

# The accessories.

## External Cylindrical Grinding Machine



### S36 - The Efficient for automated processes.

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## External grinding

2227691-Z

Cut-in ring sensor to external grinding spindle with nominal Ø 80mm / 3.15" and wheel guards without grinding wheel contact protection for cut-in detection on external grinding with clamping devices for live spindle grinding (chucks, collets) or between fixed for rotating centers. Cable length 1.5m plugable

2227723-Z

Cut-in ring sensor to external grinding spindle with nominal Ø 80mm / 3.15" and wheel guards with grinding wheel contact protection for cut-in detection on external grinding with clamping devices for live spindle grinding (chucks, collets) or between fixed or rotating centers.  
Cable length 1.5m plugable

## Wheel adaptor, nominal dia. 80mm / 3.15"

2227678-Z

Wheel adaptor dia. 610mm / 24" with bore 203.2mm / 8", width 130mm / 5.12" form1 (160mm / 6.3" form5) for tapered shaft ends 1:10 nominal dia. 80mm / 3.15".  
Incl. balancing segments and scale on booth sides

## Wheel adaptor, nominal dia. 80mm / 3.15" for balancing unit Hydrobalance

2227672-Z

Wheel adaptor right dia. 610mm / 24" with bore 203.2mm / 8", width 130mm / 5.12" form1 (160mm / 6.3" form5) for tapered shaft ends 1:10 nominal dia. 80mm / 3.15" and balancing unit Hydrobalance  
Incl. balancing segments and scales on booth sides

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## Extraction tool

2237617-Z

Abpresswerkzeug für Schleifscheibenaufnahmen zu Wellenenden mit Nenn-Ø 80mm

## Wheel changing unit

### 2237618-Z

Locating pin for more ergonomic grinding wheel change for shaft end with nominal dia. 80mm / 3.15" including extractor nut (instead of the extraction tool)

### 2237616-Z

Suspension bracket for grinding wheel change with lifting device on the customer side (e.g. hall crane) for wheelhead right 0 deg. or 20 deg.

## Static balancing

### 2416601-Z

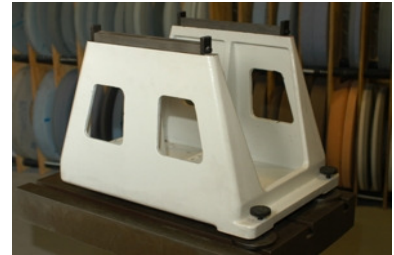
Balancing equipment dia. up to 600mm / 24.62" for static balancing of the grinding wheel outside of the machine.

Note: Requires the respective balancing mandrel for grinding wheels

Note: Only possible up to the following grinding wheel width:

-- without HBA: max. 160mm / 6.3"

-- with HBA: max. 145mm / 5.71"



### 2416621-Z

Balancing equipment dia. up to 750mm / 29.53" for static balancing of the grinding wheel outside of the machine.

Note: Requires the respective balancing mandrel for grinding wheels

### 2237028-Z

Balancing arbor for grinding wheel adaptors with nominal dia. 80mm / 3.15", length 415mm / 16.33" for balancing equipment dia. 600mm / 23.62" or 750mm / 29.53"

## External grinding wheels

General application of abrasives

11C Silicon Carbides for:

Cast iron / tungsten carbide / glass / plastics / non-ferrous metals / ceramics / stainless, acid and heat resistant steel / hardened steel 63 HRc and higher / nitriding steel.

hardened steel 63 HRc and higher / nitriding steel.

54A White aluminium oxide for:

Non-alloyed, alloyed, unhardened and hardened steel up to 63 HRc (carbon content up to 0.5% / stainless, acid and heat resistant steel / nitriding steel (untreated) / cast steel nodular cast iron / tool steel / hard-chrome plated steel.

81A Ceramic aluminium oxide:

Difficult-to-grind steel and alloys (tool steel, high speed steel) from soft state to 64 HRc / cast steel / cast iron

The following abrasives should no longer be used:

42A, 53A, 57A Pure aluminium oxide was replaced by 54A Pure aluminium oxide

## Grinding wheel dia. 600mm/23.6", bore 203.2mm/8"

5585493-Z

Grinding wheel dia. 600x100x203.2mm / 23.6x4x8"

form 1, 81A 80 H15VPMF601W. Cutting speed 50m/s /

9840sfpm

5585491-Z

Grinding wheel dia. 600x100x203.2mm / 23.6x4x8"

form 1, 55N 120 H15VPMF302W. Cutting speed 50m/s /

9840sfpm

5585486-Z

Grinding wheel dia. 600x100x203.2mm / 23.6x4x8"

form 1, 54A 60 G8V904W. Cutting speed 50m/s /

9840sfpm

5585485-Z

Grinding wheel dia. 600x100x203.2mm / 23.6x4x8"

form 1, 54A 80 H15VPMF904W. Cutting speed 50m/s /

9840sfpm

5585487-Z

Grinding wheel dia. 600x100x203.2mm / 23.6x4x8"

form 1, 54A 120 H15VPMF904W. Cutting speed 50m/s /

9840sfpm

5585488-Z

Grinding wheel dia. 600x100x203.2mm / 23.6x4x8"  
form 1N,  $v=70^\circ$   $x=3$  54A 60 G8V904W  
Cutting speed 50m/s /9840sfpm

5585489-Z

Grinding wheel dia. 600x100x203.2mm / 23.6x4x8"  
form 1N,  $v=70^\circ$   $x=3$  54A 80 H15VPMF904W  
Cutting speed 50m/s /9840sfpm

5585490-Z

Grinding wheel dia. 600x100x203.2mm / 23.6x4x8"  
form 1N,  $v=70^\circ$   $x=3$  54A 120 H15VPMF904W  
Cutting speed 50m/s /9840sfpm

5585494-Z

Grinding wheel dia. 600x100x203.2mm / 23.6x4x8"  
form 1N,  $v=70^\circ$   $x=3$  81A 80 H15VPMF601W  
Cutting speed 50m/s /9840sfpm

5585492-Z

Grinding wheel dia. 600x100x203.2mm / 23.6x4x8"  
form 1N,  $v=70^\circ$   $x=3$  55N 120 H15VPMF302W  
Cutting speed 50m/s /9840sfpm

5585505-Z

Grinding wheel dia. 600x160x203.2mm / 23.6x6.3x8"  
form5, P=290 F=30, 54A 60 G8V904W.  
Cutting speed 50m/s /9840sfpm

5585506-Z

Grinding wheel dia. 600x160x203.2mm / 23.6x6.3x8"  
form5, P=290 F=30, 54A 80 H15VPMF904W.  
Cutting speed 50m/s /9840sfpm

5585507-Z

Grinding wheel dia. 600x160x203.2mm / 23.6x6.3x8"  
form5, P=290 F=30, 54A 120 H15VPMF904W.  
Cutting speed 50m/s /9840sfpm

5585508-Z

Grinding wheel dia. 600x160x203.2mm / 23.6x6.3x8"  
form5N,  $v=70^\circ$   $x=3$ , P=290 F=30, 54A 60 G8V904W.  
Cutting speed 50m/s /9840sfpm

5585509-Z

Grinding wheel dia. 600x160x203.2mm / 23.6x6.3x8"  
form5N,  $v=70^\circ$   $x=3$ , P=290 F=30, 54A 80  
H15VPMF904W.  
Cutting speed 50m/s /9840sfpm

5585510-Z

Grinding wheel dia. 600x160x203.2mm / 23.6x6.3x8"  
form5N,  $v=70^\circ$   $x=3$ , P=290 F=30,  
54A 120 H15VPMF904W. Cutting speed 50m/s  
/9840sfpm

5585511-Z

Grinding wheel dia. 600x160x203.2mm / 23.6x6.3x8"  
form5, P=290 F=30, 55N 120 H15VPMF302W.  
Cutting speed 50m/s / 9840sfpm

5585512-Z

Grinding wheel dia. 600x160x203.2mm / 23.6x6.3x8"  
form5N,  $v=70^\circ$   $x=3$ , P=290 F=30, 55N 120  
H15VPMF302W.  
Cutting speed 50m/s /9840sfpm

5585513-Z

Grinding wheel dia. 600x160x203.2mm / 23.6x6.3x8"  
form5, P=290 F=30, 81A 80 H15VPMF601W.  
Cutting speed 50m/s / 9840sfpm

5585514-Z

Grinding wheel dia. 600x160x203.2mm / 23.6x6.3x8"  
form5N,  $v=70^\circ$   $x=3$ , P=290 F=30, 81A 80  
H15VPMF601W.  
Cutting speed 50m/s / 9840sfpm

## Accessories for workhead

2439674-Z

Cut-in ring sensor (transmitter ring) for mounting  
on the clamping device for live spindle grinding or  
its adaptors with correspondent interface for use on  
workheads with fitting taper ISO50.

Note: Requires correspondent sensor receiver ring on  
the workhead

#### 2439673-Z

Receiver ring of cut-in ring sensor for universal workhead with fitting taper ISO 50, incl. plugable connection cable (cable length 4m).

Note: For the use of centers, the receiver ring has to be detached

#### 2439672-Z

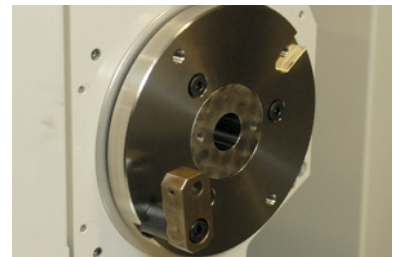
Receiver ring of cut-in ring sensor for chuck workhead with fitting taper ISO50, incl. plugable connection cable (cable length 4m).

Note: For the use of centers, the receiver ring has to be detached

### Adaptors for centres

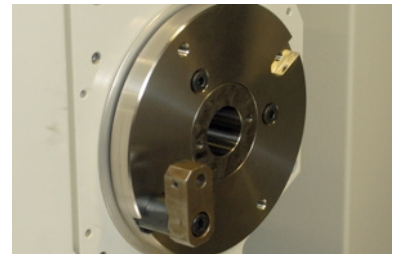
#### 2439719-Z

Insert for centers MT3 for universal workhead ISO50 incl. locking plate and driver (driver pin dia. 10mm / .39")



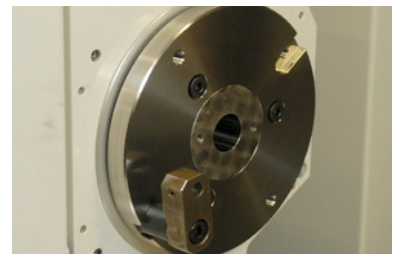
#### 2439720-Z

Insert for centers MT4 for universal workhead ISO50 incl. locking plate and driver (driver pin dia. 10mm / .39")



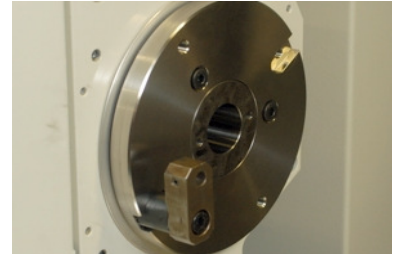
#### 2439717-Z

Insert for centers MT3 for chuck workhead ISO50 incl. driver plate and driver (driver pin dia. 10mm / .39")



2439718-Z

Insert for centers MT4 for chuck workhead ISO50 incl. driver plate and driver (driver pin dia. 10mm / .39")



### Zero backlash drivers

2439855-Z

Simple driving fork for zero backlash driving of a lathe dog, instead of a driving pin dia. 10mm / 0.39". Fits drivers of workheads with fitting taper ISO50

2439854-Z

Lateral force free driving fork for the backlash free driving of a workpiece carrier.

Note: Requires driving plate for workhead

2439856-Z

Driving plate for workhead with spindle nose dia. 110mm / 4.33" and revolving center for mounting of a tangentially stiff driving fork and/or drawdown springs for steady rest grinding applications

### applications

2439862-Z

Drawdown spring set for steady rest grinding applications for pressing the workpiece against center of the workhead.

Note: Driving plate required

### Carrier

1809617-Z

Set of 5 carriers for dia. 10-50mm / .39-1.97"



1809724-Z  
Carrier for dia. 50-80mm / 1.97-3.15"

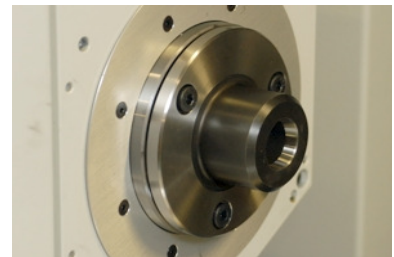


1809725-Z  
Carrier for dia. 80-120mm / 3.15-4.72"

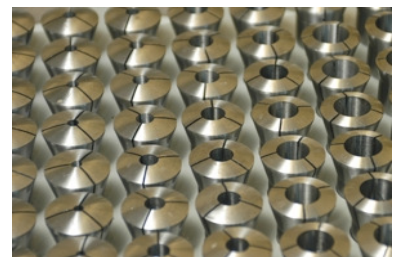


## Collets W20

2439723-Z  
Adaptor for collets W20 for fitting taper ISO50  
Note: Requires manual draw-bar or clamping cylinder with  
clamping actuating tube



5558101-Z  
Set of 37 collets W20 dia. 2-20mm, in steps of 0.5mm  
Single collets orders possible



1930539-Z  
Collet W20 dia. 0.5mm



1930540-Z  
Collet W20 dia. 1mm

1930541-Z  
Collet W20 dia. 1.5mm

1930400-Z  
Collet W20 dia. 2mm

1930401-Z  
Collet W20 dia. 2.5mm

1930402-Z  
Collet W20 dia. 3mm

1930403-Z  
Collet W20 dia. 3.5mm

1930404-Z  
Collet W20 dia. 4mm

1930405-Z  
Collet W20 dia. 4.5mm

1930406-Z  
Collet W20 dia. 5mm

1930407-Z  
Collet W20 dia. 5.5mm

1930408-Z  
Collet W20 dia. 6mm

1930409-Z  
Collet W20 dia. 6.5mm

1930410-Z  
Collet W20 dia. 7mm

1930411-Z  
Collet W20 dia. 7.5mm

1930412-Z  
Collet W20 dia. 8mm

1930413-Z  
Collet W20 dia. 8.5mm

1930414-Z  
Collet W20 dia. 9mm

1930415-Z  
Collet W20 dia. 9.5mm

1930416-Z  
Collet W20 dia. 10mm

1930417-Z  
Collet W20 dia. 10.5mm

1930418-Z  
Collet W20 dia. 11mm

1930419-Z  
Collet W20 dia. 11.5mm

1930420-Z  
Collet W20 dia. 12mm

1930421-Z  
Collet W20 dia. 12.5mm

1930422-Z  
Collet W20 dia. 13mm

1930423-Z  
Collet W20 dia. 13.5mm

1930424-Z  
Collet W20 dia. 14mm

1930425-Z  
Collet W20 dia. 14.5mm

1930426-Z  
Collet W20 dia. 15mm

1930427-Z  
Collet W20 dia. 15.5mm

1930428-Z  
Collet W20 dia. 16mm

1930429-Z  
Collet W20 dia. 16.5mm

1930430-Z  
Collet W20 dia. 17mm

1930431-Z  
Collet W20 dia. 17.5mm

1930432-Z  
Collet W20 dia. 18mm

1930433-Z  
Collet W20 dia. 18.5mm

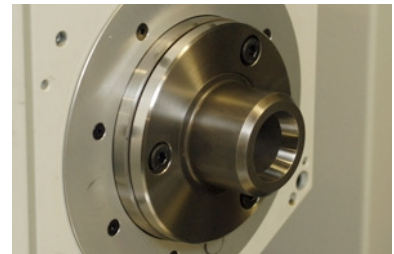
1930434-Z  
Collet W20 dia. 19mm

1930435-Z  
Collet W20 dia. 19.5mm

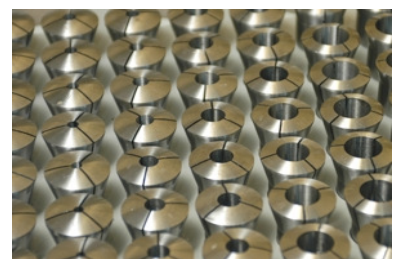
1930436-Z  
Collet W20 dia. 20mm

## Collets W25

2439724-Z  
Adaptor for collets W25 for fitting taper ISO50  
Note: Requires manual draw-bar or clamping cylinder with  
clamping actuating tube

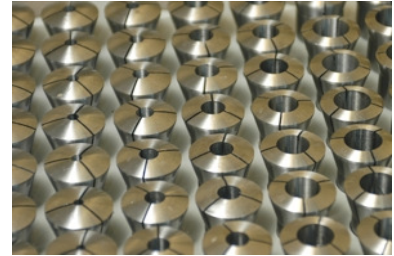


5558201-Z  
Set of 47 collets W25 dia. 2-25mm, in steps of 0.5mm  
Single collets orders possible



5558300-Z

Set of 59 collets W25 dia. 3/32-1", in steps of 1/64"



1930542-Z

Collet W25 dia. 0.5mm



1930543-Z

Collet W25 dia. 1mm

1930544-Z

Collet W25 dia. 1.5mm

1930437-Z

Collet W25 dia. 2mm

1930438-Z

Collet W25 dia. 2.5mm

1930439-Z

Collet W25 dia. 3mm

1930440-Z

Collet W25 dia. 3.5mm

1930441-Z

Collet W25 dia. 4mm

1930442-Z

Collet W25 dia. 4.5mm

1930443-Z

Collet W25 dia. 5mm

1930444-Z

Collet W25 dia. 5.5mm

1930445-Z  
Collet W25 dia. 6mm

1930446-Z  
Collet W25 dia. 6.5mm

1930447-Z  
Collet W25 dia. 7mm

1930448-Z  
Collet W25 dia. 7.5mm

1930449-Z  
Collet W25 dia. 8mm

1930450-Z  
Collet W25 dia. 8.5mm

1930451-Z  
Collet W25 dia. 9mm

1930452-Z  
Collet W25 dia. 9.5mm

1930453-Z  
Collet W25 dia. 10mm

1930454-Z  
Collet W25 dia. 10.5mm

1930455-Z  
Collet W25 dia. 11mm

1930456-Z  
Collet W25 dia. 11.5mm

1930457-Z  
Collet W25 dia. 12mm

1930458-Z  
Collet W25 dia. 12.5mm

1930459-Z  
Collet W25 dia. 13mm

1930460-Z  
Collet W25 dia. 13.5mm

1930461-Z  
Collet W25 dia. 14mm

1930462-Z  
Collet W25 dia. 14.5mm

1930463-Z  
Collet W25 dia. 15mm

1930464-Z  
Collet W25 dia 15.5mm 0.61"

1930465-Z  
Collet W25 dia. 16mm

1930466-Z  
Collet W25 dia. 16.5mm

1930467-Z  
Collet W25 dia. 17mm

1930468-Z  
Collet W25 dia. 17.5mm

1930469-Z  
Collet W25 dia. 18mm

1930470-Z  
Collet W25 dia. 18.5mm

1930471-Z  
Collet W25 dia. 19mm

1930472-Z  
Collet W25 dia. 19.5mm

1930473-Z  
Collet W25 dia. 20mm

1930474-Z  
Collet W25 dia. 20.5mm

1930475-Z  
Collet W25 dia. 21mm

1930476-Z  
Collet W25 dia. 21.5mm

1930477-Z  
Collet W25 dia. 22mm

1930478-Z  
Collet W25 dia. 22.5mm

1930479-Z  
Collet W25 dia. 23mm

1930480-Z  
Collet W25 dia. 23.5mm

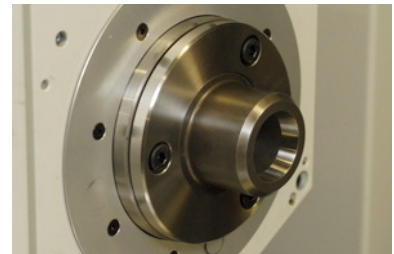
1930481-Z  
Collet W25 dia. 24mm

1930482-Z  
Collet W25 dia. 24.5mm

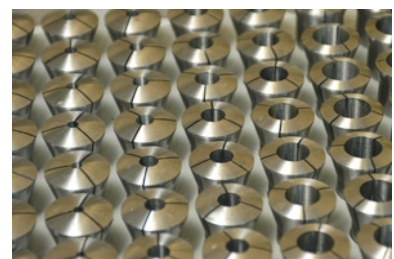
1930483-Z  
Collet W25 dia. 25mm

## Collets B32

2439725-Z  
Adaptor for collets B32 for fitting taper ISO50  
Note: Requires manual draw-bar or clamping cylinder with  
clamping actuating tube



2439644-Z  
Set of 55 collets B32 dia. 3-30mm, in steps of 0.5mm  
Single collets orders possible



1930484-Z  
Collet B32 dia. 3mm



1930485-Z  
Collet B32 dia. 3.5mm

1930486-Z  
Collet B32 dia. 4mm

1930487-Z  
Collet B32 dia. 4.5mm

1930488-Z  
Collet B32 dia. 5mm

1930489-Z  
collet B32 dia. 5.5mm

1930490-Z  
Collet B32 dia. 6mm

1930491-Z  
Collet B32 dia. 6.5mm

1930492-Z  
Collet B32 dia. 7mm

1930493-Z  
Collet B32 dia. 7.5mm

1930494-Z  
Collet B32 dia. 8mm

1930495-Z  
Collet B32 dia. 8.5mm

1930496-Z  
Collet B32 dia. 9mm

1930497-Z  
Collet B32 dia. 9.5mm

1930498-Z  
Collet B32 dia. 10mm

1930499-Z  
Collet B32 dia. 10.5mm

1930500-Z  
Collet B32 dia. 11mm

1930501-Z  
Collet B32 dia. 11.5mm

1930502-Z  
Collet B32 dia. 12mm

1930503-Z  
Collet B32 dia. 12.5mm

1930504-Z  
Collet B32 dia. 13mm

1930505-Z  
Collet B32 dia. 13.5mm

1930506-Z  
Collet B32 dia. 14mm

1930507-Z  
Collet B32 dia. 14.5mm

1930508-Z  
Collet B32 dia. 15mm

1930509-Z  
Collet B32 dia. 15.5mm

1930510-Z  
Collet B32 dia. 16mm

1930511-Z  
Collet B32 dia. 16.5mm

1930512-Z  
Collet B32 dia. 17mm

1930513-Z  
Collet B32 dia. 17.5mm

1930514-Z  
Collet B32 dia. 18mm

1930515-Z  
Collet B32 dia. 18.5mm

1930516-Z  
Collet B32 dia. 19mm

1930517-Z  
Collet B32 dia. 19.5mm

1930518-Z  
Collet B32 dia. 20mm

1930519-Z  
Collet B32 dia. 20.5mm

1930520-Z  
Collet B32 dia. 21mm

1930521-Z  
Collet B32 dia. 21.5mm

1930522-Z  
Collet B32 dia. 22mm

1930523-Z  
Collet B32 dia. 22.5mm

1930524-Z  
Collet B32 dia. 23mm

1930525-Z  
Collet B32 dia. 23.5mm

1930526-Z  
Collet B32 dia. 24mm

1930527-Z  
Collet B32 dia. 24.5mm

1930528-Z  
Collet B32 dia. 25mm

1930529-Z  
Collet B32 dia. 25.5mm

1930530-Z  
Collet B32 dia. 26mm

1930531-Z  
Collet B32 dia. 26.5mm

1930532-Z  
Collet B32 dia. 27mm

1930533-Z  
Collet B32 dia. 27.5mm

1930534-Z  
Collet B32 dia. 28mm

1930535-Z  
Collet B32 dia. 28.5mm

1930536-Z  
Collet B32 dia. 29mm

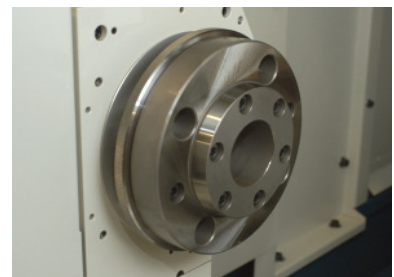
1930537-Z  
Collet B32 dia. 29.5mm

1930538-Z  
Collet B32 dia. 30mm

### Adaptor for chucks

2439678-Z  
Camlock head size 6, DIN 55029  
for spindle nose dia. 110mm / 4.33" with interface  
for mounting of cut-in ring sensor. Enables quick  
and simple change of clamping devices for live  
spindle grinding  
from series 72

2439721-Z  
Bayonet head size 6, DIN 55027, 55022 for fitting  
taper ISO50. Enable fast and easy changeover from  
live chucks. Feeding through clamp actuating tube  
for use of power chucks possible.  
Note: Must be dismantled when using centers



2439870-Z

Combination bayonet head size 6, DIN55027, 55022 with integrated, revolving center attachment MT3 for workhead with fitting taper ISO50.

Incl. driver plate and driver (driving pin dia. 10mm) to use with centers.

Enables quick and simple change of uncontrolled clamping device for live spindle grinding and MT3 centers.

Note: Not for use with power chucks, because feeding clamp actuating tube through is not possible

2439871-Z

Combination bayonet head size 6, DIN55027, 55022 with integrated, revolving center attachment MT4 for workhead with fitting taper ISO50.

Incl. driver plate and driver (driving pin dia. 10mm) to use with centers.

Enables quick and simple change of uncontrolled clamping device for live spindle grinding and MT4 centers.

Note: Not for use with power chucks, because feeding clamp actuating tube through is not possible

2439679-Z

Intermediate flange for bayonet head or combination bayonet head with interface for mounting of a cut-in ring sensor

### **Adaptor for chuck (blank)**

2439743-Z

Flange blank dia. 160mm / 6.30"  
for bayonet head size 6, DIN 55027, 55022 for mounting of customer clamping devices or as face plate (face side unworked).  
Material cast iron GC25

2439744-Z

Flange blank dia. 200mm / 7.87"  
for bayonet head size 6, DIN 55027, 55022 for mounting of customer clamping devices or as face plate (face side unworked).  
Material cast iron GC25

#### 2439745-Z

Flange blank dia. 250mm / 9.84"  
for bayonet head size 6, DIN 55027, 55022  
for mounting of customer clamping devices  
or as face plate (face side unworked).  
Material cast iron GC25

#### 2439680-Z

Flange blank dia. 185mm / 7.28"  
for spindle nose dia. 110mm / 4.33" (with interface  
for cut-in ring sensor). Clamping device interface  
is unworked, suitable for holding a chuck up to dia.

##### Notes:

- Finishing must be carried out for each clamping device through a CO
- Only chucks fastened from the front with screws can be used as clamping devices

### Three-jaw chuck (manually operated)

#### 2439737-Z

Three-jaw manual chuck dia. 160mm / 6.3"  
for bayonet head size 6, DIN 55027, 55022,  
radial precision centering.  
Clamping range: outside dia. 3-160mm / .12-6.3",  
inside dia. 42-154mm / 1.65-6".  
Repeating accuracy approx. 0.02mm / .000,79".  
Incl. hard jaws (1 set for outside and 1 set for  
inside chucking), chuck key and adjusting key.  
Laying of a coolant tube for internal grinding  
process cooling is possible

#### 2439738-Z

Three-jaw manual chuck dia. 200mm / 7.87"  
for bayonet head size 6, DIN 55027, 55022,  
radial precision centering.  
Clamping range: outside dia. 4-200mm / .16-7.87",  
inside dia. 52-202mm / 2.05-7.95".  
Repeating accuracy approx. 0.02mm / .000,79".  
Incl. hard jaws (1 set for outside and 1 set for  
inside chucking), chuck key and adjusting key.  
Laying of a coolant tube for internal grinding  
process cooling is possible

### Three-jaw chuck (manually operated) wedge type

2627653-Z

Three jaw manual chuck dia. 125mm / 4.92"  
for Camlock head size 6, DIN 55029,, wedge type.  
Clamping range: Outside dia. 3-126mm / .12-4.96",  
inside dia. 27-128mm / 1.06-5.04", jaw stroke 4.8mm  
/ .19", repeating accuracy <0.02mm / .000,79".  
Incl. 1 set of standard jaws, 1 set of soft jaws  
and chuck key for chuck actuation.  
Laying of a coolant tube for internal grinding  
process cooling is possible

2439695-Z

Soft top jaws for three jaw manual chuck dia. 125mm  
/ 4.92" wedge type (L = 54mm / 2.12", W = 20mm  
/ 0.78", H = 27.5mm / 1.08")

2627655-Z

Three jaw manual chuck dia. 160mm / 6.3"  
for Camlock head size 6, DIN 55029,, wedge type.  
Clamping range: Outside dia. 5-162mm / .20-6.37",  
inside dia. 65-179mm / 2.56-7.04", jaw stroke 6.3mm  
/ .25", repeating accuracy <0.02mm / .000,79".  
Incl. 1 set of standard jaws, 1 set of soft jaws  
and chuck key for chuck actuation.  
Laying of a coolant tube for internal grinding  
process cooling is possible

2439699-Z

Soft top jaws for three jaw manual chuck  
dia. 160mm / 6.3" wedge type (L = 105mm / 4.13",  
W = 20mm / 0.78", H = 35.5mm / 1.39")

2627656-Z

Three jaw manual chuck dia. 200mm / 7.87"  
for Camlock head size 6, DIN 55029,, wedge type.  
Clamping range: Outside dia. 7-192mm / .27-7.56",  
inside dia. 70-221mm / 2.76-8.7", jaw stroke 6.8mm  
/ .27", repeating accuracy <0.02mm / .000,79".  
Incl. 1 set of standard jaws, 1 set of soft jaws  
and chuck key for chuck actuation.  
Laying of a coolant tube for internal grinding  
process cooling is possible

2439765-Z

Soft top jaws for three jaw manual chuck dia. 200mm / 7.87" wedge type (L = 105mm / 4.13", W = 22mm / 0.87", H = 42mm / 1.65")

2439764-Z

Soft top jaws for three jaw manual chuck dia. 200mm / 7.87" wedge type (L = 125mm / 4.92", W = 22mm / 0.87", H = 42mm / 1.65")

#### Four-jaw manually operated chuck (spiral chuck)

2439739-Z

Four-jaw precision manual chuck dia. 160mm / 6.3" for bayonet head size 6, DIN 55027, 55022.  
Clamping range: outside dia. 3-160mm / .12-6.3", inside dia. 42-160mm / 1.65-6.3".  
Incl. hard jaws (1 set for outside and 1 set for inside chucking), chuck key and adjusting key.  
The jaws are individually adjustable.  
Laying of a coolant tube for internal grinding process cooling is possible

#### Face plate

2627659-Z

Face plate dia. 180mm / 7.09" for Camolock head size 6, DIN 55029 with 4 T-slots and slit-holes to clamp workpieces or clamping tools

2439735-Z

Face plate dia. 195mm / 7.68" for bayonet head size 6, DIN 55027, 55022.  
Plate with 4 T-slots and slit-holes to clamp workpieces or clamping tools



2439736-Z

Face plate dia. 240mm / 9.45" for bayonet head size 6, DIN 55027, 55022.  
Plate without T-slots and slit-holes

## Magnetic chuck

2439740-Z

Magnetic chuck dia. 120mm / 4.27"  
for bayonet head size 6, DIN 55027, 55022  
(permement magnet)  
from series 72

2439741-Z

Magnetic chuck dia. 165mm /6.50"  
for bayonet head size 6, DIN 55027, 55022,  
(permement magnet)  
from series 72

2627660-Z

Magnetic chuck dia. 165mm /6.50"  
for Camolock head size 6, DIN 55029

2439742-Z

Magnetic chuck dia. 230mm / 9.06"  
for bayonet head size 6, DIN 55027, 55022  
(permement magnet)  
from series 72



## Power chuck

2439685-Z

3 jaw power chuck dia. 200mm / 7.87"  
for bayonet head siz 6, DIN 55027, 55022, radial  
fine-centering device.  
Clamping range: outside dia. 26-231mm / 1.02-9.1",  
inside dia. 74-270mm / 2.91-10.63".  
Jaw stroke 5.3mm / .20". Repeating accuracy <0.02mm  
/ .000,79". Jaw holding fixture, serrated 1/16"x90 deg.  
Incl. 1 set of one-piece hard reversing jaws for  
outside and inside chucking. Laying of a coolant  
tube for internal grinding process cooling is possible.  
Note: Clamping cylinder and clamping actuating tube  
necessary  
from series 85

#### 2439686-Z

3 jaw precision power chuck dia. 200mm / 7.87"  
for bayonet head size 6, DIN 55027, 55022, radial  
fine centering. Jaw holding fixture with ball  
positioning for precision jaw changing. Jaw stroke  
2.5 mm / .10".

Repeating accuracy <0.002 mm / .000,079".

Incl. 1 set of soft reversing jaws. Correspondent top  
jaws for each clamping diameter required. Laying of  
a coolant tube for internal grinding process cooling  
is possible.

Notes:

- Clamping cylinder and clamping actuating tube  
necessary
- For jaws with a prescribed diameter, it is neces-  
sary to order a jaw machining by a design order  
from series 85

#### 2439751-Z

Soft top jaws for precision power chuck  
dia. 200mm / 7.87" (L=90mm / 3.54", W=26mm /  
1.02",  
H=40mm / 1.57").

Notes:

- 1 set per clamping diameter required
- For jaws with a prescribed diameter, it is  
necessary to order a jaw machining for each  
dia. by a desidn order indicating the desired  
diameter

#### 2439752-Z

Chuck simulator for precision power chuck dia. 200mm  
/ 7.87" for precise pre-machining of top jaws

#### 2439753-Z

Pretension discs for outside chucking for precision  
power chuck dia. 200mm / 7.87". For precise grinding  
of the clamping diameter on the jaws. Pretension  
disc can be removed without removal of the jaws.  
Set consists of 17 discs, graduation 0.25mm / .010"

2439754-Z

Pretension ring for inside chucking for precision power chuck dia. 200mm / 7.87". For precise grinding of the clamping diameter on the jaws. The ring can be clamped in 4 different positions with a pretension diameter difference of 0.5mm/.02" for each. By means of 3 cyl. pins dia. 5mm / .20" or 6mm / .24" it is possible to cover the whole clamping range (supplied without cyl. pins)

## Insert

2224739-ZK

Insert for lateral force free driver, size 1 with 3 jaws for clamping dia. ....mm/inch.

Note: It is necessary to order per each clamping dia.



2224743-ZK

Insert for lateral force free driver, size 1 with 6 jaws for clamping dia. ....mm/inch.

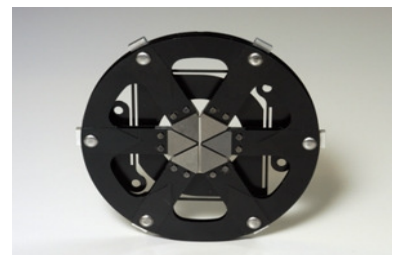
Note: It is necessary to order per each clamping dia.



2224750-ZK

Insert for lateral force free driver, size 2 with 6 jaws for clamping dia. ....mm/inch.

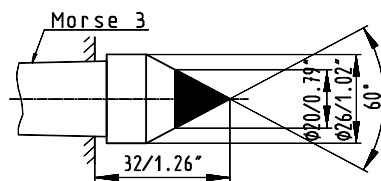
Note: It is necessary to order per each clamping dia.



## Centres with adaptor MT3

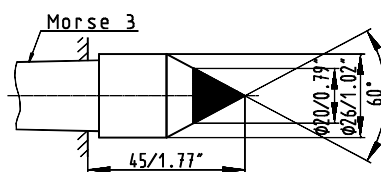
0709017-Z

Full centre short dia. 26mm/1.02" MT3



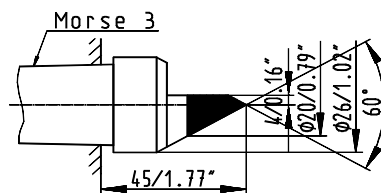
0710020-Z

Full centre long dia. 26mm/1.02" MT3



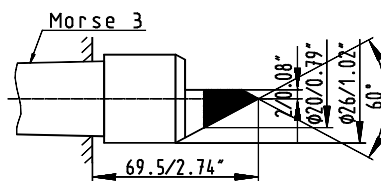
0710021-Z

Half centre short dia. 26/4mm/1.02/.157" MT3

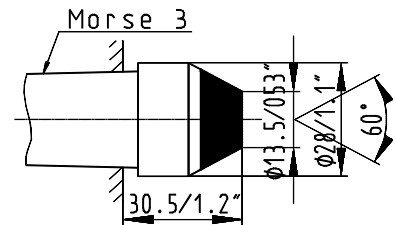


0710045-Z

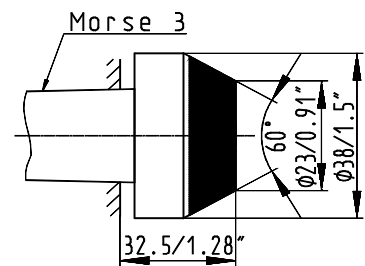
Half centre long dia. 26/2mm/1.02/.08" MT3



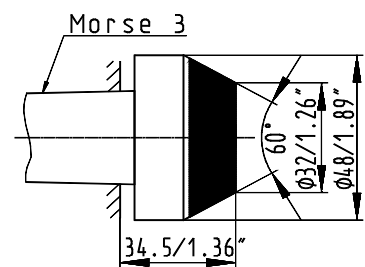
0709058-Z  
Blunt centre dia. 28mm/1.1" MT3



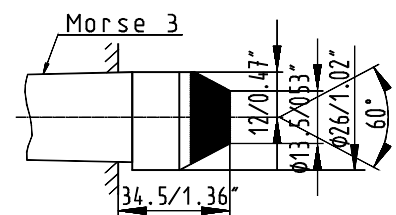
0709059-Z  
Blunt centre dia. 38mm/1.5" MT3



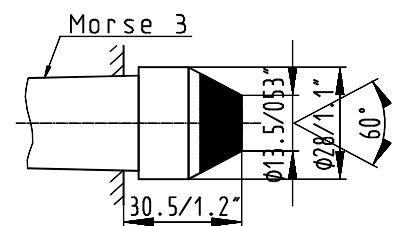
0709044-Z  
Blunt centre dia. 48mm/1.89" MT3



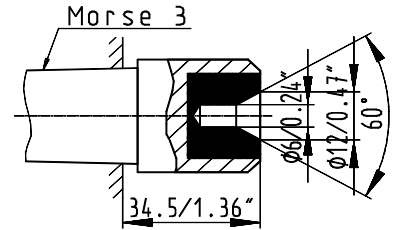
1865052-Z  
Blunt half centre dia. 28/12mm/1.1/.472" MT3



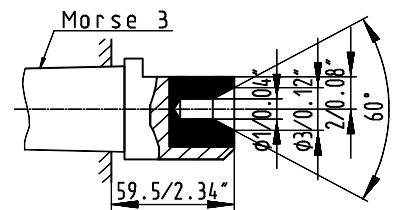
0709057-Z  
Female full centre dia. 3mm/.118" MT3



1865051-Z  
 Female full centre dia. 12mm/.472" MT3

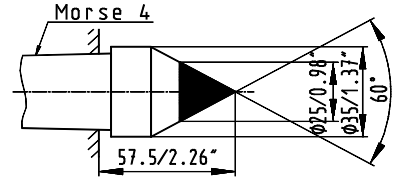


0710048-Z  
 Female half centre dia. 3/2mm/.118/.08" MT3

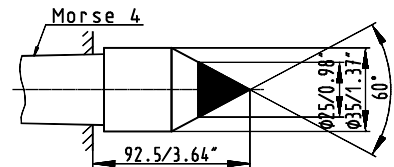


**Centres with adaptor MT4**

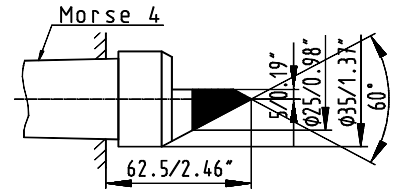
2810030-Z  
 Full centre short dia. 35mm/1.38" MT4



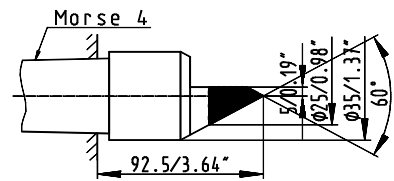
2810182-Z  
 Full centre long dia. 35mm/1.38" MT4



2810031-Z  
Half centre short dia. 35/13mm/1.38/.51" MT4



2810183-Z  
Half centre long dia. 35/13mm/1.38/.51" MT4



## Steady

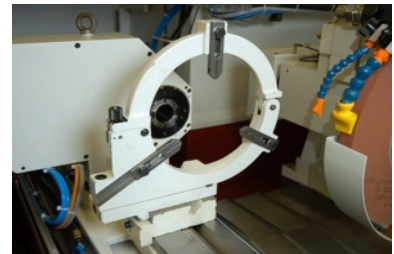
2414620-Z  
Two-point steady for dia. 4-88 mm / .16-3.5"  
(for centre height 225mm / 8.89", broad table profile)

2414624-Z  
Two-point steady for dia. 10-100mm / 0.4-4"  
(centre height 225mm / 8.86", broad table profile)

2414613-Z  
Three-jaw steady for dia. 5-140mm / .2-5.51",  
(for centre height 225mm / 8.86", broad table profile)  
with fine adjustment

2414616-Z  
Three-jaw steady for dia. 125-230mm / 4.92-9.05"  
(centre height 225mm / 8.86", broad table profile)  
with fine adjustment

Note: Dial gauging radial see chapter "various"



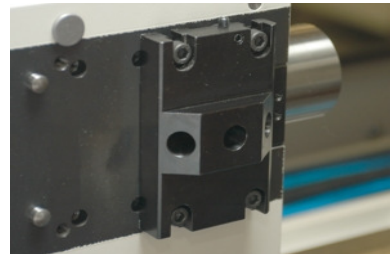
## Prism support

2414628-Z  
Prism support (2 pieces) for dia. 15-150mm  
/ 0.6-5.9" (centre height 225mm / 8.86",  
broad table profile)

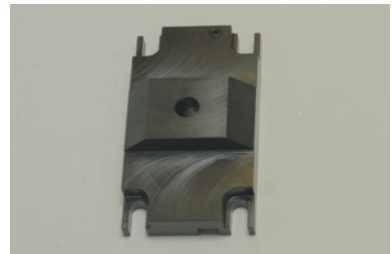


## Dressing tool holder for workhead or tailstock

2915601-Z  
Dressing tool holder vertically adjustable  
for workhead or tailstock.  
With 3 fitting tapers Morse1 shortened for  
2 dressing tools  
from series 109



2915606-Z  
Dressing tool holder vertically adjustable, for  
workhead or tailstock. With 1 taper dia. 9.52mm  
/ .37" for dressing for thread grinding applications  
with one dressing tool  
from series 109



## Dressing turbine

2915662-Z

Dressing spindle 16000min<sup>-1</sup>. rpm-range  
3'000-16'000min<sup>-1</sup> power supply 0.13-0.2kW  
(max. 0.4kW at 9'000min<sup>-1</sup>). Spindle dia. 72mm  
/ 2.83" with cylindrical dressing tool holding  
fixture dia. 40-h3.

Connection cable length 4m and Harting plug HAN-module  
with lateral cable output (spindle according to  
electrical specification 1330366A).

Notes:

- Requires spindle holder dia. 72mm / 2.83"
- Requires dressing frequency converter
- Dressing tool has to be checked by technical  
clarification and subsequently ordered by  
a design order



2915690-Z

Dressing spindle 16000min<sup>-1</sup>. rpm-range with  
integrated cut-in sensor 3'000-16'000min<sup>-1</sup>  
power supply 0.13-0.2kW (max. 0.4kW at 9'000min<sup>-1</sup>).  
Spindle dia. 72mm / 2.83" with cylindrical dressing  
tool holding fixture dia. 40-h3.

Connection cable length 4m and Harting plug HAN-module  
with lateral cable output (spindle according to  
electrical specification 1330366A).

Notes:

- Requires spindle holder dia. 72mm / 2.83"
- Requires dressing frequency converter
- Dressing tool has to be checked by technical  
clarification and subsequently ordered by  
a design order

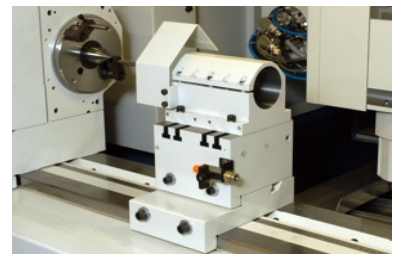
Note: For dressing of external grinding wheels

## Spindle holder

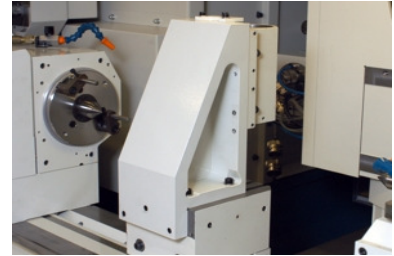
2415759-Z

Spindle holder for horizontal mounting  
of the dressing spindle dia. 72mm / 2.83"  
on longitudinal table.

(Center height 225mm / 8.86")



2415767-Z  
 Conversion kit for dressing spindle holder  
 for vertical mounting of a dressing spindle  
 dia. 72mm / 2.83"



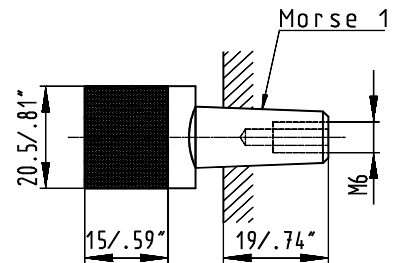
**M-sensor for dressing spindle**

2915631-Z  
 M-sensor for dressing spindle dia. 72mm / 2.83"  
 for cut-in detection on rotating dressing. Incl.  
 sensor holder for mounting on the spindle holder  
 and plugable connection cable (length 4m)

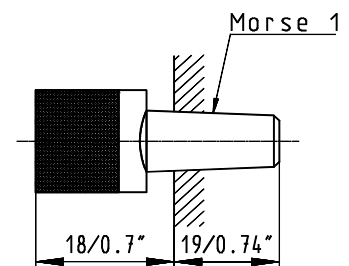


**Dressing tools with fitting taper MT1 shortened**

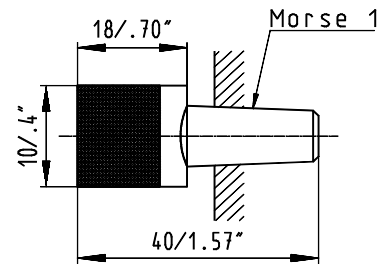
2813076-Z  
 Grain fliese diamond 1.15 mm/.045" with fitting  
 taper MT1 shortened



2230036-Z  
 Grain fliese diamond FCS 115 W, height 10mm / .39",  
 length 15mm / .59" with fitting taper MT1 shortened



5560732-Z  
 Needle fliese type DV/10 NX, hight 10mm / .39",  
 length 18mm / .71" with fitting taper MT1 shortened

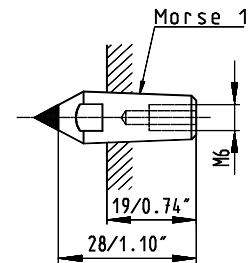


5560731-Z  
 Needle fliese type DV/20 NX, hight 20mm / .79",  
 length 20mm / .79" with fitting taper MT1 shortened

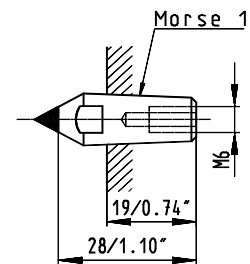
5560511-Z  
 Needle fliese type MKD-3-0640 DV/10, hight 10mm / .39",  
 length 18mm / .71" with fitting taper MT1 shortened

5560512-Z  
 Needle fliese type CVD-3-0640 DV/10, hight 10mm / .39",  
 length 18mm / .71" with fitting taper MT1 shortened

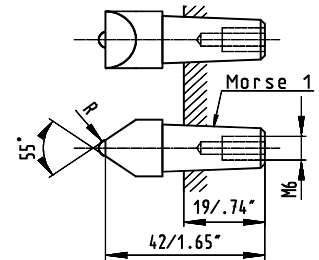
2813077-Z  
 Single point diamond 0.1 carat,  
 with fitting taper MT1 shortened



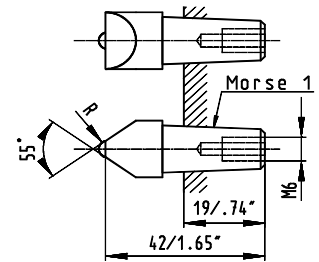
2813079-Z  
 Single point diamond 1.5 carat



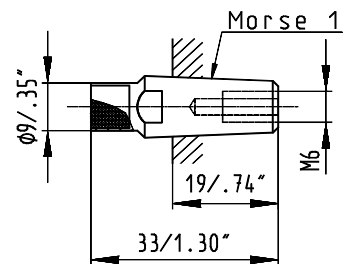
5560304-Z  
 Single point diamond 0.45 carat 55 deg.  
 R 0.25mm / .01"



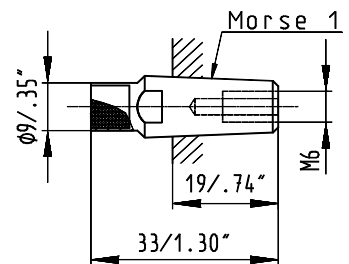
5560305-Z  
 Single point diamond 0.45 carat 55 deg.  
 R 0.5mm / .02"



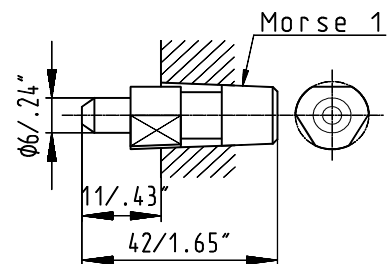
2813075-Z  
 Impregnated diamond grit 25



2813081-Z  
 Impregnated diamond grit 100

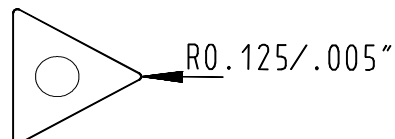


5560709-Z  
 Impregnated diamond with fitting taper MT1 shortened

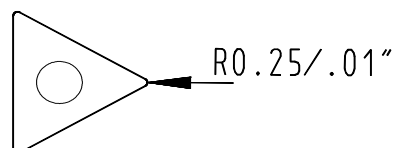


**PCD-dressing plate with sep. fitting taper**

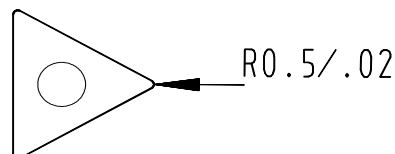
5560721-Z  
PCD-dressing plate R 0.125mm/.005"



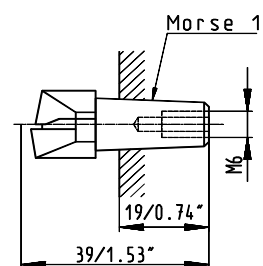
5560722-Z  
PCD-dressing plate R 0.25mm/.01"



5560723-Z  
PCD-dressing plate R 0.5mm/.02"

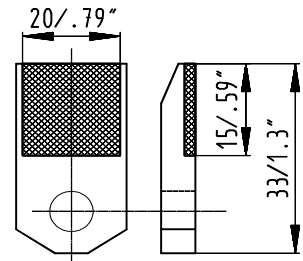


5560727-Z  
Adaptor for PCD-dressing plates (self-centering)

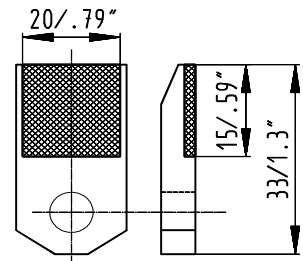


**Grain fliese diamonds with sep. fitting taper**

5560712-Z  
Grain fliese diamond 1.15mm/.045"



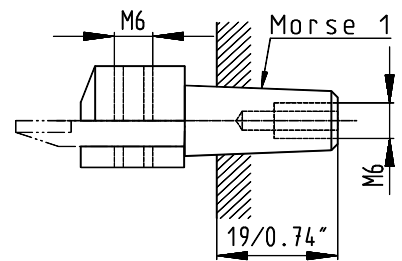
5560714-Z  
Grain fliese diamond 0.9mm/.035"



5560719-Z  
Grain fliese diamond 0.75mm/.03"



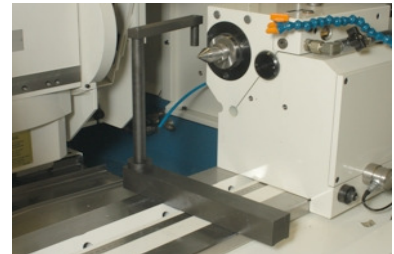
5560708-Z  
Adaptor MT1 shortened for grain fliese diamonds



### Auxiliary attachment for the adjustment of the dressing tool height

2621606-Z

Auxiliary attachment to adjust stationary dressing tools to 225mm/8.86" center height



### Footpedal

2404753-Z

Approval pedal to carry out movements with open operating doors (with switch-off above the stroke). Facilitates workpiece alignment in the chucks. Connection cable length 3.5m



2404754-Z

Footpedal for clamping devices for electrically controlled clamping devices (hydraulic tailstock retraction, chucks etc.) Double foot pedal (clamping/unclamping) with over-travel switch on the clamping pedal. Connection cable length 3.5m

### First cut recognition

2404774-Z

First cut sensor with magnetic base and connection cable, length 4m



## Dynamic balancing

5549064-Z

?? Portables 2-Ebenen-Betriebsauswuchtgerät  
MPM 3.BMT210-2.M.24 mit Anschlussspannung 24VDC.  
Anzeigegerät zum manuellen Verstellen der Auswucht-  
segmente auf 2 Schleifscheibenflanschen (einseitig  
mit 2 Schleifscheiben auf einer Spindel oder  
zweiseitig zu einer breiten Schleifscheibe)  
nach dynamischer Unwuchtüberprüfung.  
(inkl. Transportkoffer).

Hinweise:

- 1 Gerät kann für mehrere Maschinen verwendet werden, welche mit einer Schnittstelle für manuelles 2-Ebenen-Betriebswuchten MPM und pro Spindel mit 2 Auswuchtsensoren MPM ausgerüstet sind.
- Das Gerät kann zum 1-Ebenen-Betriebswuchten auch auf Maschinen verwendet werden, welche nur mit einer Schnittstelle zum 1-Ebenen-Betriebswuchten und nur 1 Auswuchtsensor pro Spindel ausgerüstet sind

?? Hinweise:

- Erfordert Auswuchtsensor MPM  
(2 mal pro Aussenschleifspindel)
- Erfordert Anschlusskabelsatz für portables Betriebsauswuchtgerät MPM BMT210

2912653-Z

Inbalance sensor MPM with magnetic base dia.  
25mm / 1" for manual balancing with balancing  
unit MPM BMT100 or BMT210



2912897-Z

??Anschlusskabelsatz für portables Betriebsauswuchtgerät  
MPM BMT 210 mit Anschlussspannung 24VDC. Je 1  
Kabel für  
24VDC-Speisung und Drehzahlsensor und 2 Kabel für Aus-  
wuchtsensoren (Kabellänge 1.4m)

## Interface card for external PC

1397101-Z

High-Speed serial bus PCI plug-in card Fanuc for personal computers. Enables communication between PC and Fanuc CNC control via optical fiber transmission cable of the machine and High-Speed serial bus on machine side.

PC system requirements:

IBM-compatible computer with Windows95 or WindowsNT;

Pentium processor, 16MB RAM, VGA-screen, mouse.

Free slot for a PCI extension card (16bit)

Items included: PCI extension card HSSB

## Input and output units

2404657-Z

External disk unit 3 1/2" (Fanuc Handy File) incl. 7m cable. MS-DOS-compatible



2219605-Z

Discs 3 1/2", 2HD (package with 10 pieces)



1332655-Z

Transmission cable RS 232 C for the connection Fanuc-control <--> personal computer, length 5m.

Note: Not necessary if the machine and PC is equipped with HSSB and optical fiber transmission cable



1389854-Z

Studer Ethernet transmission cable (Crossover) for connecting the Fanuc control system to an external PC, length 10m.

Note: Cannot be used as network cable

## Communication software

1397019-Z

StCom for Windows 4.x software pack for transferring data and grinding programs from Fanuc control system to a PC or vice versa through the serial interface.

Dialog language German / English / French / Italian (switchable), incl. integrated operating instructions.

System requirements:

Personal computer with:

- Operating system: Microsoft Windows 95 or higher
- Pentium processor
- 16MB random access memory (RAM)
- CD-ROM and 3.5" floppy disk drive
- Free serial interface RS 232 C
- MOUSE

Studer grinding machine with:

- Fanuc control system and Studer operating system Release A or higher

Scope of supply:

- Software on CD-ROM and license key on 3.5" floppy disk
- Installation instructions German / English

Note: Requires RS 232 C data cable

## Accessories for measuring head

2431610-Z

Breaking piece for measuring probe Marposs T25G (spare part)

2429819-Z

Measuring tip for measuring probe Marposs T25G (spare part)

2431688-Z

Support for mounting 2 positioning measuring heads Unimar P50 stacked on one hydraulic retraction unit for measuring of lengths

2431696-Z

Support to hydraulic retraction unit to enable mounting of 2 diameter measuring heads Unimar S20 or S30 side on side on the same retraction unit. Distance of measuring between 8.5mm-50mm/0.33-1.97" with standard measuring feelers

2431697-Z

Support to hydraulic retraction unit to enable mounting of 2 diameter measuring heads Unimar S20 or S30 side on side on the same retraction unit. Distance of measuring between 8.5mm-90mm/0.33-3.54" with standard measuring feelers

## Diameter measuring stand

2431616-Z

Diameter measuring stand Marposs DIRAC 4N for bore control.

- Diameter measuring range 4-50mm/.16-1.97" (vertical measuring arrangement)
- Repeatability <0.0001mm/.000,004"
- Precision <0.0005mm/.000,02
- Thermal drift <0.0001mm/.000,004"/°K
- Measuring depth 20mm/.79" (other measuring depth on request)
- Cable length 3m.

Condition:

- Occupied one measuring circuit
- For each diameter a centering measuring arbor is necessary (evtl. extension cable)

2429651-ZK

Centering arbor for match-measuring tripod DIRAC 4N for measuring inside diameter of .....mm according to drawing No. .... (The diameter must be within the measuring range of the match-measuring tripod).

Note: Workpiece-dependent, 1 x per inside diameter required

## Internal measuring arbor Marposs M1 electron BASE

2429653-Z

Hand measuring arbor Marposs M1 electron Base:

- Diameter range 9-15mm/.35-.59"
- Precision <0.001mm/.000,04"
- Max. measuring depth 50mm/1.97"
- Cable length 3 m

Note: For each diameter a measuring sleeve is necessary (evtl. extension cable)

2429655-ZK

Measuring sleeve for hand measuring arbor Marposs M1 electron Base dia. 9-15mm / .35-.59", consisting of guiding sleeve and measuring probe for dia. ....mm.

Remark: Workpiece-dependent, 1 x per inside diameter required

2429657-Z

Hand measuring arbor Marposs M1 electron Base:

- Diameter range 15-36mm/.59-1.42"
- Precision <0.001mm/.000,04"
- Max. measuring depth 50mm/1.97"
- Cable length 3m

Note: For each diameter a measuring sleeve is necessary (evtl. extension cable)

2429659-ZK

Measuring sleeve for hand measuring arbor Marposs M1 electron Base dia. 15-36mm / .59-1.42", consisting of guiding sleeve and measuring probe for dia. ....mm.

Remark: Workpiece dependent, 1x per internal diameter necessary

2429661-Z

Hand measuring arbor Marposs M1 electron Base:

- Diameter range 36-120mm/1.42-4.72"
- Precision <0.001mm/.000,04"
- Max. measuring depth 50mm/1.97"
- Cable length 3m

Condition: For each diameter a measuring sleeve is necessary (evtl. extension cable)

2429663-ZK

Measuring sleeve for hand measuring arbor Marposs M1 electron Base dia. 36-120mm / 1.42-4.72", consisting of guiding sleeve and measuring probe for dia. ....mm.  
Remark: Workpiece dependent, 1x per internal diameter necessary

## Movomatic

2431624-Z

Measuring tip with rated break point for measuring probe Movomatic C25 (spare part)

## Diameter measuring stand

2429683-Z

Diameter measuring stand Movomatic CI213 for bore control (vertical measuring arrangement).

- Measuring range 4-150mm/.16-5.91"
- Repeatability <0.0001mm/.000,004" measuring depth 1 x nominal diameter
- Precision <0.0005mm/.000,2"
- Cable length 3m

Condition:

- Occupied one measuring circuit
- For each diameter a centering measuring arbor is necessary (evtl. extension cable)



## Centering measuring arbor

2429685-ZK

Measuring and centering arbor within dia. 4-20mm / .16-.79" for match-measuring tripod CI213, designed for dia....mm according to drawing No. ....

Measuring depth:

- Minimum 0.5mm / .02"
- Standard = 1 x nominal diameter
- Absolute maximum = 3 x nominal diameter

Note: Workpiece-dependent, 1 x per inside diameter required



2429817-ZK

Measuring and centering arbor within  $\text{Ø}20.1\text{-}40\text{mm}$  /  $0.79\text{-}1.57\text{''}$  for match-measuring tripod CI213, designed for dia....mm according to drawing No. ....

Measuring depth:

- Minimum  $0.5\text{mm}/.02\text{''}$
- Standard = 1 x nominal diameter
- Absolute maximum = 3 x nominal diameter

Note: Workpiece-dependent, 1 x per inside diameter required



2429818-ZK

Measuring and centering arbor within dia.  $40.1\text{-}100\text{mm}$  /  $1.57\text{-}3.94\text{''}$  for match-measuring tripod CI213, designed for dia....mm according to drawing No. ....

Measuring depth:

- Minimum  $0.5\text{mm} / .02\text{''}$
- Standard = 1 x nominal diameter
- Absolute maximum = 3 x nominal diameter

Note: Workpiece-dependent, 1 x per inside diameter required



## Hydraulic and lubricating oil

For X-/Z-axes: Oil Shell Tonna S32

For spindle screw lubrication: Grease Klüber Staburags NBU 8 EP

For workhead: Oel Mobil DTE 22

For tailstock: Oil Shell Tonna S32

For tailstock fine adjustment: Fett Mobilux EP 023

Oil for lubrication in connection with pneumatic lifting: Mobil DTE 24

For hydraulic: Oil Mobil DTE 24

## Oil Shell Tonna S32

5601806-Z

5 litre can oil Shell Tonna S32



5601807-Z  
3 cans at 20 litres oil Shell Tonna S32



**Grease Klüber Staburags NBU 8 EP**

5601613-Z  
1 kg grease KLÜBER Staburags NBU 8 EP

**Oil Mobil DTE 24**

5601829-Z  
5 litre can oil MOBIL DTE 24



5601816-Z  
2 cans of 10 litre oil MOBILE DTE 24



5601814-Z  
50kg drum oil MOBIL DTE 24



### Grease Mobilux EP 023

5601818-Z  
0.5 kg grease Mobilux EP 023

### Filter paper

5490116-Z  
Filter paper medium OL 40,roll of 200 , width 1000mm



5490115-Z  
Filter fleece, fine OL 50, recommended for emulsion;  
roll of 150m, width 1000mm

### Coolant

5601412-Z  
5 litre can of coolant CASTROL Hysol R



5601420-Z  
15 litres can of coolant CASTROL Hysol R



## Filter mat for grinding mist extraction unit

2422667-Z

Spare filter mat (10 pces.) for grinding mist extraction unit for emulsion



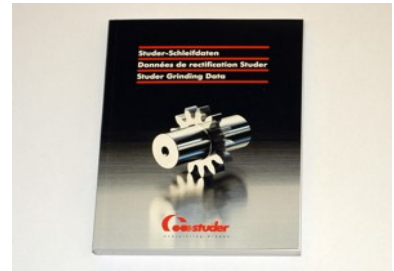
2422662-Z

Spare filter mat (10 pces.) for grinding mist extraction unit for oil

## Machine documentation

9904256-Z

Booklet Studer Grinding Data (pocket file)



## Dial indicators

For steady: Dial gauging radial

5530018-Z

Radial dial gauge, metric (division 0.002mm)



5530118-Z  
Radial dial gauge, inch (division 0.0001")



## Auxiliary accessories

1848602-Z  
Steel tool cabinet

