

ROTARY ACTUATORS

SECTION 3



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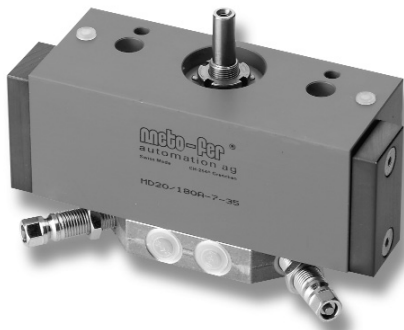
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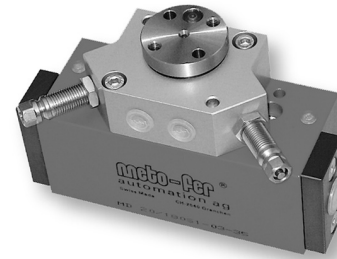
Rotary Actuators MD

Features:

- Backlash free
- Ball bearings
- External stops



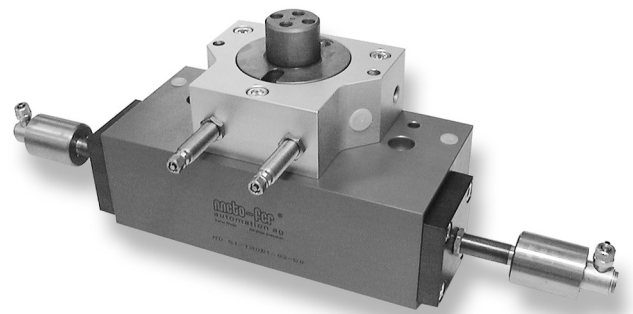
Model A (MD 20)



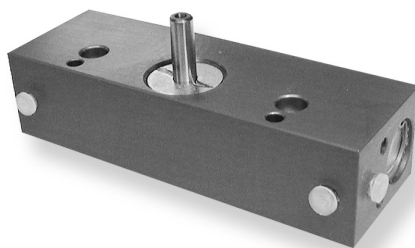
Model V (MD 20)



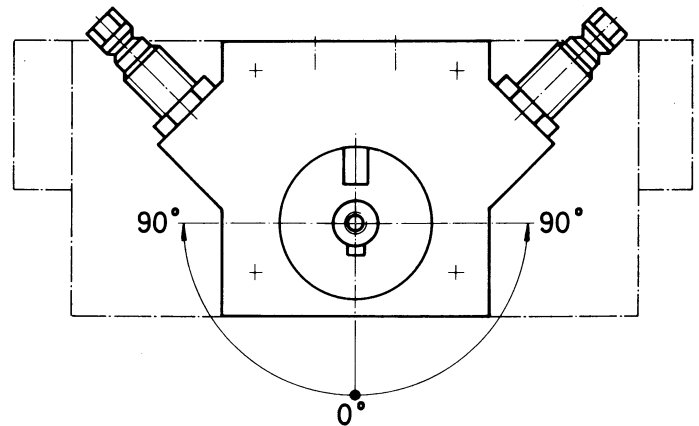
Model B (MD 12)



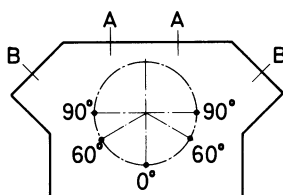
MD51 / 180B1, with oil cushion



Model S (MD 12)

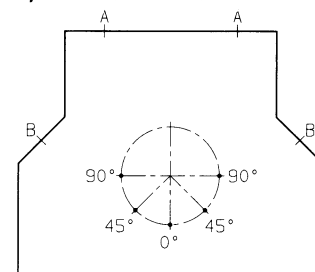


Position of the shaft by MD12, MD20, MD32



Position of the Stop screw by MD12, MD20, MD32

Angle of rotation: 0 – 60° Stop screw in Pos. B
 Angle of rotation: 60 – 90° Stop screw in Pos. A

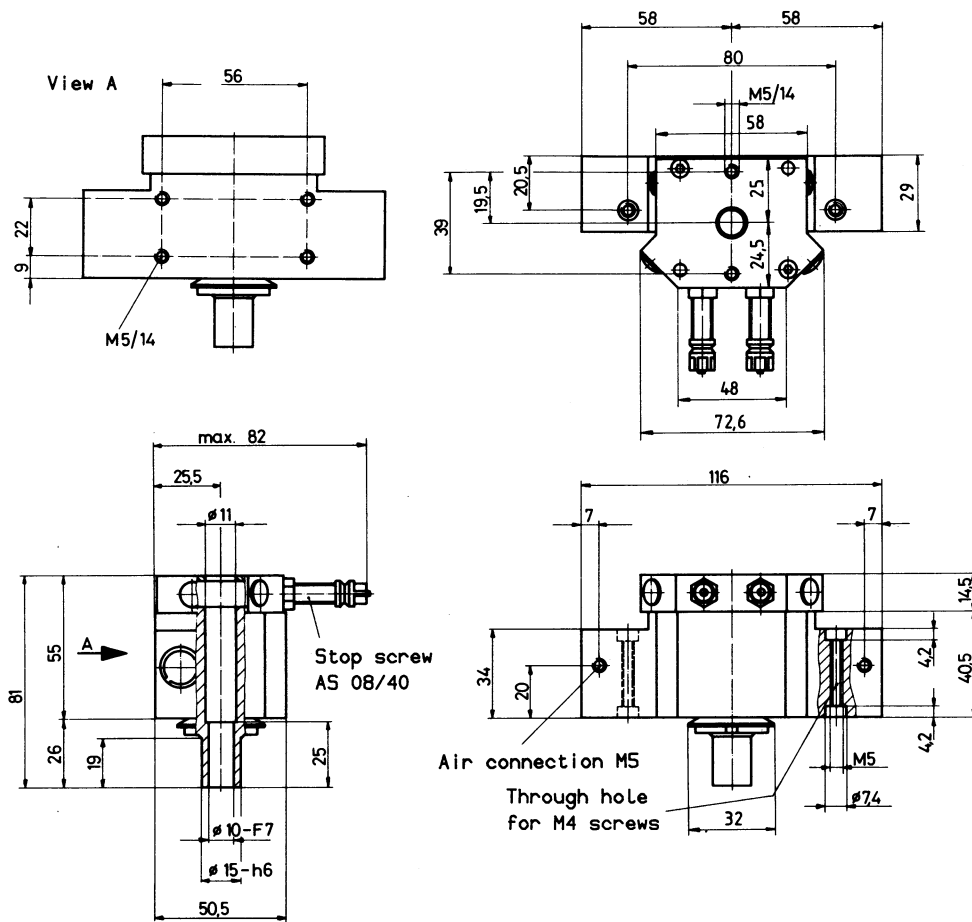


Position of the Stop screw by MD 51

Angle of rotation: 0 - 45° Stop screw in Pos. A
 Angle of rotation: 45 - 90° Stop screw in Pos. B

Rotary Actuator MD 12/180 H

Rotary actuator with hollow shaft



Type	Angle of rotation	Max. load radial to shaft	Max. load axial to shaft	Torque at 72.5 psi (5 bar)	Air consumption for each double stroke at 72.5 psi (5 bar)	Weight	Order No.
MD 12/180 H	0–180°	337 lb (1500 N)	34 lb (150 N)	4.07 lb.in (0,46 Nm)	.002 scf (0,04 NL)	1.65 lb (0,75 kg)	MD 12/180 H

Technical data:

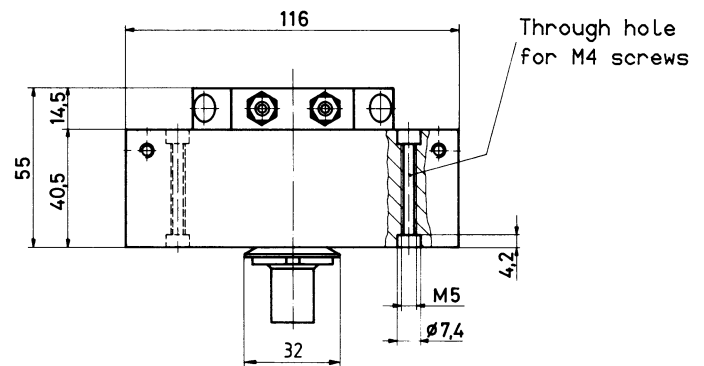
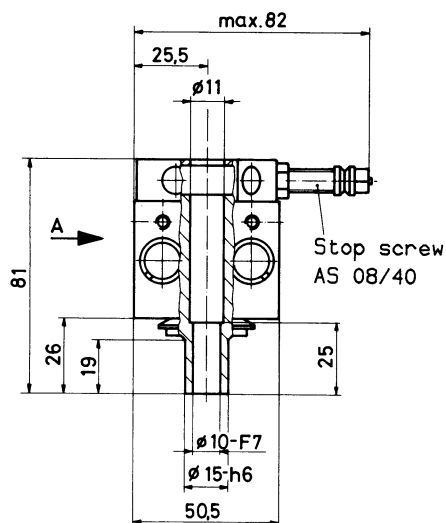
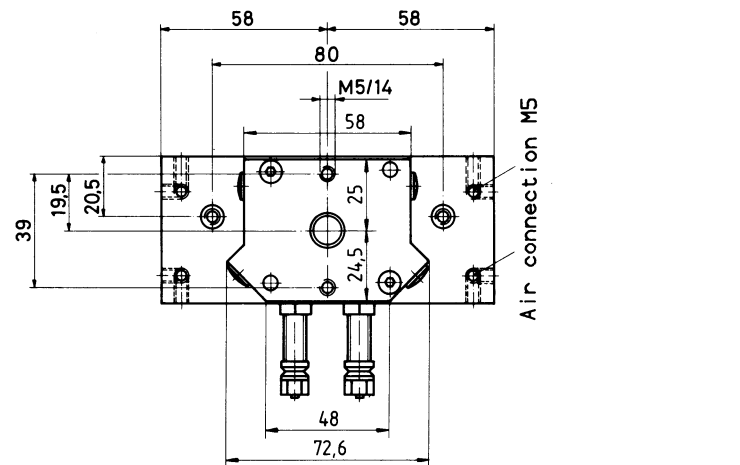
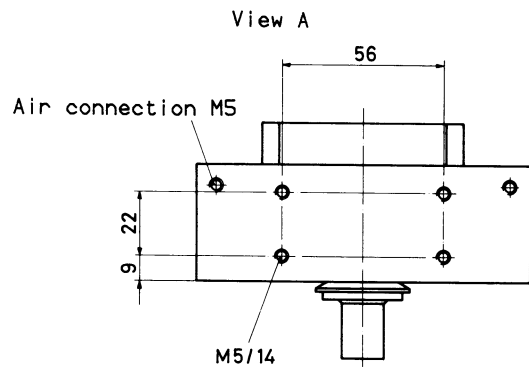
- Built in patented stop screws with fine threads provide for stepless adjustable angle of rotation.
- The stop screws can be fitted with patented sensing elements (see section "Stop Screws with plug-in sensing elements").
- Intermediate position can be added. (see sheet 3.051)
- Designed for high operating rates and long life.

- Operating medium
- Operating pressure
- Repeatability
- Air connection

Compressed air or hydraulic oil
43.5 - 116 psi (3 - 8 bar)
± 190 Arc sec
M5

Rotary Actuator MD 12 D/180 H

Rotary actuator with hollow shaft and 2 piston



Type	Angle of rotation	Max. load radial to shaft	Max. load axial to shaft	Torque at 72.5 psi (5 bar)	Air consumption for each double stroke at 72.5 psi (5 bar)	Weight	Order No.
MD 12 D/180 H	0–180°	337 lb (1500 N)	34 lb (150 N)	8.14 lb.in (0,92 Nm)	.003 scf (0,08 NL)	2.09 lb (0,95 kg)	MD 12 D/180 H

Technical data:

- Built in patented stop screws with fine threads provide for stepless adjustable angle of rotation.
- The stop screws can be fitted with patented sensing elements (see section "Stop Screws with plug-in sensing elements").
- Intermediate position can be added. (see sheet 3.051)
- Designed for high operating rates and long life.

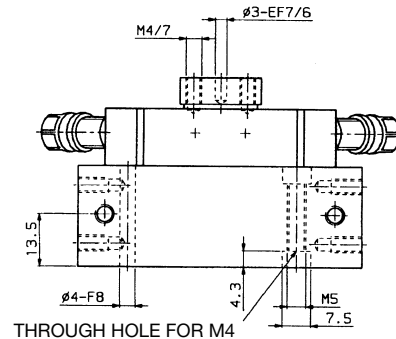
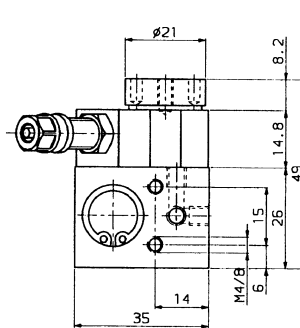
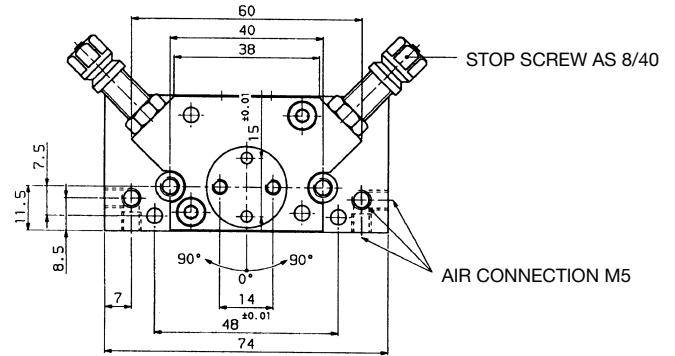
- Operating medium
- Operating pressure
- Repeatability
- Air connection

Compressed air or hydraulic oil
43.5 - 116 psi (3 - 8 bar)
± 190 Arc sec
M5

Rotary Actuator MD 12/90V

Rotation:	0-90 degrees
Max Load Radial To Shaft:	34 lb (150 N)
Max Load Axial To Shaft:	54 lb (240 N)
Repeatability:	±320 ARC SEC.
Torque:	3.36 lb IN (.38 Nm)
Operating Medium:	compressed air or hydraulic oil
Operating Pressure:	43.5-116 PSI (3-8 bar)
Air Connection:	M5
Air Consumption For Each Double Stroke:	0.001 scf (0.02 NL)
Weight:	0.77 lb. (0.35 kg)

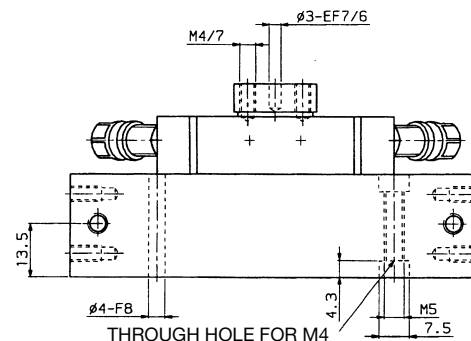
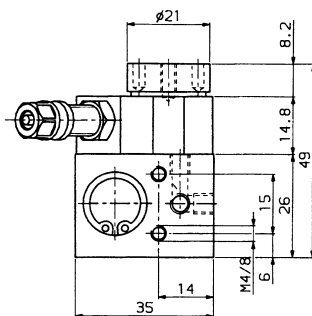
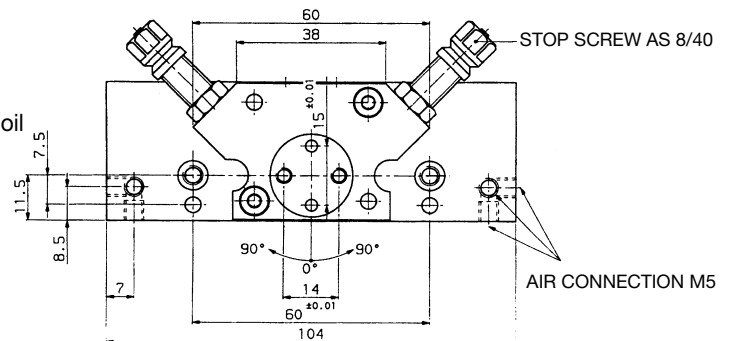
Order No.: MD12/90V



Rotary Actuator MD 12/180V

Rotation:	0-180 degrees
Max Load Radial To Shaft:	34 lb (150 N)
Max Load Axial To Shaft:	54 lb (240 N)
Repeatability:	±320 ARC SEC.
Torque:	3.36 lb IN (.38 Nm)
Operating Medium:	compressed air or hydraulic oil
Operating Pressure:	43.5-116 PSI (3-8 bar)
Air Connection:	M5
Air Consumption For Each Double Stroke:	0.002 scf (0.04 NL)
Weight:	0.88 lb. (0.40 kg)

Order No.: MD12/180V

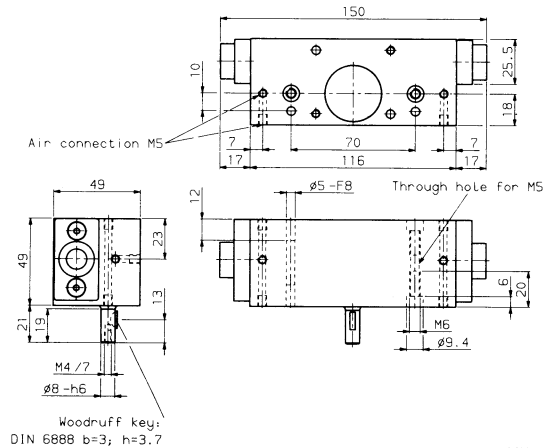


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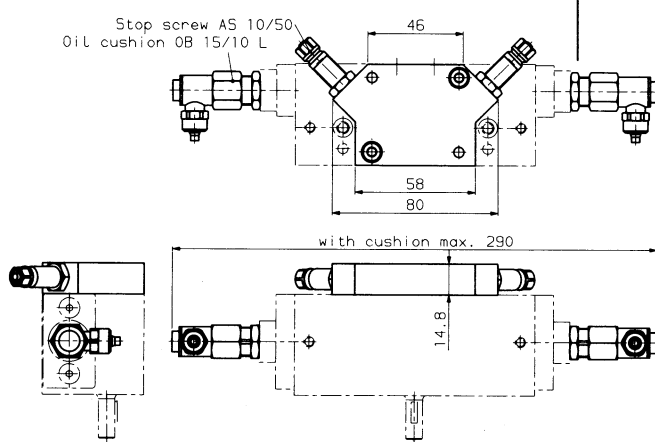
- Built in patented stop screws with fine threads provide adjustable angle of rotation.
- The stop screws can be fitted with patented sensing elements (see section "Stop Screws with plug-in sensing elements")
- Designed for high operating rates

Rotary Actuator MD 20/180

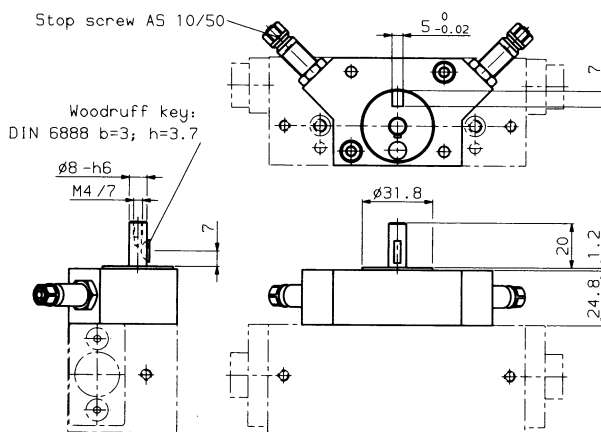
Model S



Model A



Model B



Technical data:

- Built in patented stop screws with fine threads provide for stepless adjustable angle of rotation.
- The stop screws can be fitted with patented sensing elements (see section "Stop Screws with plug-in sensing elements").
- Intermediate position can be added (on model B).
- Designed for high operating rates and long life.
- Operating medium Compressed air or hydraulic oil
- Operating pressure 43.5 - 116 psi (3 - 8 bar)
- Air connection M5

Type	Angle of rotation	Air consumption for each double stroke at 5 bar	Weight
MD 20/180 S	180°	.004 scf (0.12 NL)	2.0 lb (0.9 kg)

Max. load radial to shaft: 79 lb (350 N)

Max. load axial to shaft: 61 lb (270 N)

Torque at 72.5 psi (5 bar) : 9.74 lb.in (1.1 Nm)

Order No.

MD 20/180 S

MD 20/180 S1 end cover for oil cushions
or elastomer cushions

OIL CUSHIONS = OB 15/IOL

ELASTOMER = KB08/M14X1

Type	Angle of rotation	Air consumption for each double stroke at 5 bar	Weight
MD 20/180 A	0 - 180°	.004 scf (0.12 NL)	2.4 lb (1.1 kg)

Max. load radial to shaft: 79 lb (350 N)

Max. load axial to shaft: 61 lb (270 N)

Repeatability: +/- 200 Arc sec

Torque at 72.5 psi (5 bar) : 9.74 lb.in (1.1 Nm)

Order No.

MD 20/180 A

MD 20/180 A1 end cover for oil cushions
or elastomer cushions

NOTE: when using cushions need 2 nuts, o-rings
(MU01.008)

Type	Angle of rotation	Air consumption for each double stroke at 5 bar	Weight
MD 20/180 B	0 - 180°	.004 scf (0.12 NL)	2.6 lb (1.2 kg)

Max. load radial to shaft: 40 lb (180 N)

Max. load axial to shaft: 67 lb (300 N)

Repeatability: +/- 200 Arc sec

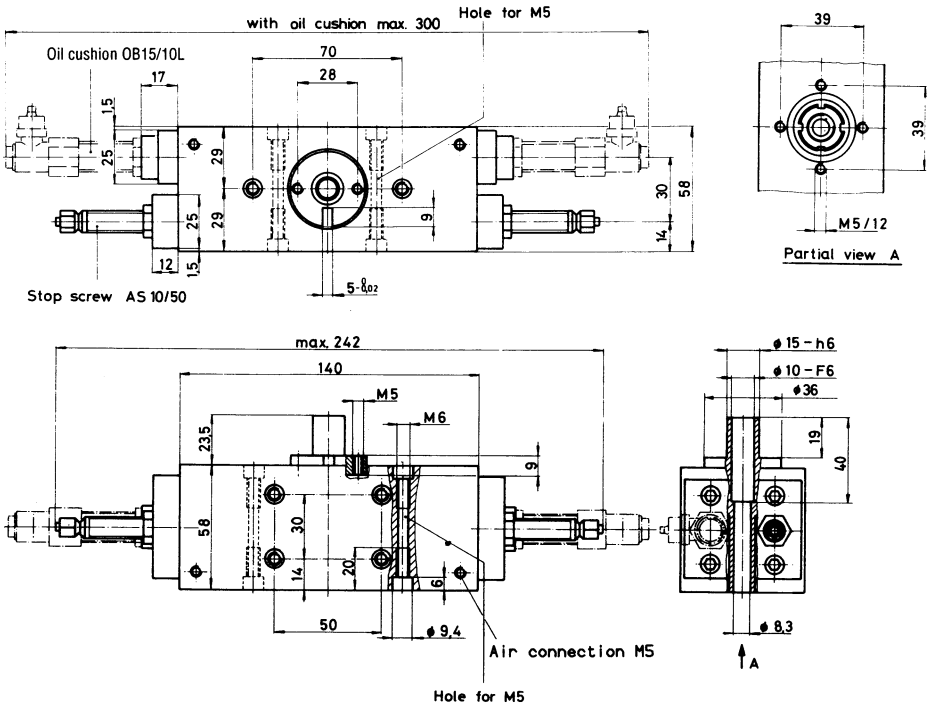
Torque at 72.5 psi (5 bar) : 9.74 lb.in (1.1 Nm)

Order No.

MD 20/180 B

MD 20/180 B1 end cover for oil cushions
or elastomer cushions

Rotary Actuator MD 20/360



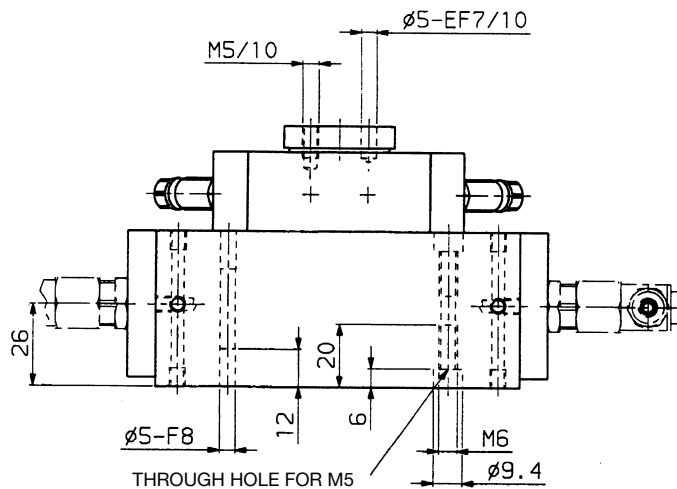
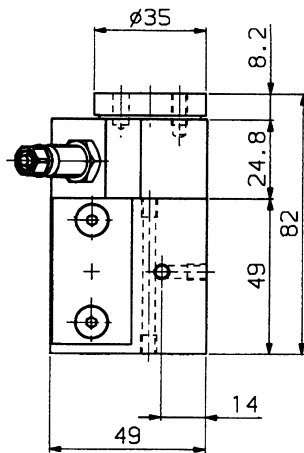
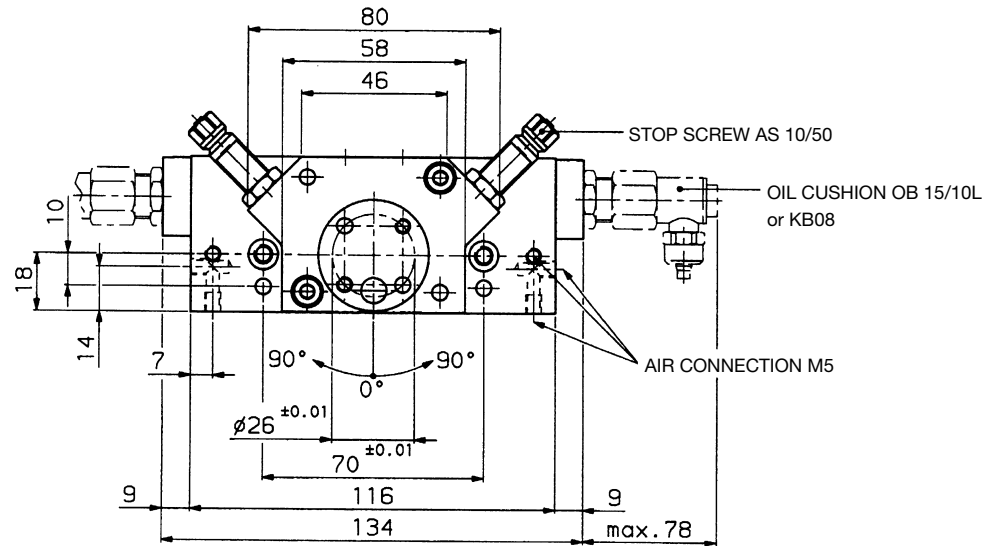
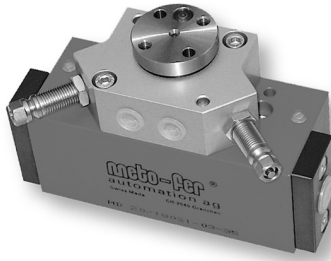
Type	Angle of rotation	Max. load radial to shaft	Max. load axial to shaft	Torque at 72.5 psi (5 bar)	Air consumption for each double stroke 72.5 psi (5 bar)	Weight
MD 20/360	0–360°	337 lb (1500 N)	34 lb (150 N)	7.26 lb.in (0,82 Nm)	.006 scf (0,17 NL)	4.0 lb (1,8 kg)

Order No.
MD 20/360
MD 20/360-1 end cover for oil cushions or elastomer cushions

- Technical data:**
- Built in patented stop screws with fine threads provide for stepless adjustable angle of rotation.
 - The stop screws can be fitted with patented sensing elements (see section "Stop Screws with plug-in sensing elements").
 - End position can be damped with adjustable oil cushions.
 - Designed for high operating rates and long life.
 - Operating medium Compressed air or hydraulic oil
 - Operating pressure 43.5 - 116 psi (3 - 8 bar)
 - Repeatability ± 294 Arc sec
 - Air connection M5

Cushions page 5.001

Rotary Actuator MD 20/180V

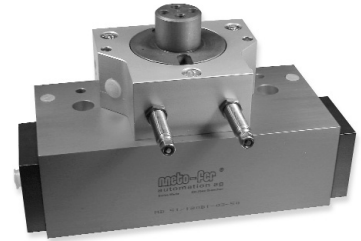


Rotation:	0-180 degrees
Max Load Radial To Shaft:	40 lb (180 N)
Max Load Axial To Shaft:	67 lb (300 N)
Repeatability:	± 200 ARC SEC.
Torque:	9.74 lb IN (1.1 Nm)
Operating Medium:	compressed air or hydraulic oil
Operating Pressure:	43.5-116 PSI (3-8 bar)
Air Connection:	M5
Air Consumption For Each Double Stroke:	0.004 scf (0.12 NL)
Weight:	2.6 lb. (1.20 kg)

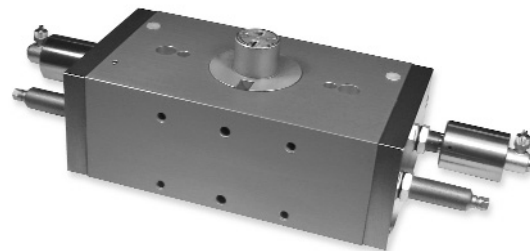
Order No.: MD20/180V
MD20/180V1 WITH END COVER FOR OIL OR ELASTOMER CUSHIONS

Technical data:

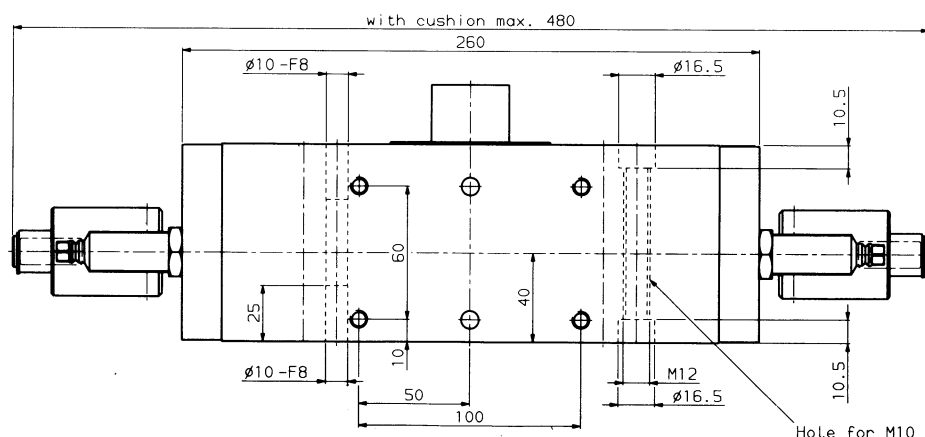
- Built in patented stop screws with fine threads provide adjustable angle of rotation.
- The stop screws can be fitted with patented sensing elements (see section "Stop Screws with plug-in sensing elements")
- End position can be damped with adjustable oil cushions. (OB15/10L) or Elastomer (KB08)
- Designed for high operating rates



Type	Angle of rotation	Max. load radial to shaft	Max. load axial to shaft	Torque at 72.5 psi (5 bar)	Air consumption for each double stroke at 5 bar	Weight
MD 51/180B	0-180°	1124 lb (5000 N)	629 lb (2800 N)	117.3 lb.in (13.25 Nm)	0.048 scf (1.35 NL)	17.9 lb (8.1 kg)

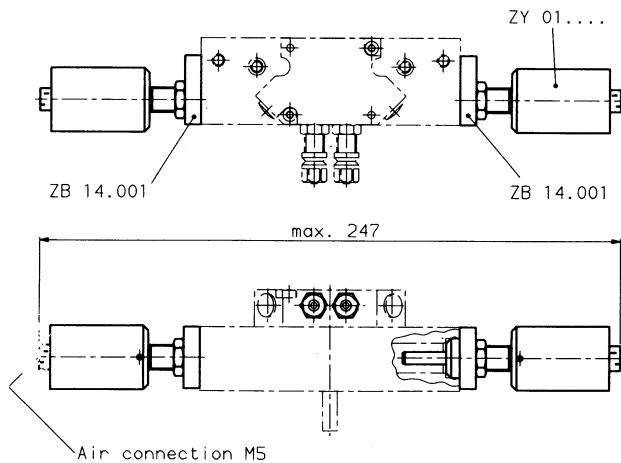


Stop screw AS 18/100P
Standard



Intermediate position

for MD12/180



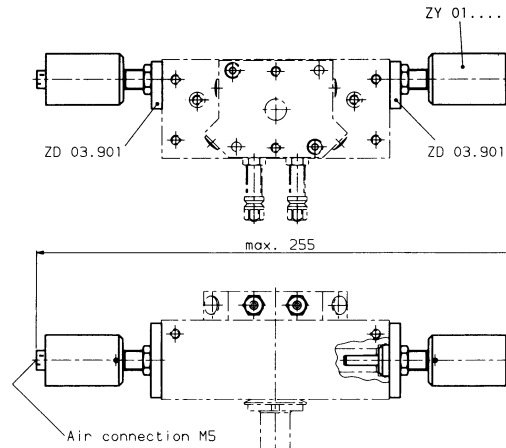
Order No.

Cylinder ZY 01....

End cover ZB 14.001

Intermediate position

for MD12D/180H and ZD12D/180



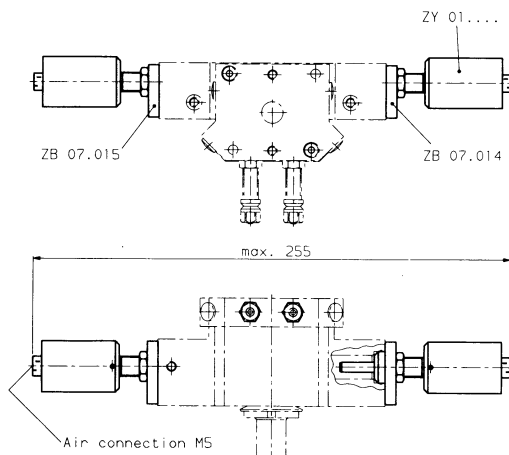
Order No.

Cylinder ZY 01....

End cover ZD 03.901

Intermediate position

for MD12/180H and ZD12/180



Order No.

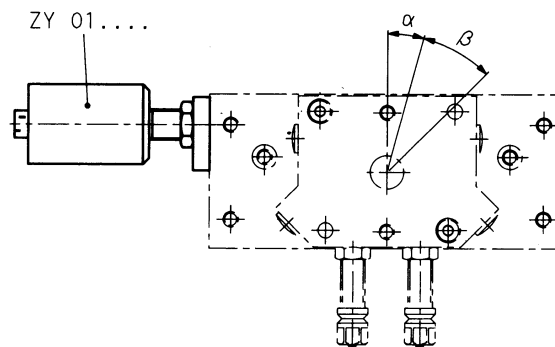
Cylinder ZY 01....

End cover ZB 07.014

End cover ZB 07.015

Intermediate position

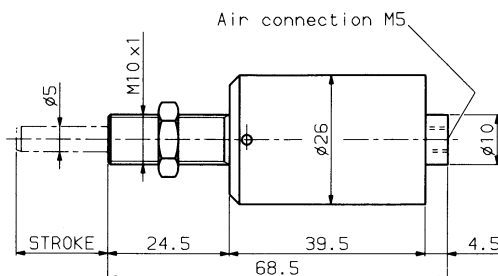
Possible adjustments

Dimensions of α and β see table of Cylinder ZY

Cylinder ZY

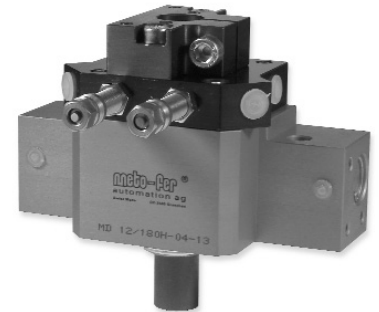
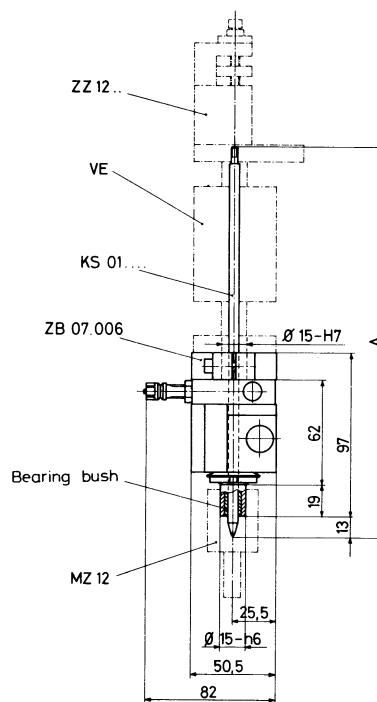
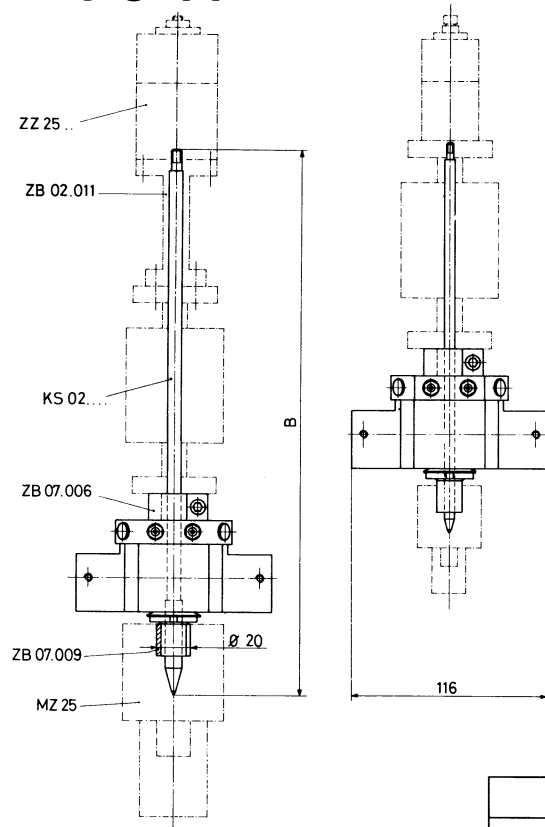
Technical data:

- Stroke return movement has to occur mechanical (Piston of rotary drive)
- Operating medium Compressed air
- Operating pressure 43.5 - 116 psi (3 - 8 bar)
- Air connection M5



Type	Stroke	α	β	Piston force at 72.5 psi (5 bar)	Air consumption for each stroke at 72.5 psi (5 bar)	Weight	Order No.
ZY 01.000	18.5	0°	0-30°	27 lb (118 N)	0.0012 scf (0.035 NL)	0.11 lb (0.05 kg)	ZY 01.000
ZY 02.000	15.5	15°	0-30°	27 lb (118 N)	0.0010 scf (0.029 NL)	0.11 lb (0.05 kg)	ZY 02.000
ZY 03.000	12.5	30°	0-30°	27 lb (118 N)	0.0008 scf (0.024 NL)	0.11 lb (0.05 kg)	ZY 03.000
ZY 04.000	9.5	45°	0-30°	27 lb (118 N)	0.0006 scf (0.018 NL)	0.11 lb (0.05 kg)	ZY 04.000
ZY 05.000	6.5	60°	0-30°	27 lb (118 N)	0.0004 scf (0.012 NL)	0.11 lb (0.05 kg)	ZY 05.000

Rotary gripper head ZD 12/180 Rotary gripper head for Vertical units VE



Type	Conical bar for MZ 12		Conical bar for MZ 25	
	A	Conical bar No.	B	Conical bar No.
ZD 12/180	—	—	—	—
ZD 12/180 VE 22	231	KS 01.017	324	KS 02.004
ZD 12/180 VE 52	291	KS 01.018	384	KS 02.008
ZD 12/180 VE 82	351	KS 01.019	444	KS 02.000

Technical data: Sheet 3.011

Rotary gripper head and support must be ordered separately.

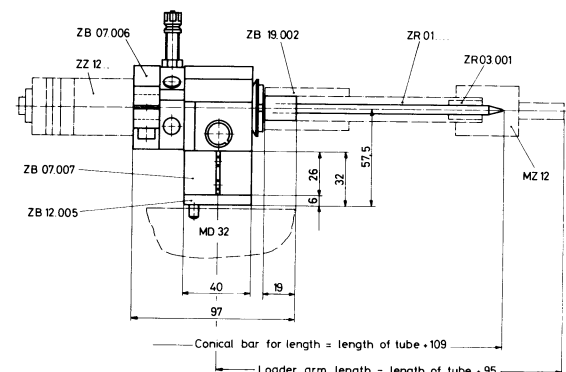
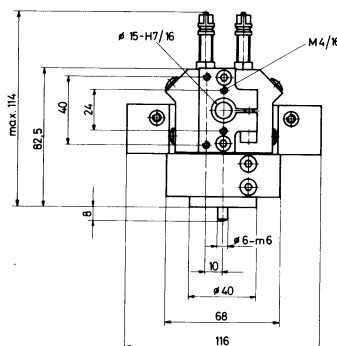
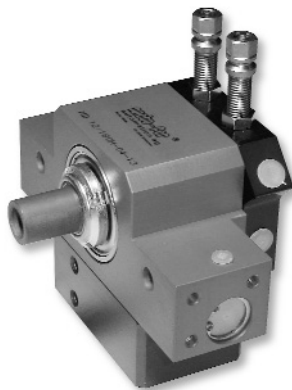
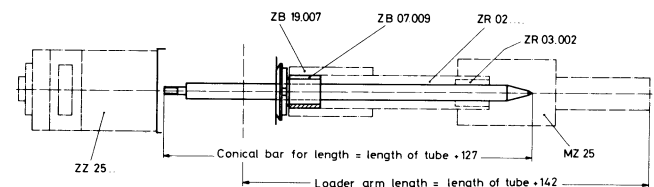
Order No. for Rotary gripper head (delivery as per photo) ZD 12/180

Order No. for Split sleeve ZB 07.009

Order No. for Conical bar KS

No. of Conical bar

Rotary gripper head for use
with rotary loader arms



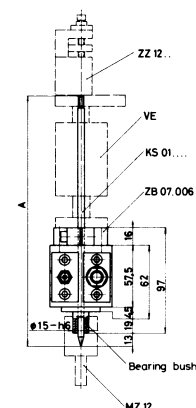
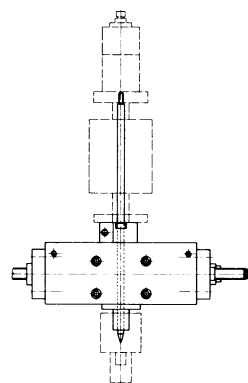
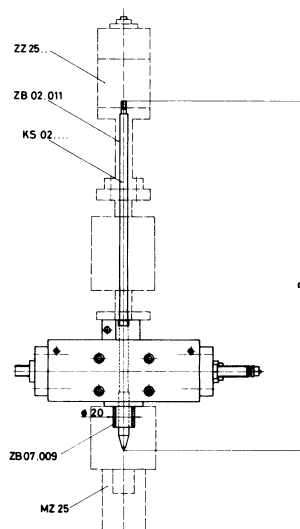
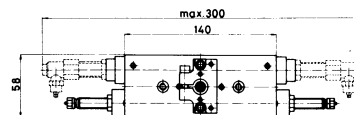
Technical data: Sheet 3.011

Rotary gripper head and support must be ordered separately.

Order No. for Rotary gripper head (delivery as per photo) ZD 12/180L

Order No. for Conical bar see sheet 8.022

Order No. for Gripper mounting tubes see sheet 8.022



Type	Angle of rotation	Max. load radial	Max. load axial	Torque at 72.5 psi (5 bar)	Air consumption for each double stroke at 72.5 psi (5 bar)	Weight
ZD 20/360	0—360°	337 lb (1500 N)	34 lb (150 N)	7.26 lb. in (0,82 Nm)	.006 scf (0,17 NL)	4.2 lb (1,9 kg)

	Conical bar for MZ 12		Conical bar for MZ 25	
Type	A	Conical bar No.	B	Conical bar No.
ZD 20/ 360	—	—	—	—
ZD 20/360 VE 22	231	KS 01.017	324	KS 02.004
ZD 20/360 VE 52	291	KS 01.018	384	KS 02.008
ZD 20/360 VE 82	351	KS 01.019	444	KS 02.000

ZB 07.009

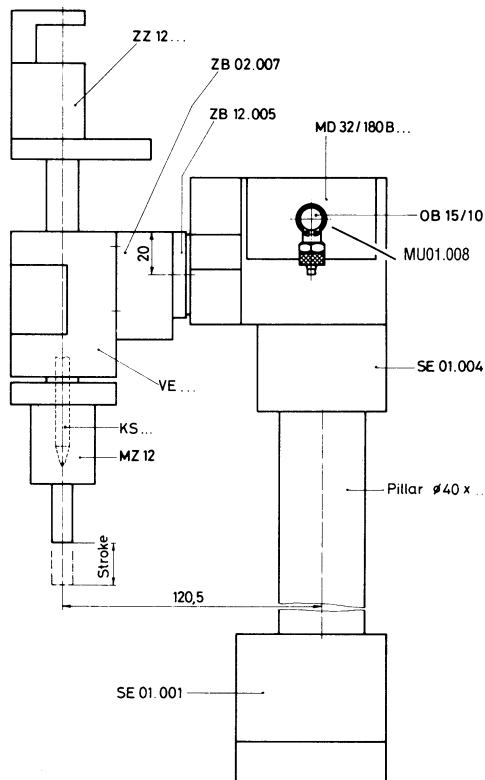
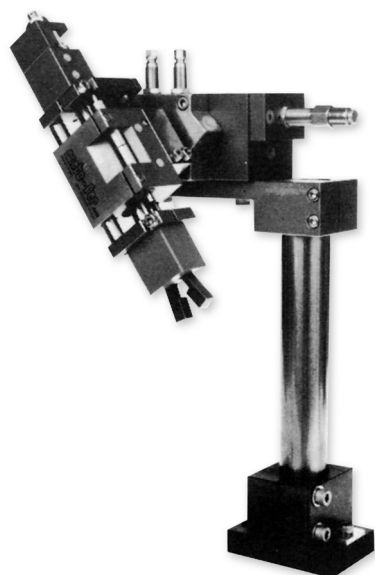
M5

Angle Loader WL

Individual angle loader components are available in various versions and should, therefore, be ordered separately. Components can be determined with the aid of the following list according to the description.

Description	Sheet	Description	Sheet
KOB	Compensation reservoir5.001	SD 01.001	Stand base6.002
* KS...	Conical bar	SD 01.005	Mounting plate6.002
LH...	Linear unit1.001	SE 01.001	Stand base6.001
MD 32/180 B...	Rotary drive3.031	SE 01.004	Mounting plate6.001
MD 51/180 B...	Rotary drive3.041	VE...	Vertical unit1.011
* MZ 12	Mechanical gripper4.001	ZB 02.007	Plate
OB 15/10L	Oil cushion5.001	ZB 11.021	Plate
OB 12/20	Oil cushion5.001	ZB 12.005	Flange (MD 32)
Pillar ø 40 x...	Pillar6.002	ZZ 12...	Gripper cylinder4.001

* KS, MZ 12 und ZZ 12 can be ordered as NW... (Sheet 4.001).



The oil cushions and the compensation reservoir for the rotary drive have to be ordered separately.

Page 5.001

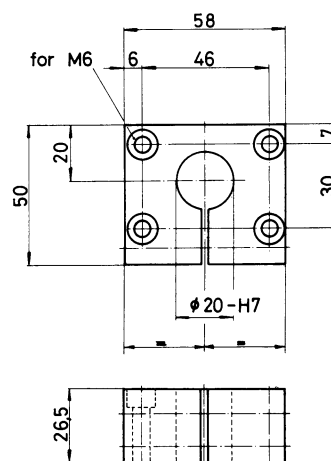
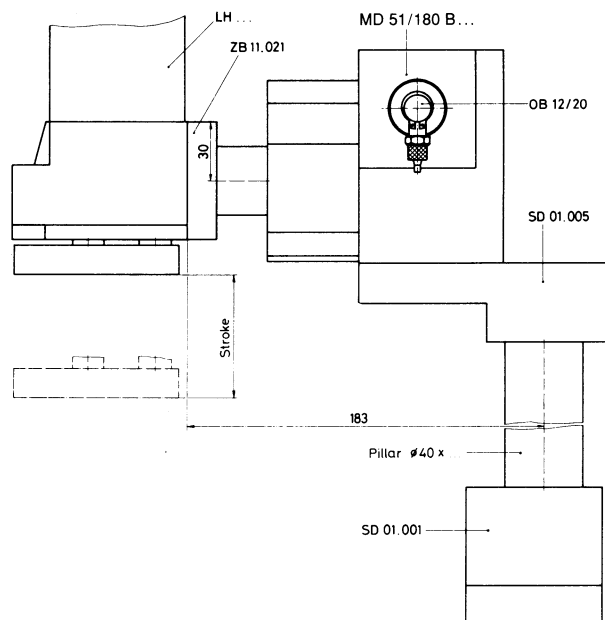
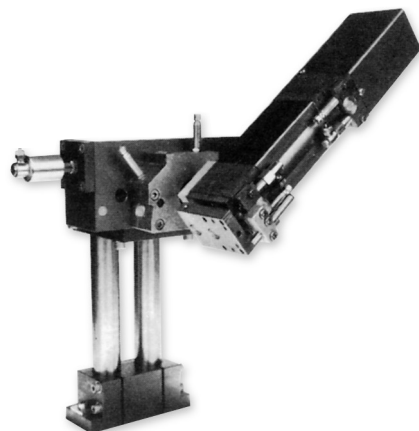


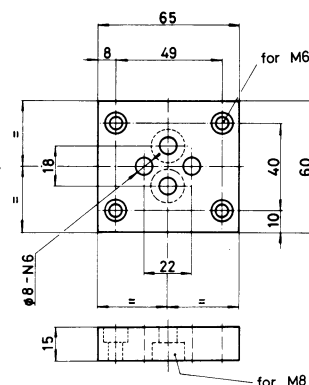
Plate
Order No. ZB 02.007

WL 32



The oil cushions for the rotary drive must be ordered separately. The compensation reservoir is included with the linear unit.

Plate
Order No. ZB 11.021



WL 51