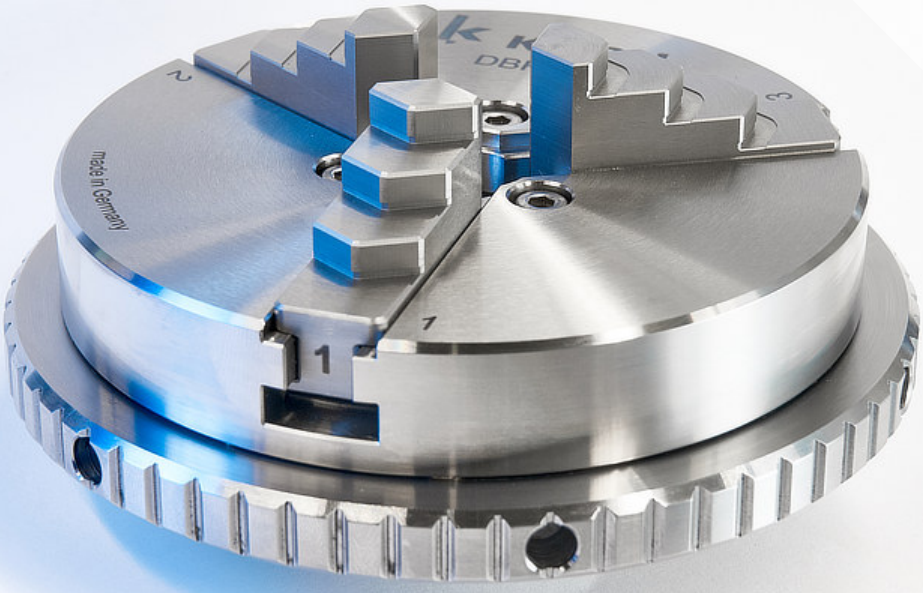
# precision clamping chucks

*for EDM*
*metrology*
*laser technology*
*special purpose machinery*



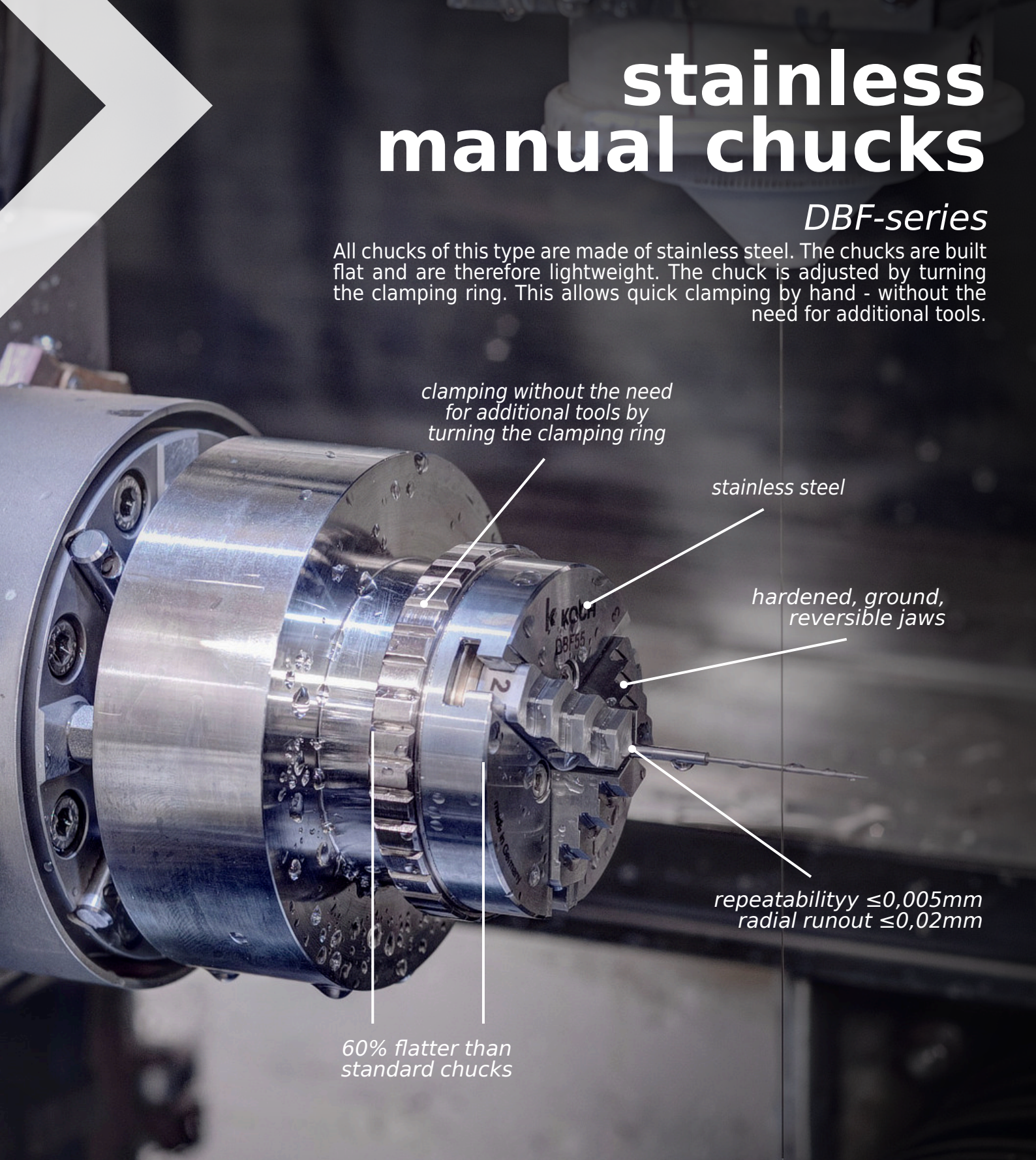

KOCH MASCHINENBAU

DBF-series
PSF-series
accessories
special Chucks

# stainless manual chucks

## *DBF-series*

All chucks of this type are made of stainless steel. The chucks are built flat and are therefore lightweight. The chuck is adjusted by turning the clamping ring. This allows quick clamping by hand - without the need for additional tools.




## *Applications*

**Metrology**
measurement of gearbox shafts
measurement of spindles
testing of needles and cannulas

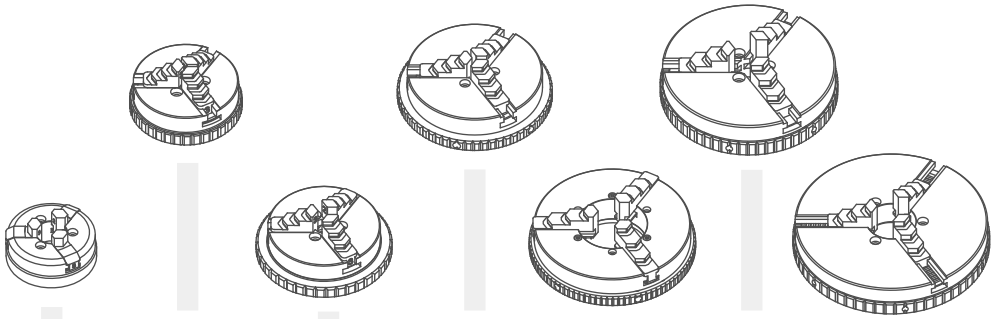
**EDM**
**electrical discharge machining**
wire erosion with rotating spindle
usage as work piece holder in dividing machines

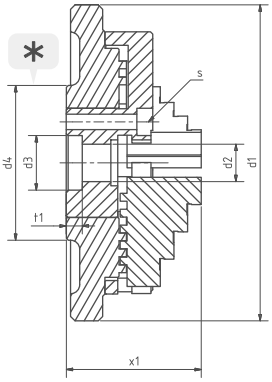
**underwater applications**
ultrasonic testing
ultrasound cleaning

**laser / electron beam**
laser marking
laser welding

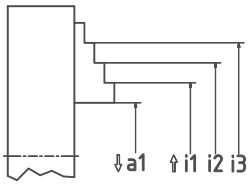
# stainless manual chucks

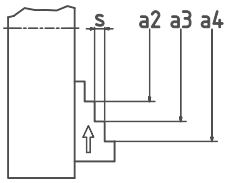
## *DBF-series*






| | DBF34 | DBF55 | DBF63 | DBF100 | DBF140 | DBF160 | DBF200 |
|---|---|---|---|---|---|---|---|
| $d_1$ | 35 | 55,5 | 69,5 | 119 | 138 | 159 | 199 |
| $d_2$ | 12 | 11 | 8,2 | 15,2 | 58 | 23 | 50 |
| $d_3$ | Ø14H6 | Ø14H6 | Ø12H6 | Ø24H6 | Ø58H6 | Ø28H6 | Ø55H6 |
| $d_4$ | Ø29 | Ø34 | Ø34 | Ø51 | Ø85$_{-0,01}$ | Ø68 | Ø95 |
| $t_1$ | 3,1 | 3,5 | 3,5 | 3,8 | 5 | 3,5 | 3,5 |
| $x_1$ | 18,5 | 29,8 | 29,3 | 42,7 | 43,6 | 56,8 | 56,8 |
| s | 3×M2 on Ø16,5 | 3×M3 on Ø18 | 3×M3 on Ø18 | 3xM4 on Ø30 | 3xM3 on Ø66 | 3×M6 on Ø36 | 3×M6 on Ø64 |
| weight | 85g | 280g | 380g | 1,6kg | 2,2kg | 5kg | 6,7kg |




clamping range**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $i_1$ | 11-23 | 13-28 | 12-32 | 20-60 | 24-68 | 24-82 | 24-144 |
| $i_2$ | - | 23-28 | 24-44 | 40-80 | 54-98 | 52-110 | 52-172 |
| $i_3$ | - | 33-48 | 36-56 | 60-110 | 84-128 | 80-138 | 80-200 |
| $a_1$*** | 1-14 | 1-16 | 1-20 | 1-40 | 1-58 | 1-56 | 1-80 |
| $a_2$ | 20-32 | 12-24 | 15,4-32 | 30-74 | 32-84 | 30-80 | 30-144 |
| $a_3$ | - | 22-34 | 27,4-44 | 60-104 | 62-114 | 58-108 | 58-172 |
| $a_4$ | - | 32-44 | 39,4-56 | 90-134 | 92-144 | 86-136 | 86-200 |
| s | 4,5 | 3 | 3 | 4,5 | 4,5 | 7 | 7 |

* *Illustration of geometry shows DBF63. Larger types have a different geometry of the back side. Please check the corresponding drawings and models for more detailed information.*

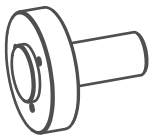
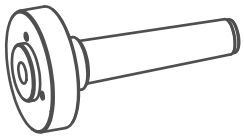
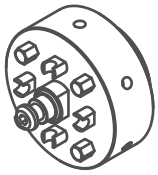
** *The values given refer to the range in which accuracy is assured. clamping of larger workpieces may be possible under certain circumstances.*

*** *Smaller clamping diameters possible - please contact us for details.*

The DBF series chucks are not suitable for applications requiring high clamping forces. The chucks have been specially developed for applications with low clamping forces but highest requirements for accuracy. In milling and turning applications, the workpiece may be torn out of the chuck.

# accessories for Koch-chucks

*Adapters for DBF & PSF series*

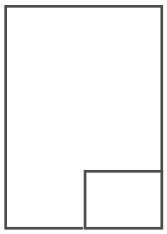
| Description | Example image* | Part number |
|---|---|---|
| cylindrical fixture (standard fixture) |  | AUFNAHME_*[Futtertyp]*_STD<br>e.g.: AUFNAHME_DBF63_STD |
| Morse fixture MK2 (incl. forcing nut) |  | AUFNAHME_*[Futtertyp]*_MORSE-MK2<br>e.g.: AUFNAHME_DBF63_MORSE-MK2 |
| flat adapter |  | AUFNAHME_*[Futtertyp]*_FLACH<br>e.g.: AUFNAHME_DBF63_FLACH |
| adapter for zero point clamping system 3R |  | AUFNAHME_*[Futtertyp]*_3R<br>e.g.: AUFNAHME_DBF63_3R |
| adapter for zero point clamping system Erowa |  | AUFNAHME_*[Futtertyp]*_EROWA<br>e.g.: AUFNAHME_DBF63_EROWA |
| adapter for zero point clamping system Hirschmann PrisFix |  | AUFNAHME_*[Futtertyp]*_HIRSCHMANN<br>e.g.: AUFNAHME_DBF63_HIRSCHMANN |

* *Example pictures show the version of the fixture for a DBF100. Other sizes may have a different geometry. Drawings and CAD data for the individual models can be found on our website www.kochmaschinenbau.de*

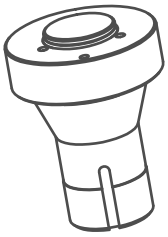
## *Custom adapter*

There is a vast number of rotary axes and spindles on the market, each of which requires an individual adaptation.

Koch Maschinenbau supports you with the design of the adapter or takes over the design and manufacturing completely. We only need a drawing of the interface to which you want to adapt the chuck. Our production also has the advantage that we can adapt the adapters individually to the corresponding chuck and thus minimize the fit clearance.



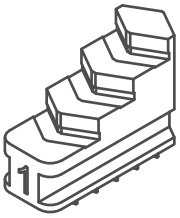
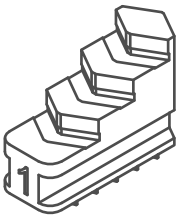
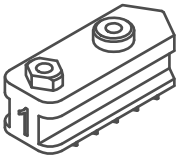
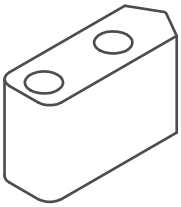
*Drawing*
*Axis / spindle*



*Manufacturing of*
*fitting adapter*

# accessories for Koch-chucks

*jaws for DBF- & PSF-series*

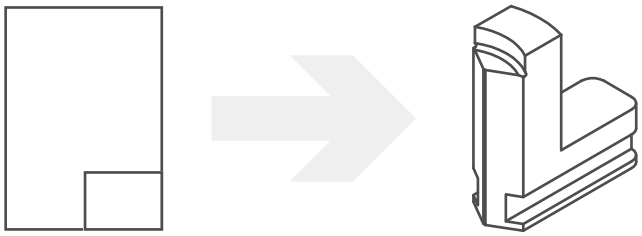
| Description | Example image* | Part number |
|---|---|---|
| Standard jaws, made of hardened stainless steel |  | BACKEN_*[Futtertyp]*_STD<br>e.g.: BACKEN_DBF63_STD |
| Standard jaws, made of bronze (CuSn8) |  | BACKEN_*[Futtertyp]*_STD-BRONZE<br>e.g.: BACKEN_DBF63_STD-BRONZE |
| Base jaws, made of hardened stainless steel |  | GRUNDBACKEN_*[Futtertyp]*_STD<br>e.g.: GRUNDBACKEN_DBF63_STD |
| Full top jaws, made of brass |  | *AUFSATZBACKEN_[Futtertyp]_VOLL-MS*<br>e.g.: AUFSATZBACKEN_DBF63_VOLL-MS |

* *Example pictures show the version of the jaws for a DBF63. Other sizes may have a different geometry. Drawings and CAD-data for the individual models can be found on our website www.kochmaschinenbau.de*

Please note that we require the chuck in which the jaws are to be used in-house if the jaws are subsequently ordered or repaired. The jaws must be grinded over in the chuck in which they are to be used. Otherwise, high accuracy cannot be achieved.

## *Custom jaws*

Many applications can already be solved with the standard jaws. However, there are always cases in which the use of application-specific jaws is necessary. Koch Maschinenbau will work with you to find the right solution for your application. Special solutions are our daily business and are possible at low cost and uncomplicated starting from quantity »1«. You can find some examples in the section "Special chucks".



*Drawing Workpiece* — *Manufacturing fitting jaws*

# non-magnetic chucks

## *for special applications*

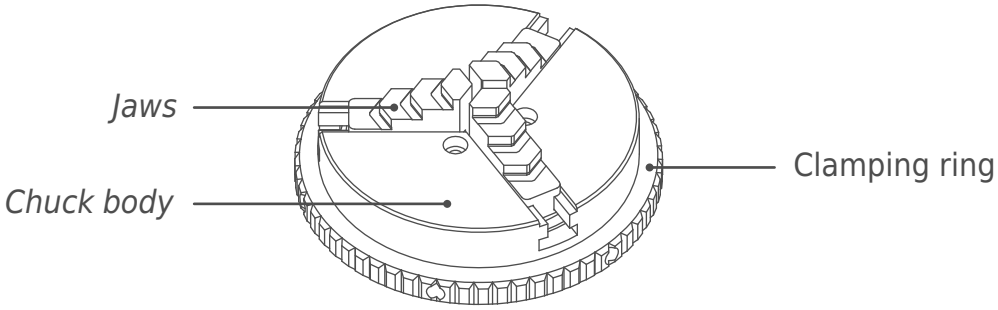
In addition to our standard chucks, we also supply chucks that have been specially adapted for applications where the magnetic properties are relevant. We can put together a chuck suiting your application.

**★ Variant 1**
e.g. for electron beam welding
Only parts close to the work-piece are made of non-magnetizable materials.

| Part | Material | $\mu_r$ |
|---|---|---|
| Jaws | CuSn8 | ≈1,0 |
| Chuck body | 1.4301 | ≤1,3 |
| Clamping ring | 1.4021 | >100 |

**★★ Variant 2**
e.g. for magnetic field measurements
All the parts of the chuck are made of non magnetizable materials.

| Part | Material | $\mu_r$ |
|---|---|---|
| Jaws | CuSn8 | ≈1,0 |
| Chuck body | 1.4429 ESU | ≤1,05 |
| Clamping ring | 1.4429 ESU | ≤1,05 |




**Question: Are standard DBF series chucks made of magnetizable materials?**

The standard jaws of the DBF series are made of martensitic stainless steel and therefore magnetizable. However, we also supply chucks made completely of non-magnetizable materials.

**Question: Is it possible to manufacture the jaws of normal stainless steel (e.g. AISI 304)?**

No. Since the chuck body is already made of this or a similar material, this would lead to cold welding and thus to complete failure of the jaws after only a short period of use. For this reason, hardened jaws are used in the standard version. We therefore recommend the use of bronze as an alternative. This material is relatively tough, abrasion-resistant and non-magnetizable.

**Question: What is the material 1.4429 ESU (AISI 316LN) and why is it used?**

The material 1.4429 ESU (AISI 316LN) is an austenitic stainless steel which is used, for example, for the construction of particle accelerators. It has exceptionally low magnetic permeability combined with good mechanical properties. This material is therefore much better suited than aluminum for building a durable chuck and is also suitable for use in a vacuum.

**Question: What types of chucks can be produced in the above-mentioned variants?**

In principle, we can manufacture all sizes and from the materials mentioned above. The most frequently requested types are DBF63, DBF100, DBF140. Here a faster delivery and lower prices due to stock may be possible.

# pneumatic chucks

## *PSF100*

With the PSF series, Koch Maschinenbau presents an extraordinary pneumatic chuck with numerous innovative features especially for use in metrology applications. The presettable clamping range enables universal use without special jaws for individual part variants.

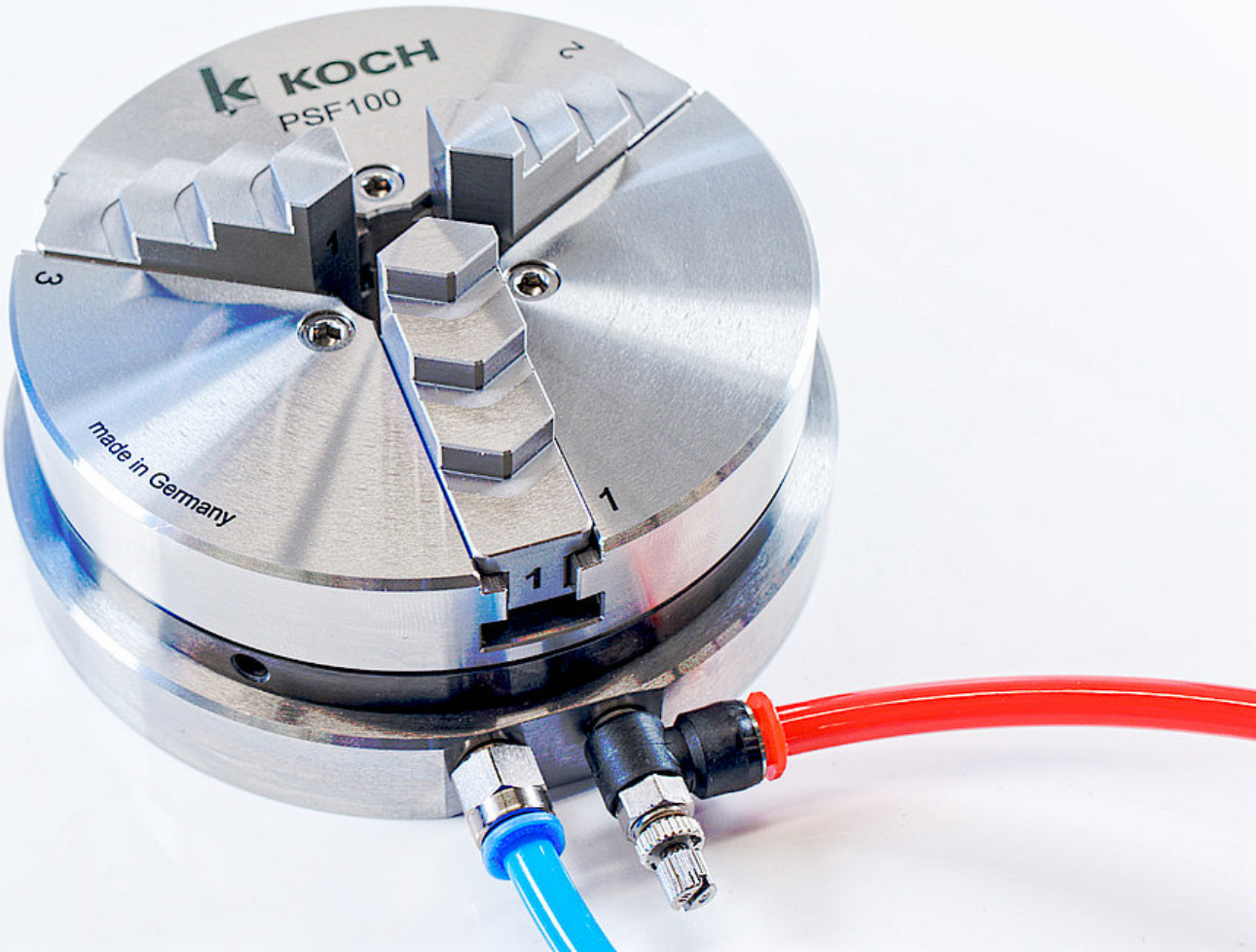
**Low clamping forces**
Only 200N at 6bar provide clamping without the risk of of distorting the workpiece.

**Highest accuracy**
Concentricity ≤20µm
Repeatability ≤5µm
(only chuck itself, without adapter)

**Reversible jaws**
The hardened stainless steel jaws can be reversed in the chuck. This additionally increases the clamping range.

**Clamping range presettable**
The clamping range can be preset with only one screw. Therefore individual jaws are often not necessary.

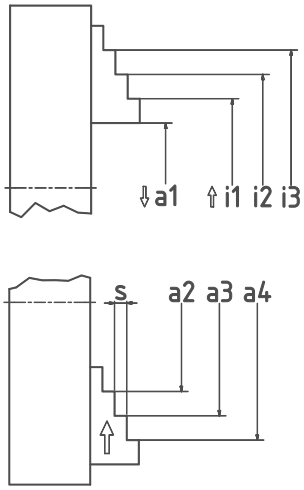
**stainless**
The chuck is built entirely of stainless materials - for lasting precision without corrosion.



# pneumatic chucks

## *PSF100*

The PSF100 closes the gap between pneumatic grippers, which are small and lightweight but offer unsatisfactory accuracy, and power chucks, which are very precise but too large and heavy and clamp with several kN clamping force, which is particularly disadvantageous for applications in the field of metrology.




| | clamping range* |
|---|---|
| $i_1$ | 20-60 |
| $i_2$ | 40-80 |
| $i_3$ | 60-110 |
| $a_1$** | 1-40 |
| $a_2$ | 30-74 |
| $a_3$ | 60-104 |
| $a_4$ | 90-134 |
| s | 4,5 |

| property | specification |
|---|---|
| operating medium | Compressed air, unlubricated,<br>according to ISO 8573-1:2010 [7:4:4] |
| operating pressure | 6bar |
| clamping force | 200N (@ 6bar) |
| ambient temperature | +10 ... +50°C |
| pneumatic connection | M5 |
| weight | 2kg |
| radial stroke of jaws | stroke of jaws radial 1,33mm, (≙2,66mm in diameter)<br>position of jaws can be preset to 0.08mm |
| repeatability*** | ≤5µm |
| concentricity*** | ≤20µm |

*Drawings and CAD data can be found on our website www.kochmaschinenbau.de*

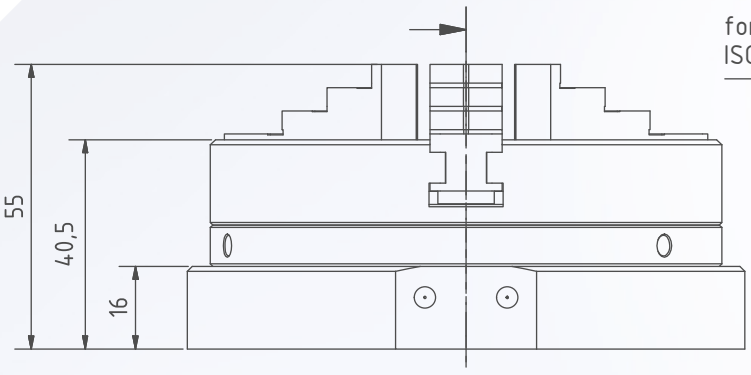
* *The values given relate to the range in which the accuracy is guaranteed. It may be possible to clamp larger workpieces.*

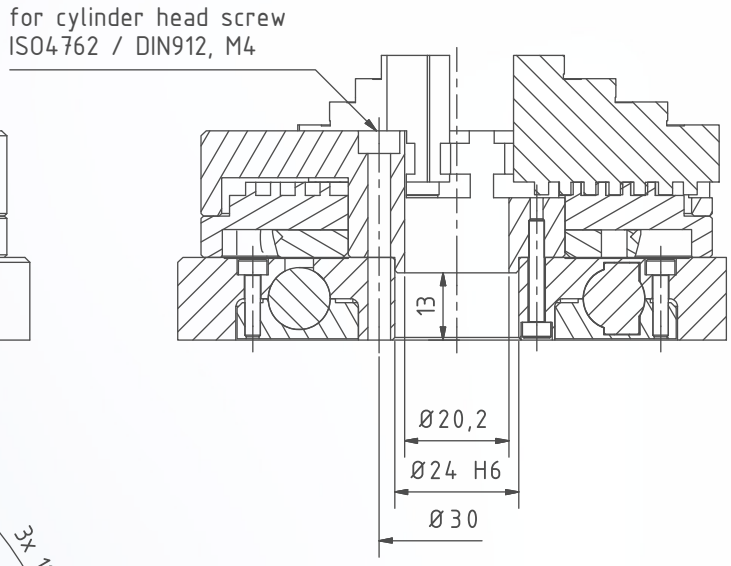
** *smaller clamping diametersmay be possible - please contact us for details*

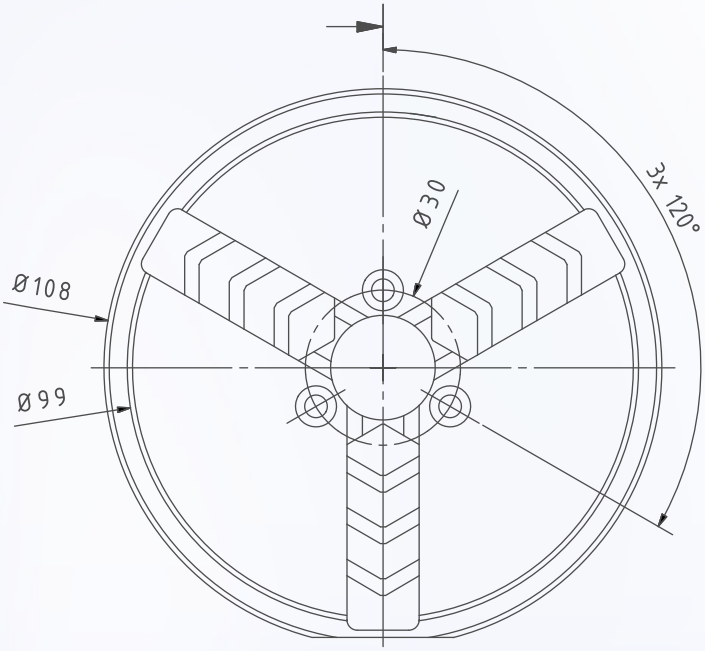
*** *The data refers to the chuck without attachments. The values are worsened by the rotating union or adapter. Please contact us if you have particularly high requirements for accuracy.*

# pneumatic chucks

*PSF100*

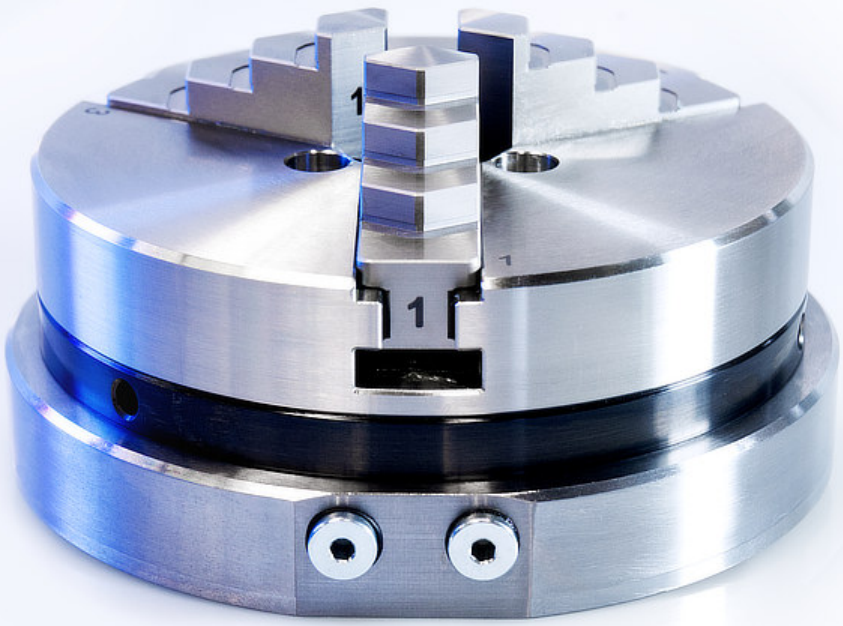



The PSF series chucks differ in many aspects from common pneumatic chucks or grippers. Please be sure to follow the instructions in the operating manual during setup.

The PSF-series chucks are not suitable for applications requiring high clamping forces. The chucks have been specially developed for applications with low clamping forces but highest requirements for accuracy. In milling and turning applications, the workpiece may be torn out of the chuck.



# rotary union for pneumatic chuck

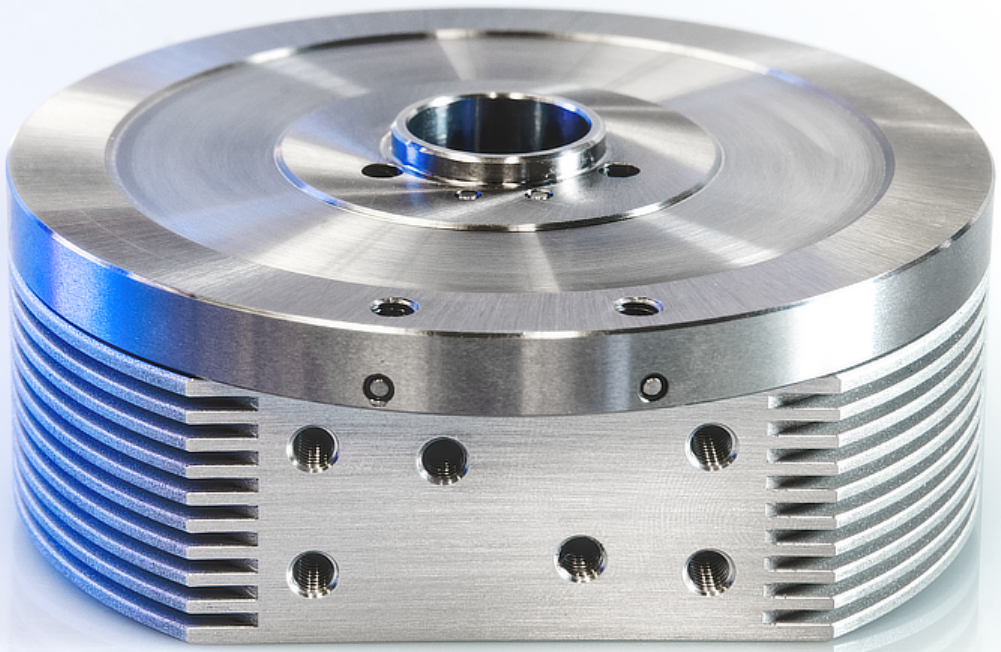
## *DDP100*

With the DDP100 rotating union, compressed air can be transmitted to the PSF100 pneumatic chuck on two channels (opening / closing) during an endless rotary movement. Unlike conventional rotating unions, the body of the DDP series is made of one piece and precisely grinded. This minimizes the negative influence of the rotary union on the concentricity of the chuck.

| property | specification |
|---|---|
| operating medium | Compressed air, unlubricated, according to ISO 8573-1:2010 [7:4:4] |
| operating pressure | 6bar |
| maximum speed | 125 $min^{-1}$ |
| ambient temperature | +10 ... +50°C |
| pneumatic connection | M5 |
| weight | 1,65kg |
| material | stainless steel / aluminum / high performance plastics |
| breakaway torque* | 2 Nm (at 6bar on one channel) |
| continuous torque* | 1 Nm (at 6bar on one channel) |

*Drawings and CAD data can be found on our website www.kochmaschinenbau.de*

* *The value depends on humidity, temperature, etc. and is therefore subject to variations.*



# special chucks

## *according to customer specifications*

We manufacture a wide range of chucks in different sizes and for different applications - from the world's smallest spiral chuck with a diameter of 34mm for use on measuring microscopes, to chucks with a diameter of 300mm for special machinery.

## *Custom chuck bodys*

The chucks can be customized in many ways:

- Holes and threads in the chuck body
- specially ground measuring surfaces
- Covers and adjustment limits

In addition to our standard 3-jaw chucks, various special types have already been built, e.g. 2-, 4-, 5-, 6- and even 7-jaw chucks.

Our chuck bodies can also be made of different materials:

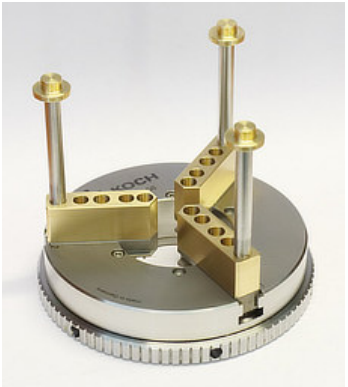
- special stainless steel alloys for extra low magnetism (1.4429 ESU, $\mu_r$<1,01)
- aluminum for weight reduction.
- special stainless steels for chem. resistance

## *Clamping jaws*

Special clamping jaws can be manufactured very individually and in many variants. For example, the production of jaws made of materials such as aluminum, bronze or high-strength PEEK plastic is possible.

## *Custom Logo*

All chucks can also be manufactured with special markings, such as your customer logo. The inscription is lasered by us based on your data and can be carried out either as engraving with material removal or as tempering inscription with very low throw-up.

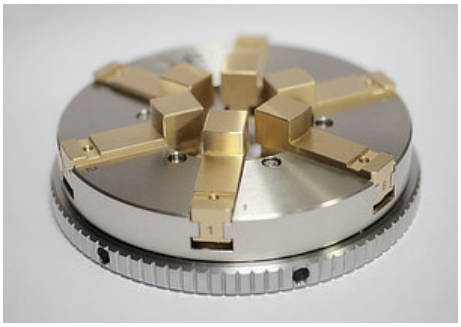


DBF140 with brass jaws and relocatable inserts

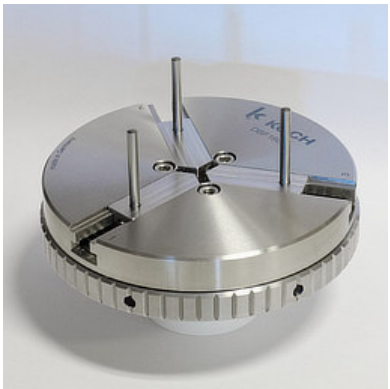
Top jaws made of PEEK for DBF160

DBF34 with extra long brass jaws

DBF100 with extended PEEK clamping elements



6-jaw chuck with bronze jaws based on a DBF140



DBF160 with flat jaws and cylindrical pins

DBF63 on a rotating device for electron beam welding

**Koch Maschinenbau GmbH & Co. KG**

An der Hopfendarre 13
09212 Limbach-Oberfrohna
Germany

Tel.: +49 (0)3722 60898 -0
Fax: +49 (0)3722 60898 -29

info@kochmaschinenbau.de
www.kochmaschinenbau.de

KOCH
MASCHINENBAU