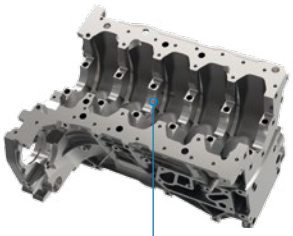
1 We define the best possible solution and develop an appropriate concept based on your requirements.



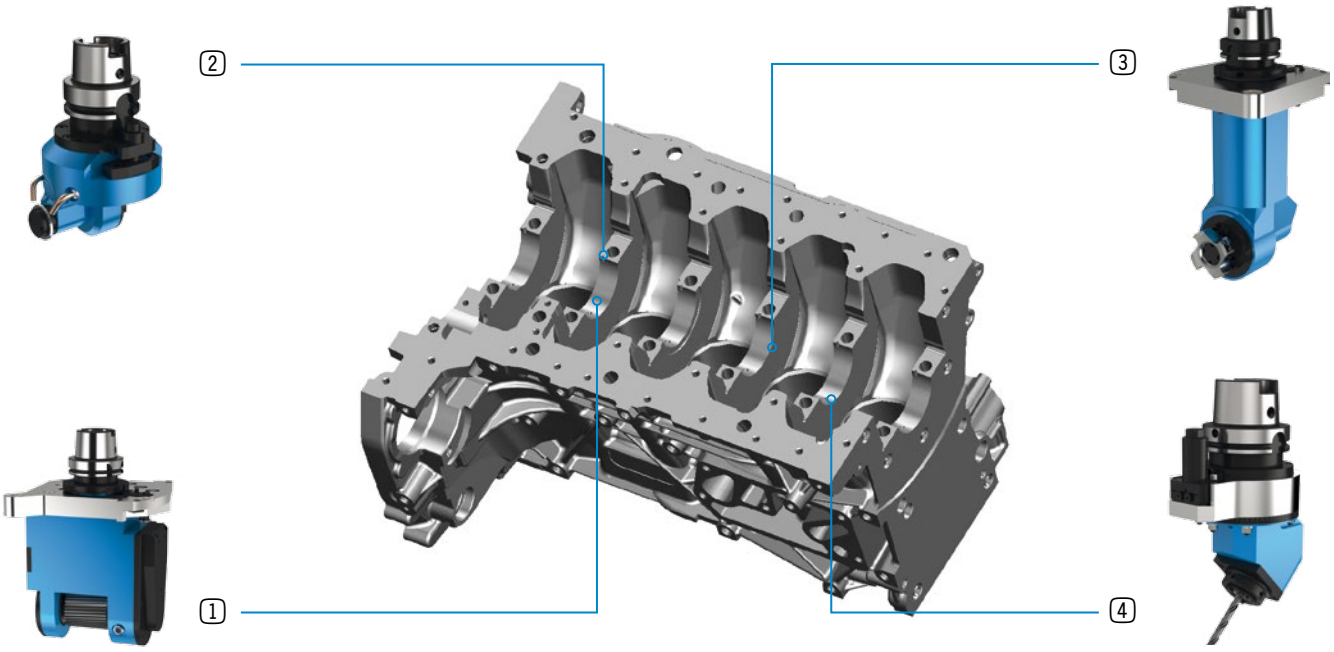
2 Your contact partner for construction starts implementation after coordinating the solution proposal.

3 Your angle head is a high quality piece of work and is produced and assembled at the BENZ factory by experienced employees.

4 Your angle head is subjected to various performance tests before it leaves our factory.

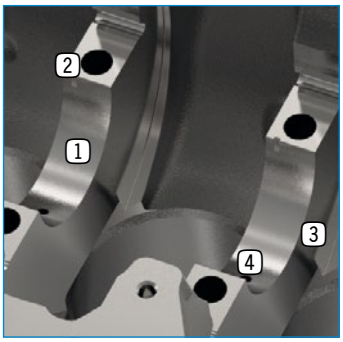


## ▶ AUTOMOTIVE EXAMPLE




Engine block machining in the automobile industry

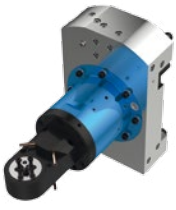
**Workpiece in detail**




**▶ Automobile industry**

| 1 | 2 | 3 | 4 |
|---|---|---|---|
| Bearing shell | Retaining slot | Side plate | Oil hole |

**More special solutions:**



Milling operation for servo housing

Milling operation at rear side of a disc brake

Engine block machining

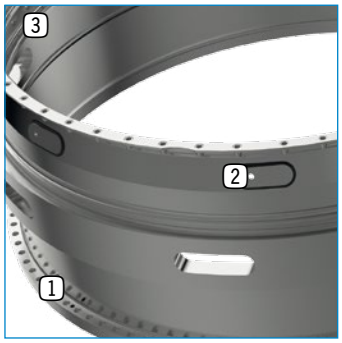
# ANGLE HEADS
## CUSTOMISED SPECIAL SOLUTIONS



### ▶ AEROSPACE EXAMPLES


Engine machining in the aerospace industry

**Workpiece in detail**




**▶ Aerospace**

| 1 | 2 | 3 |
|---|---|---|
| Flange hole | Connection hole | Internal hole |

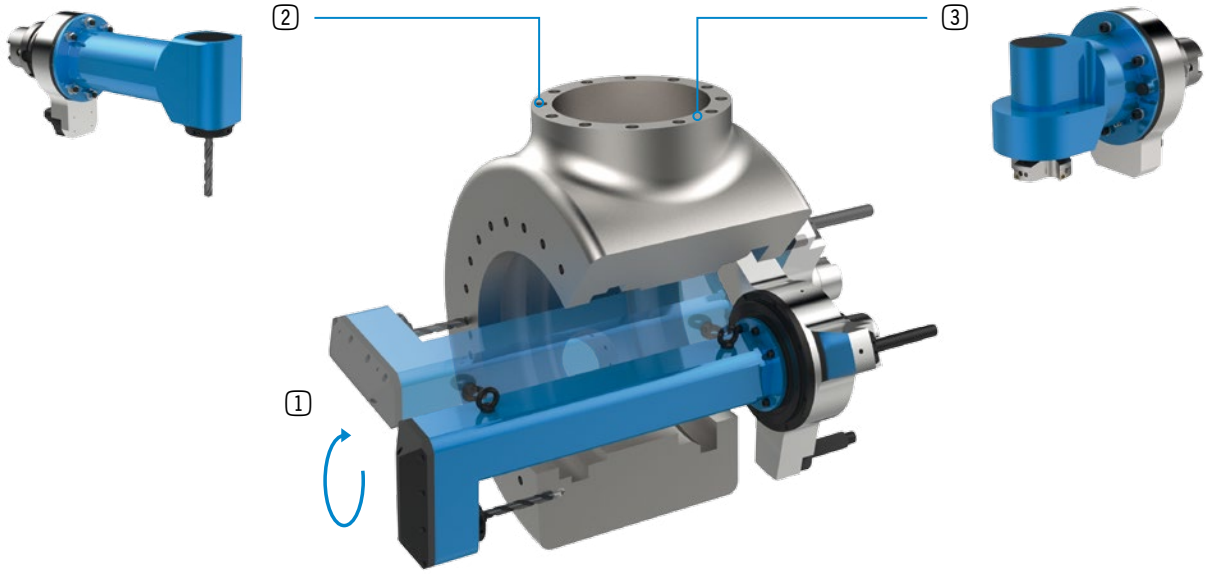
**More special solutions:**

Oil pan hole

Milling operation at aircraft wheel rims

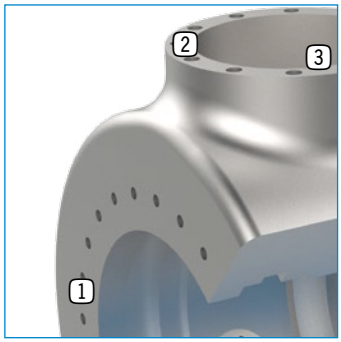
Connection hole in hydraulic blocks

## ▶ WIND POWER EXAMPLES




Rotor hub machining in the wind power industry

**Workpiece in detail**




**▶ Wind power**

| 1 | 2 | 3 |
|---|---|---|
| Core hole | Thread | Flange surface |

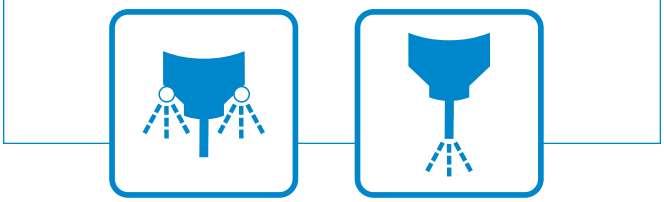
**More special solutions:**

Cross holes with large immersion depth

Milling operations on vertical boring and turning machines

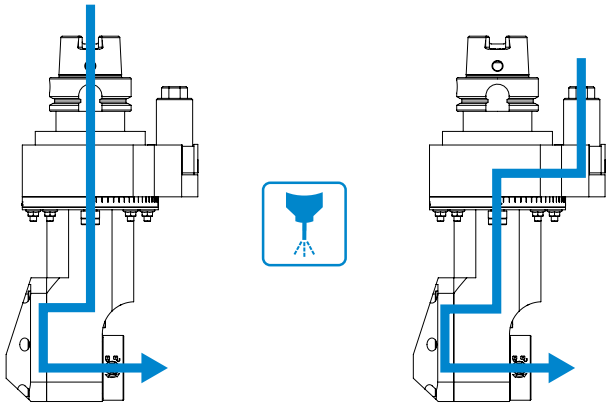
# ANGLE HEADS
## EQUIPMENT VERSIONS

### ▶ COOLANT FEED FOR CUTTING EDGE



- **Cooling of the tool**
  for demanding machining work
- **Various options**
  internal cooling, external cooling or a combination of both
- **Cooling lubricant options**
  Water, oil, MQL and a

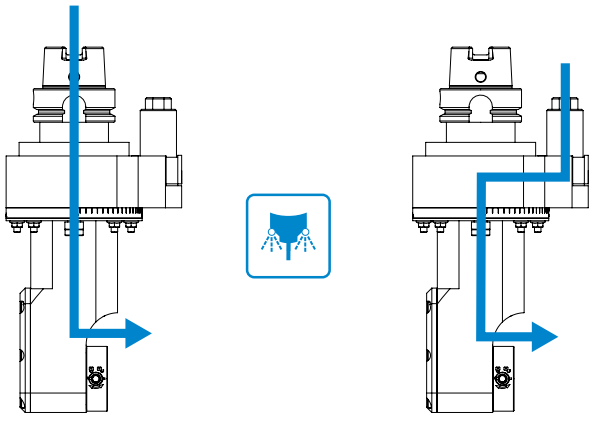
### Internal (IC)



via the spindle

via the stop block

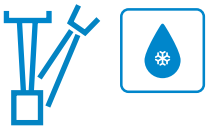
### External (EC)



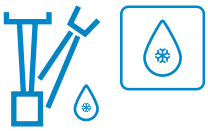
via the spindle

via the stop block

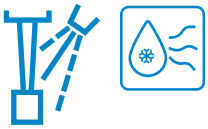
### Types of cooling (coolants)



Water cooling



Oil cooling



MQL

Air cooling

## ▶ ADDITIONAL SUPPORT

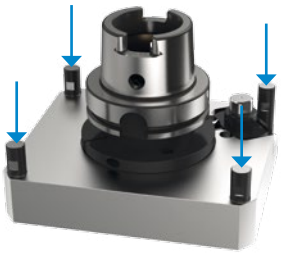
- **Increased rigidity**
  between angle head and machine spindle
- **Optimum power transmission**
  from the machine spindle onto the tool
- **Improved workpiece quality / service life of the angle head**
  due to reduced vibrations

i The need for an additional support depends on the respective machining case. Please contact us. We will be happy to advise you.

## Versions

Torque support

Torque support
with 3-point support

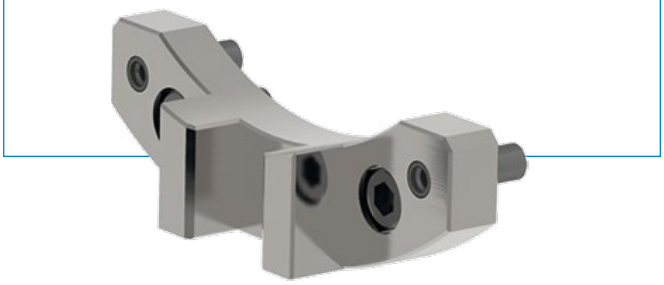


Torque support
with 4-point support

Mechanical/hydraulic
additional support

# ANGLE HEADS
## EQUIPMENT VERSIONS

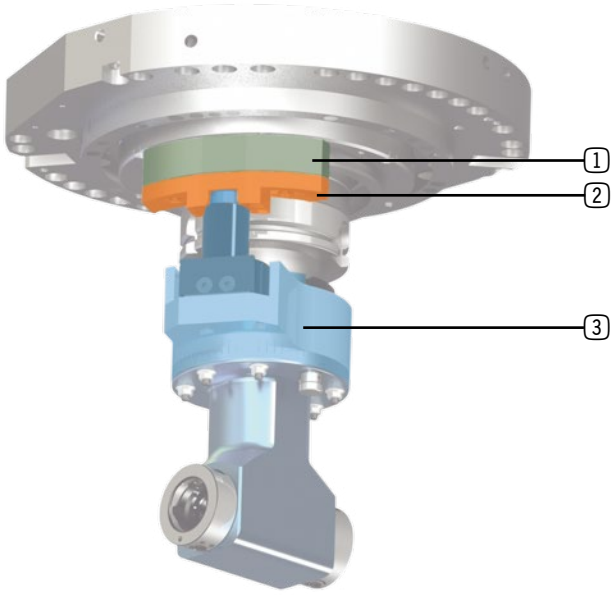
### ▶ LOCK AND UNLOCK BLOCK: STOP BLOCK



- **Positioning the angle head**
  at the machine spindle
- **Fixing the angle head**
  against possible turning
- **Guarantees a high level of repeat accuracy**
  during automatic change of the angle head
- **ISO 9524 standardised design**

i BENZ stop blocks can be adjusted to the machine by the user. In this case, the hole pattern is provided by the user. For this purpose, please observe our latest angle head operating instructions.

We will be happy to help you with the adjustment of the stop block. Please contact us.




1 **Spacer block**
- Regulates the distance between stop block and machine
- Matched to the specific machine

2 **Stop block**
- Locks or unlocks the angle head at the machine spindle
- The slot at the stop block holds the locking bolt of the torque support

3 **Torque support**
- Increases the rigidity between angle head and machine spindle
- As a rule matched to the specific machine
- Alternative: BENZ standard torque support

## Matching

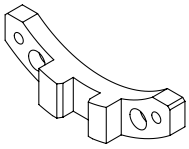
▶ **Stop block / torque support**

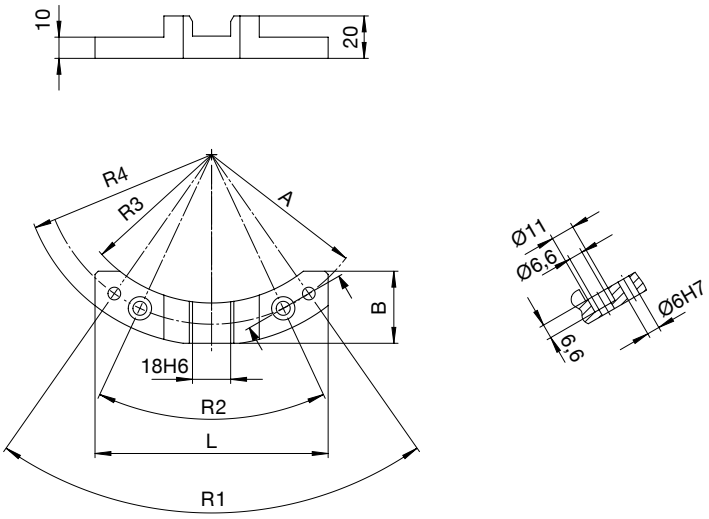
The torque support of the angle head and the stop block at the machining centre must be matched to each other

▶ **Stop block / spacer block**

The spacer block must be attached to the machine and adjusted by the customer to set the stop block.

## ▶ Standard stop blocks






### ▶ Technical data

| Order No. | A [mm] | R1 [°] | R2 [°] | R3 [°] | R4 [°] | L [mm] | B [mm] |
|---|---|---|---|---|---|---|---|
| **K00600-055/075** | 65 | 70 | 50 | R55 | R75 | 90 | 28 |
| **K00600-070/090** | 80 | 70 | 50 | R70 | R90 | 110 | 34 |
| **K00600-100/120** | 110 | 60 | 40 | R100 | R120 | 130 | 31 |

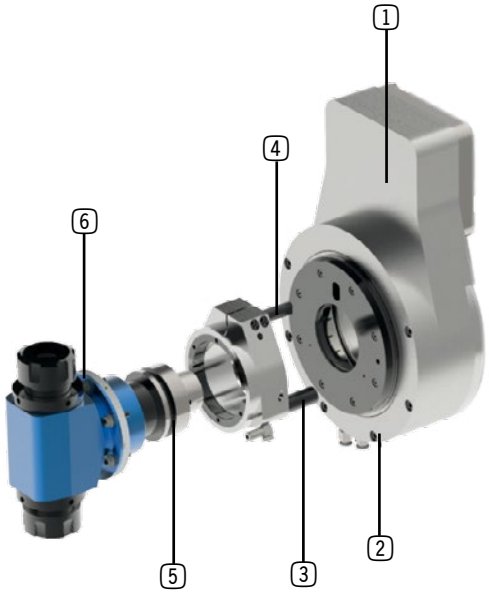
# ANGLE HEADS
## EQUIPMENT VERSIONS

### ▶ OPERATING HOURS COUNTER


- **Simple and fast monitoring of the operating times**
  via digital display (this is integrated directly in the housing of the angle head)
  The counter is activated when the spindle of the angle head starts to turn
- **Efficient and preventative maintenance**
  by determining the optimum time for maintenance
- **Prevention of any faults in the production sequence**
  by reducing the risk of failure of the unit to a minimum

## ▶ C-AXIS FUNCTIONALITY

- **NC angle positioning of exchangeable units**
  by extending the available machine basic axes (XYZ) by a 4th axis (C-axis)
- **Control of the exchangeable units**
  using 3 independent controllable compressed air interfaces




1 **C-axis**
- For swivelling the angle head

2 **Plane surface of support bolt**
- The support bolt of the torque support lies on this surface

3 **Support bolt**

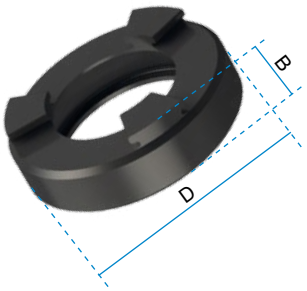
4 **Locking pin of the torque support**
- Locks the torque support at the C-axis

5 **Drive cone**
- adapted to the specific machine

6 **Angle head can be rotated 360°**
- Different types and sizes of design available for delivery according to application

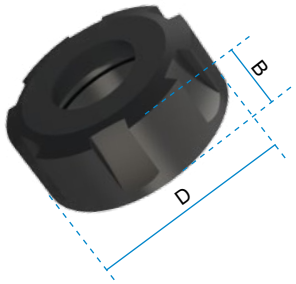
# ANGLE HEADS
## ACCESSORIES

### Clamping nut: internal




| Order No. | Technical data ► ER | D | B |
|---|---|---|---|
| B135-E1AX | 11 | M18x1 | 7.5 |
| B135-E3AX | 16 | M24x1 | 7.6 |
| B135-E4AX | 20 | M28x1.5 | 8.5 |
| B135-E5AX | 25 | M32x1.5 | 8.8 |
| B135-E6AX | 32 | M40x1.5 | 9.8 |
| B135-E7AX | 40 | M50x1.5 | 11.7 |

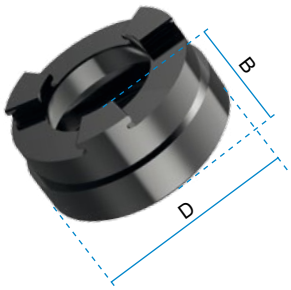
### Clamping nuts: Shape D+E




| Order No. | Technical data ► ER | D | B |
|---|---|---|---|
| B135-E1 | 11 | 19 | 11 |
| B135-E3 | 16 | 28 | 17 |
| B135-E4 | 20 | 34 | 19 |
| B135-E5 | 25 | 42 | 20 |
| B135-E6 | 32 | 50 | 22 |
| B135-E7 | 40 | 63 | 25 |
| B135-E8 | 50 | 78 | 35 |

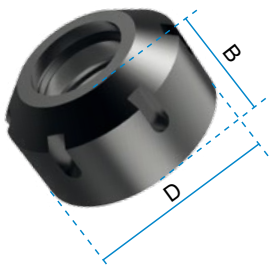


### Clamping nut for internally cooled tools: Internal Regofix system




| Order No. | Technical data ► ER | D | B |
|---|---|---|---|
| B135-E3AXC | 16 | M18x1 | 12.5 |
| B135-E4AXC | 20 | M24x1 | 13.5 |
| B135-E5AXC | 25 | M28x1.5 | 13.8 |
| B135-E6AXC | 32 | M32x1.5 | 14.9 |
| B135-E7AXC | 40 | M40x1.5 | 16.6 |

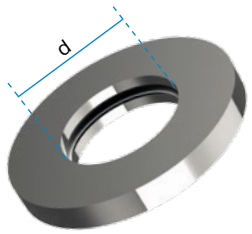
### Clamping nut for internally cooled tools: External Regofix system




| Order No. | Technical data ► ER | D | B |
|---|---|---|---|
| on request | 11 | | |
| B135-H3A | 16 | 28 | 22.5 |
| B135-H4A | 20 | 34 | 24 |
| B135-H5A | 25 | 42 | 25 |
| B135-H6A | 32 | 50 | 27.5 |
| B135-H7A | 40 | 63 | 30.5 |

A sealing disc is required when using angle heads with internal cooling.

## Sealing discs




| Order No. | Technical data ▶ ER | d |
|---|---|---|
| **B137-E3-...** | 16 | 1-10 |
| **B137-E4-...** | 20 | 1-13 |
| **B137-E5-...** | 25 | 2-16 |
| **B137-E6-...** | 32 | 2-20 |
| **B137-E7-...** | 40 | 4-26 |

Sealing area up to 0.5 mm smaller than nominal dimension d can be used

| Order No. | | | |
|---|---|---|---|
| ER 16 | **B137-E3-** | ☐ | |
| d=6 | | **0600** | |

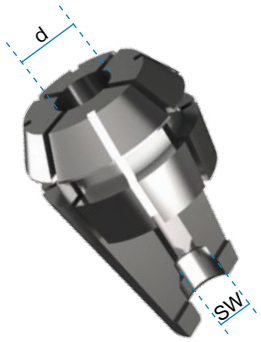
## Collet chuck: Regofix shape B


| Order No. | Technical data ▶ ER | d | increasing by |
|---|---|---|---|
| **B134-424E-...** | 11 | 1-7[1] | 0.5 |
| **B134-426E-...** | 16 | 1-10[1] | 0.5 |
| **B134-428E-...** | 20 | 1-13[2] | 1 |
| **B134-430E-...** | 25 | 1-16[2] | 1 |
| **B134-470E-...** | 32 | 3-20[2] | 1 |
| **B134-472E-...** | 40 | 4-26[2] | 1 |

[1] Collet chuck can clamp up to 0.5 mm smaller than nominal dimension
[2] Collet chuck can clamp up to 1 mm smaller than nominal dimension

| Order No. | | | |
|---|---|---|---|
| ER 16 | **B134-426E-** | ☐ | |
| d=6 | | **0600** | |

## Collet chuck for screw tap: Regofix with internal square drive




| Order No. | Technical data ▶ ER | d | Wrench size (SW) |
|---|---|---|---|
| **B134-E3...** | 16 | 1-10 | 4.5-9 |
| **B134-E4...** | 20 | 1-13 | 4.5-11 |
| **B134-E5...** | 25 | 1-16 | 4.5-16 |
| **B134-E6...** | 32 | 3-20 | 4.5-20 |
| **B134-E7...** | 40 | 4-26 | 7-22 |

| Order No. | | | | |
|---|---|---|---|---|
| ER 16 | **B134-E3-** | ☐ | ☐ | |
| d=6 | | **0600** | | |
| SW=4.9 | | | | **49** |

## Collet chuck for screw tap: Regofix square drive incl. length compensation


| Order No. | Technical data ▶ ER | d |
|---|---|---|
| **B134-A2...** | 11 | 1-7 |
| **B134-A3...** | 16 | 1-10 |
| **B134-A4...** | 20 | 1-13 |
| **B134-A5...** | 25 | 1-16 |
| **B134-A6...** | 32 | 3-20 |
| **B134-A7...** | 40 | 4-26 |

| Order No. | | | |
|---|---|---|---|
| ER 16 | **B134-A2-** | ☐ | |
| d=6 | | **0600** | |

# ANGLE HEADS
## ACCESSORIES

### Clamping wrench: for external clamping nut

| Order No. | ▶ Technical data<br>ER |
|---|---|
| B136-E1 | 11 |
| B136-E3 | 16 |
| B136-E4 | 20 |
| B136-E5 | 25 |
| B136-E6 | 32 |
| B136-E7 | 40 |
| B136-E8 | 50 |

### Clamping wrench: for internal clamping nut

| Order No. | ▶ Technical data<br>ER |
|---|---|
| B136-E1AX | 11 |
| B136-E3AX | 16 |
| B136-E4AX | 20 |
| B136-E5AX | 25 |
| B136-E6AX | 32 |
| B136-E7AX | 40 |
| B136-E8AX | 50 |

### Hook wrench

| Order No. | ▶ Technical data<br>Ø |
|---|---|
| D01810B012014 | 12-14 |
| D01810B016018 | 16-18 |
| D01810B020022 | 20-22 |
| D01810B025028 | 25-28 |
| D01810B030032 | 30-32 |
| D01810B034036 | 34-36 |
| D01810B040042 | 40-42 |
| D01810B045050 | 45-50 |
| D01810B052055 | 52-55 |
| D01810B058062 | 58-62 |
| D01810B068075 | 68-75 |
| D01810B080090 | 80-90 |
| D01810B095100 | 95-100 |

**BENZ ANGLE HEADS ENABLE THE MACHINING OF DIFFICULT TO ACCESS PARTS OF A WORK-PIECE, E.G. IN INTERNAL MACHINING**

# ANGLE HEADS
## SERVICE

### ▶ SERVICES: CUSTOMIZED, VALUE-RETAINING, COST-EFFECTIVE

▶ **Service repair**
Fast and professional analysis of damage
Findings and repair recommendations within 5 working days
on request: general maintenance or refurbishing

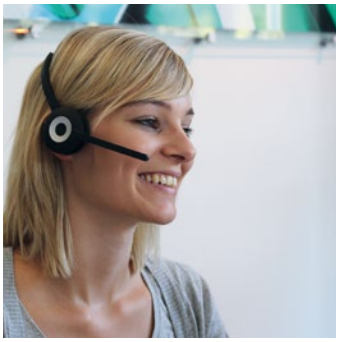
▶ **ExpressService**
Exceptionally fast and efficient turnaround
Repair at a fixed price
48-hour ExpressService available for select units

▶ **Individual crash package**
Keep machine downtime and lost profits to a minimum
Highly recommended for customer-specific solutions
Includes regular wear and tear as well as special parts

▶ **Preventive maintenance**
Prevention: Reduce unplanned downtime, increase unit operating times and unit life cycle
Maintain proper product performance / general maintenance or refurbishing
Replacement of wear parts during your planned downtime

**Spare part management**
Immediate availability / delivery of original precision spare parts
Comprehensive inventory of spare parts / High availability
Spare parts express shipment as needed

**Global service**
Service technicians visit you on site



**Service Hotline**
Skilled service representatives answer your questions and provide additional support in the event of a problem
Contact information: www.benz-tools.com

# INQUIRY FORM
# EXCHANGEABLE UNITS

BENZ Werkzeugsysteme

| | | | |
|---|---|---|---|
| Customer number | | Telephone number | |
| Company | | Fax number | |
| Contact<br>Mr. ☐ Ms. ☐ | | E- mail | |
| BENZ retailer<br>(if known) | | Date | |

## Machine information/Tool data

Machine manufacturer | Serial number

Machine model | Spindle input

Are BENZ angle heads already in use on the machine? ☐ Yes ☐ No

Drawing number/
Unit number

Stop block present ☐ Yes ▶ Please send us the drawing of the spindle with the stop block ☐ Nein ▶ Please send us the machine adaptation drawing

Additional support ☐ Yes ☐ No

Tool change ☐ Manual ☐ Automatic ▶ max. ____ kg max. Ø ____ mm

## Design

Reference article No.

■ IC not possible

| Design | MONO WSX | DUO WZX | FORTE WWX | SLIM WGX | FIX WFX | FLEX WDX | MULTI | RAPIDO | BENZ LinS |
|---|---|---|---|---|---|---|---|---|---|
| Effective length | | | | | | | | | |
| Quantity | | | | | | | | | |

| Spindle form / Type | BENZ Solidfix® | BENZ CAPTO™ | Collet chuck | Weldon | Whistle Notch | Milling arbor | KM™ | Other |
|---|---|---|---|---|---|---|---|---|
| Size | | | | | | | | |

Coolant supply ☐ No ☐ Yes ▶ ☐ EC ☐ IC

## Machining

Application
Please specify the tool Ø

| | | | | | |
|---|---|---|---|---|---|
| ☐ Drilling | ▶ | Ø | | Material | |
| ☐ Milling - Finishing | ▶ | Ø | | Speed max. | rpm |
| ☐ Milling - Roughing | ▶ | Ø | | Torque max. | Nm |
| ☐ Tapping | ▶ | Ø | | Duty / Off time cycle | / min |

Comments
e.g. requests for accessories, special processing details

☐ Drawing of workpiece enclosed

☐ 3D model enclosed

Desired delivery date

# INQUIRY FORM
# EXCHANGEABLE UNITS - SUPPLEMENT

**Please do only attach this form if you would like to order equipment versions or accessories.**

## Equipment versions

- ☐ Additional support ▶ ☐ 3-point ☐ 4-point ☐ Mechanical/hydraulic
- ☐ Stop block ▶ ☐ A=65 ☐ A=80 ☐ A=110
- ☐ Operating hours counter
- ☐ C-axis functionality

## Accessories

| | | | | | Order No. |
|---|---|---|---|---|---|
| Collet chuck | ☐ Regofix Form B | ▶ | | qty | |
| | ☐ Regofix with internal square drive | ▶ | | qty | |
| | ☐ Regofix with internal square drive incl. length compensation | ▶ | | qty | |
| Clamping nut | ☐ Form D+E | ▶ | | qty | |
| | ☐ for internally cooled tools / External Regofix system | ▶ | | qty | |
| | ☐ internal | ▶ | | qty | |
| | ☐ for internally cooled tools / Internal Regofix system | ▶ | | qty | |
| Sealing disc | | | | qty | |
| Wrench | ☐ Clamping wrench: for external clamping nut | ▶ | | qty | |
| | ☐ Clamping wrench: for internal clamping nut | ▶ | | qty | |
| | ☐ Hook wrench | ▶ | | qty | |

# TECHNOLOGIES
# ZIMMER GROUP

## HANDLING TECHNOLOGY

WITH MORE THAN 30 YEARS OF EXPERIENCE AND INDUSTRY KNOWLEDGE, OUR PNEUMATIC, HYDRAULIC AND ELECTRICAL HANDLING COMPONENTS AND SYSTEMS ARE GLOBAL LEADERS.

**Components**. More than 2000 standardized gripper systems, positioning systems, robotools and much more. We offer a complete selection of technologically superior products that are ready for rapid delivery.

**Semistandard**. Our modular approach to design enables custom configurations and high rates of innovation for process automation.

**Systems**. We are particularly strong in providing custom system solutions for handling technologies, robotics and vacuum engineering.

## DAMPING TECHNOLOGY

INDUSTRIAL DAMPING TECHNOLOGY AND SOFT CLOSE PRODUCTS EXEMPLIFY THE INNOVATION AND PIONEERING SPIRIT OF THE KNOW-HOW FACTORY.

**Industrial damping technology**. Whether standard or customized solutions, our products stand for the highest cycle rates and maximum energy absorption with minimal space requirements.

**Soft Close**. Development and mass production of pneumatic and hydraulic dampers with extraordinary quality and rapid delivery.

**OEM and direct**. Whether they need components, returning mechanisms or complete production lines – we are the trusted partner of many prestigious customers.

## LINEAR TECHNOLOGY

WE DEVELOP LINEAR COMPONENTS AND SYSTEMS THAT ARE INDIVIDUALLY ADAPTED TO OUR CUSTOMERS' NEEDS.

**Clamping and braking elements**. We offer you more than 4000 types for profiled and rounded rails as well as for a variety of guide systems from all manufacturers. It makes no difference whether you prefer a manual, automatic, electric or hydraulic drive.

**Individualized systems**. The unique functionality and precision of our clamping and breaking elements open up numerous possibilities for custom applications such as active or semi-active braking and damping.

ZIMMER

## PROCESS TECHNOLOGY

MAXIMUM EFFICIENCY IS ESSENTIAL FOR SYSTEMS AND COMPONENTS USED IN PROCESS TECHNOLOGY. HIGH-LEVEL CUSTOM SOLUTIONS ARE OUR TRADEMARK.

**A rich reservoir of experience**. Our know-how ranges from the development of materials, processes and tools through product design to production of series products. Challenge us.

**Deep production capabilities**. The Zimmer Group pairs these capabilities with flexibility, quality and precision, even when making custom products.

**Series production**. We manufacture demanding products out of metal (MIM), elastomers and plastics with flexibility and speed.

BENZ Werkzeugsysteme

## TOOLING TECHNOLOGY

ZIMMER GROUP DEVELOPS INNOVATIVE WOOD, METAL AND COMPOSITE PROCESSING TOOL SYSTEMS FOR ALL INDUSTRIES. NUMEROUS CUSTOMERS CHOOSE US AS THEIR SYSTEMS AND INNOVATION PARTNER.

**Knowledge and experience**. Industry knowledge and a decades-long development partnership for exchangeable assemblies, tool interfaces and tool systems make us the ideal choice for new challenges around the world.

**Components**. We deliver numerous standard components from stock and develop innovative, customized systems for OEM and end customers – far beyond just the metal- and wood-processing industries.

**Variety**. Whether you have machining centers, lathes or flexible production cells, the power tools, holders, assemblies and drilling heads of Zimmer Group are ready for action.

BENZ Werkzeugsysteme

## MACHINE TOOLING TECHNOLOGY

AS A DRIVING FORCE IN OUR INDUSTRY, WE DELIVER HIGH-VALUE SOLUTIONS IN THE FIELD OF MECHANICAL ENGINEERING, FULLY ACCORDING TO THE NEEDS OF OUR CUSTOMERS.

**Development partner**. We accompany you from brainstorming to inspection of the final machine, always to your expectations.

**Components**. We deliver series products and modules, five-axis heads, motor spindles, gearbox swiveling heads, add-on assemblies and motors.

**Systems**. The Know-how Factory stands for solutions in the fields of mechanical engineering systems, specialty solutions, custom assemblies and mechanical modules. We manufacture and configure multiple-spindle and large-angle heads as well as large boring heads.

# USAGE NOTE
## GENERAL

The contents of this catalog are not legally binding and are intended solely for informational purposes. Any final agreement will be in the form of a written order confirmation from BENZ GmbH, which occurs only subject to the respective current General Terms and Conditions of Sale and Delivery of BENZ GmbH. These can be found online at **www.benz-tools.com**.

All of the products listed in this catalog are designed for their intended use, e.g. machines for precision machining. The recognized technical regulations for safety and professional work must be followed for use and installation.

Furthermore, the respective laws, guidelines from TÜV, guidelines from the respective trade association and VDE stipulations shall apply.

The technical data listed in this catalog must be observed by the user. The conditions of use may not fall below or exceed the specified data. If information is missing, it cannot be assumed that there are no upper or lower limits or no limitations for specific use cases. Consultation is required in these cases.

Disposal is not included in the price, which would have to be taken into account accordingly in the event of return to or disposal by BENZ GmbH.

### TECHNICAL DATA AND FIGURES

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### STANDARDS

Zimmer Group has a quality management system certified in accordance with ISO 9001:2008. Zimmer Group has an environmental management system certified in accordance with ISO 14001:2004.

# USAGE NOTE
# INDIVIDUAL

## DECLARATION OF INCORPORATION IN TERMS OF THE EC DIRECTIVE 2006/42/EC ON MACHINERY (ANNEX II 1 B)

We hereby declare that our products meet the basic requirements of the Machinery Directive 2006/42/EC as an incomplete machine to the extent that this is possible as part of delivery.

We also declare that the specific technical documents were produced in accordance with Annex VII Part B of this Directive. We undertake to provide the market supervisory bodies with versions of the incomplete machine's special documents via our documentation department should they have reason to request them.

The incomplete machine also satisfies the stipulations of EC Directive 2004/108/EC on electromagnetic compatibility. The protective goals of EC Directive 2006/95/EC regarding electronic equipment have been met.

The incomplete machine may only be commissioned if it has been ascertained, if applicable, that the machine or system in which the incomplete machine is to be installed satisfies the requirements of Directive 2006/42/EC on Machinery and an EC declaration of conformity has been drawn up in accordance with Annex II.

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- INTERNATIONALLY NETWORKED THROUGH WORLD-WIDE LOCATIONS AND PARTNERS
- THE HIGHEST QUALITY FOR ALL PRODUCTS AND SERVICES
- PRECISE, CUSTOMER-SPECIFIC SOLUTIONS
- CONSTANT DEVELOPMENT OF OUR INDUSTRY EXPERTISE

## BENZ GMBH WERKZEUGSYSTEME

BENZ PRECISION TOOLS PROVIDE REFINED SOLUTIONS, INNOVATIVE TECHNOLOGY AND THE HIGHEST LEVELS OF QUALITY IN PRECISION MACHINING.

AS PART OF THE ZIMMER GROUP, WE GO ONE STEP FURTHER. THE NEW **ZIMMER GROUP** UMBRELLA BRAND COMBINES THE COMPANIES ZIMMER GMBH, ZIMMER KUNSTSTOFFTECHNIK, ZIMMER DAEMPFUNGSSYSTEME AND BENZ WERKZEUGSYSTEME INTO ONE PARTNER FOR YOUR PROJECTS: THE KNOW-HOW FACTORY.

CHALLENGE US. DISCOVER THE ENTIRE WORLD OF ZIMMER GROUP! IF YOU HAVE QUESTIONS ABOUT THE NEW ZIMMER GROUP AND OUR TECHNOLOGY, WE WOULD BE HAPPY TO ANSWER THEM.

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