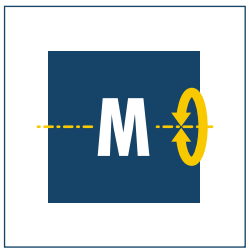
Sizes
061 .. 221

Triggering force F_z
1713 N .. 13800 N

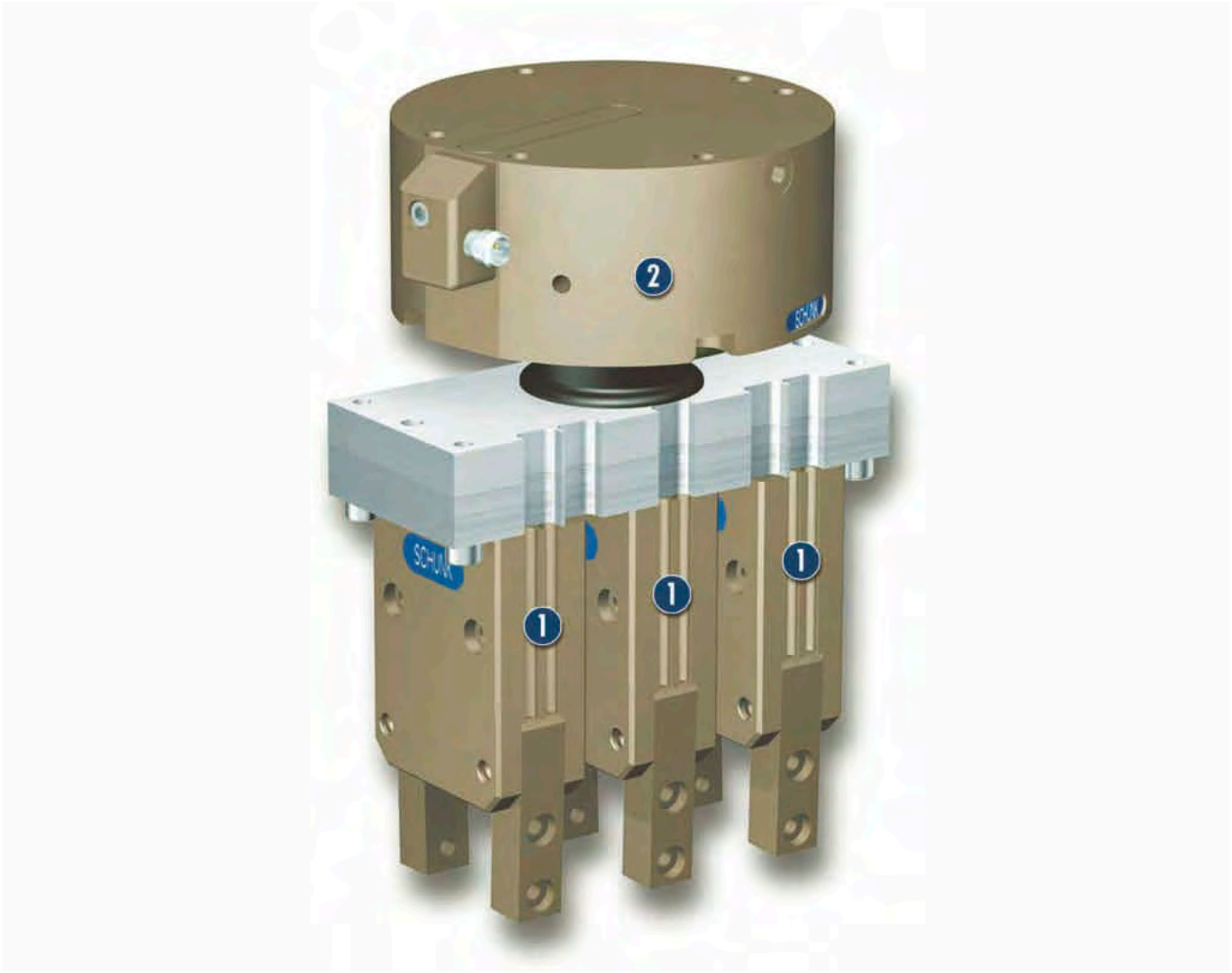


Triggering torque M_x
59 Nm .. 1300 Nm

Triggering torque M_y
59 Nm .. 1300 Nm

Triggering torque M_z
61 Nm .. 960 Nm

Application example



Triple transfer unit for repacking small cardboard boxes

1 SWG 50 2-Finger Angular Gripper

2 OPR-101 Collision and Overload Protection

Collision and Overload Protection

Collision and overload protection with automatic reset for protecting robots and handling units against damage resulting from collisions or overload conditions

Area of application

Standard solution for all robot applications whereby the robot, the tool or the workpiece are to be protected in the event of a collision

Your advantages and benefits

Automatic reset
for faster production restart after a collision

Triggering force and torque can be adjusted via the operating pressure
for optimum protection of your components

Integrated monitoring
for signal transmission in the event of a collision, whereby the robot can be stopped

Various ISO adapter plates as an option
for easy attachment to most robots without production expense

General information on the series

Working principle
Integrated cylinder piston

Actuation
Pneumatic, with filtered compressed air (10 µm): dry or lubricated

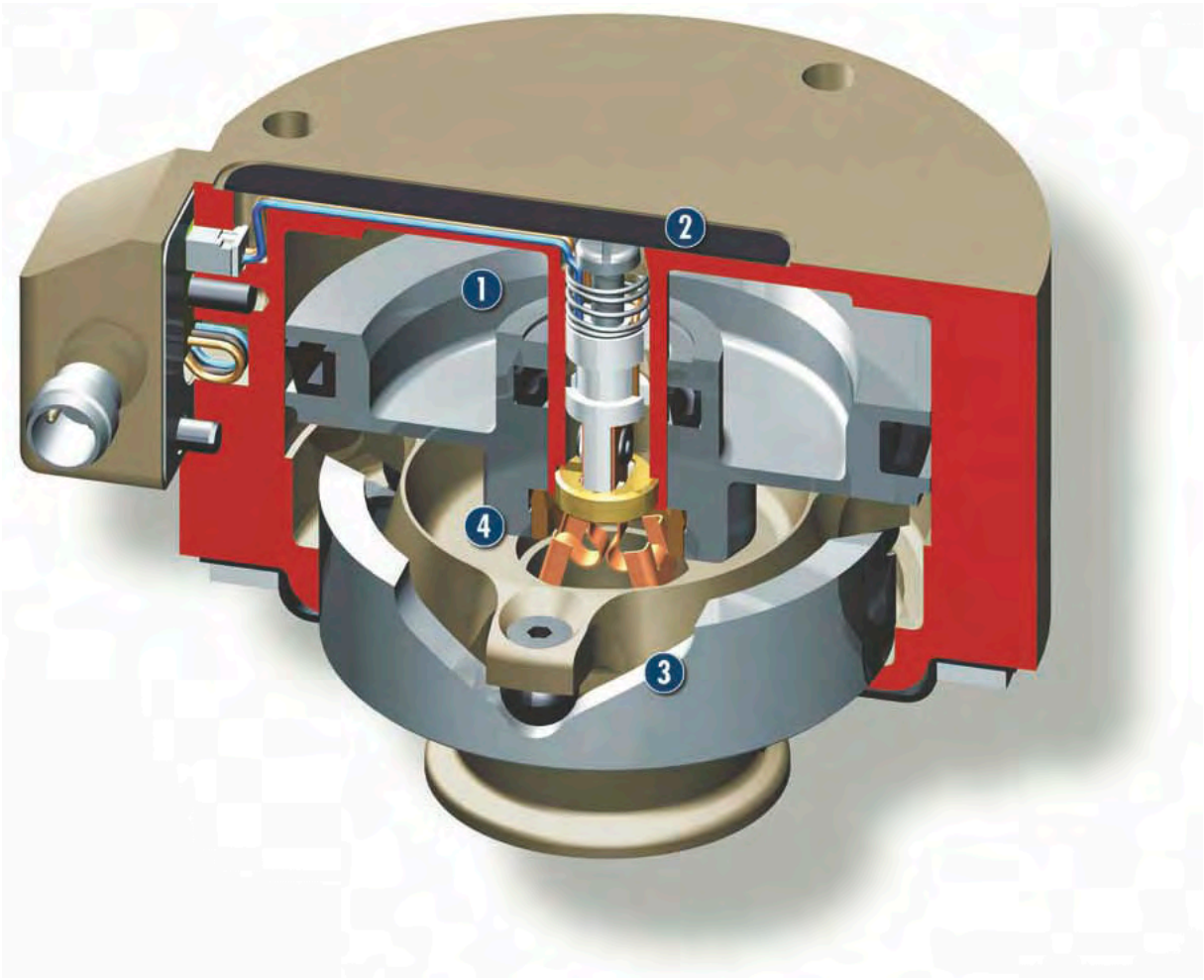
Maintenance
Maintenance-free

Ambient temperature
From 5 °C to 60 °C

Scope of delivery
Coupling with 5 m cable, operating manual, maintenance instructions, manufacturer's declaration

Warranty
24 months

Sectional diagram



1 **Drive**
pneumatic for easy adjustment of the triggering force

2 **Adjustment Screw**
for adjusting the switching point

3 **Bearing Point**
to absorb strong forces and large moments

4 **Monitoring**
mechanical and robust

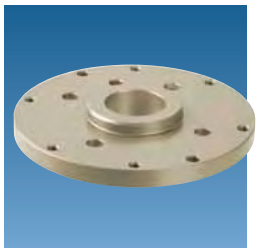
Function description

In the event of a collision, the tool plate deflects while simultaneously actuating the system's emergency stop mechanism. The OPR automatically returns to zero position when the gripper moves away from the collision object. Production can continue immediately as manual resetting is not necessary.

Accessories

Accessories from SCHUNK – the suitable supplement for maximum functionality, reliability and performance of all automation modules.

Adapter plates



Fittings

Cables

ⓘ For the exact size of the accessories, the availability for this size and the designation and ID, please refer to the additional views at the end of the size in question. You can find more detailed information on our accessory range in the "Accessories" catalog section.

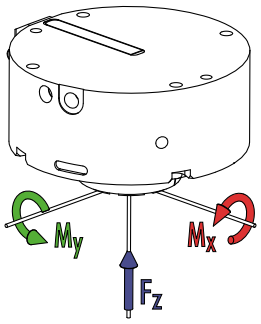
General information on the series

Extreme ambient conditions

Please note that use in extreme ambient conditions (e.g. in the coolant zone, in the presence of abrasive dust) can significantly reduce the tool life span of these units and we cannot accept any liability for this reduction. However, in many cases we have a solution at hand. Please ask for details.

OPR-061

Forces and moments

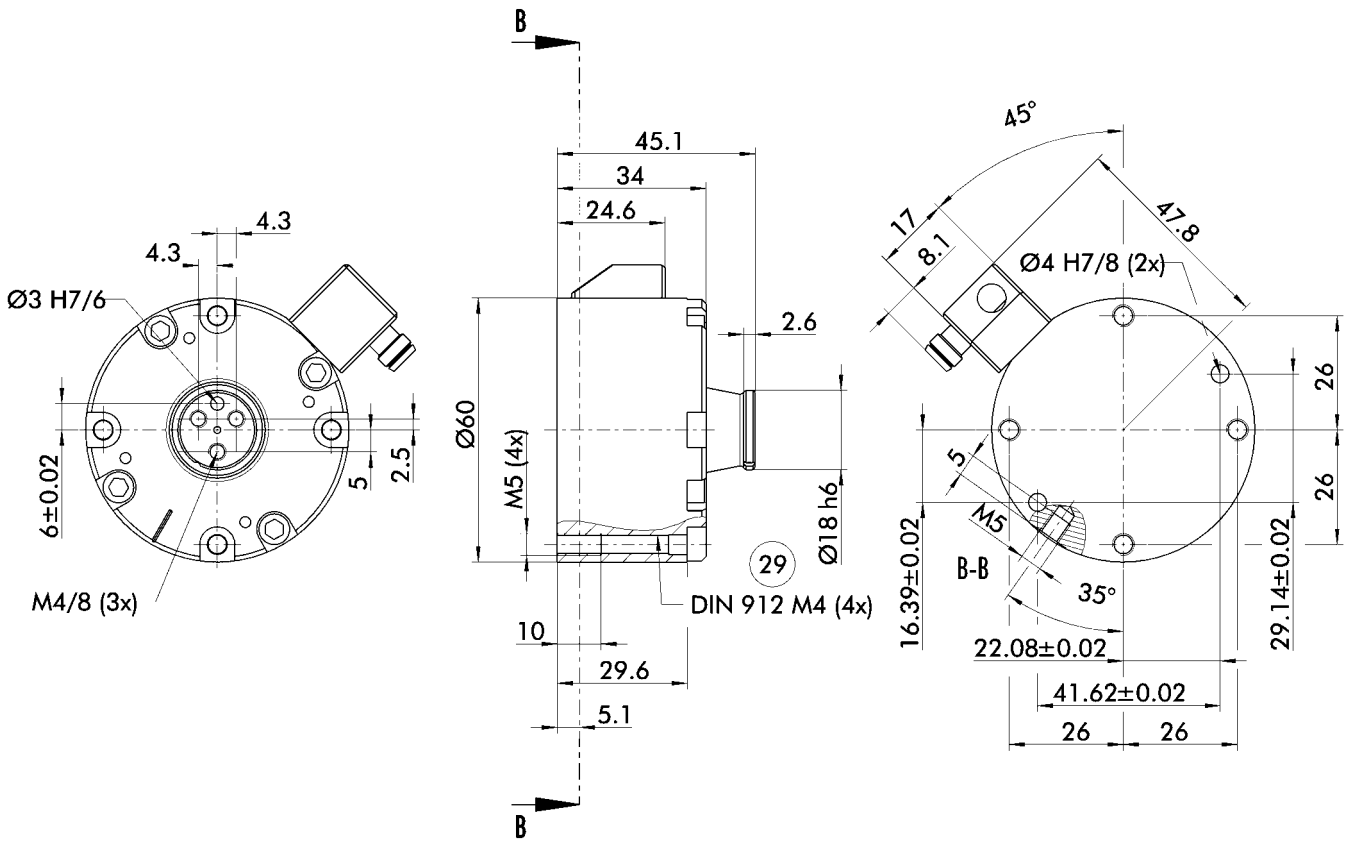


M_x max. 28 Nm
M_y max. 28 Nm
F_z max. 880 N

Technical data

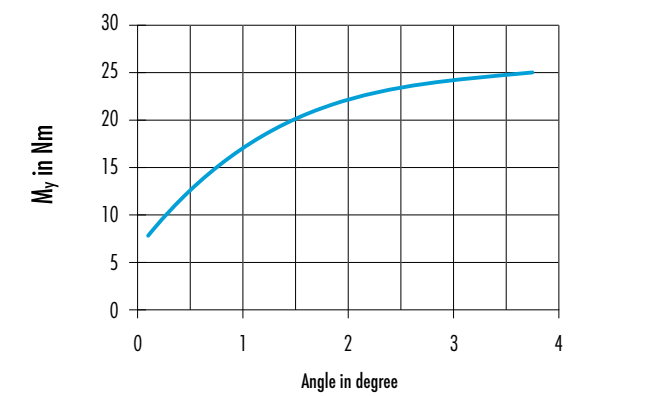
Designation			OPR-061-P00	OPR-061-P05	OPR-061-P10	OPR-061-P15
ID without splash protection			**321361**	**321362**	**321363**	**321364**
ID with splash protection			**321365**	**321366**	**321367**	**321368**
Axial compensation		[mm]	5.6	5.6	5.6	5.6
Angular compensation		[°]	11	11	11	11
Rotational compensation		[°]	20	20	20	20
Triggering force with maximum operating pressure		[N]	880	880	880	880
Triggering torque with	Angular	[Nm]	28	28	28	28
maximum operating pressure	Rotational	[Nm]	24.4	24.4	24.4	24.4
Triggering force safeguarded by springs		[N]	-	43	86	128
Triggering torque safeguarded	Angular	[Nm]	-	1.4	2.7	4.1
by springs	Rotational	[Nm]	-	1.2	2.4	3.6
Maximum operating pressure		[bar]	6.0	5.7	5.4	5.1
Repeat accuracy		[mm]	+/- 0.025	+/- 0.025	+/- 0.025	+/- 0.025
Rotational repeat accuracy		[min]	+/- 5	+/- 5	+/- 5	+/- 5
Sensitivity		[mm]	0.5	0.5	0.5	0.5
Weight		[kg]	0.32	0.35	0.35	0.35

Main views



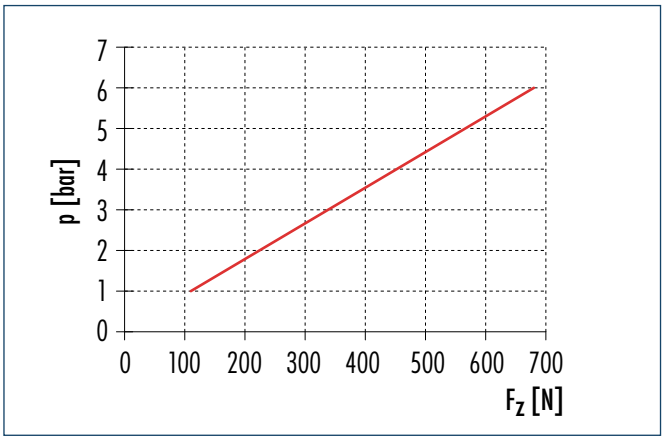
29 Through-bore for screw connection

Moment load

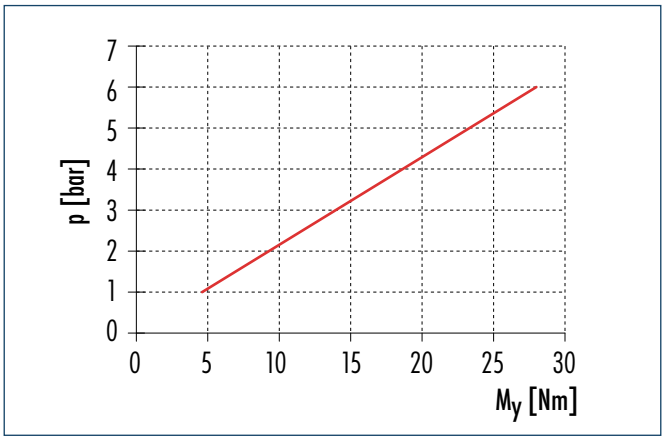


The diagram shows the actual deflection of the OPR, dependent upon the moment M_x at the maximum permissible operating pressure.

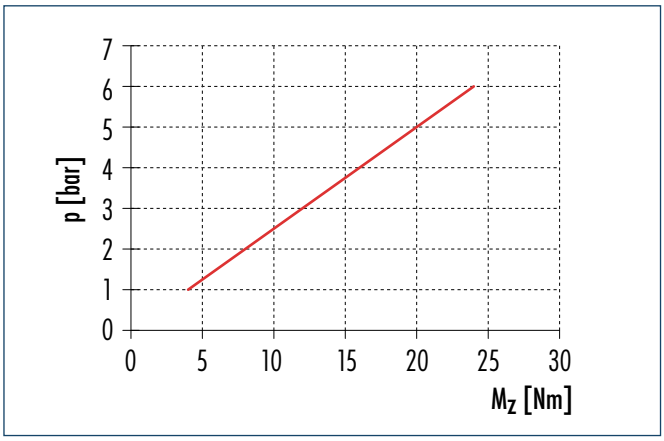
Force and moment range



Axial (F_z)

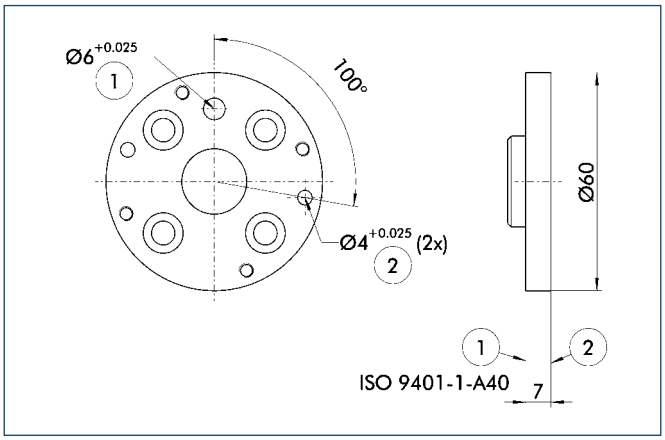


Moment (M_y)



Torsion (M_z)

Adapter plate A40

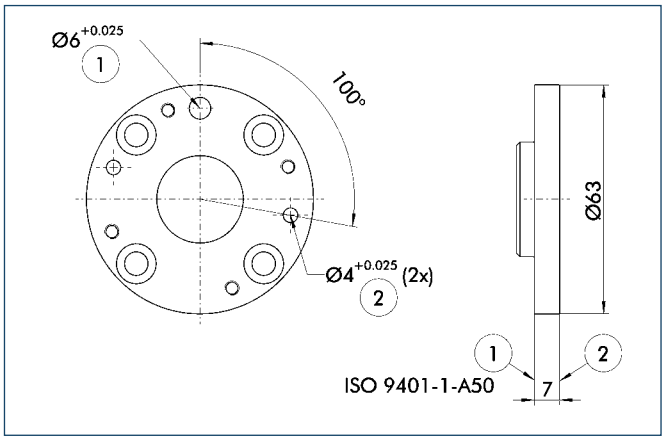


① Robot-side connection
② Tool-side connection

For mounting the OPR-061 directly to a flange in accordance with ISO 9409-40-4-M6

Designation	ID
A-OPR-061-ISO-A40-R	0321370

Adapter plate A50



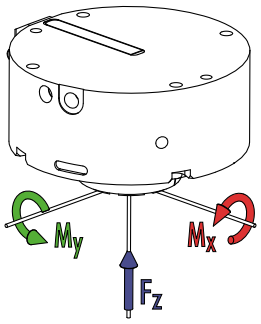
① Robot-side connection
② Tool-side connection

For mounting the OPR-061 directly to a flange in accordance with ISO 9409-50-4-M6

Designation	ID
A-OPR-061-ISO-A50-R	0321371

OPR-081

Forces and moments

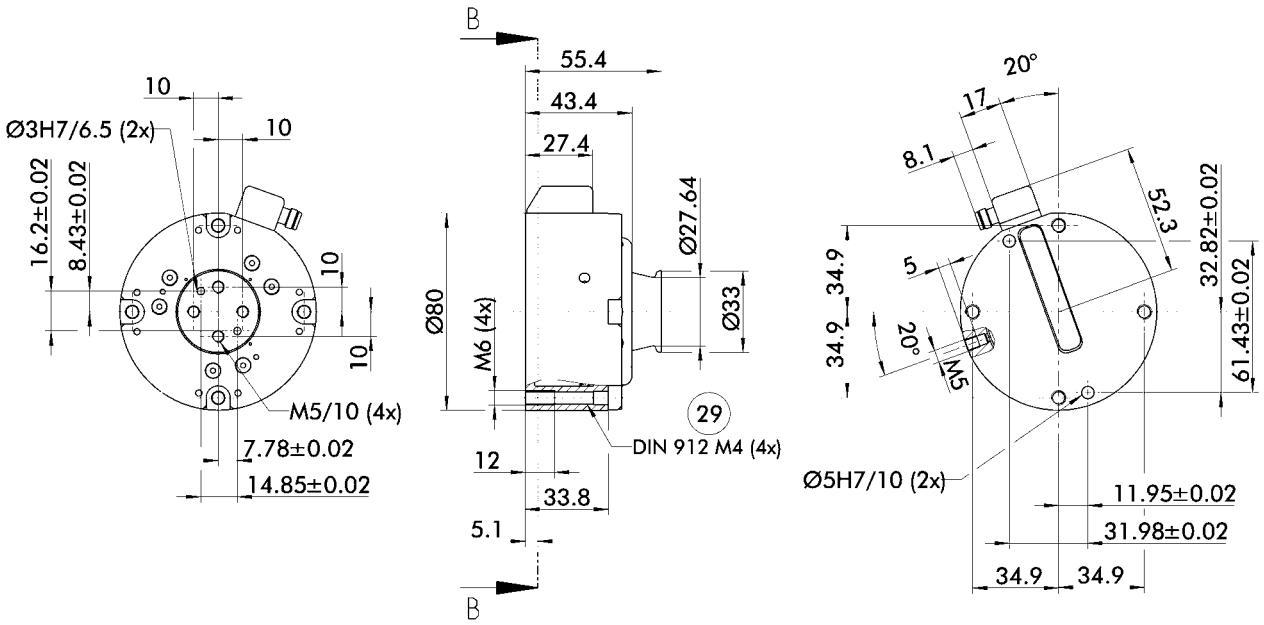


- M_x max. 59 Nm
- M_y max. 59 Nm
- F_z max. 1713 N

Technical data

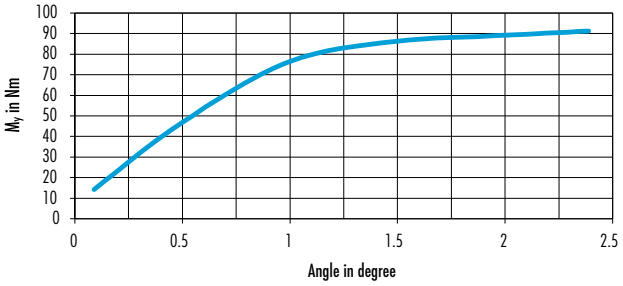
Designation			OPR-081-P00	OPR-081-P05	OPR-081-P10	OPR-081-P15
ID without splash protection			**0321381**	**0321382**	**0321383**	**0321384**
ID with splash protection			**0321385**	**0321386**	**0321387**	**0321388**
Axial compensation		[mm]	8.5	8.5	8.5	8.5
Angular compensation		[°]	± 13	± 13	± 13	± 13
Rotational compensation		[°]	± 25	± 25	± 25	± 25
Triggering force with maximum operating pressure		[N]	1713	1713	1713	1713
Triggering torque with	Angular	[Nm]	59	59	59	59
maximum operating pressure	Rotational	[Nm]	61	61	61	61
Triggering force safeguarded by springs		[N]	-	95	190	285
Triggering torque safeguarded	Angular	[Nm]	-	3.2	6.4	9.6
by springs	Rotational	[Nm]	-	3.4	6.8	10.2
Maximum operating pressure		[bar]	6.0	5.7	5.4	5.1
Repeat accuracy		[mm]	± 0.025	± 0.025	± 0.025	± 0.025
Rotational repeat accuracy		[min]	± 5	± 5	± 5	± 5
Sensitivity		[mm]	0.5	0.5	0.5	0.5
Weight		[kg]	0.58	0.6	0.6	0.6

Main views



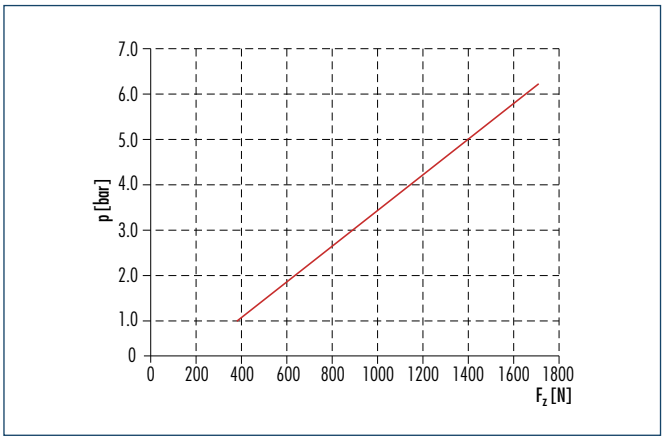
29 Through-bore for screw connection

Moment load

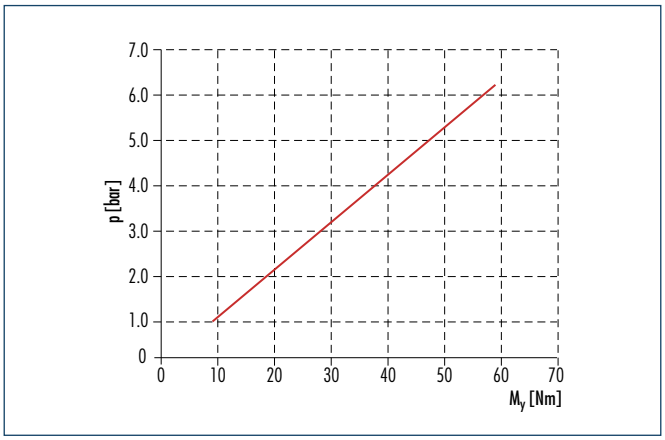


The diagram shows the actual deflection of the OPR, dependent upon the moment M_x at the maximum permissible operating pressure.

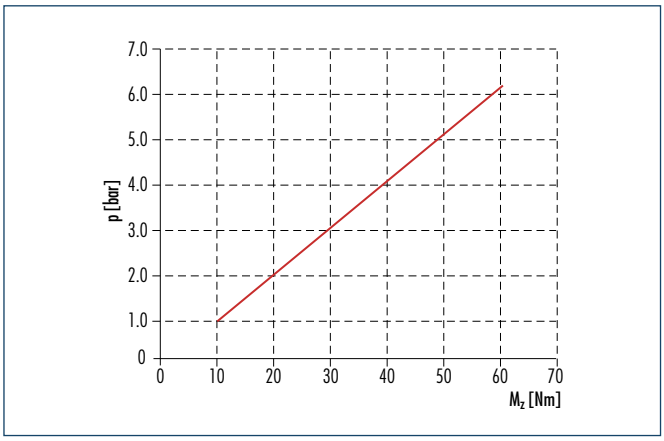
Force and moment range



Axial (F_z)

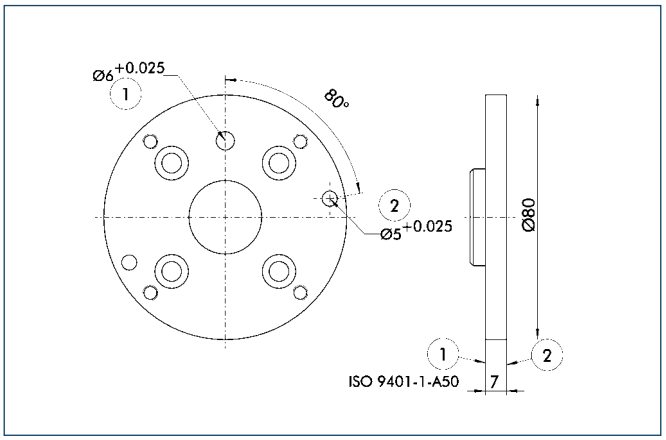


Moment (M_y)



Torsion (M_z)

Adapter plate A50

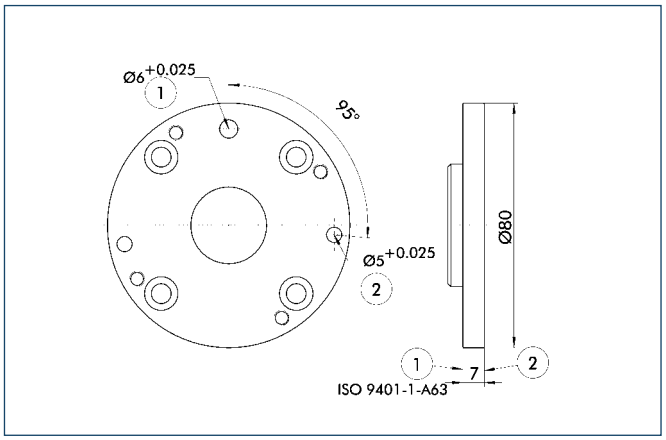


① Robot-side connection
② Tool-side connection

For mounting the OPR-081 directly to a flange in accordance with ISO 9409-50-4-M6

Designation	ID
A-OPR-081-ISO-A50-R	0321190

Adapter plate A63



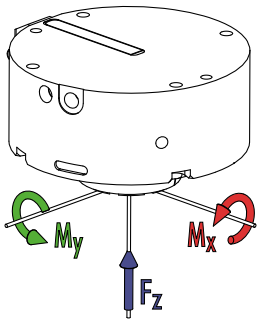
① Robot-side connection
② Tool-side connection

For mounting the OPR-081 directly to a flange in accordance with ISO 9409-63-4-M6

Designation	ID
A-OPR-081-ISO-A63-R	0321191

OPR-101

Forces and moments

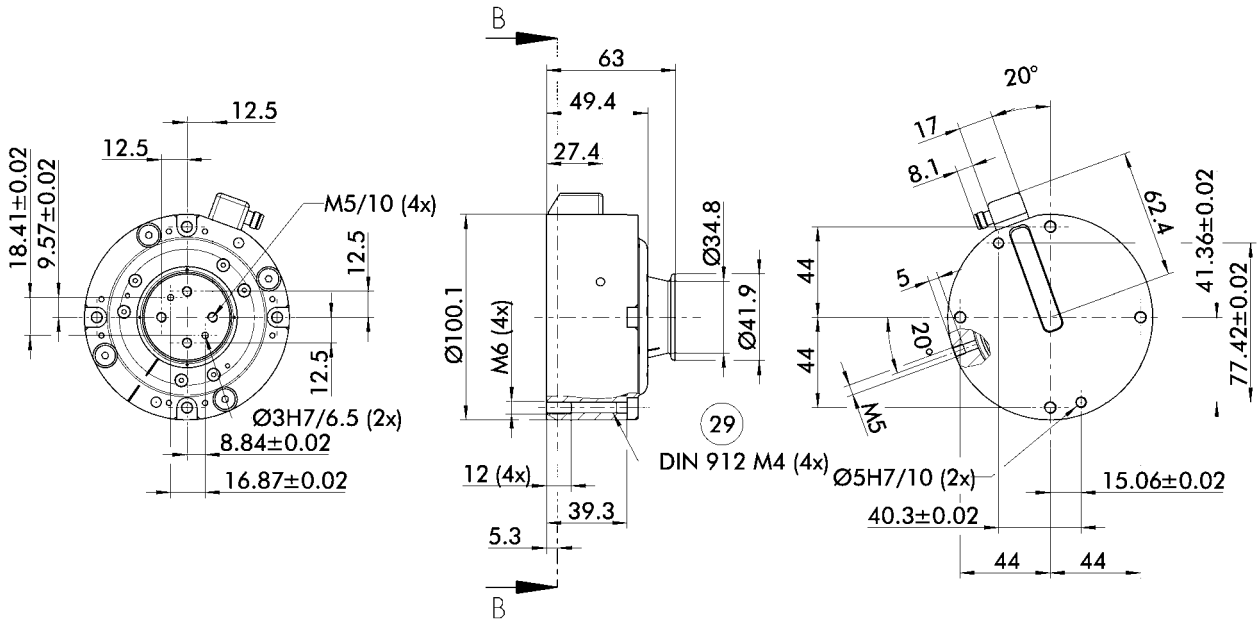


M_x max. 120 Nm
M_y max. 120 Nm
F_z max. 2723 N

Technical data

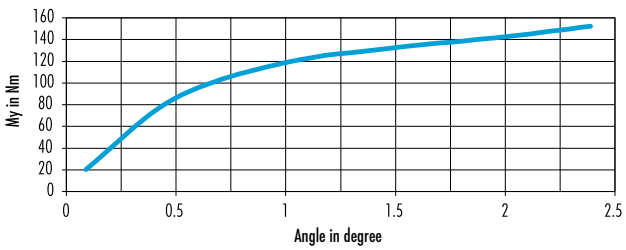
Designation			OPR-101-P00	OPR-101-P05	OPR-101-P10	OPR-101-P15
ID without splash protection			**0321401**	**0321402**	**0321403**	**0321404**
ID with splash protection			**0321405**	**0321406**	**0321407**	**0321408**
Axial compensation		[mm]	10	10	10	10
Angular compensation		[°]	± 12	± 12	± 12	± 12
Rotational compensation		[°]	± 25	± 25	± 25	± 25
Triggering force with maximum operating pressure		[N]	2723	2723	2723	2723
Triggering torque with	Angular	[Nm]	120	120	120	120
maximum operating pressure	Rotational	[Nm]	130	130	130	130
Triggering force safeguarded by springs		[N]	-	150	300	450
Triggering torque safeguarded	Angular	[Nm]	-	6.6	13.3	20
by springs	Rotational	[Nm]	-	7.2	14.4	21.6
Maximum operating pressure		[bar]	6.0	5.7	5.4	5.1
Repeat accuracy		[mm]	± 0.025	± 0.025	± 0.025	± 0.025
Rotational repeat accuracy		[min]	± 5	± 5	± 5	± 5
Sensitivity		[mm]	0.5	0.5	0.5	0.5
Weight		[kg]	1.2	1.3	1.3	1.3

Main views



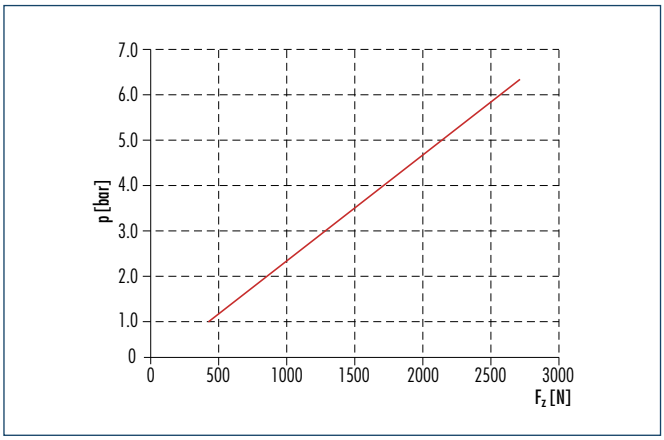
29 Through-bore for screw connection

Moment load

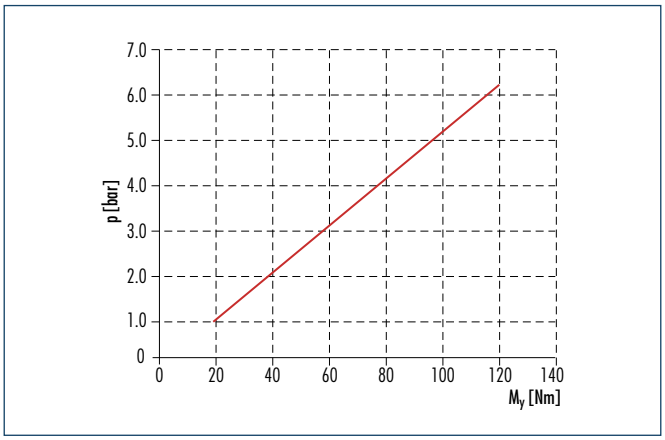


The diagram shows the actual deflection of the OPR, dependent upon the moment M_x at the maximum permissible operating pressure.

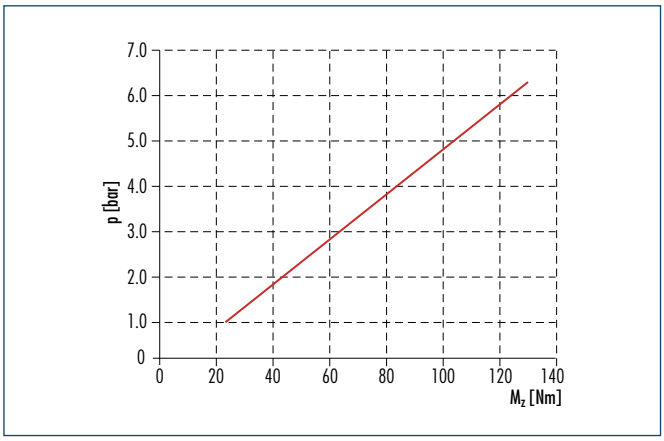
Force and moment range



Axial (F_z)

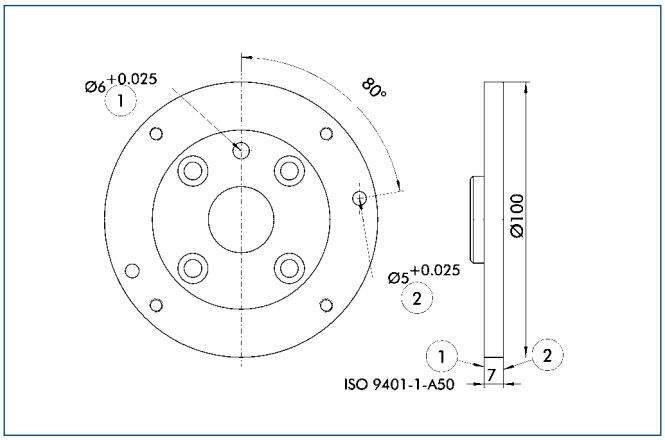


Moment (M_y)



Torsion (M_z)

Adapter plate A50

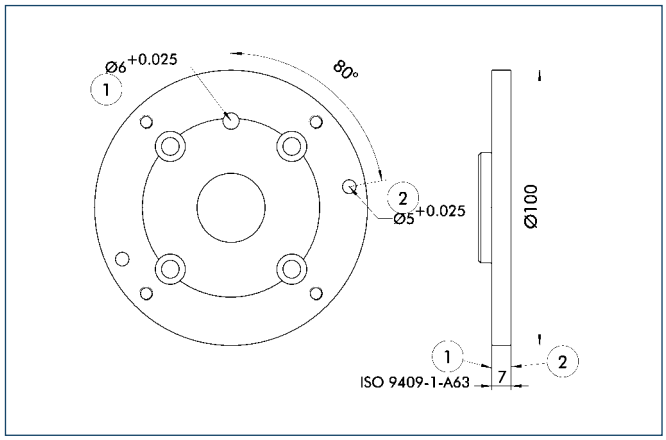


① Robot-side connection
② Tool-side connection

For mounting the OPR-101 directly to a flange in accordance with ISO 9409-50-4-M6

Designation	ID
A-OPR-101-ISO-A50-R	0321410

Adapter plate A63

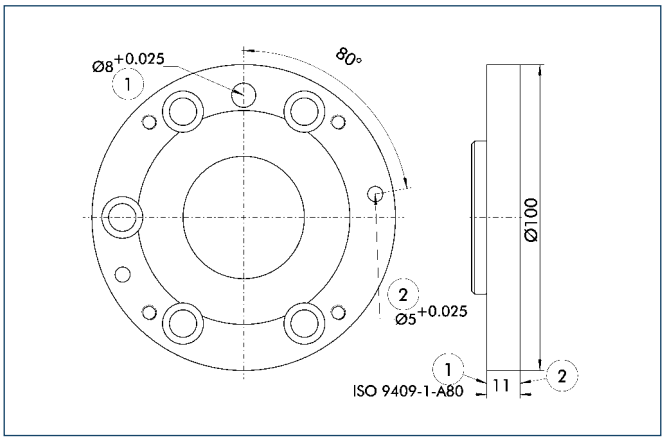


① Robot-side connection
② Tool-side connection

For mounting the OPR-101 directly to a flange in accordance with ISO 9409-63-4-M6

Designation	ID
A-OPR-101-ISO-A63-R	0321411

Adapter plate A80



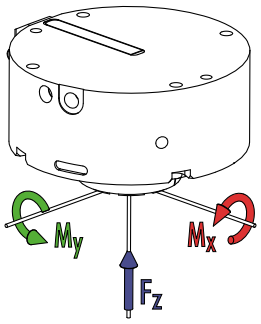
① Robot-side connection
② Tool-side connection

For mounting the OPR-101 directly to a flange in accordance with ISO 9409-80-6-M8

Designation	ID
A-OPR-101-ISO-A80-R	0321412

OPR-131

Forces and moments

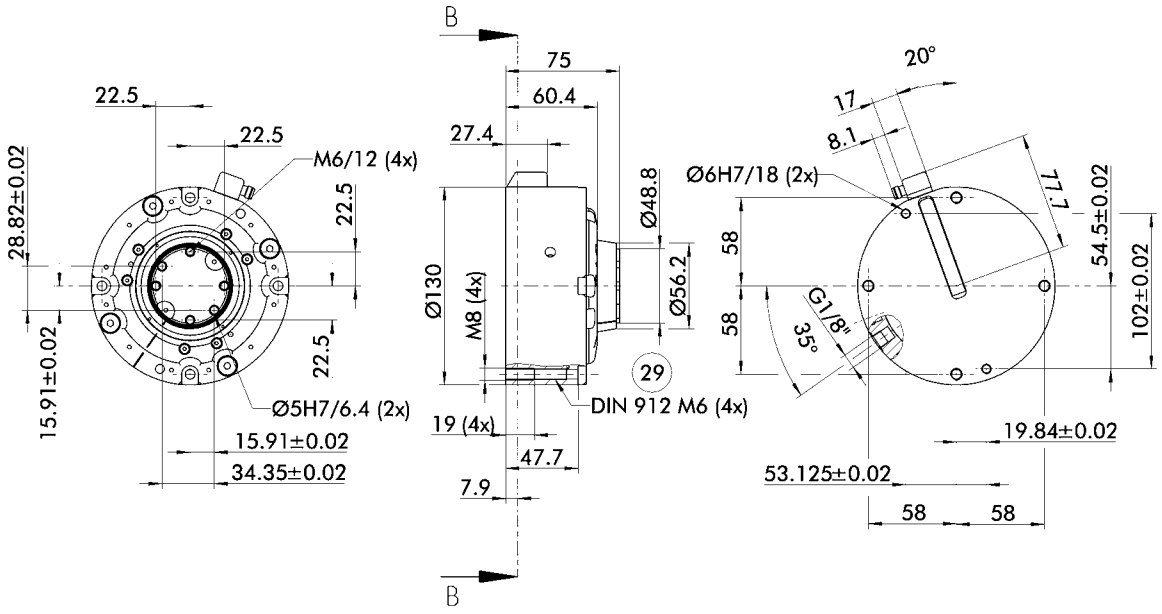


M_x max. 328 Nm
M_y max. 328 Nm
F_z max. 4715 N

Technical data

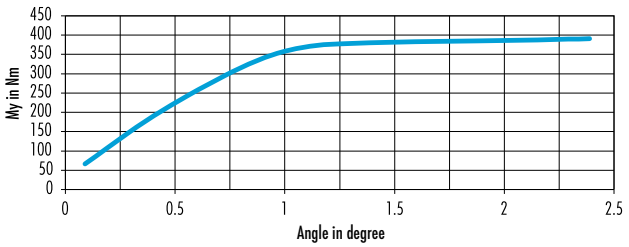
Designation			OPR-131-P00	OPR-131-P05	OPR-131-P10	OPR-131-P15
ID without splash protection			**0321431**	**0321432**	**0321433**	**0321434**
ID with splash protection			**0321435**	**0321436**	**0321437**	**0321438**
Axial compensation		[mm]	11.5	11.5	11.5	11.5
Angular compensation		[°]	± 10	± 10	± 10	± 10
Rotational compensation		[°]	± 20	± 20	± 20	± 20
Triggering force with maximum operating pressure		[N]	4715	4715	4715	4715
Triggering torque with	Angular	[Nm]	328	328	328	328
maximum operating pressure	Rotational	[Nm]	303	303	303	303
Triggering force safeguarded by springs		[N]	-	262	524	785
Triggering torque safeguarded	Angular	[Nm]	-	18	36	54
by springs	Rotational	[Nm]	-	19	38	57
Maximum operating pressure		[bar]	6.0	5.7	5.4	5.1
Repeat accuracy		[mm]	± 0.025	± 0.025	± 0.025	± 0.025
Rotational repeat accuracy		[min]	± 5	± 5	± 5	± 5
Sensitivity		[mm]	0.5	0.5	0.5	0.5
Weight		[kg]	2.3	2.4	2.4	2.4

Main views



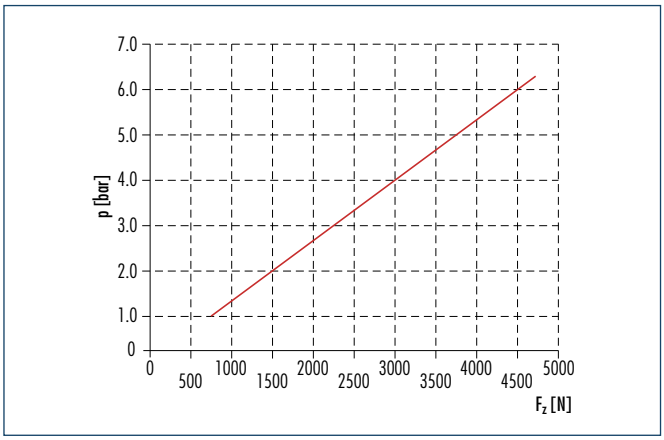
29 Through-bore for screw connection

Moment load

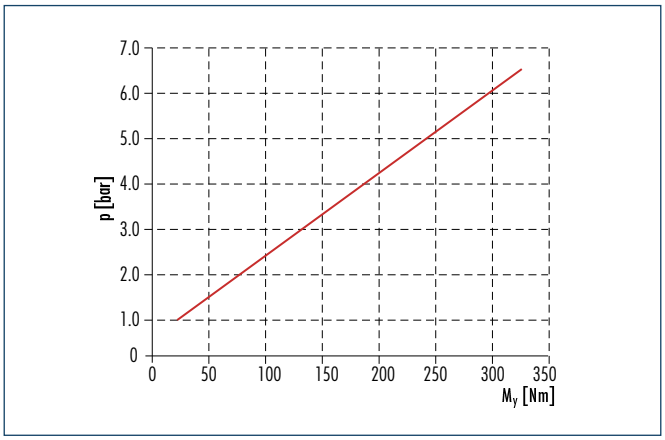


The diagram shows the actual deflection of the OPR, dependent upon the moment M_x at the maximum permissible operating pressure.

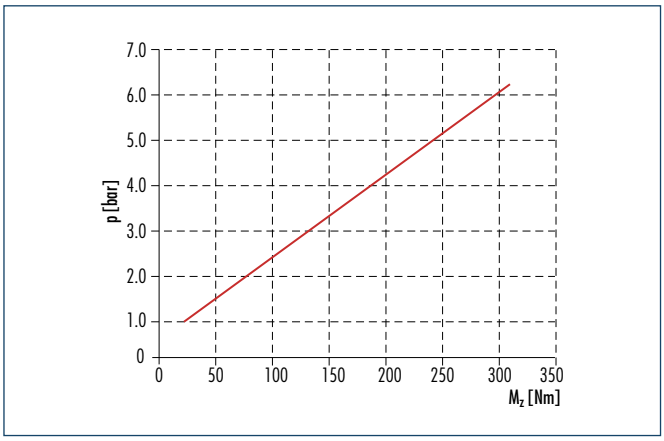
Force and moment range



Axial (F_z)

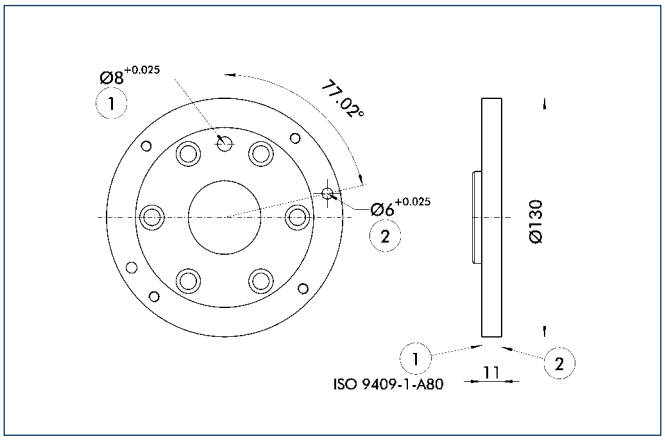


Moment (M_y)



Torsion (M_z)

Adapter plate A80

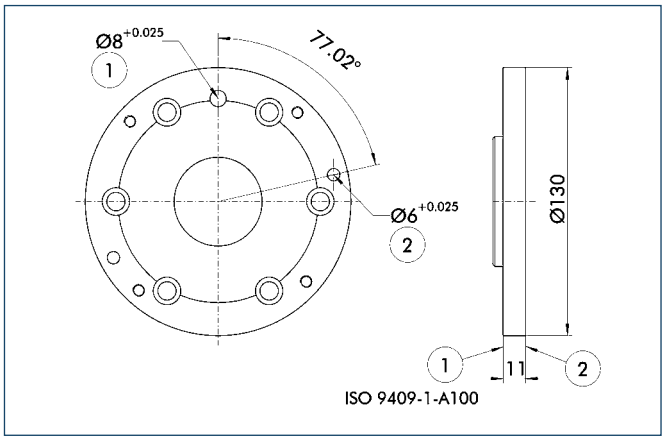


① Robot-side connection
② Tool-side connection

For mounting the OPR-131 directly to a flange in accordance with ISO 9409-80-6-M8

Designation	ID
A-OPR-131-ISO-A80-R	0321440

Adapter plate A100



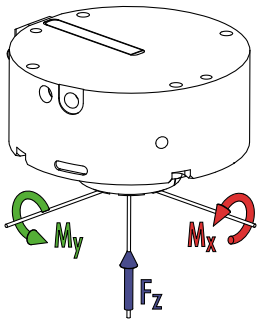
① Robot-side connection
② Tool-side connection

For mounting the OPR-131 directly to a flange in accordance with ISO 9409-100-6-M8

Designation	ID
A-OPR-131-ISO-A100-R	0321441

OPR-176

Forces and moments

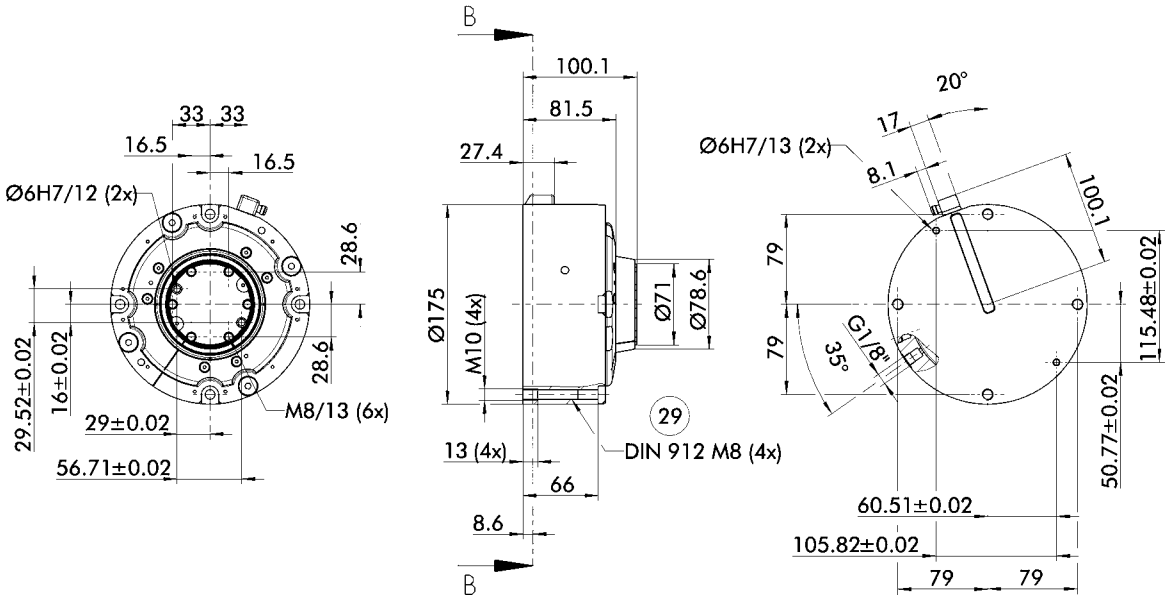


M_x max. 806 Nm
M_y max. 806 Nm
F_z max. 8900 N

Technical data

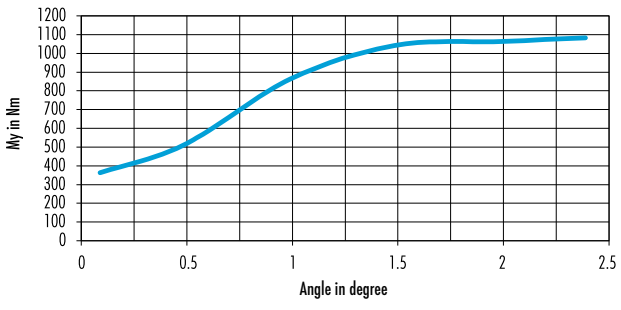
Designation			OPR-176-P00	OPR-176-P05	OPR-176-P10	OPR-176-P15
ID without splash protection			**0321476**	**0321477**	**0321478**	**0321479**
ID with splash protection			**0321480**	**0321481**	**0321482**	**0321483**
Axial compensation		[mm]	16	16	16	16
Angular compensation		[°]	± 10	± 10	± 10	± 10
Rotational compensation		[°]	± 20	± 20	± 20	± 20
Triggering force with maximum operating pressure		[N]	8900	8900	8900	8900
Triggering torque with	Angular	[Nm]	806	806	806	806
maximum operating pressure	Rotational	[Nm]	543	543	543	543
Triggering force safeguarded by springs		[N]	-	494	989	1483
Triggering torque safeguarded	Angular	[Nm]	-	45	90	135
by springs	Rotational	[Nm]	-	46	92	138
Maximum operating pressure		[bar]	6.0	5.7	5.4	5.1
Repeat accuracy		[mm]	± 0.025	± 0.025	± 0.025	± 0.025
Rotational repeat accuracy		[min]	± 5	± 5	± 5	± 5
Sensitivity		[mm]	0.5	0.5	0.5	0.5
Weight		[kg]	5.3	5.4	5.4	5.4

Main views



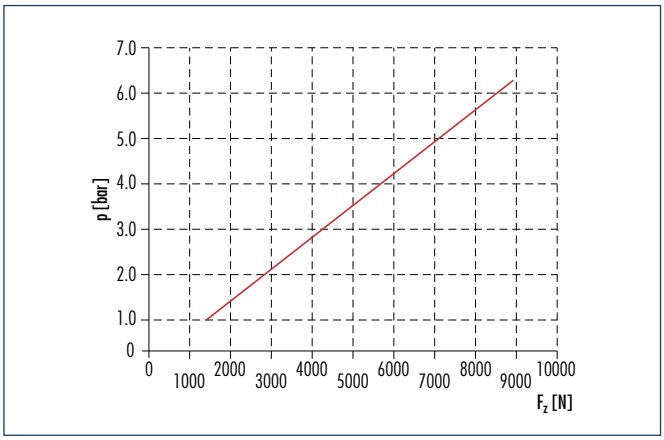
29 Through-bore for screw connection

Moment load

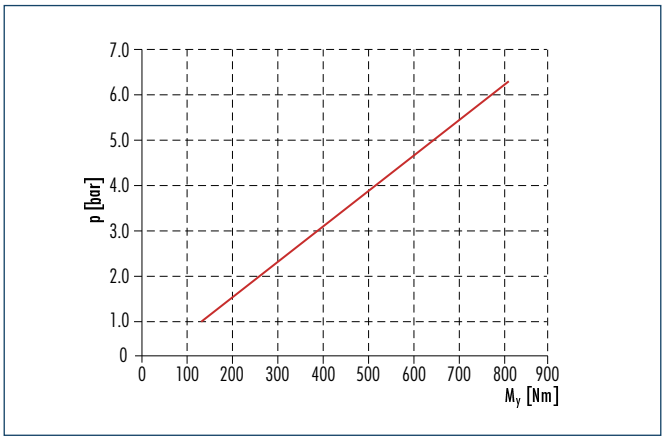


The diagram shows the actual deflection of the OPR, dependent upon the moment M_x at the maximum permissible operating pressure.

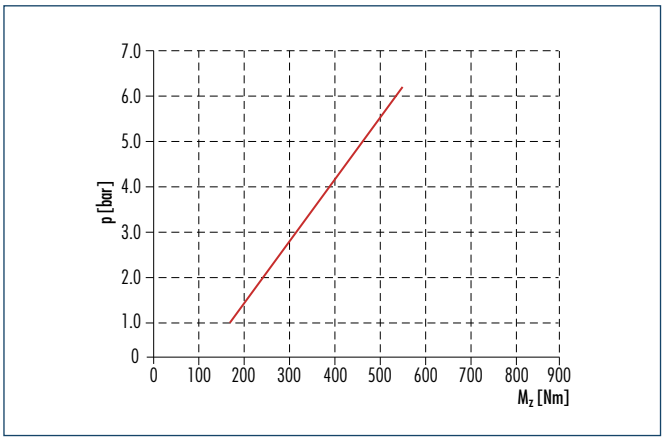
Force and moment range



Axial (F_z)

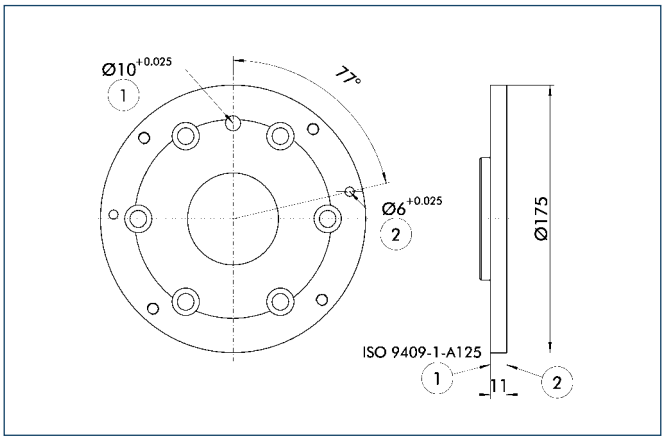


Moment (M_y)



Torsion (M_z)

Adapter plate A125

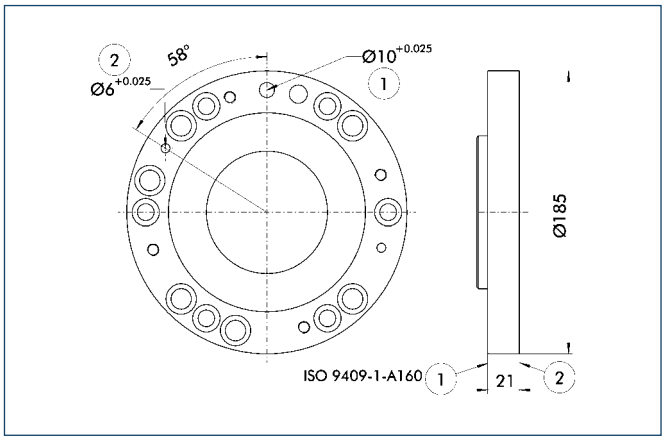


① Robot-side connection
② Tool-side connection

For mounting the OPR-176 directly to a flange in accordance with ISO 9409-125-6-M10

Designation	ID
A-OPR-176-ISO-A125-R	0321485

Adapter plate A160



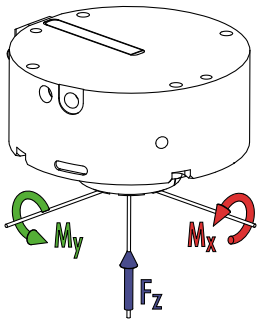
① Robot-side connection
② Tool-side connection

For mounting the OPR-176 directly to a flange in accordance with ISO 9409-160-6-M10 and ISO 9409-160-11-M12

Designation	ID
A-OPR-176-ISO-A160-R	0321486

OPR-221

Forces and moments

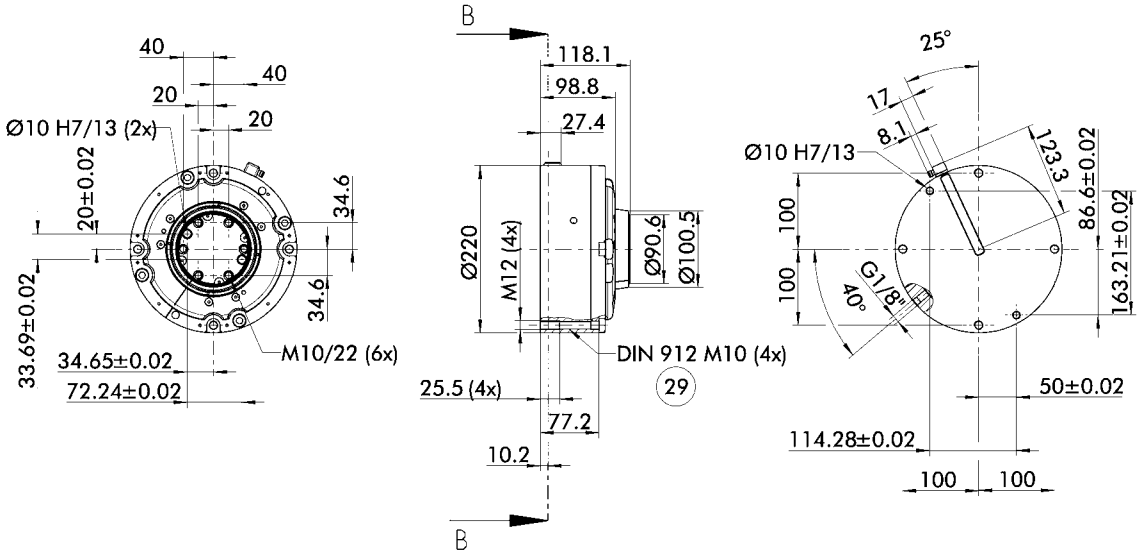


M_x max. 1300 Nm
M_y max. 1300 Nm
F_z max. 13800 N

Technical data

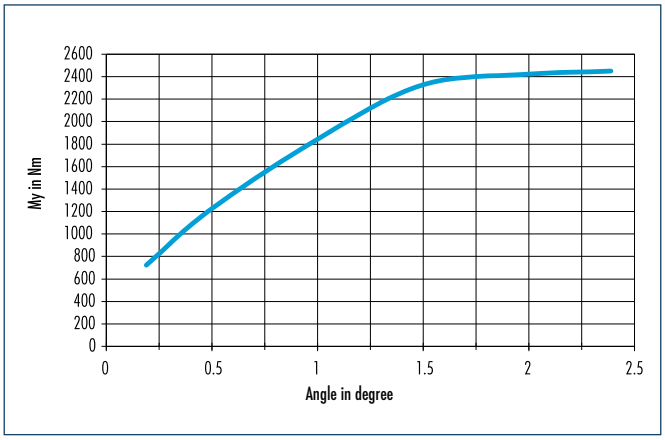
Designation			OPR-221-P00	OPR-221-P05	OPR-221-P10	OPR-221-P15
ID without splash protection			**0321521**	**0321522**	**0321523**	**0321524**
ID with splash protection			**0321525**	**0321526**	**0321527**	**0321528**
Axial compensation		[mm]	16	16	16	16
Angular compensation		[°]	± 8	± 8	± 8	± 8
Rotational compensation		[°]	± 20	± 20	± 20	± 20
Triggering force with maximum operating pressure		[N]	13800	13800	13800	13800
Triggering torque with	Angular	[Nm]	1300	1300	1300	1300
maximum operating pressure	Rotational	[Nm]	960	960	960	960
Triggering force safeguarded by springs		[N]	-	766	1532	2298
Triggering torque safeguarded	Angular	[Nm]	-	72	144	216
by springs	Rotational	[Nm]	-	82	164	246
Maximum operating pressure		[bar]	6.0	5.7	5.4	5.1
Repeat accuracy		[mm]	± 0.025	± 0.025	± 0.025	± 0.025
Rotational repeat accuracy		[min]	± 5	± 5	± 5	± 5
Sensitivity		[mm]	0.5	0.5	0.5	0.5
Weight		[kg]	11.4	11.7	11.7	11.7

Main views



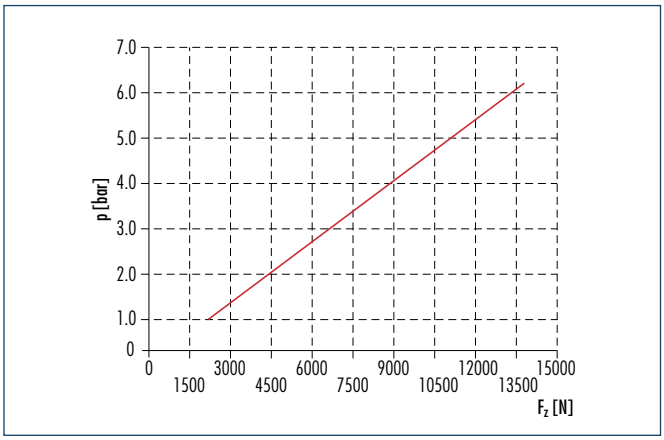
29 Through-bore for screw connection

Moment load

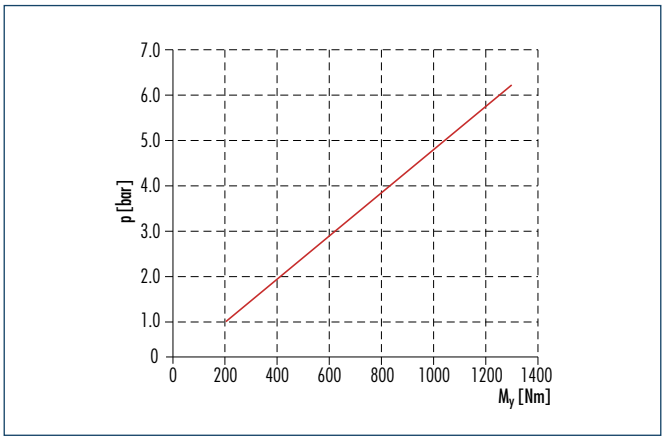


The diagram shows the actual deflection of the OPR, dependent upon the moment M_x at the maximum permissible operating pressure.

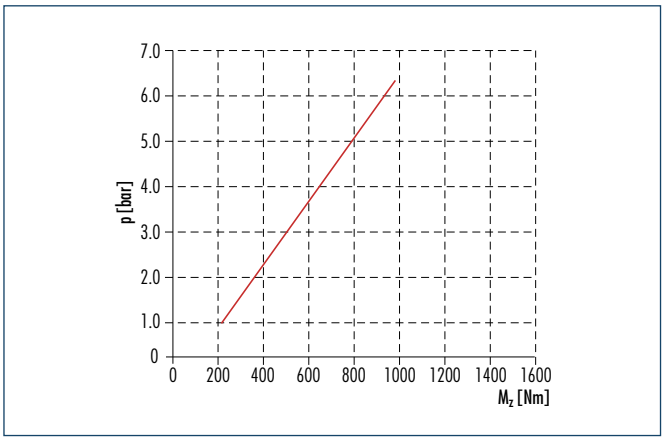
Force and moment range



Axial (F_z)

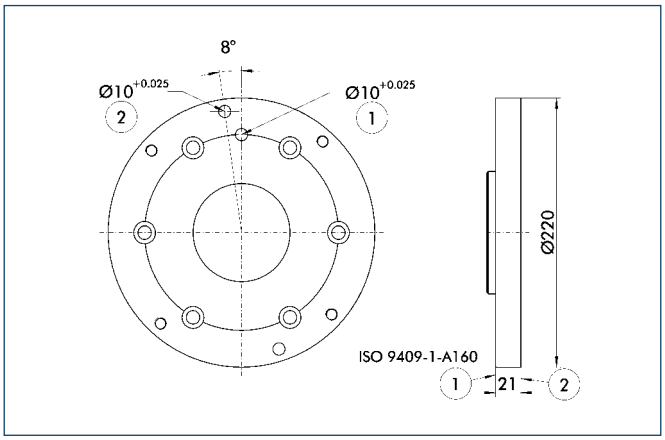


Moment (M_y)



Torsion (M_z)

Adapter plate A160

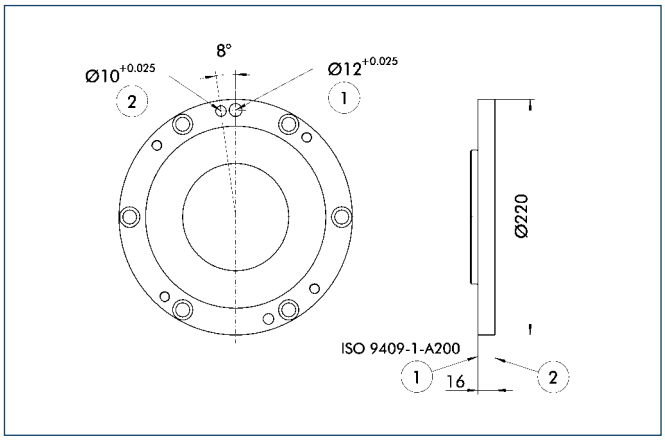


① Robot-side connection
② Tool-side connection

For mounting the OPR-221 directly to a flange in accordance with ISO 9409-160-6-M10

Designation	ID
A-OPR-221-ISO-A160-R	0321530

Adapter plate A200

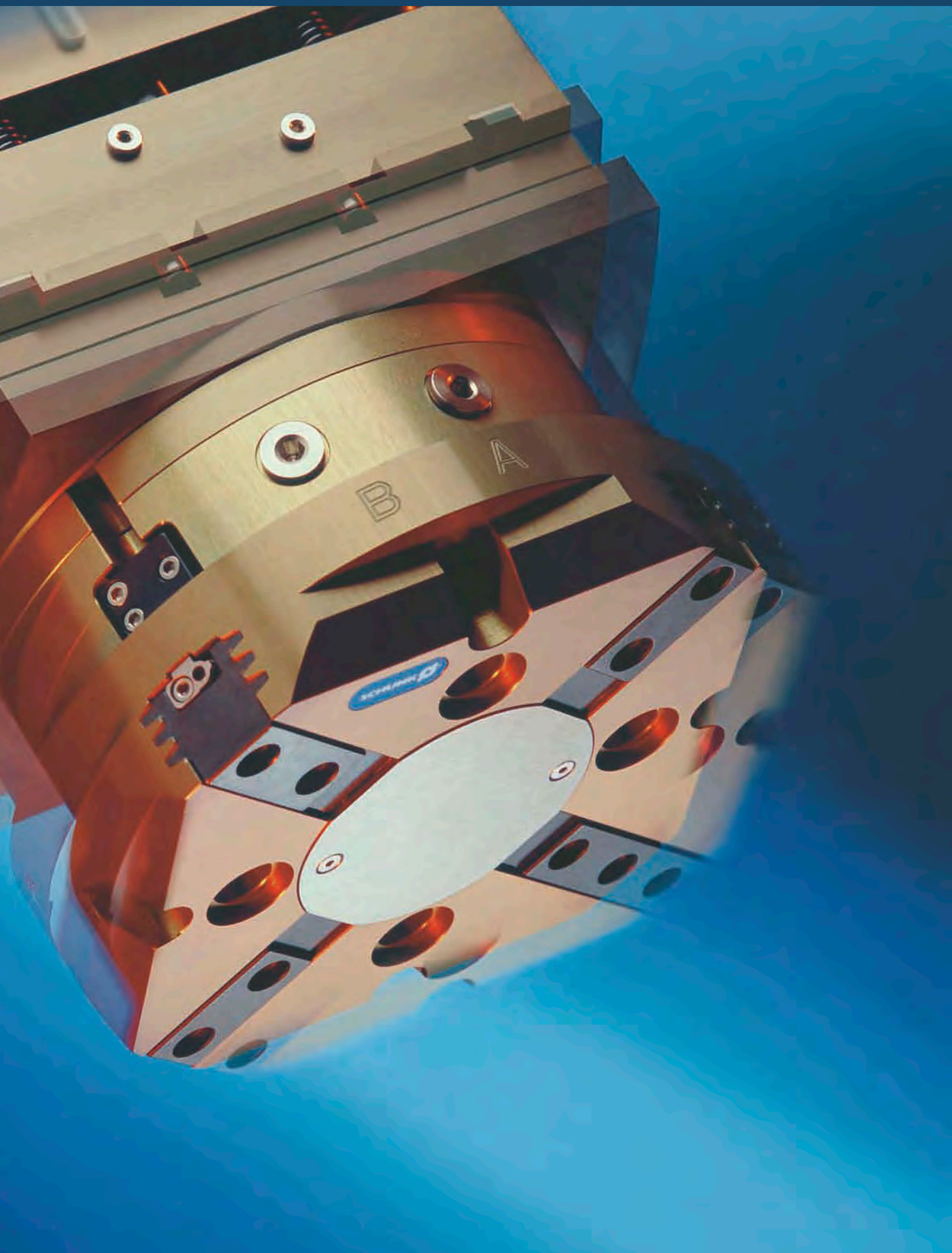


① Robot-side connection
② Tool-side connection

For mounting the OPR-221 directly to a flange in accordance with ISO 9409-200-6-M10

Designation	ID
A-OPR-221-ISO-A200-R	0321531

Compensation



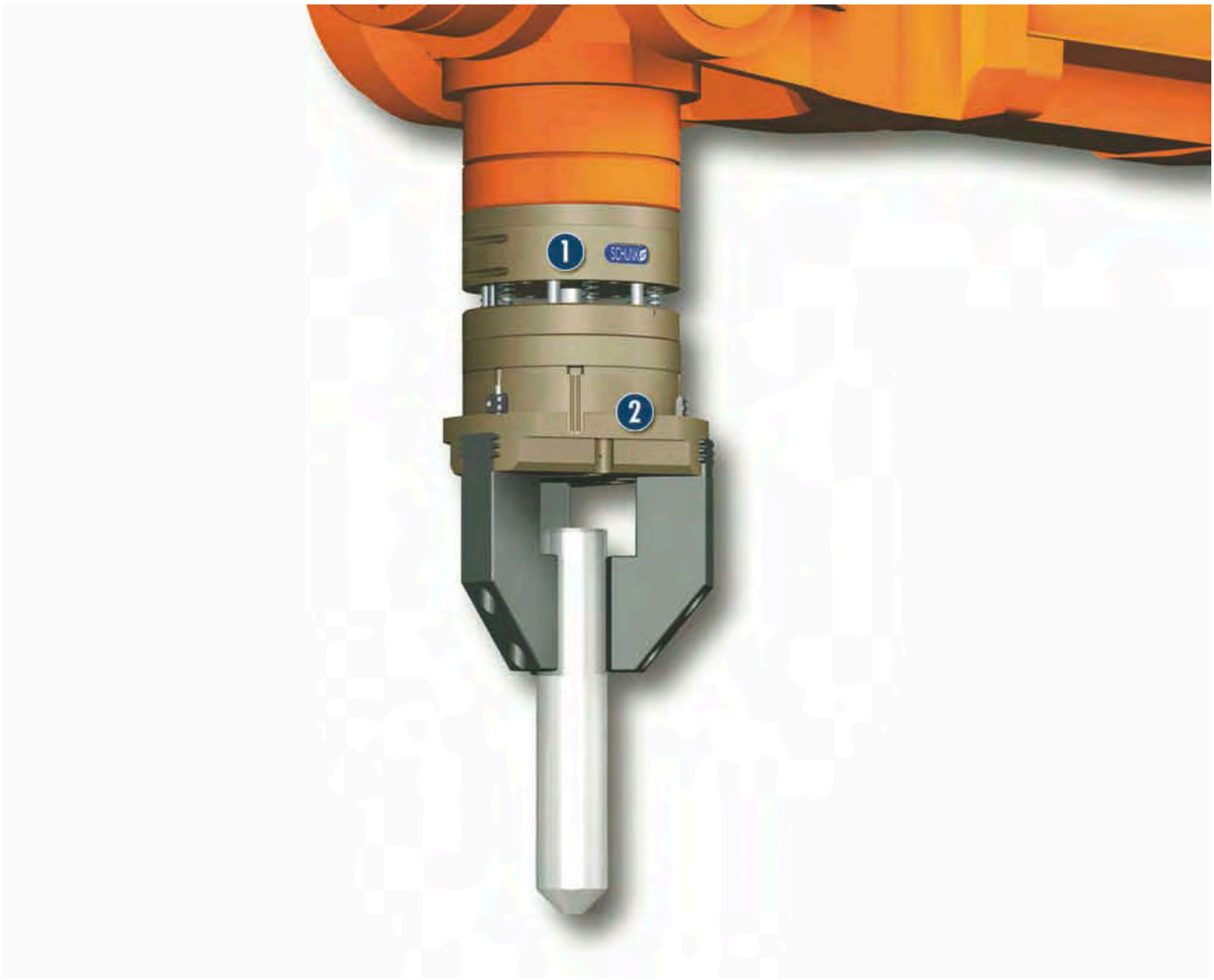
COMPENSATION

Sizes
050 .. 080

Payload
1 kg .. 5 kg

Compensation paths Z
± 10 mm

Example for application



Compensation unit for handling of workpieces with different height tolerances. The compensation unit compensates the horizontal offset of the placing position.

1 Compensation Unit AGE-Z 80

2 3-Finger Centric Gripper PZN-plus 80 with workpiece-specific gripper fingers

Compensation Unit

Compensation unit with Z-axis yielding.

Area of application

Mounting, palletizing and insertion of workpieces

Benefits

ISO flange pattern
for easy mounting to most robot types without additional adapter plates

Locking device
for rigid switching of the unit in a defined extended or retracted position

Compact design
for minimum overall height

Can be combined with AGE-XY without additional adapter plate

General information on the series

Compensation path
Z-direction: up to 10 mm

Guides
Solid guides

Actuation
Pneumatic, filtered compressed air (10 µm): dry, lubricated or non-lubricated

Operating pressure range
2 bar to 8 bar

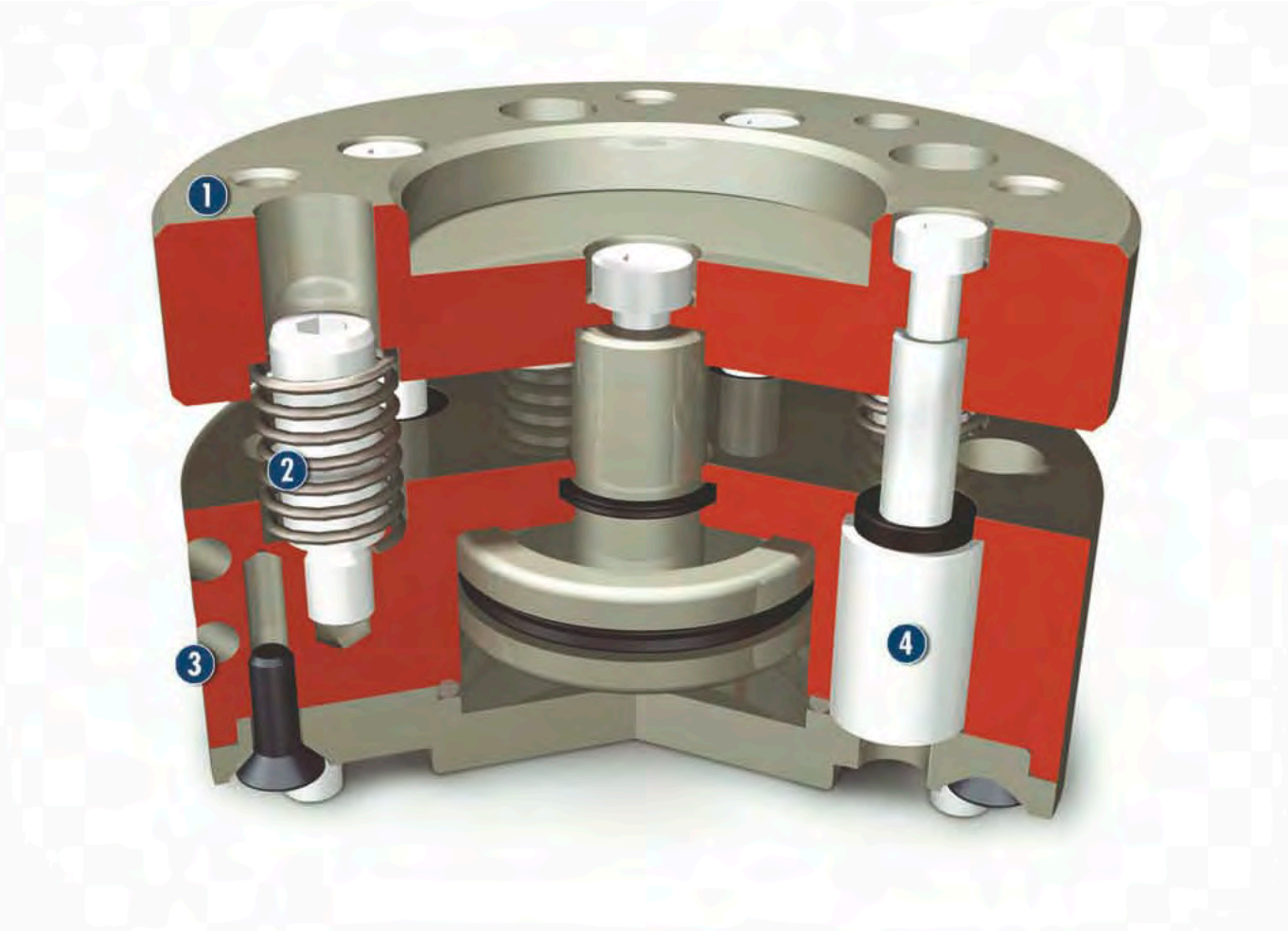
Monitoring of the Z-stroke
By magnetic switches

Ambient temperature
5° to 60° C

Material
Aluminum alloy, hard-anodized.
Functional components of hardened steel.

Warranty
24 months

Sectional diagram



1 Housing
weight-reduced due to use of a hard-anodized, high-strength aluminum alloy

2 Compression Springs
for defined pressure forces during placing

3 Monitoring Groove
Stroke monitoring of the locking piston with magnetic switches

4 Ball Guides are Free of Play
for large maximum moments at a minimum size

Function description

The compensation unit AGE-Z enables a Z-compensation of different pickup and placing positions.
The compensation unit is guided by a ball guide without play.
Compression springs define the rigidity of the AGE-Z. which can be increased by additional actuation of the pneumatic cylinder.
The cylinder also enables locking of the unit during dynamic movements. The retracted and extended positions are monitored by means of magnetic switches.

Accessories

Accessories from SCHUNK – the suitable supplement for maximum functionality, reliability and performance of all automation modules.

Fittings

Magnetic switch MMS

Sensor cable

ⓘ The specific size of the desired accessories, availability for the model and the name and ID no. can be found in the additional diagrams following each model. For further information on our accessories, please consult the "Accessories" section of the catalog.

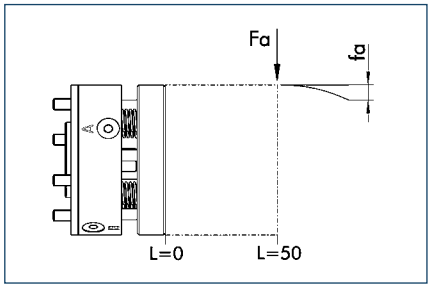
General information on the series

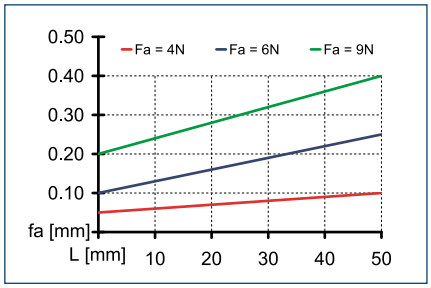
Extreme ambient conditions

Please be aware that use under extreme conditions (e.g. with coolants, or in the presence of casting dust or abrasive dust) can significantly reduce the tool life of these units, for which we can make no guarantee. In many cases, however, we have a solution. Please contact us.

AGE-Z 050

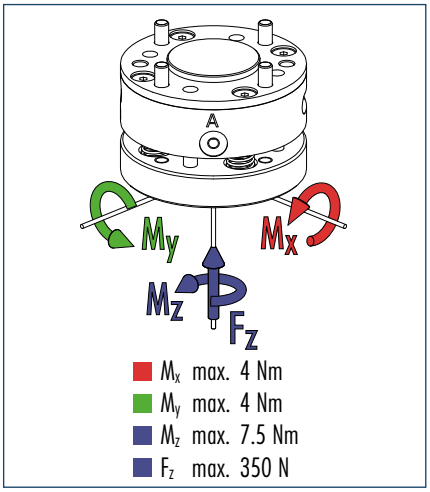
Load diagram





Deflection of the AGE-Z under load

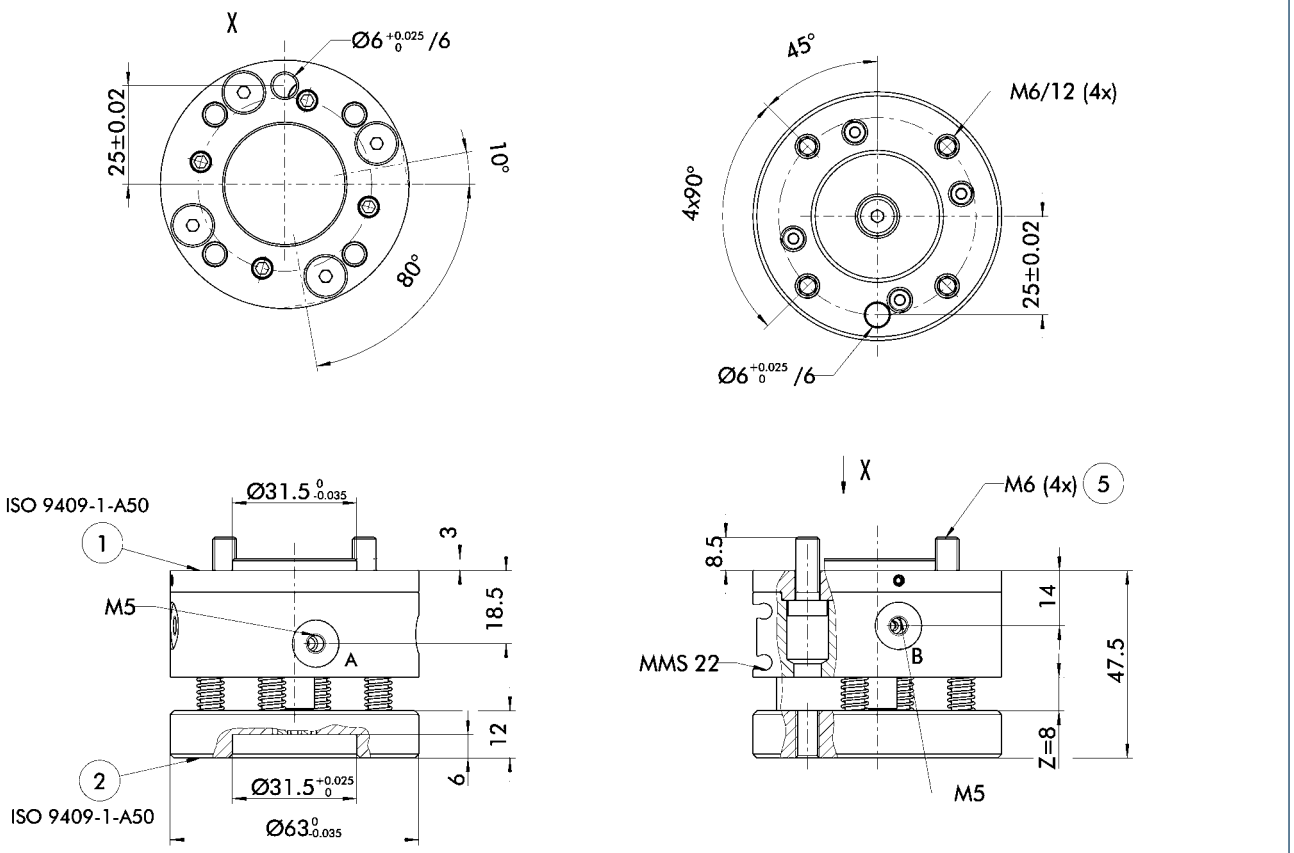
Forces and moments



Technical data

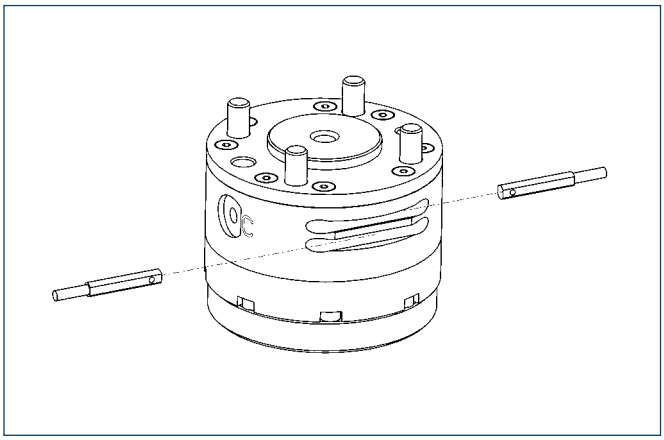
Designation		AGE-Z-050
	ID	0324452
Workpiece weight (recommendation)	[kg]	1.0
Compensation stroke	[mm]	8.0
Mounting, round mechanical interface		ISO 9409-50-4-M6
Spring force	[N]	10 - 30
Extend piston force at 6 bar	[N]	300
Retract piston force at 6 bar	[N]	270
Weight	[kg]	0.35

Main views



A Connection locked
B Air connection unlocked
(1) Connection, robot-side
(2) Connection, tool-side
(5) Through-bores for screw connection with screw (enclosed)

Sensor system



End position monitoring:
Electronic magnetic switches, for mounting in C-slot

Designation	ID	Recommended product
MMS 22-S-M5-NPN	0301439	
MMS 22-S-M5-NPN-SA	0301449	
MMS 22-S-M5-PNP	0301438	
MMS 22-S-M5-PNP-SA	0301448	
MMS 22-S-M8-NPN	0301433	
MMS 22-S-M8-NPN-SA	0301443	
MMS 22-S-M8-PNP	0301432	•
MMS 22-S-M8-PNP-SA	0301442	
MMSK 22-S-NPN	0301435	
MMSK 22-S-PNP	0301434	

ⓘ Two sensors (closers/S) are required for each compensation unit, plus extension cables as an option.

Extension cable for proximity switches/magnetic switches

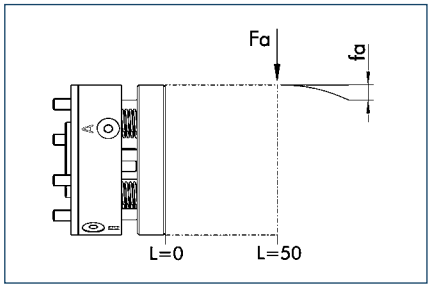
Designation	ID
GK 3-M8	0301622
GK 3-M5-PNP/NPN	0301652
KV 10-M12	0301596
KV 10-M8	0301496
KV 20-M12	0301597
KV 20-M8	0301497
KV 3-M12	0301595
KV 3-M8	0301495
W 3-M12	0301503
W 5-M12	0301507
W 3-M5-PNP/NPN	0301650
WK 3-M8	0301594
WK 3-M8 NPN	0301602
WK 5-M8	0301502
WK 5-M8 NPN	9641116

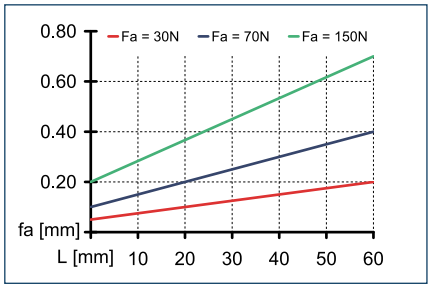
ⓘ Please note the minimum permitted bending radii for the sensor cables, which are generally 35 mm.

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the “Accessories” catalog section.

AGE-Z 063

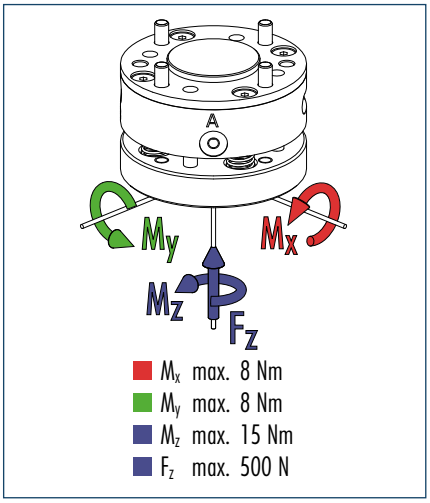
Load diagram





Deflection of the AGE-Z under load

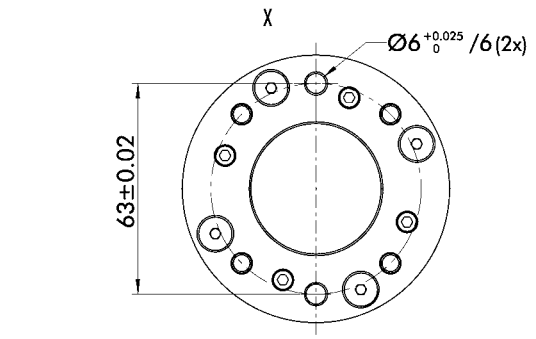
Forces and moments

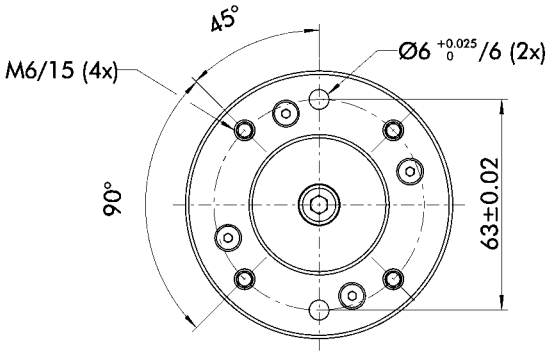


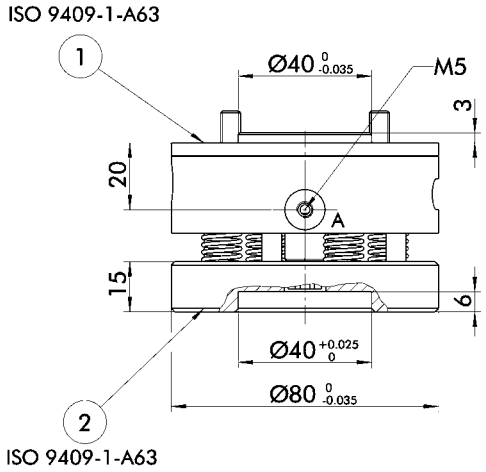
Technical data

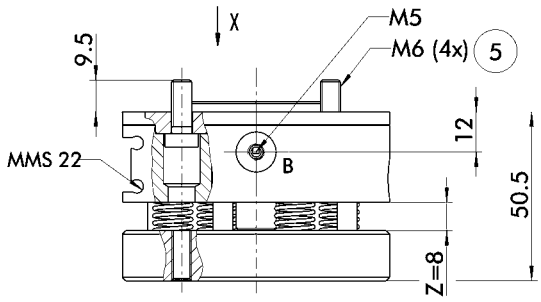
Designation		AGE-Z-063
	ID	032465
Workpiece weight (recommendation)	[kg]	6.0
Compensation stroke	[mm]	8.0
Mounting, round mechanical interface		ISO 9409-63-4-M6
Spring force	[N]	20-60
Extend piston force at 6 bar	[N]	560
Retract piston force at 6 bar	[N]	500
Weight	[kg]	0.6

Main views



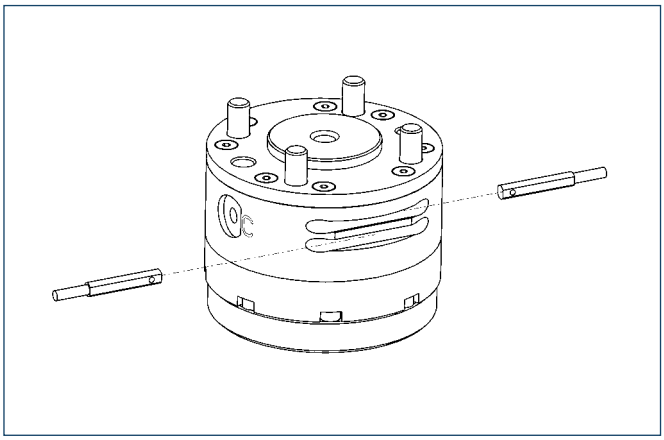






A Locked air connection
B Unlocked air connection
(1) Robot-side connection
(2) Tool-side connection
(5) Through-bore for screw connection with screw (enclosed)

Sensor system



End position monitoring:
Electronic magnetic switches, for mounting in C-slot

Designation	ID	Recommended product
MMS 22-S-M5-NPN	0301439	
MMS 22-S-M5-NPN-SA	0301449	
MMS 22-S-M5-PNP	0301438	
MMS 22-S-M5-PNP-SA	0301448	
MMS 22-S-M8-NPN	0301433	
MMS 22-S-M8-NPN-SA	0301443	
MMS 22-S-M8-PNP	0301432	•
MMS 22-S-M8-PNP-SA	0301442	
MMSK 22-S-NPN	0301435	
MMSK 22-S-PNP	0301434	

ⓘ Two sensors (closers/S) are required for each compensation unit, plus extension cables as an option.

Extension cable for proximity switches/magnetic switches

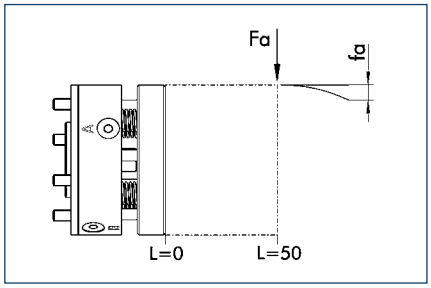
Designation	ID
GK 3-M8	0301622
GK 3-M5-PNP/NPN	0301652
KV 10-M12	0301596
KV 10-M8	0301496
KV 20-M12	0301597
KV 20-M8	0301497
KV 3-M12	0301595
KV 3-M8	0301495
W 3-M12	0301503
W 5-M12	0301507
W 3-M5-PNP/NPN	0301650
WK 3-M8	0301594
WK 3-M8 NPN	0301602
WK 5-M8	0301502
WK 5-M8 NPN	9641116

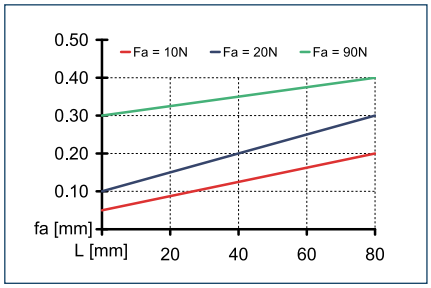
ⓘ Please note the minimum permitted bending radii for the sensor cables, which are generally 35 mm.

For further information on individual elements of the accessories, please consult the “Accessories” section of the catalog.

AGE-Z 080

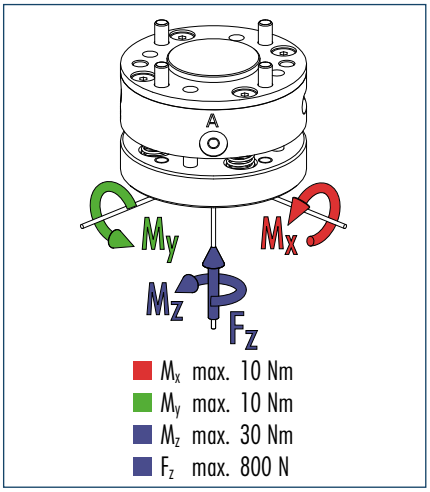
Load diagram





Deflection of the AGE-Z under load

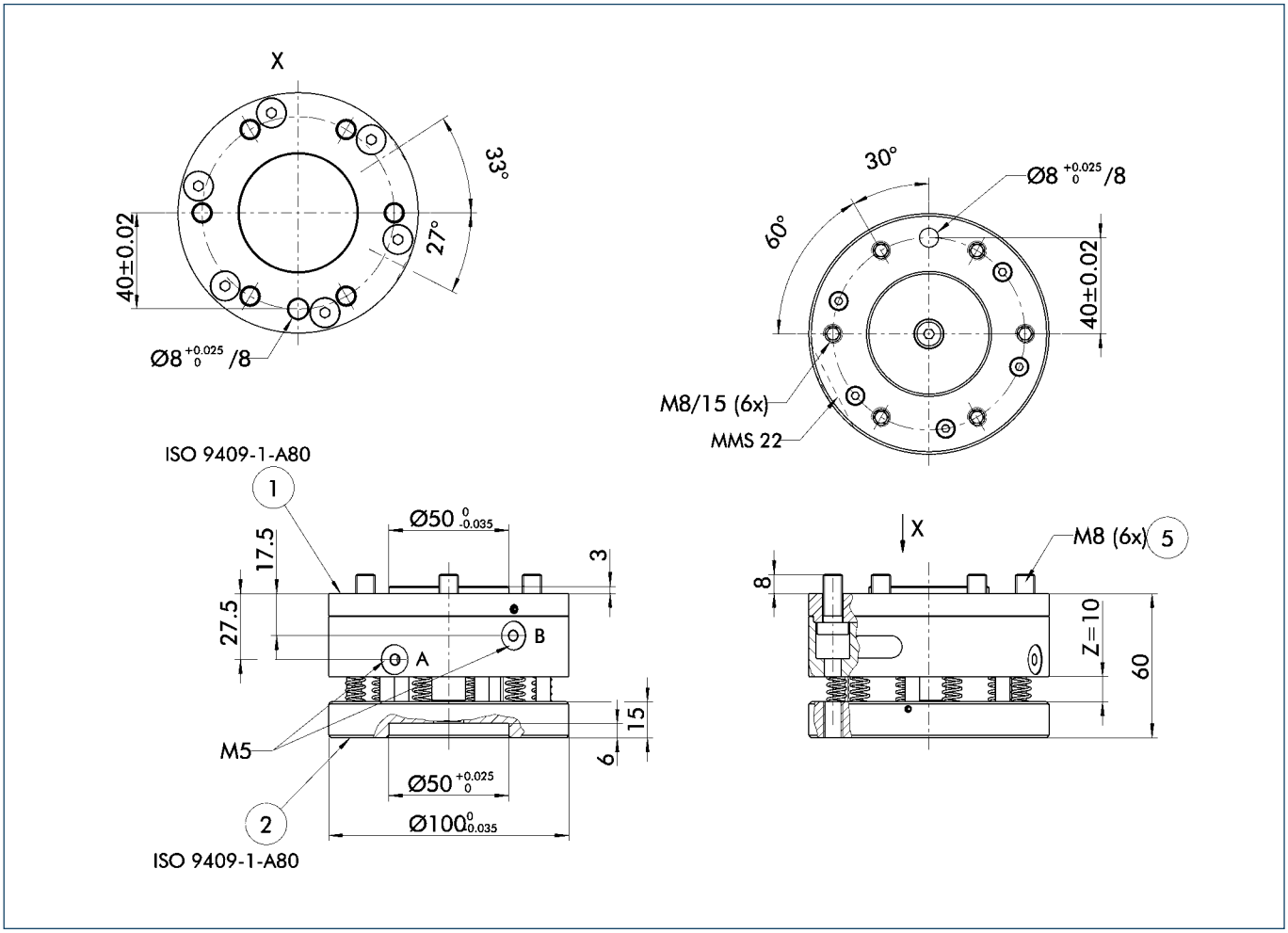
Forces and moments



Technical data

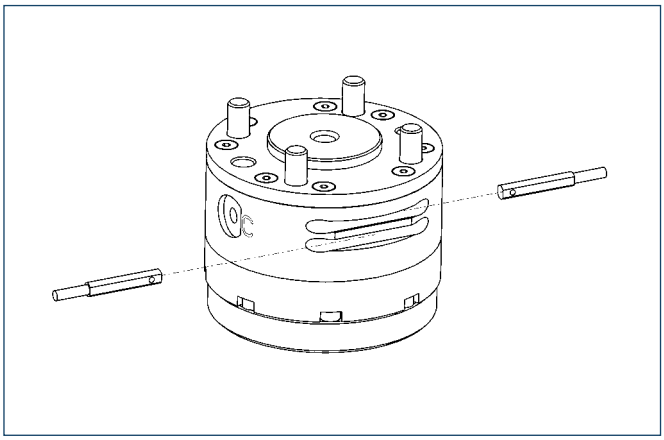
Designation		AGE-Z-080
	ID	0324482
Workpiece weight (recommendation)	[kg]	10.0
Compensation stroke	[mm]	8.0
Mounting, round mechanical interface		ISO 9409-80-6-M8
Spring force	[N]	40 - 240
Extend piston force at 6 bar	[N]	840
Retract piston force at 6 bar	[N]	600
Weight	[kg]	1.1

Main views



A Locked air connection
B Unlocked air connection
(1) Robot-side connection
(2) Tool-side connection
(5) Through-bore for screw connection with screw (enclosed)

Sensor system



End position monitoring:
Electronic magnetic switches, for mounting in C-slot

Designation	ID	Recommended product
MMS 22-S-M5-NPN	0301439	
MMS 22-S-M5-NPN-SA	0301449	
MMS 22-S-M5-PNP	0301438	
MMS 22-S-M5-PNP-SA	0301448	
MMS 22-S-M8-NPN	0301433	
MMS 22-S-M8-NPN-SA	0301443	
MMS 22-S-M8-PNP	0301432	•
MMS 22-S-M8-PNP-SA	0301442	
MMSK 22-S-NPN	0301435	
MMSK 22-S-PNP	0301434	

ⓘ Two sensors (closers/S) are required for each compensation unit, plus extension cables as an option.

Extension cable for proximity switches/magnetic switches

Designation	ID
GK 3-M8	0301622
GK 3-M5-PNP/NPN	0301652
KV 10-M12	0301596
KV 10-M8	0301496
KV 20-M12	0301597
KV 20-M8	0301497
KV 3-M12	0301595
KV 3-M8	0301495
W 3-M12	0301503
W 5-M12	0301507
W 3-M5-PNP/NPN	0301650
WK 3-M8	0301594
WK 3-M8 NPN	0301602
WK 5-M8	0301502
WK 5-M8 NPN	9641116

ⓘ Please note the minimum permitted bending radi for the sensor cables, which are generally 35 mm.

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the “Accessories” catalog section.

AGE-XY

Sizes
050 .. 080

Workpiece weight
4 kg .. 10 kg

Compensation paths XY
± 2.5 mm .. ± 4 mm

Rotation
± 12° .. ± 16°

Application example

Insertion unit for assembling a pin in a bore, in an approximately toleranced position. The compensation unit compensates for the planar offset without allowing the workpiece to twist and therefore to tilt.

1. PGF 80 2-Finger Parallel Gripper with special fingers and workpiece (pin)
2. AGE-XY-80 Compensation Unit

Compensation Unit

Compensation unit for use in assembly, and for loading and unloading machines and tool carriers. Using the AGE-XY, workpieces can be gripped and routed reliably despite positioning or angle offset.

Area of application

Assembling, palletizing and inserting workpieces

Your advantages and benefits

ISO flange
for easy attachment to most types of robots without additional adapter plates

Robust guidance
for high moment load with minimum space requirements

Centric locking
for fixing the unit rigidly in a defined, centric position

Pneumatic position storage
for secure retention of the deflected position

General information on the series

Compensation paths and angles
± 2.5 mm to ± 4 mm
12° to 16°

Guides
Robust guidance

Actuation
Pneumatic, filtered compressed air (10 µm): dry, lubricated or non-lubricated

Operating pressure range
2 bar to 8 bar

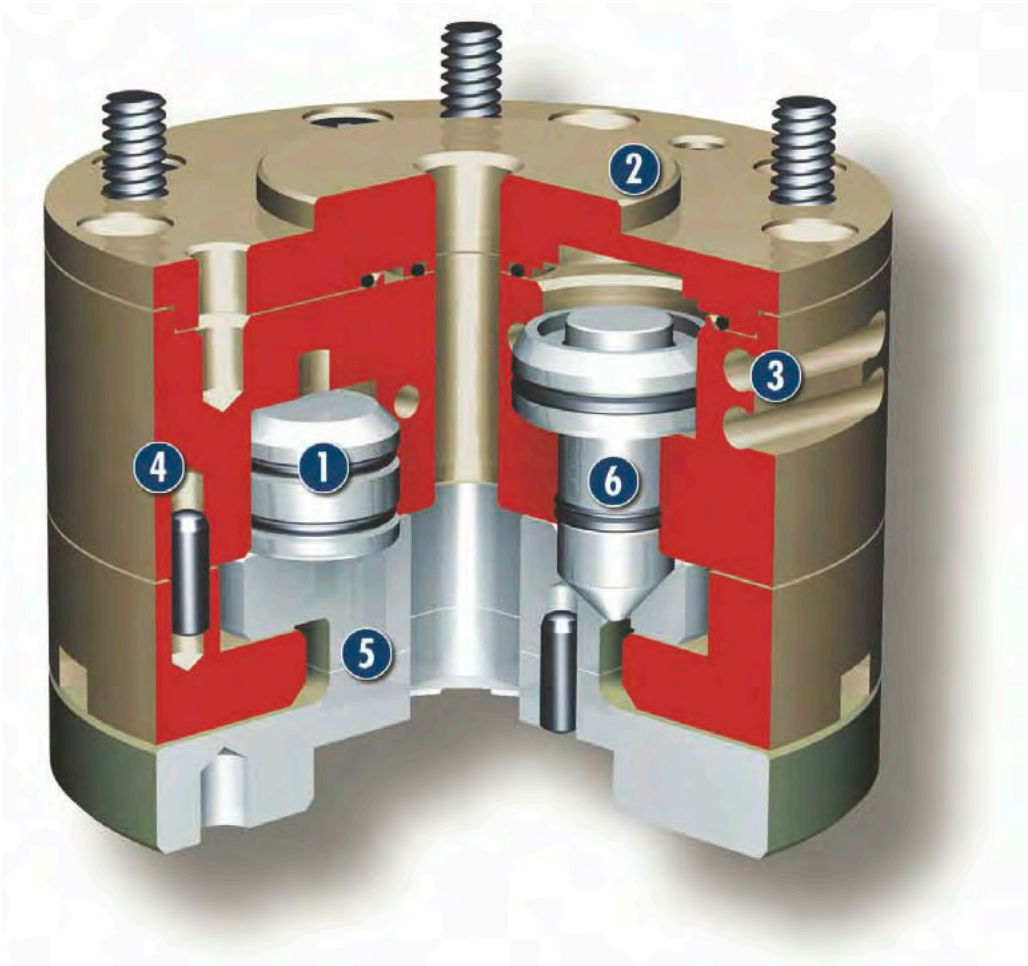
Monitoring of central locking
Via electronic magnetic switch

Ambient temperature
5 °C to 60 °C

Material
The housing is made from a high-strength, hard-coated aluminum alloy. The functional components are made from hardened steel.

Warranty
24 months

Sectional diagram



1 Position storage
locking in any position via two pneumatically driven pistons and frictional contact

2 Direct mounting
by means of standardized ISO 9409 interface for robots

3 Monitoring
locking piston stroke monitoring with electronic magnetic switch

4 Housing
weight-reduced through the use of a hard-anodized, high-strength aluminum alloy

5 Compensating element
for compensating positioning errors in the X-Y plane

6 Locking mechanism
pneumatically operated centric locking

Function description

The AGE compensation unit enables activation of the linear movement of robots/handling devices in the X and Y axis (AGE-X-Y), or additionally in the Z axis (AGE-X-Y-Z). This way, workpieces can be aligned centrically.

Accessories

Accessories from SCHUNK – the suitable supplement for maximum functionality, reliability and performance of all automation modules.

Fittings

MMS magnetic switches

Sensor cables

ⓘ For the exact size of the accessories, the availability for this size and the designation and ID, please refer to the additional views at the end of the size in question. You can find more detailed information on our accessory range in the "Accessories" catalog section.

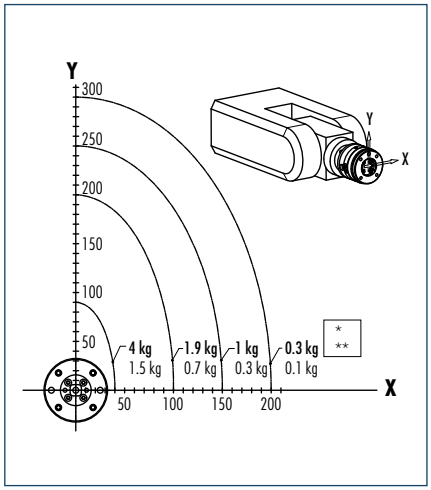
General information on the series

Extreme ambient conditions

Please note that use in extreme ambient conditions (e.g. in the coolant zone, in the presence of abrasive dust) can significantly reduce the tool life of these units and we cannot accept any liability for this reduction. However, in many cases we have a solution at hand. Please ask for details.

AGE-XY-050

Load diagram

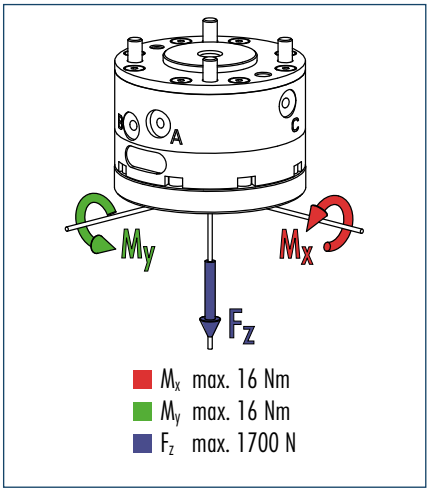


Position of the center of mass in relation to the payload in the event of horizontal configuration

* For centric locking

** For position storage

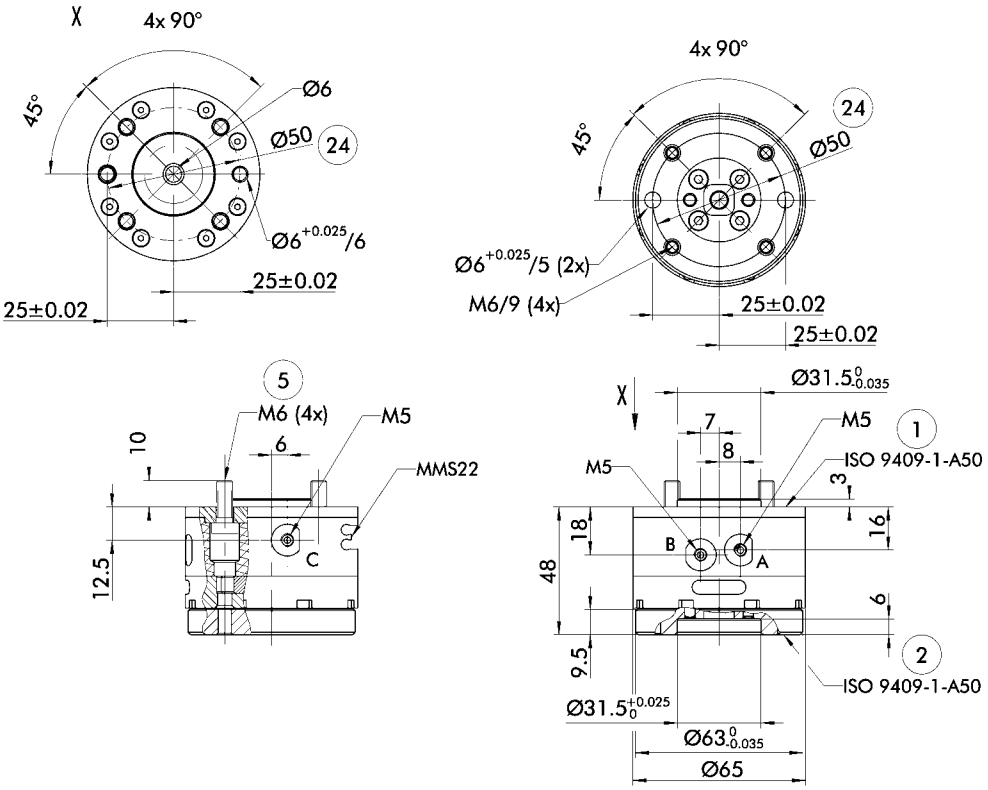
Forces and moments



Technical data

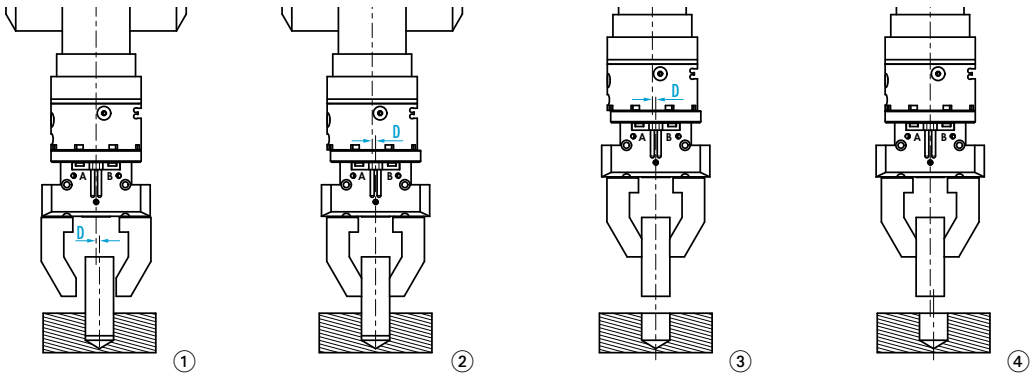
Designation			AGE-XY-050	AGE-XY-050-P
		ID	0324450	0324451
Locking force at 6 bar		[N]	235	235
Position storage force at 6 bar		[N]	-	180
Compensation stroke		[mm]	± 2.5	± 2.5
Max. compensation angle (with AGE in centric position)		[°]	± 12	± 12
Workpiece weight	With centric locking	[kg]	4	4
(recommendation)	With deflected position storage	[kg]	-	1.5
Weight		[kg]	0.46	0.47
Max. rotation	With centric locking	[Nm]	3.5	3.5
moment MR	With deflected position storage	[Nm]	-	1.2
Max. load strength	With centric locking	[N]	130	130
Fx, Fy	With deflected position storage	[N]	-	45
Mass moment of inertia Iz		[kg/cm²]	2.32	2.33
Robot and tool-side mounting			Interface ISO 9409-50-4-M6	Interface ISO 9409-50-4-M6
Maximum displacement force distance in z		[mm]	120	120

Main views



A Unlocked air connection
B Locked air connection
C Air connection position storage XY
① Robot-side connection
② Tool-side connection
⑤ Through-bore for screw connection with screw (enclosed)
㉔ Bolt pitch circle

Diagram of the functions



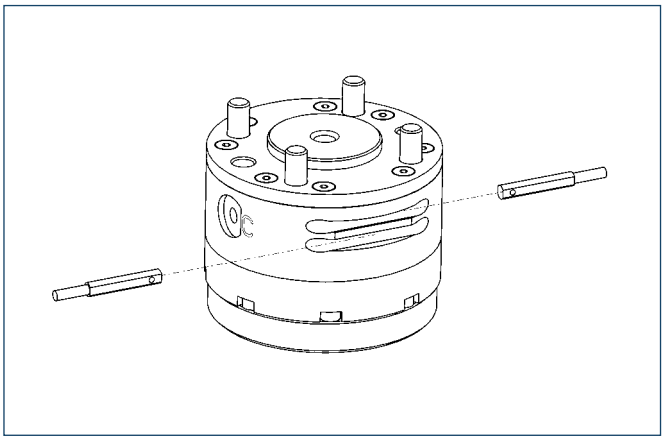
① Offset [D] between the gripper axis and the workpiece axis – AGE unlocked

② Gripper closes – AGE compensates for the offset [D] between the gripper and the workpiece. With the AGE-XY-P, this offset can be "stored".

③ Workpiece removed

④ Locking the AGE-workpiece axis, gripper axis and robot axis are centric in relation to one another

Sensor system



End position monitoring:
Electronic magnetic switches, for mounting in C-slot

Designation	ID	Recommended product
MMS 22-S-M5-NPN	0301439	
MMS 22-S-M5-NPN-SA	0301449	
MMS 22-S-M5-PNP	0301438	
MMS 22-S-M5-PNP-SA	0301448	
MMS 22-S-M8-NPN	0301433	
MMS 22-S-M8-NPN-SA	0301443	
MMS 22-S-M8-PNP	0301432	•
MMS 22-S-M8-PNP-SA	0301442	
MMSK 22-S-NPN	0301435	
MMSK 22-S-PNP	0301434	

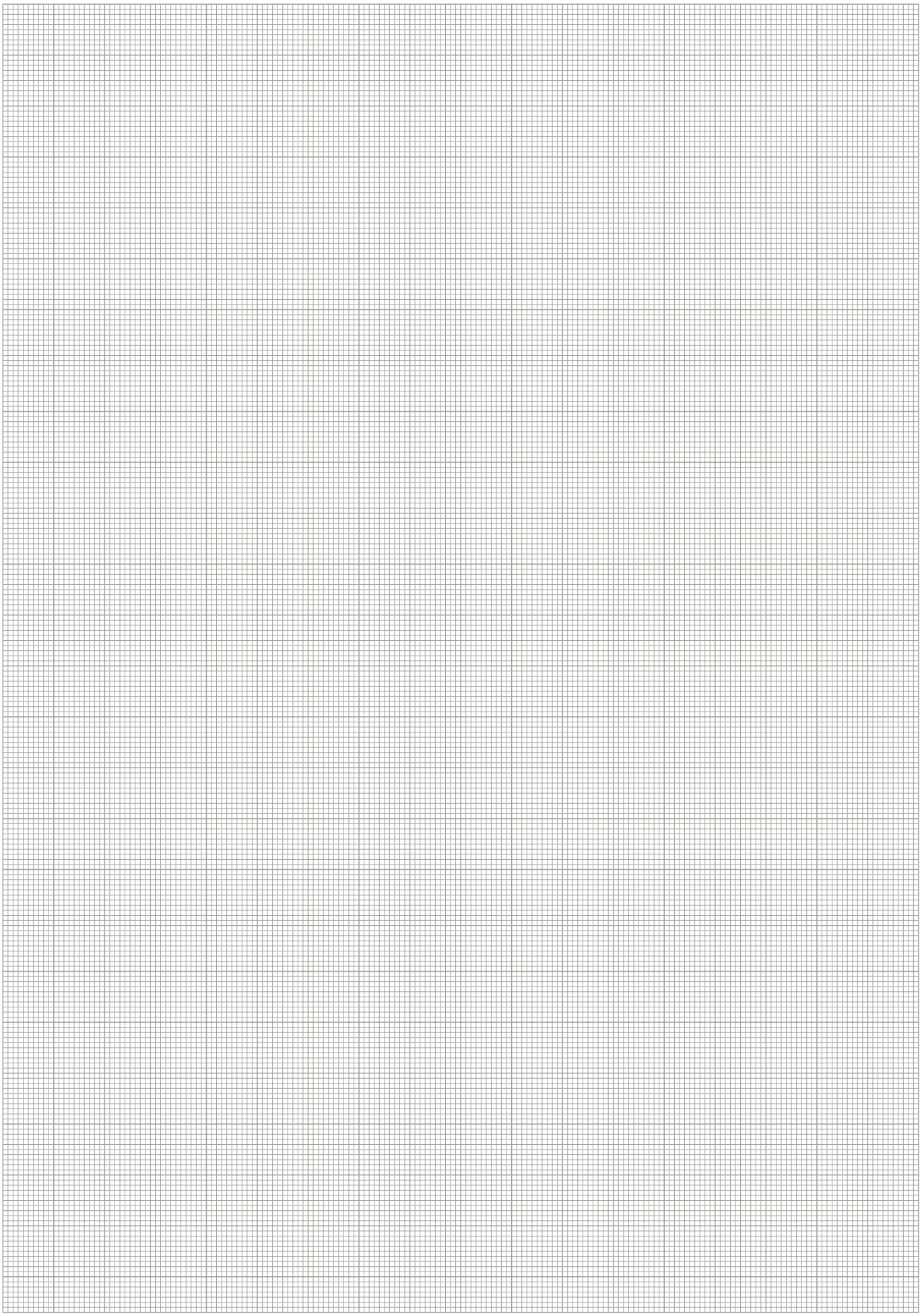
ⓘ Two sensors (closers/S) are required for each compensation unit, plus extension cables as an option.

Extension cables for proximity switches/magnetic switches

Designation	ID
GK 3-M8	0301622
GK 3-M5-PNP/NPN	0301652
KV 10-M12	0301596
KV 10-M8	0301496
KV 20-M12	0301597
KV 20-M8	0301497
KV 3-M12	0301595
KV 3-M8	0301495
W 3-M12	0301503
W 5-M12	0301507
W 3-M5-PNP/NPN	0301650
WK 3-M8	0301594
WK 3-M8 NPN	0301602
WK 5-M8	0301502
WK 5-M8 NPN	9641116

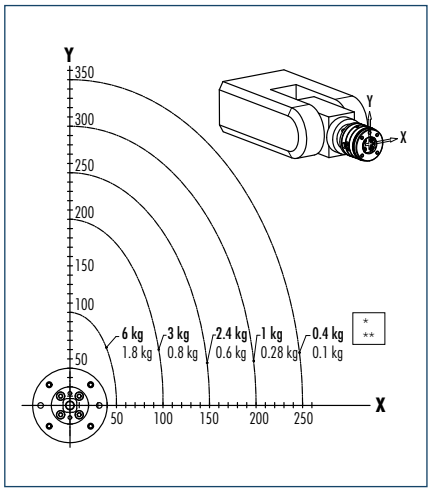
ⓘ Please note the minimum permitted bending radii for the sensor cables, which are generally 35 mm.

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the “Accessories” catalog section.



AGE-XY-063

Load diagram

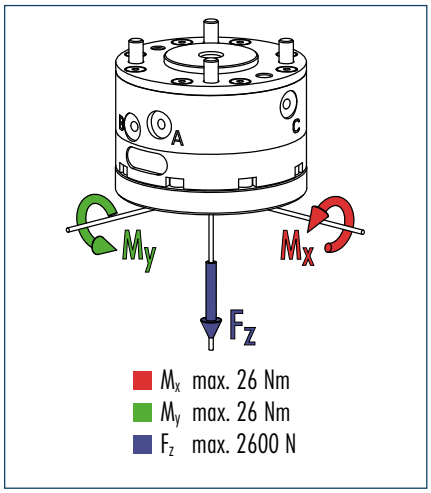


Position of the center of mass in relation to the payload in the event of horizontal configuration

* For centric locking

** For position storage

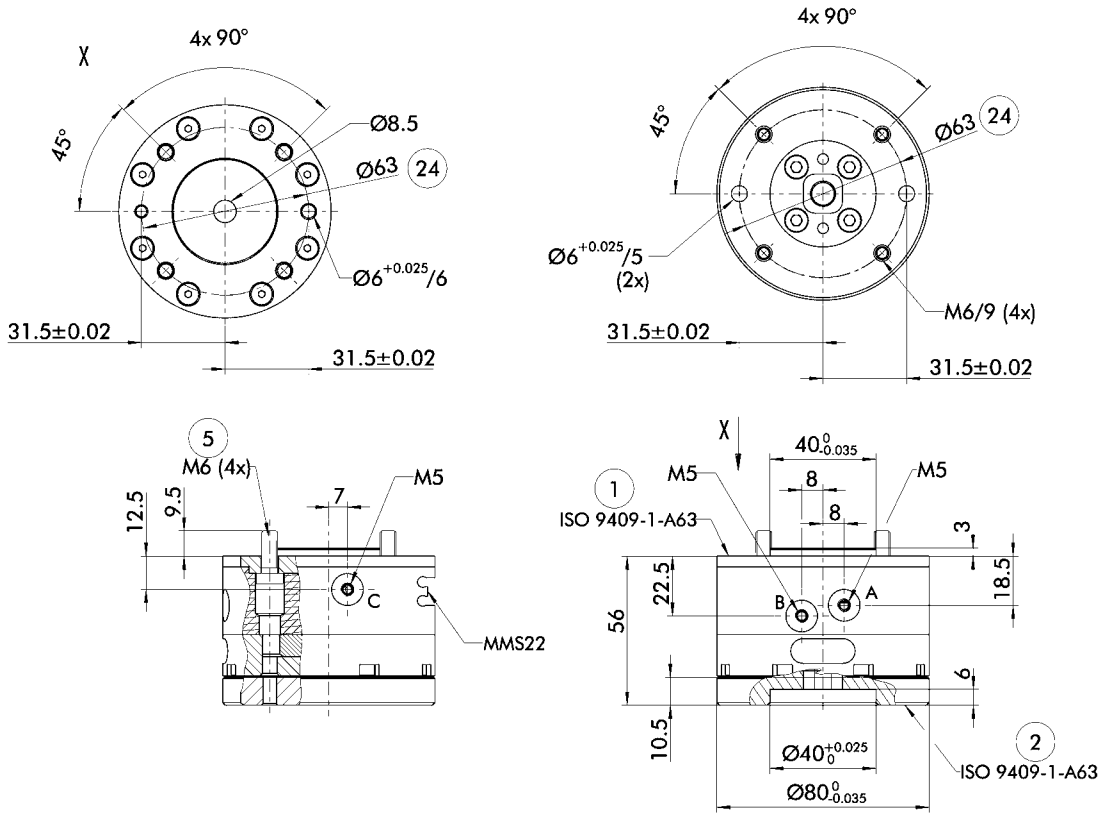
Forces and moments



Technical data

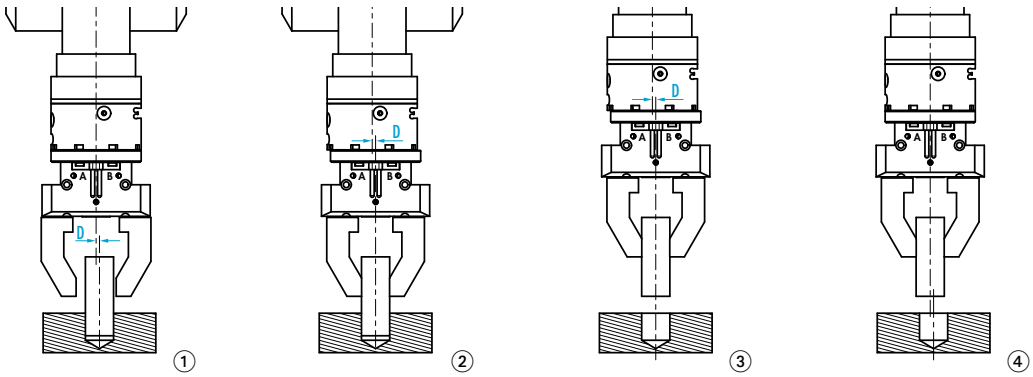
Designation			AGE-XY-063	AGE-XY-063-P
		ID	0324463	0324464
Locking force at 6 bar		[N]	370	370
Position storage force at 6 bar		[N]	-	235
Compensation stroke		[mm]	± 3	± 3
Max. compensation angle (with AGE in centric position)		[°]	± 12	± 12
Workpiece weight	With centric locking	[kg]	6	6
(recommendation)	With deflected position storage	[kg]	-	1.8
Weight		[kg]	0.83	0.85
Max. rotation	With centric locking	[Nm]	6	6
moment MR	With deflected position storage	[Nm]	-	1.7
Max. load strength	With centric locking	[N]	200	200
Fx, Fy	With deflected position storage	[N]	-	50
Mass moment of inertia Iz		[kg/cm²]	6.45	6.5
Robot and tool-side mounting			Interface ISO 9409-63-4-M6	Interface ISO 9409-63-4-M6
Maximum displacement force distance in z		[mm]	160	160

Main views



A Unlocked air connection
B Locked air connection
C Air connection position storage XY
① Robot-side connection
② Tool-side connection
⑤ Through-bore for screw connection with screw (enclosed)
㉔ Bolt pitch circle

Diagram of the functions



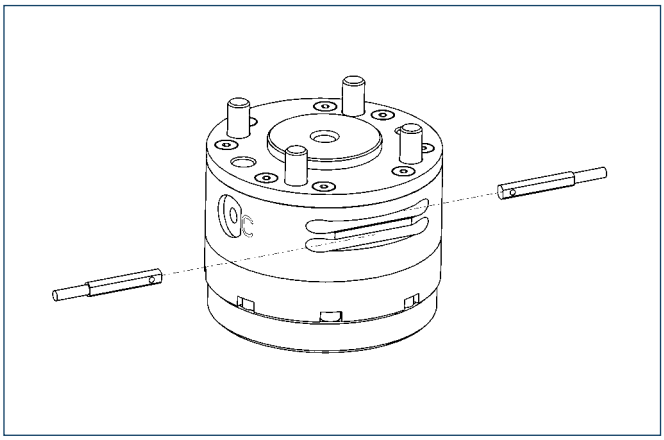
① Offset [D] between the gripper axis and the workpiece axis - AGE unlocked

② Gripper closes - AGE compensates for the offset [D] between the gripper and the workpiece. With the AGE-XY-P, this offset can be "stored".

③ Workpiece removed

④ Locking the AGE-workpiece axis, gripper axis and robot axis are centric in relation to one another

Sensor system



End position monitoring:
Electronic magnetic switches, for mounting in C-slot

Designation	ID	Recommended product
MMS 22-S-M5-NPN	0301439	
MMS 22-S-M5-NPN-SA	0301449	
MMS 22-S-M5-PNP	0301438	
MMS 22-S-M5-PNP-SA	0301448	
MMS 22-S-M8-NPN	0301433	
MMS 22-S-M8-NPN-SA	0301443	
MMS 22-S-M8-PNP	0301432	•
MMS 22-S-M8-PNP-SA	0301442	
MMSK 22-S-NPN	0301435	
MMSK 22-S-PNP	0301434	

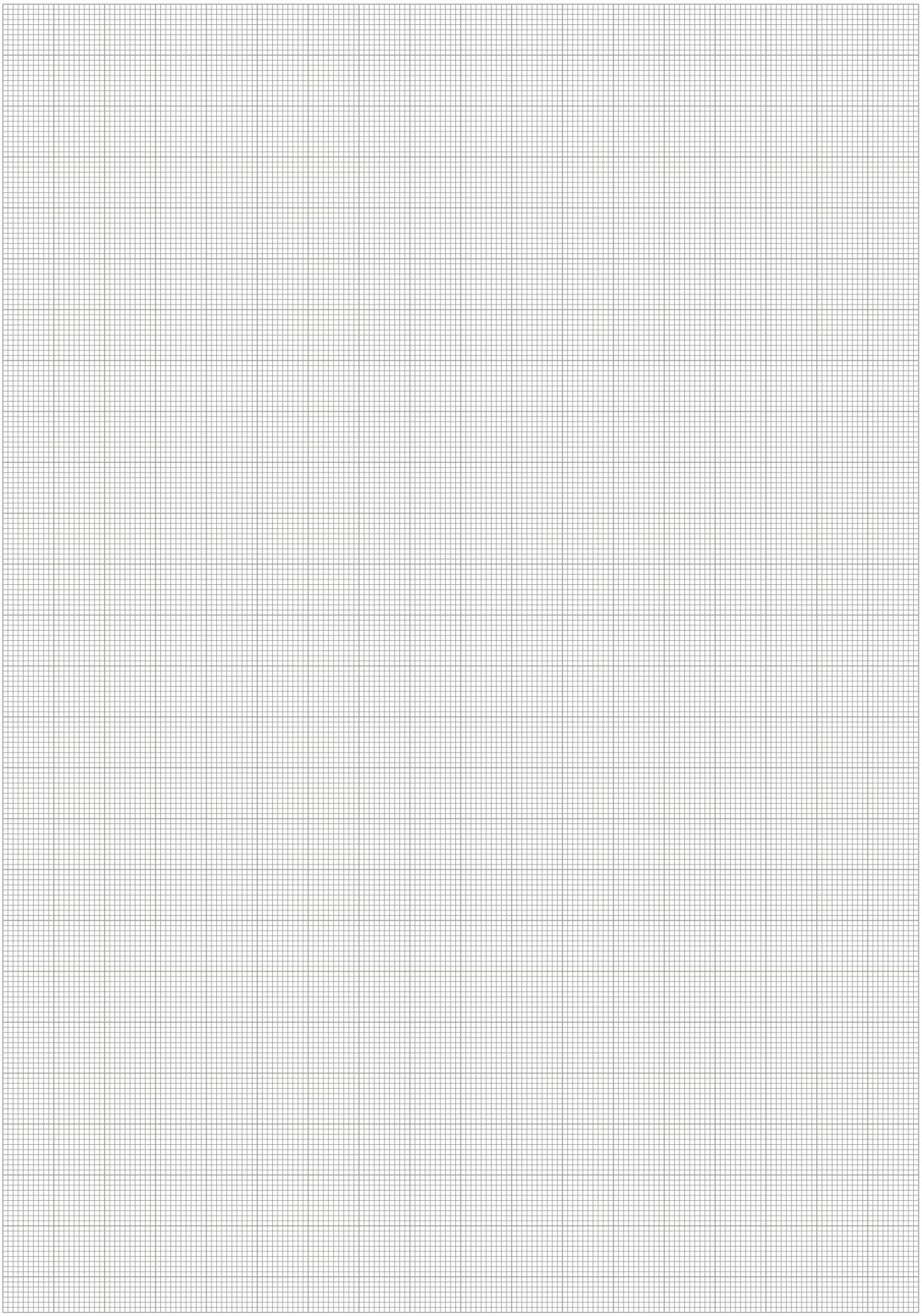
ⓘ Two sensors (closers/S) are required for each compensation unit, plus extension cables as an option.

Extension cables for proximity switches/magnetic switches

Designation	ID
GK 3-M8	0301622
GK 3-M5-PNP/NPN	0301652
KV 10-M12	0301596
KV 10-M8	0301496
KV 20-M12	0301597
KV 20-M8	0301497
KV 3-M12	0301595
KV 3-M8	0301495
W 3-M12	0301503
W 5-M12	0301507
W 3-M5-PNP/NPN	0301650
WK 3-M8	0301594
WK 3-M8 NPN	0301602
WK 5-M8	0301502
WK 5-M8 NPN	9641116

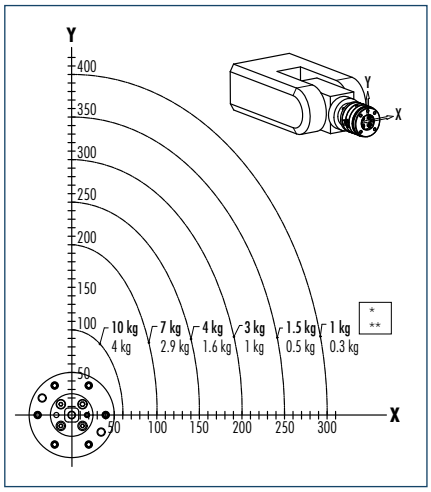
ⓘ Please note the minimum permitted bending radii for the sensor cables, which are generally 35 mm.

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the “Accessories” catalog section.



AGE-XY-080

Load diagram

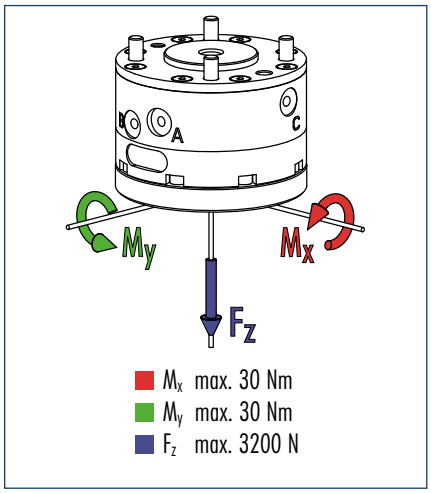


Position of the center of mass in relation to the payload in the event of horizontal configuration

* For centric locking

** For position storage

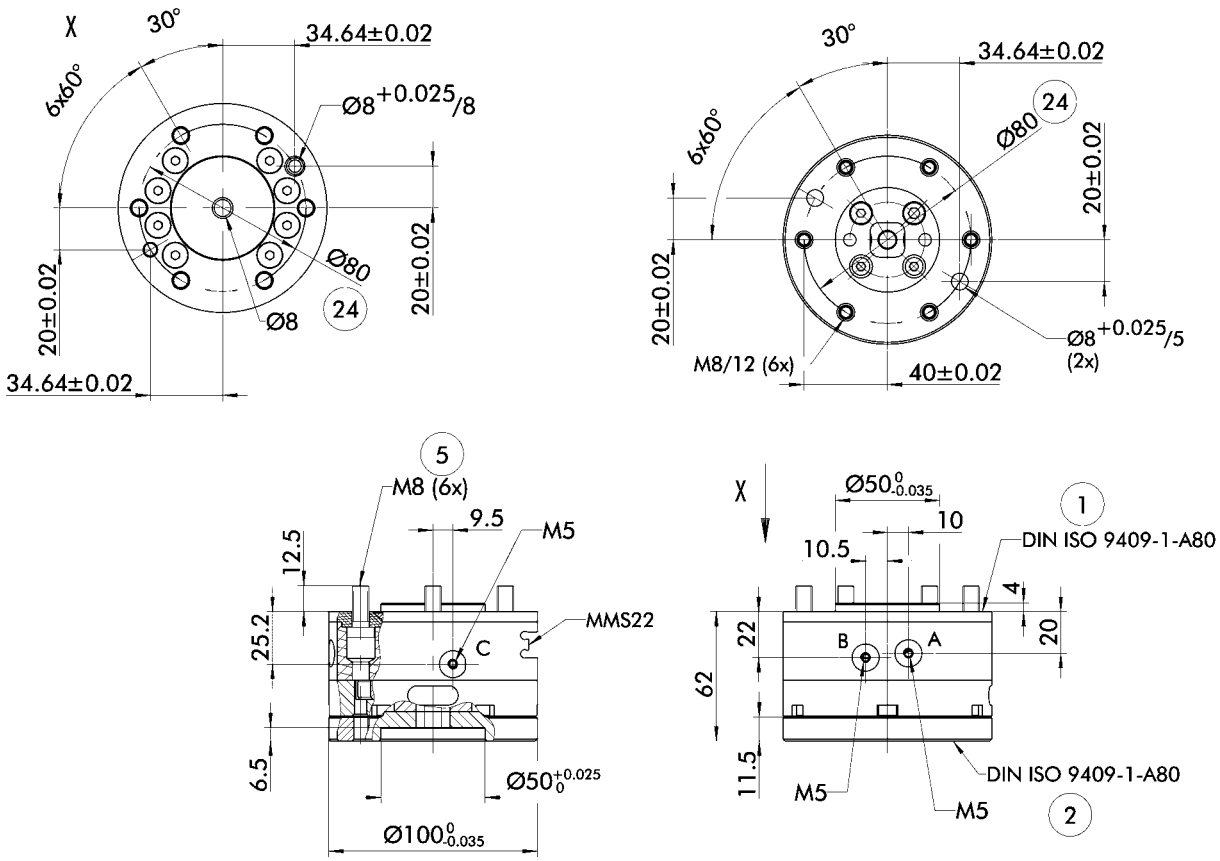
Forces and moments



Technical data

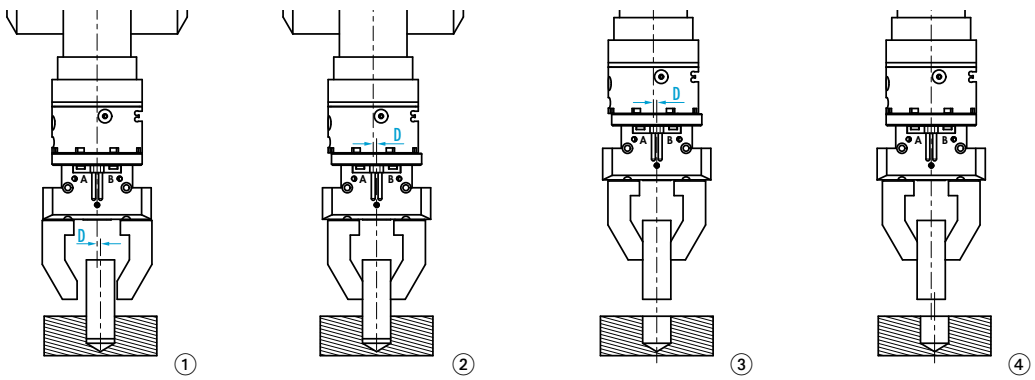
Designation			AGE-XY-080	AGE-XY-080-P
		ID	0324480	0324481
Locking force at 6 bar		[N]	580	580
Position storage force at 6 bar		[N]	-	580
Compensation stroke		[mm]	± 4	± 4
Max. compensation angle (with AGE in centric position)		[°]	± 16	± 16
Workpiece weight	With centric locking	[kg]	10	10
(recommendation)	With deflected position storage	[kg]	-	4
Weight		[kg]	1.49	1.5
Max. rotation	With centric locking	[Nm]	9	9
moment MR	With deflected position storage	[Nm]	-	4
Max. load strength	With centric locking	[N]	310	310
Fx, Fy	With deflected position storage	[N]	-	145
Mass moment of inertia Iz		[kg/cm²]	17.8	18.0
Robot and tool-side mounting			Interface ISO 9409-80-6-M8	Interface ISO 9409-80-6-M8
Maximum displacement force distance in z		[mm]	200	200

Main views



A Unlocked air connection
B Locked air connection
C Air connection position storage XY
① Robot-side connection
② Tool-side connection
⑤ Through-bore for screw connection with screw (enclosed)
㉔ Bolt pitch circle

Diagram of the functions



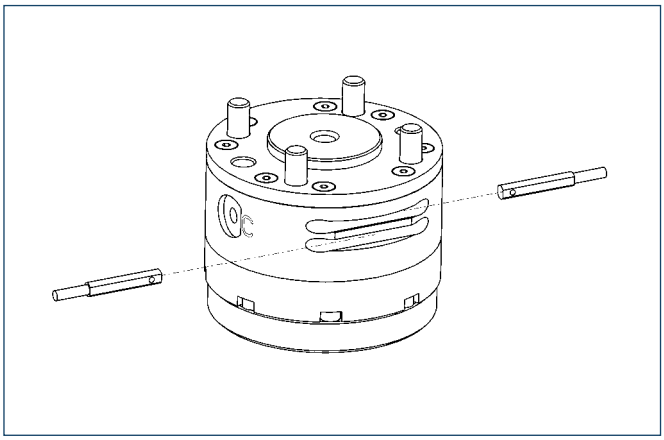
① Offset [D] between the gripper axis and the workpiece axis – AGE unlocked

② Gripper closes – AGE compensates for the offset [D] between the gripper and the workpiece. With the AGE-XY-P, this offset can be "stored".

③ Workpiece removed

④ Locking the AGE-workpiece axis, gripper axis and robot axis are centric in relation to one another

Sensor system



End position monitoring:
Electronic magnetic switches, for mounting in C-slot

Designation	ID	Recommended product
MMS 22-S-M5-NPN	0301439	
MMS 22-S-M5-NPN-SA	0301449	
MMS 22-S-M5-PNP	0301438	
MMS 22-S-M5-PNP-SA	0301448	
MMS 22-S-M8-NPN	0301433	
MMS 22-S-M8-NPN-SA	0301443	
MMS 22-S-M8-PNP	0301432	•
MMS 22-S-M8-PNP-SA	0301442	
MMSK 22-S-NPN	0301435	
MMSK 22-S-PNP	0301434	

ⓘ Two sensors (closers/S) are required for each compensation unit, plus extension cables as an option.

Extension cables for proximity switches/magnetic switches

Designation	ID
GK 3-M8	0301622
GK 3-M5-PNP/NPN	0301652
KV 10-M12	0301596
KV 10-M8	0301496
KV 20-M12	0301597
KV 20-M8	0301497
KV 3-M12	0301595
KV 3-M8	0301495
W 3-M12	0301503
W 5-M12	0301507
W 3-M5-PNP/NPN	0301650
WK 3-M8	0301594
WK 3-M8 NPN	0301602
WK 5-M8	0301502
WK 5-M8 NPN	9641116

ⓘ Please note the minimum permitted bending radii for the sensor cables, which are generally 35 mm.

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the “Accessories” catalog section.

AGE-F

Sizes
031 .. 080

Workpiece weight
1.5 kg .. 32 kg

Compensation paths XY
± 1.5 mm .. ± 5 mm

Application example

Insertion unit for assembling a pin in a bore, in an approximately toleranced position. The compensation unit compensates for the planar offset without allowing the workpiece to twist and therefore to tilt.

1. **PGF 80 2-Finger Parallel Gripper with special fingers and workpiece (pin)**
2. **AGE-F-80 Compensation Unit**

Compensation Unit with spring return

Compensation unit for use in assembly, and for loading and unloading machines and tool carriers. Using the AGE-F, workpieces can be gripped and routed reliably despite positioning offset

Area of application

Assembling, palletizing and inserting workpieces

Your advantages and benefits

Spring return in 3 levels

Defined centric Position with a repeat accuracy of 0.003 mm

Direct mounting of Parallel- and Centric Grippers

Possibility to mount PGN-plus and PZN-plus on the AGE-F without additional adapter plate

Roller bearing guide

Smooth-running compensation even with small application force

General information on the series

Compensation paths and angles

± 1.5 mm bis ± 5 mm

Guides

Roller bearing guide

Actuation

Spring return with spring stiffness from 1 N to 47 N

Monitoring of the compensation path

Via electronic magnetic switch

Ambient temperature

5 °C to 60 °C

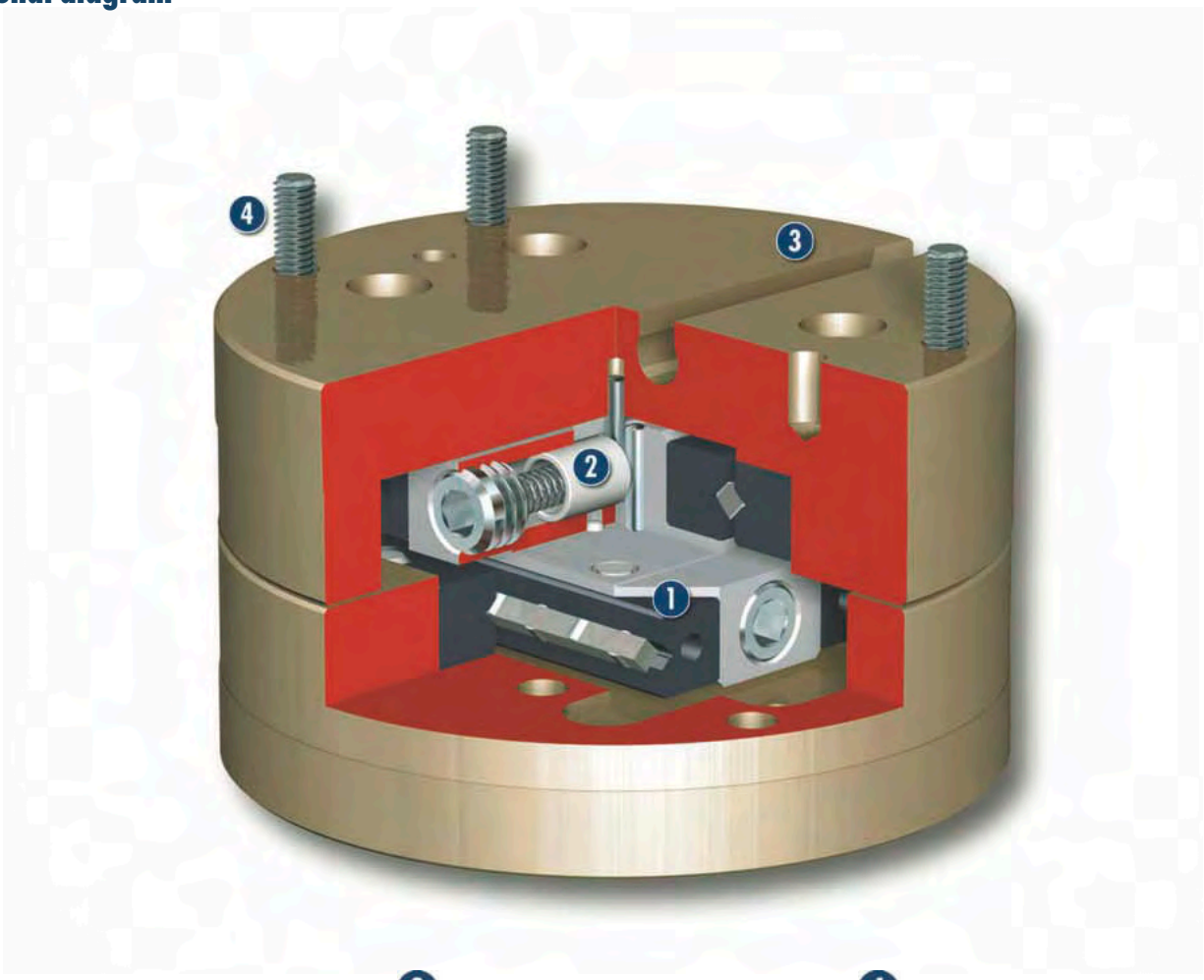
Material

The housing is made from a high-strength, hard-coated aluminum alloy. The functional components are made from hardened steel.

Warranty

24 months

Sectional diagram



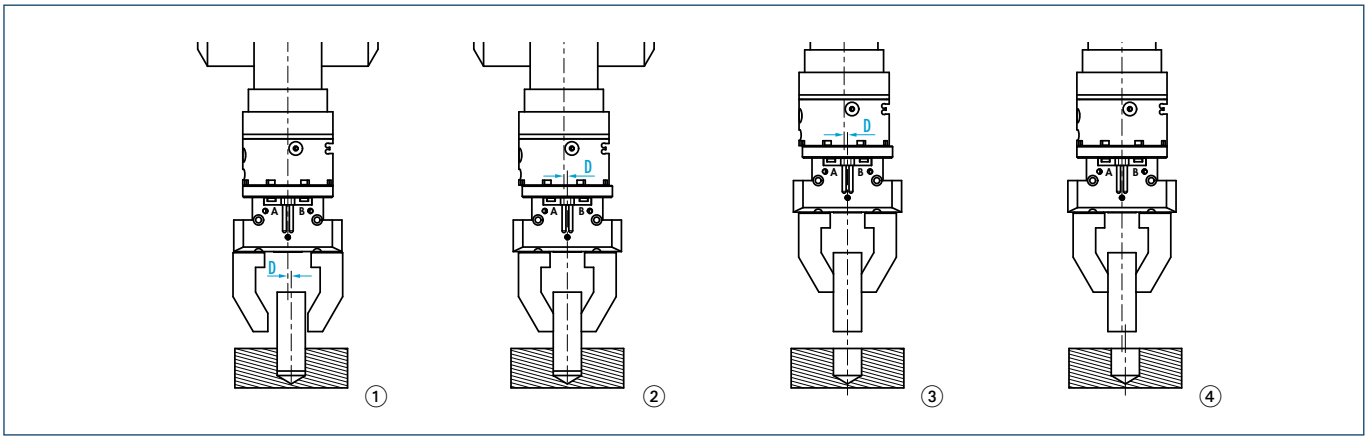
1 Linear Guides
Smooth-running roller bearing

2 Spring Loaded Reset Piston
Springs with different stiffness for centric reset without pneumatic

3 Groove for Magnetic Switch
For monitoring the movement in X and Y direction

4 Housing
Weight-reduced through the use of a hardanodized, high-strength aluminum alloy

Diagram of the functions



① Offset [D] between the gripper axis and the workpiece axis - AGE unlocked

② Gripper closes - AGE compensates for the offset [D] between the gripper and the workpiece. With the AGE-XY-P, this offset can be "stored".

③ Workpiece removed

④ Locking the AGE-workpiece axis, gripper axis and robot axis are centric in relation to one another

Accessories

Accessories from SCHUNK – the suitable supplement for maximum functionality, reliability and performance of all automation modules.

Fittings

MMS magnetic switches

Sensor cables

ⓘ For the exact size of the accessories, the availability for this size and the designation and ID, please refer to the additional views at the end of the size in question. You can find more detailed information on our accessory range in the "Accessories" catalog section.

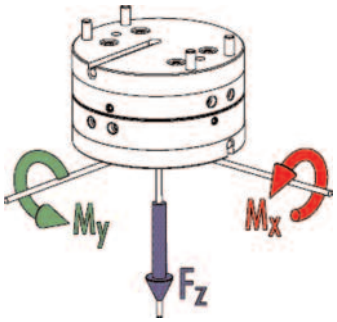
General information on the series

Extreme ambient conditions

Please note that use in extreme ambient conditions (e.g. in the coolant zone, in the presence of abrasive dust) can significantly reduce the tool life of these units and we cannot accept any liability for this reduction. However, in many cases we have a solution at hand. Please ask for details.

AGE-F-031

Forces and moments

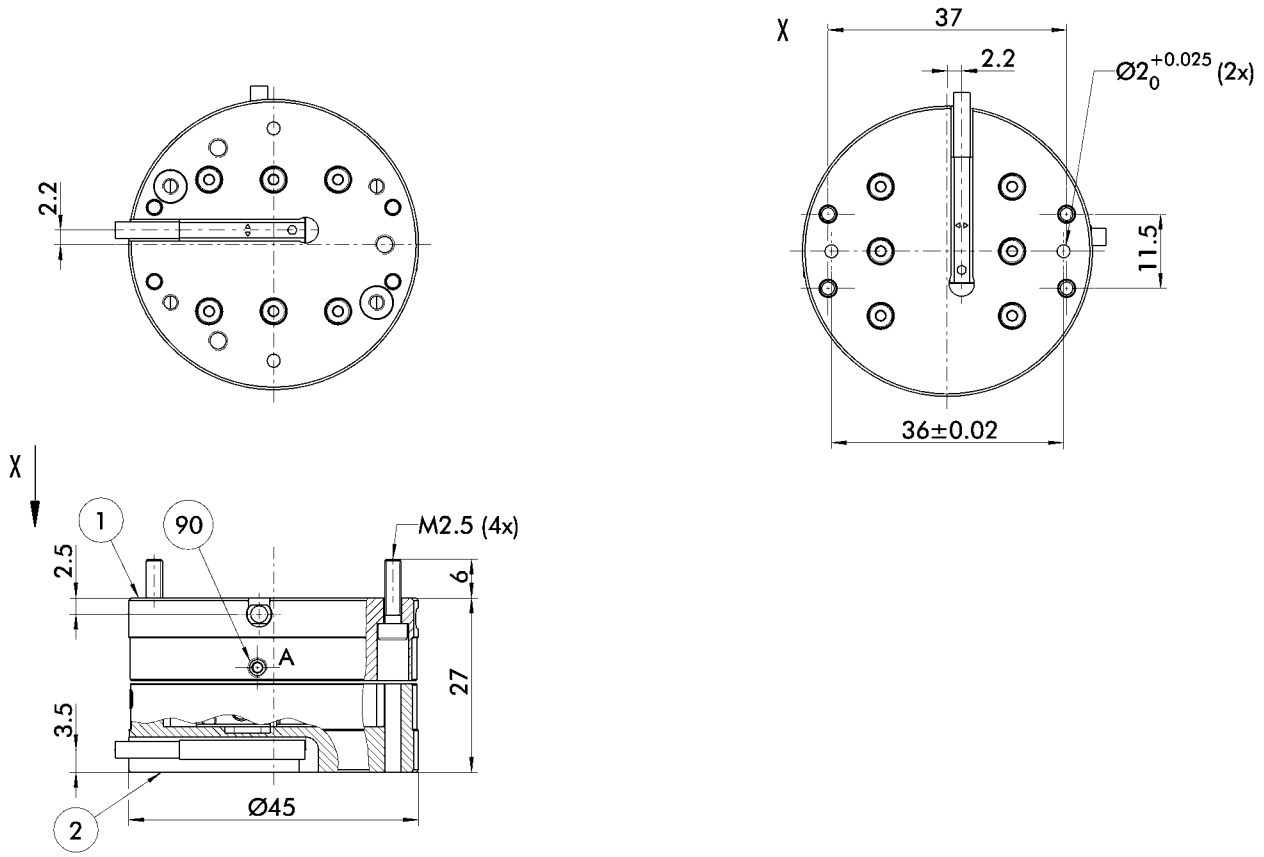


M_x max. 3.5 Nm
M_y max. 3.5 Nm
F_z max. 100 N

Technical data

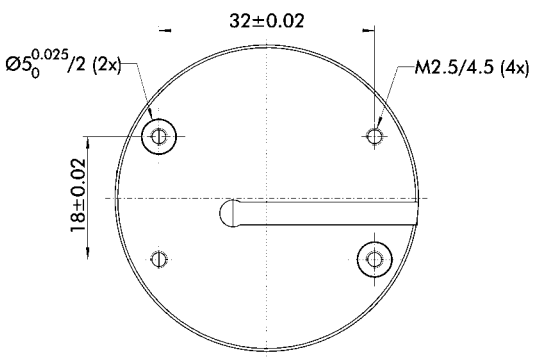
Designation		AGE-F-XY-031-1	AGE-F-XY-031-2	AGE-F-XY-031-3
	ID	0324900	0324901	0324902
Compensation stroke X	[mm]	± 1.5	± 1.5	± 1.5
Compensation stroke Y	[mm]	± 1.5	± 1.5	± 1.5
Workpiece weight recommendation	[kg]	1.5	1.5	1.5
Max. payload Fz	[N]	100	100	100
Max. payload Fd	[N]	200	200	200
Weight	[kg]	0.123	0.123	0.123
Moment Mx My	[Nm]	3.5	3.5	3.5
Moment Mz	[Nm]	6.0	6.0	6.0
Mass Moment of inertia Iz	[kg/cm²]	0.3	0.3	0.3
Mounting robot side		ISO 9409-31.5-4-M5 with adapter plate (optional)		
Mounting tool side		PGN-plus/PZN-plus 40		
Repeat accuracy	[mm]	± 0.003	± 0.003	± 0.003
Spring force	[N]	1.0	2.5	3.3
Spring rate	[N/mm]	0.6	0.8	1.9
Min. ambient temperature	[°C]	5.0	5.0	5.0
Max. ambient temperature	[°C]	80	80	80

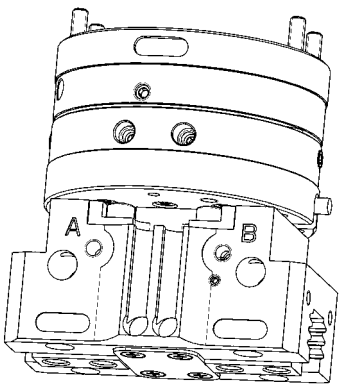
Main views



① Robot-side connection
② Tool-side connection
90 Adjustable stop for stroke limitation

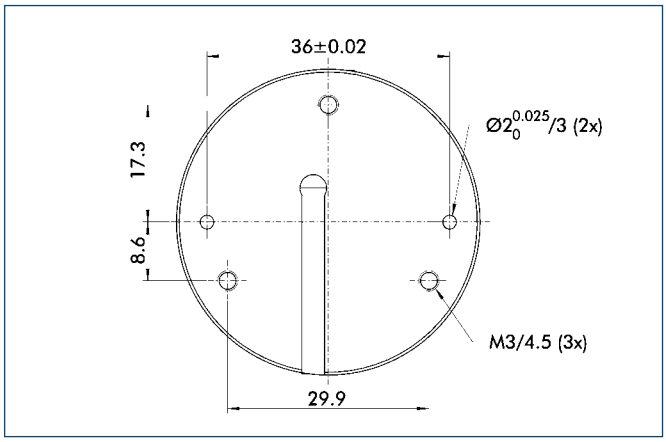
Mounting pattern for PGN-plus 40

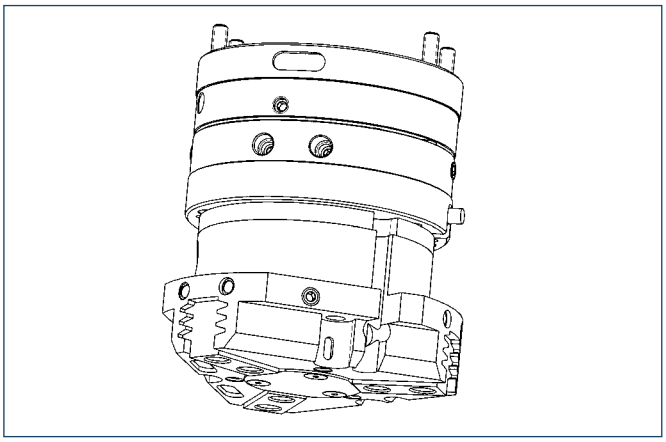




ⓘ Monitoring of the gripper is not possible (interference contour)

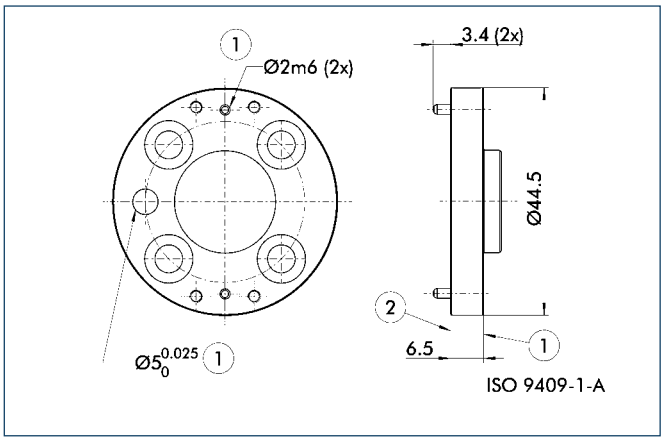
Mounting pattern for PZN-plus 40





ⓘ Monitoring of the gripper is not possible (interference contour)

Adapter plate ISO 9409-31.5-4-M5



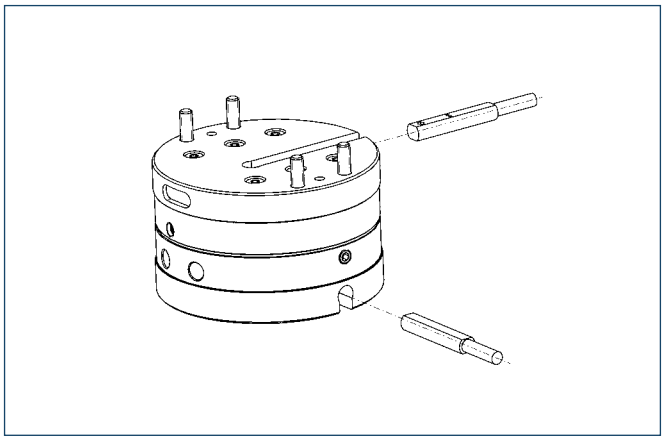
① Robot-side connection
② Tool-side connection

Adapter plate:
Robot-side adapter plate with ISO 9409-31.5-4-M5 screw connection diagram

Designation	ID
A-AGE-F-XY-031	0324903

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the "Accessories" catalog section.

Sensor system

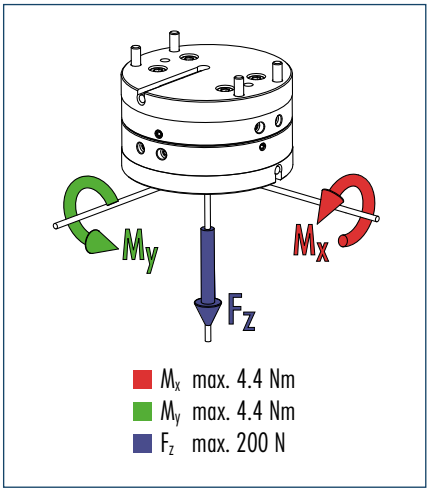


End position monitoring:
Electronic magnetic switches, for mounting in C-slot

Designation	ID
MMS-P-22-S-M8-PNP	0301370

AGE-F-040

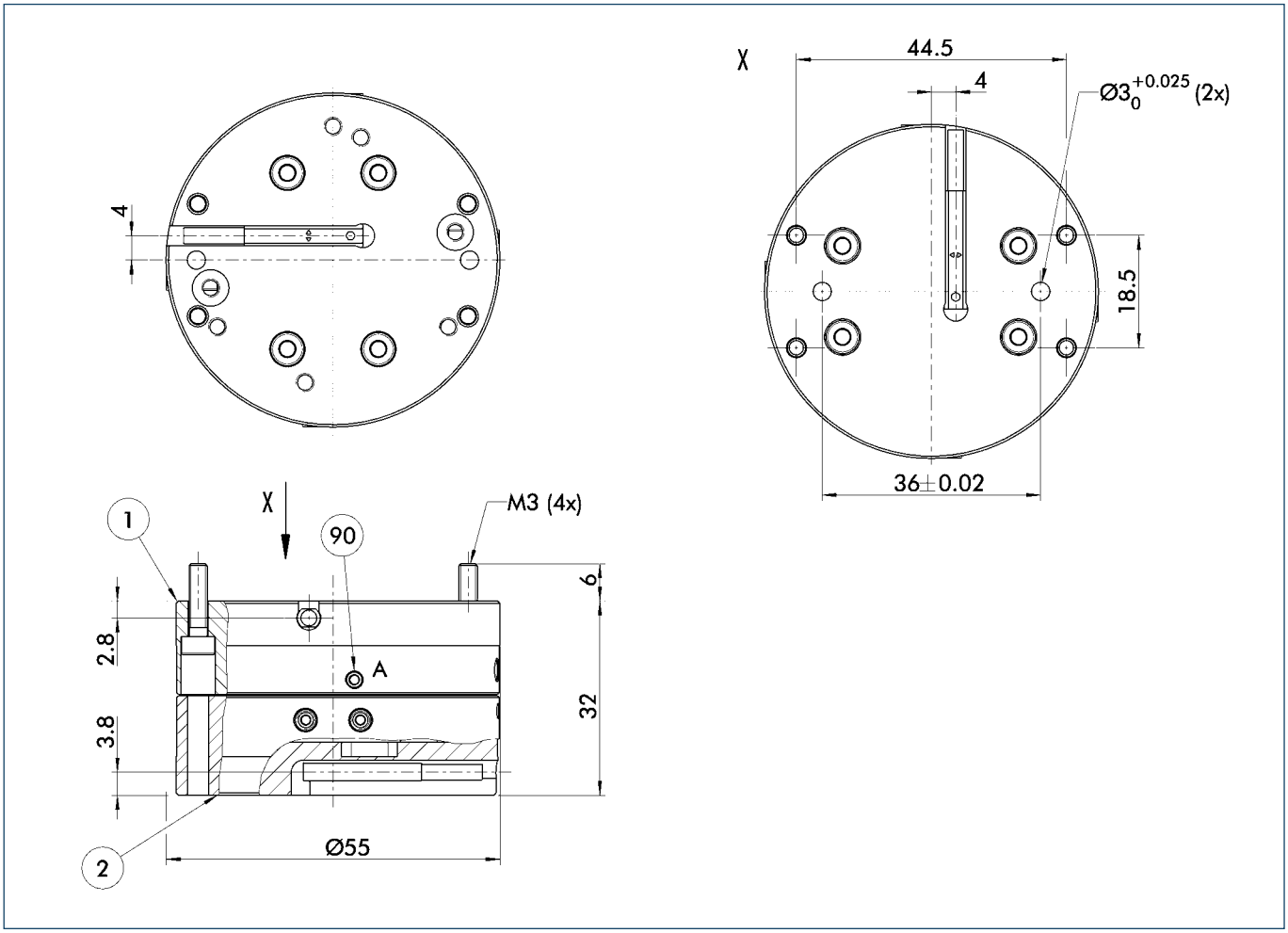
Forces and moments



Technical data

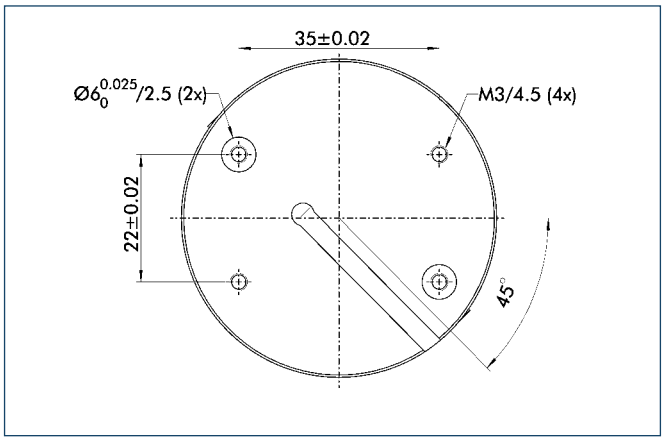
Designation		AGE-F-XY-040-1	AGE-F-XY-040-2	AGE-F-XY-040-3
	ID	0324920	0324921	0324922
Compensation stroke X	[mm]	± 2	± 2	± 2
Compensation stroke Y	[mm]	± 2	± 2	± 2
Workpiece weight recommendation	[kg]	4	4	4
Max. payload Fz	[N]	200	200	200
Max. payload Fd	[N]	500	500	500
Weight	[kg]	0.23	0.23	0.23
Moment Mx My	[Nm]	4.4	4.4	4.4
Moment Mz	[Nm]	8.0	8.0	8.0
Mass Moment of inertia Iz	[kg/cm²]	on request	on request	on request
Mounting robot side		ISO 9409-40-4-M6 with adapter plate (optional)		
Mounting tool side		PGN-plus/PZN-plus 50		
Repeat accuracy	[mm]	± 0.003	± 0.003	± 0.003
Spring force	[N]	1.0	2.5	3.3
Spring rate	[N/mm]	0.6	0.8	1.4
Min. ambient temperature	[°C]	5.0	5.0	5.0
Max. ambient temperature	[°C]	80	80	80

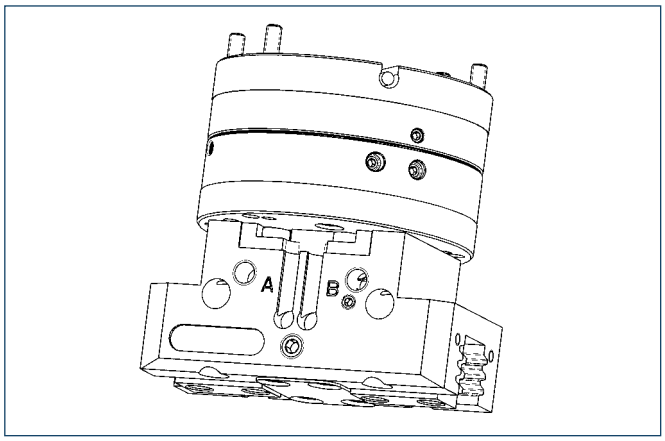
Main views



① Robot-side connection
② Tool-side connection
90 Adjustable stop for stroke limitation

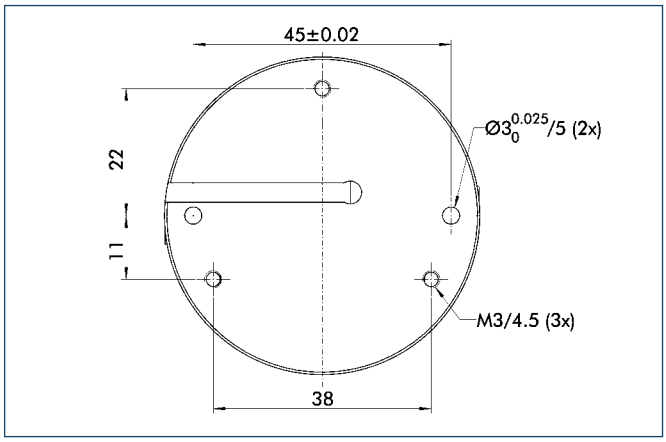
Mounting pattern for PGN-plus 50

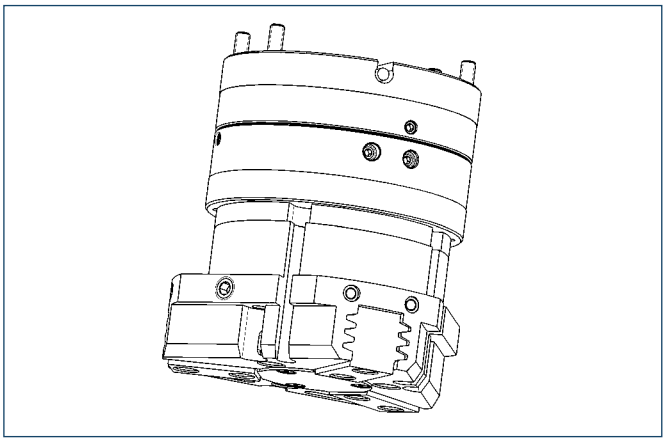




ⓘ Monitoring of the gripper is not possible (interference contour)

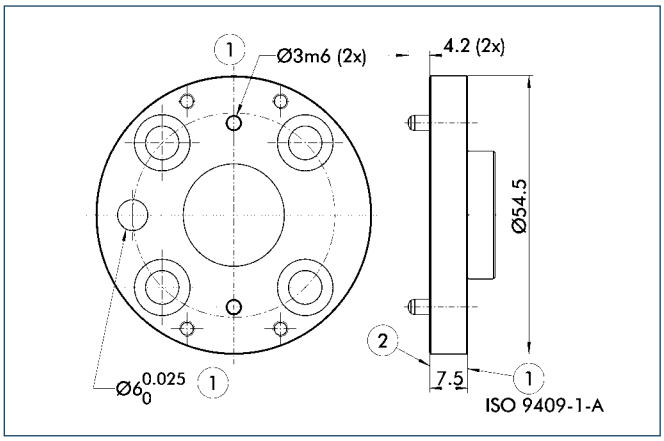
Mounting pattern for PZN-plus 50





ⓘ Monitoring of the gripper is not possible (interference contour)

Adapter plate ISO 9409-40-4-M6



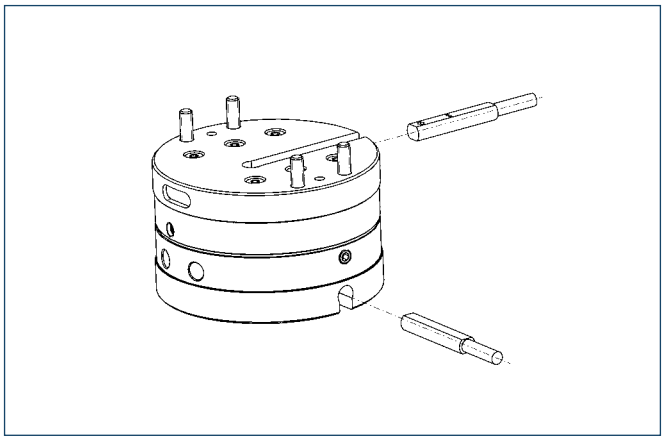
① Robot-side connection
② Tool-side connection

Adapter plate:
Robot-side adapter plate with ISO 9409-40-4-M6 screw connection diagram

Designation	ID
A-AGE-F-XY-040	0324923

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the "Accessories" catalog section.

Sensor system

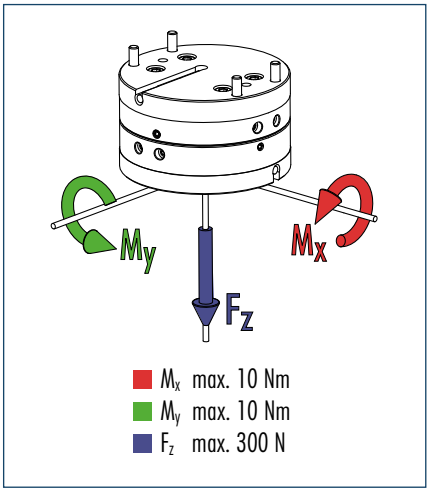


End position monitoring:
Electronic magnetic switches, for mounting in C-slot

Designation	ID
MMS-P-22-S-M8-PNP	0301370

AGE-F-063

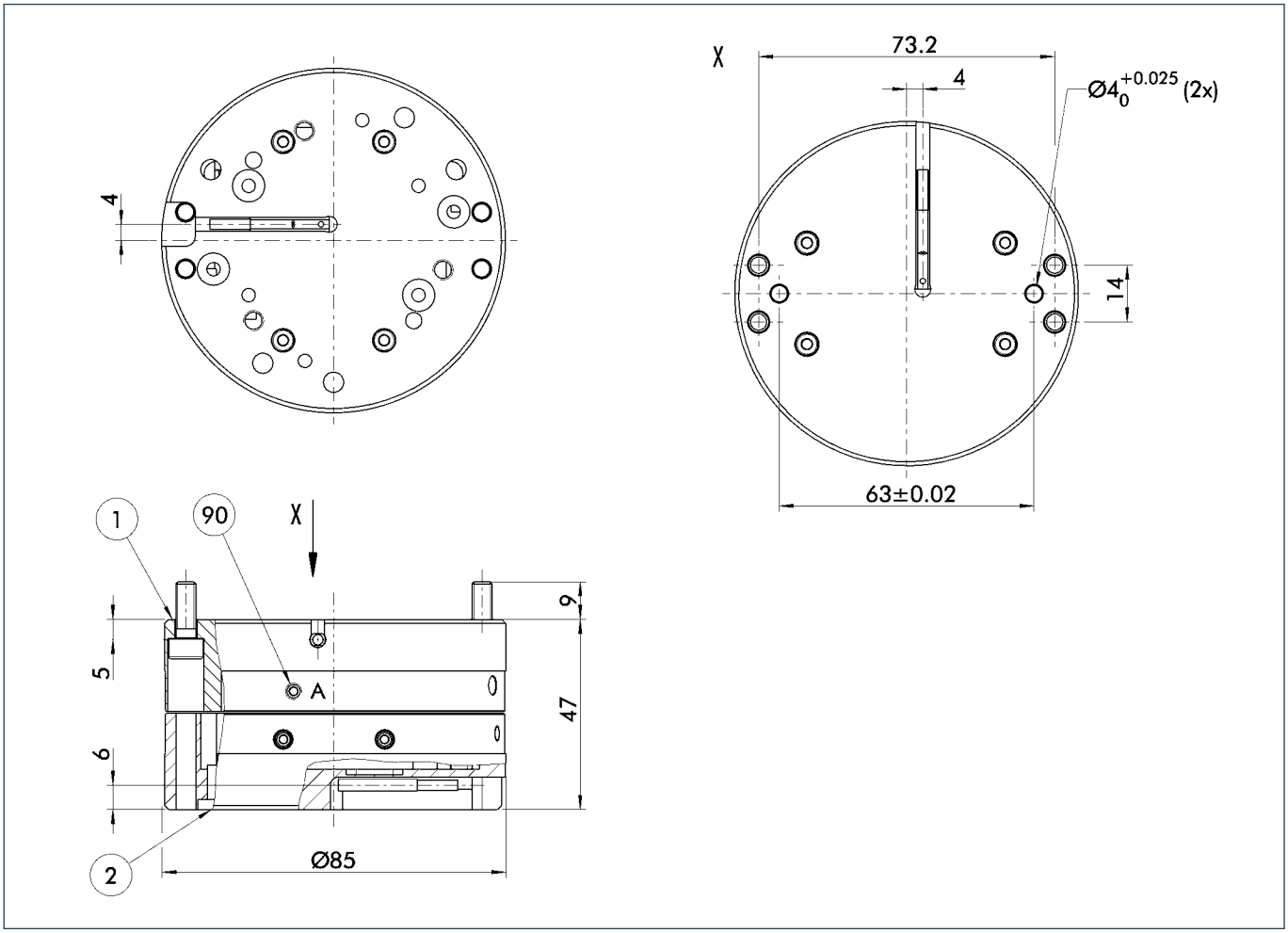
Forces and moments



Technical data

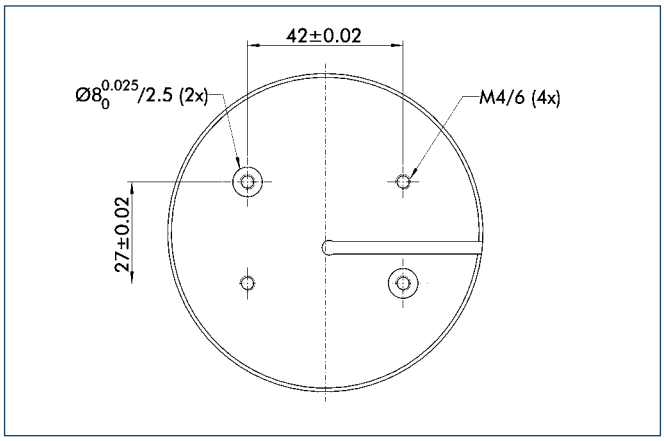
Designation		AGE-F-XY-063-1	AGE-F-XY-063-2	AGE-F-XY-063-3
	ID	0324940	0324941	0324942
Compensation stroke X	[mm]	± 4	± 4	± 4
Compensation stroke Y	[mm]	± 4	± 4	± 4
Workpiece weight recommendation	[kg]	12.5	12.5	12.5
Max. payload Fz	[N]	300	300	300
Max. payload Fd	[N]	3000	3000	3000
Weight	[kg]	0.78	0.78	0.78
Moment Mx My	[Nm]	10	10	10
Moment Mz	[Nm]	21	21	21
Mass Moment of inertia Iz	[kg/cm²]	on request	on request	on request
Mounting robot side		ISO 9409-63-4-M6 with adapter plate (optional)		
Mounting tool side		PGN-plus/PZN-plus 64 and 80		
Repeat accuracy	[mm]	± 0.004	± 0.004	± 0.004
Spring force	[N]	9.0	10.0	19.3
Spring rate	[N/mm]	1.5	4.1	3.9
Min. ambient temperature	[°C]	5.0	5.0	5.0
Max. ambient temperature	[°C]	80	80	80

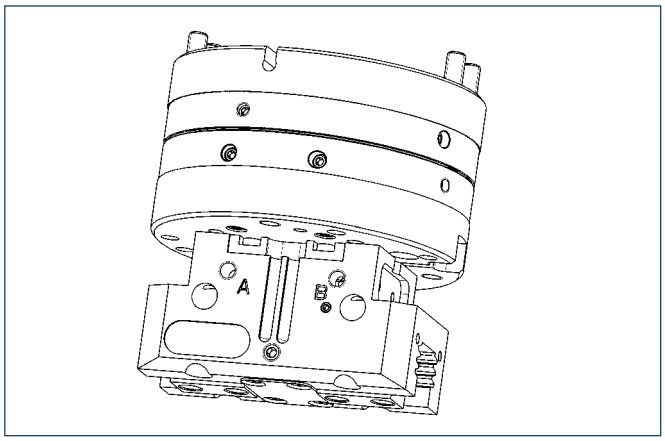
Main views



① Robot-side connection
② Tool-side connection
90 Adjustable stop for stroke limitation

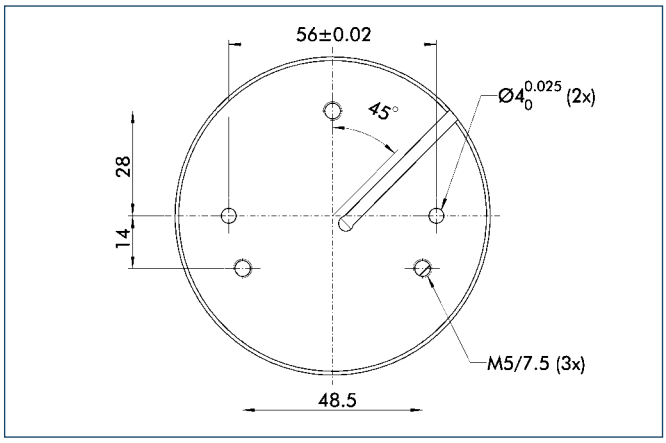
Mounting pattern for PGN-plus 64

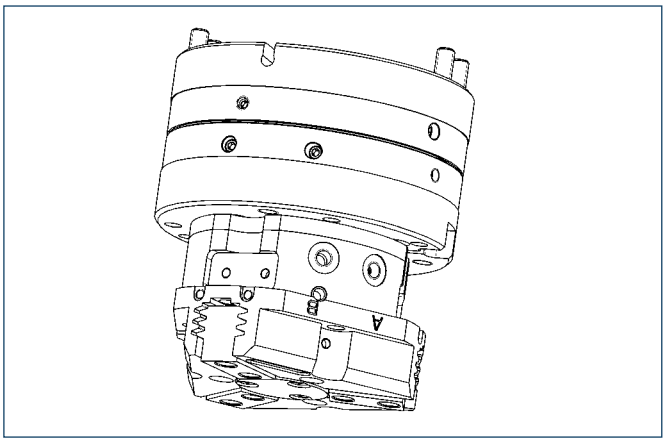




ⓘ Monitoring of the gripper is not possible (interference contour)

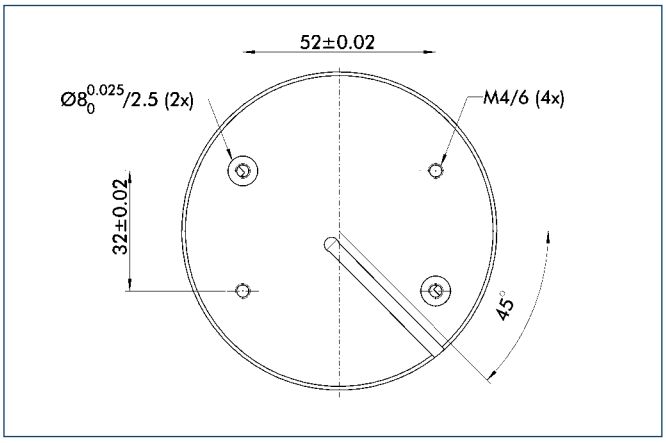
Mounting pattern for PZN-plus 64

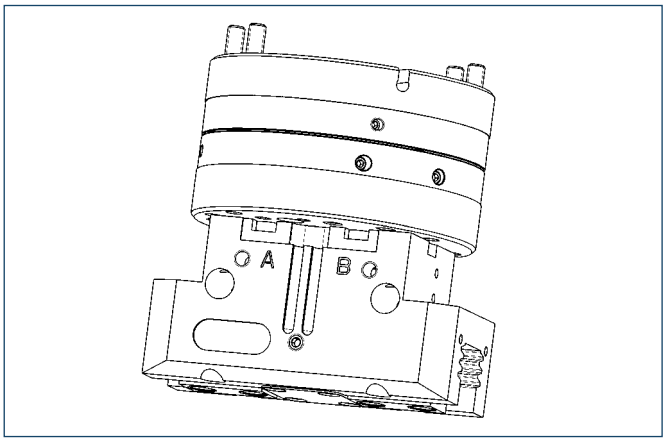




ⓘ Monitoring of the gripper is not possible (interference contour)

Mounting pattern for PGN-plus 80

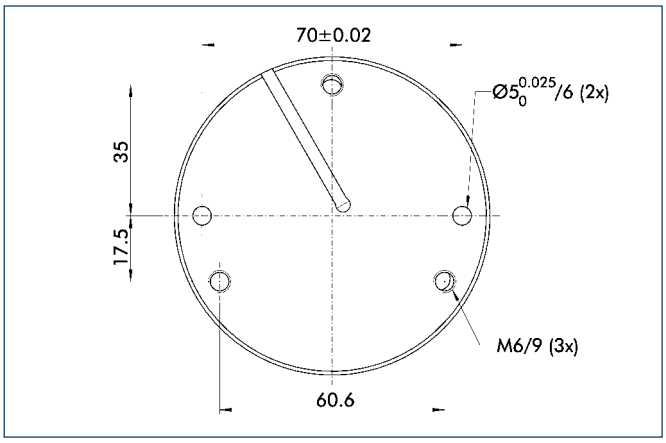


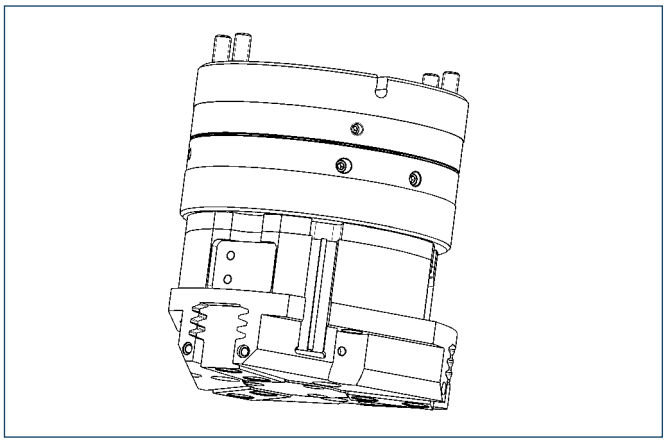


ⓘ Monitoring of the gripper is not possible (interference contour)

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the "Accessories" catalog section.

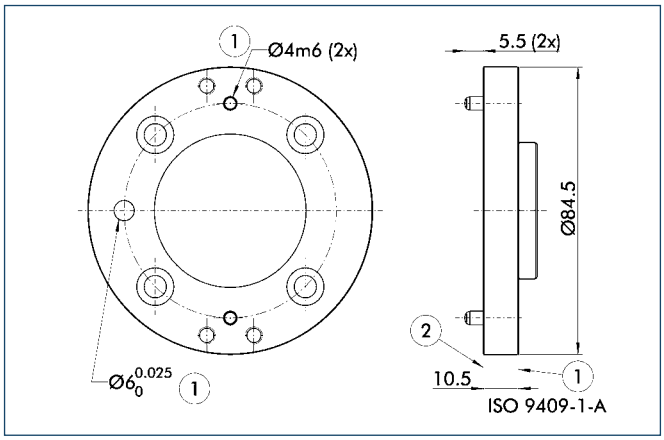
Mounting pattern for PZN-plus 80





ⓘ Monitoring of the gripper is not possible (interference contour)

Adapter plate ISO 9409-63-4-M6

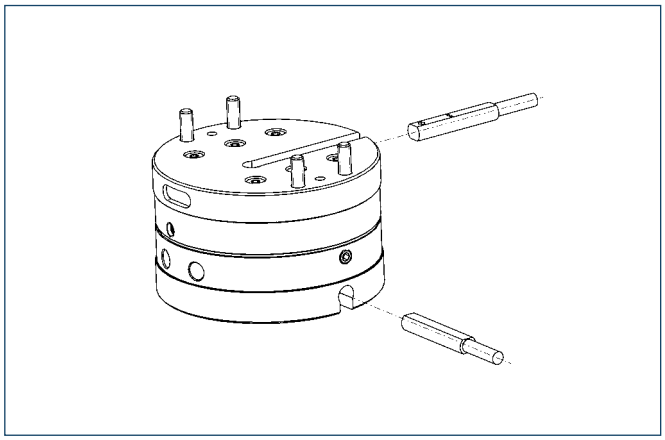


① Robot-side connection
② Tool-side connection

Adapter plate:
Robot-side adapter plate with ISO 9409-63-4-M6 screw connection diagram

Designation	ID
A-AGE-F-XY-063	0324943

Sensor system

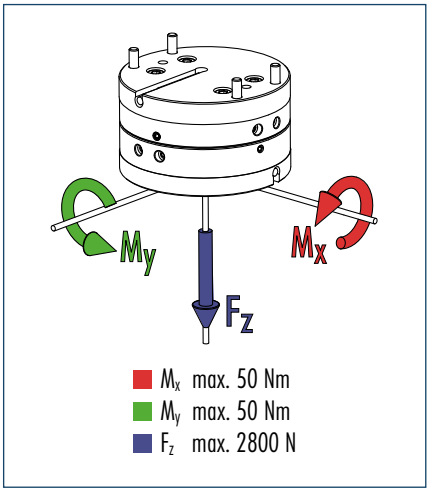


End position monitoring:
Electronic magnetic switches, for mounting in C-slot

Designation	ID
MMS-P-22-S-M8-PNP	0301370

AGE-F-080

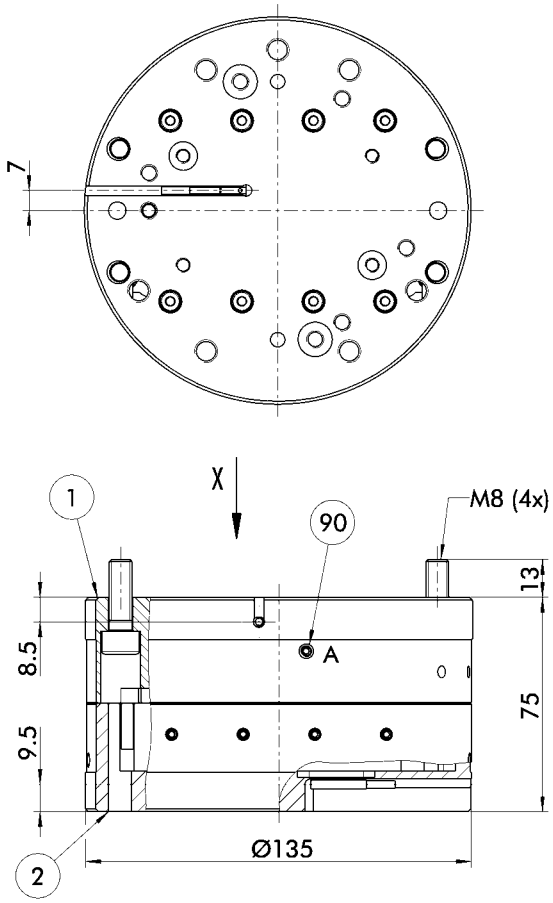
Forces and moments

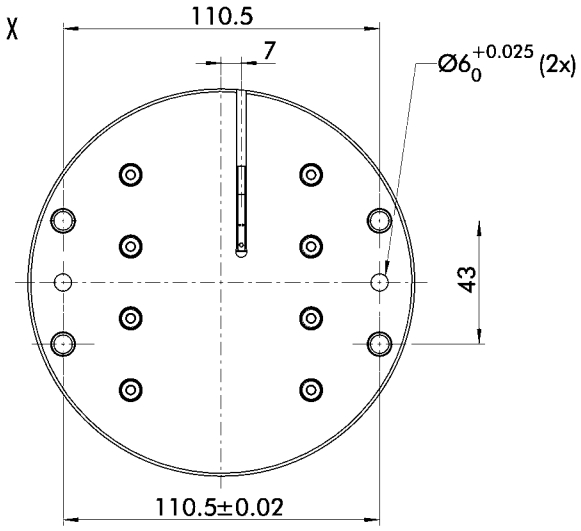


Technical data

Designation		AGE-F-XY-080-1	AGE-F-XY-080-2	AGE-F-XY-080-3
	ID	0324960	0324961	0324962
Compensation stroke X	[mm]	± 5	± 5	± 5
Compensation stroke Y	[mm]	± 5	± 5	± 5
Workpiece weight recommendation	[kg]	32.3	32.3	32.3
Max. payload Fz	[N]	2800	2800	2800
Max. payload Fd	[N]	12000	12000	12000
Weight	[kg]	3.13	3.13	3.13
Moment Mx My	[Nm]	50	50	50
Moment Mz	[Nm]	150	150	150
Mass Moment of inertia Iz	[kg/cm²]	on request	on request	on request
Mounting robot side		ISO 9409-80-6-M8 with adapter plate (optional)		
Mounting tool side		PGN-plus/PZN-plus 100 and 125		
Repeat accuracy	[mm]	± 0.008	± 0.008	± 0.008
Spring force	[N]	28.3	42.5	47.6
Spring rate	[N/mm]	7.0	12.1	18.3
Min. ambient temperature	[°C]	5.0	5.0	5.0
Max. ambient temperature	[°C]	80	80	80

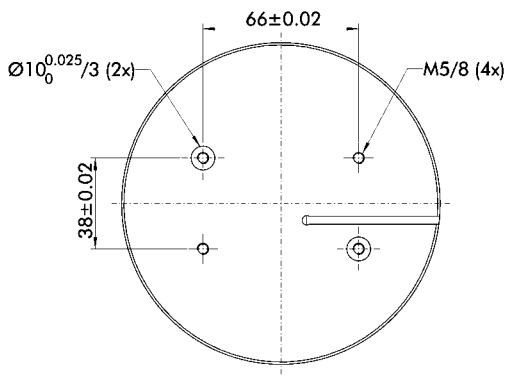
Main views

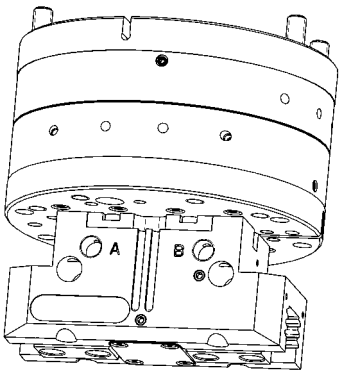




① Robot-side connection
② Tool-side connection
90 Adjustable stop for stroke limitation

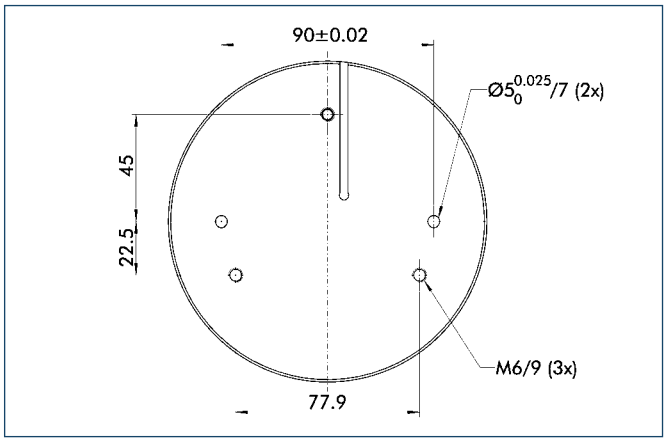
Mounting pattern for PGN-plus 100

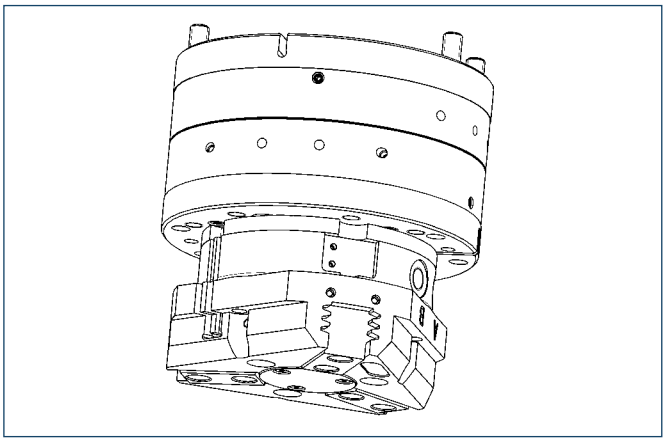




ⓘ Monitoring of the gripper is not possible (interference contour)

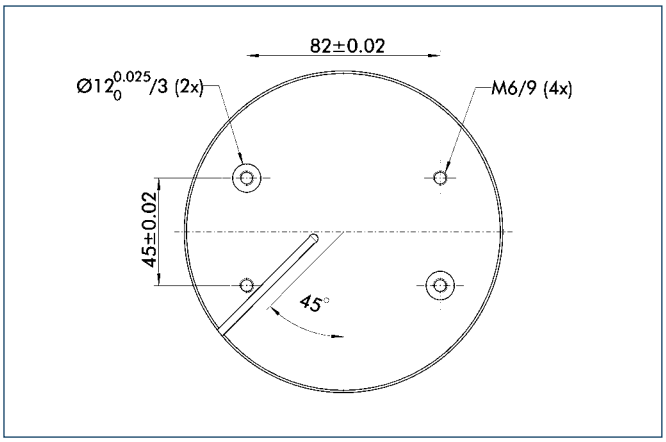
Mounting pattern for PZN-plus 100

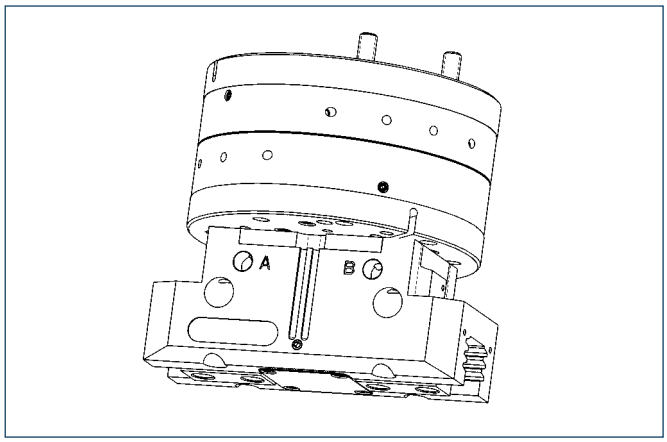




ⓘ Monitoring of the gripper is not possible (interference contour)

Mounting pattern for PGN-plus 125

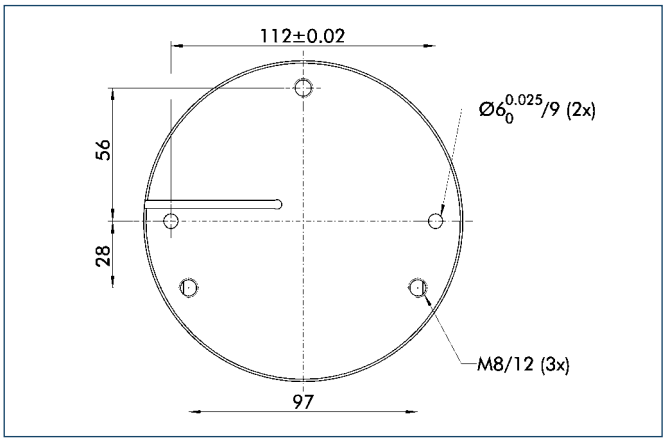


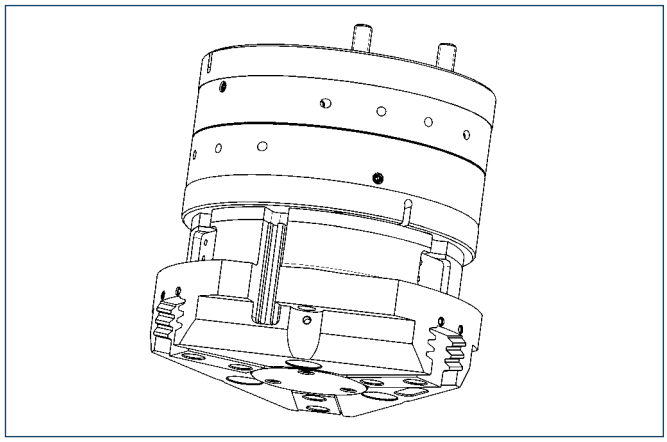


ⓘ Monitoring of the gripper is not possible (interference contour)

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the "Accessories" catalog section.

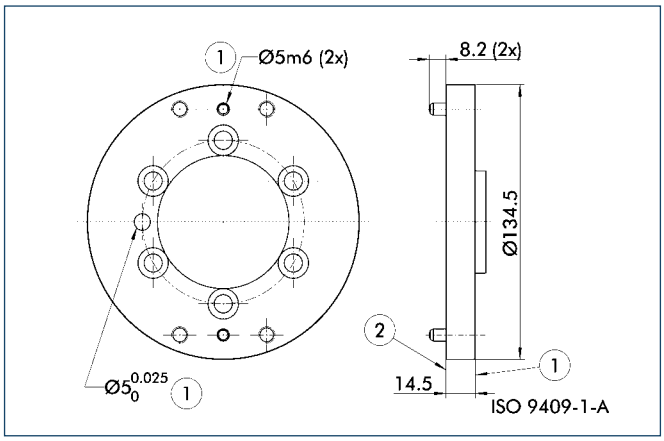
Mounting pattern for PZN-plus 125





ⓘ Monitoring of the gripper is not possible (interference contour)

Adapter plate ISO 9409-80-6-M8

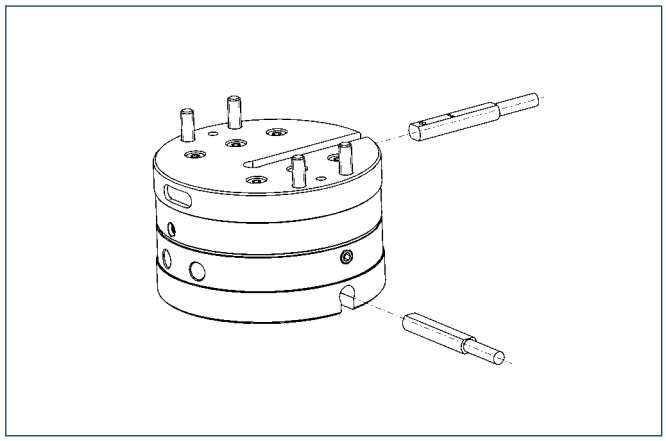


① Robot-side connection
② Tool-side connection

Adapter plate:
Robot-side adapter plate with ISO 9409-80-6-M8 screw connection diagram

Designation	ID
A-AGE-F-XY-080	0324963

Sensor system



End position monitoring:
Electronic magnetic switches, for mounting in C-slot

Designation	ID
MMS-P-22-S-M8-PNP	0301370

AGE-S

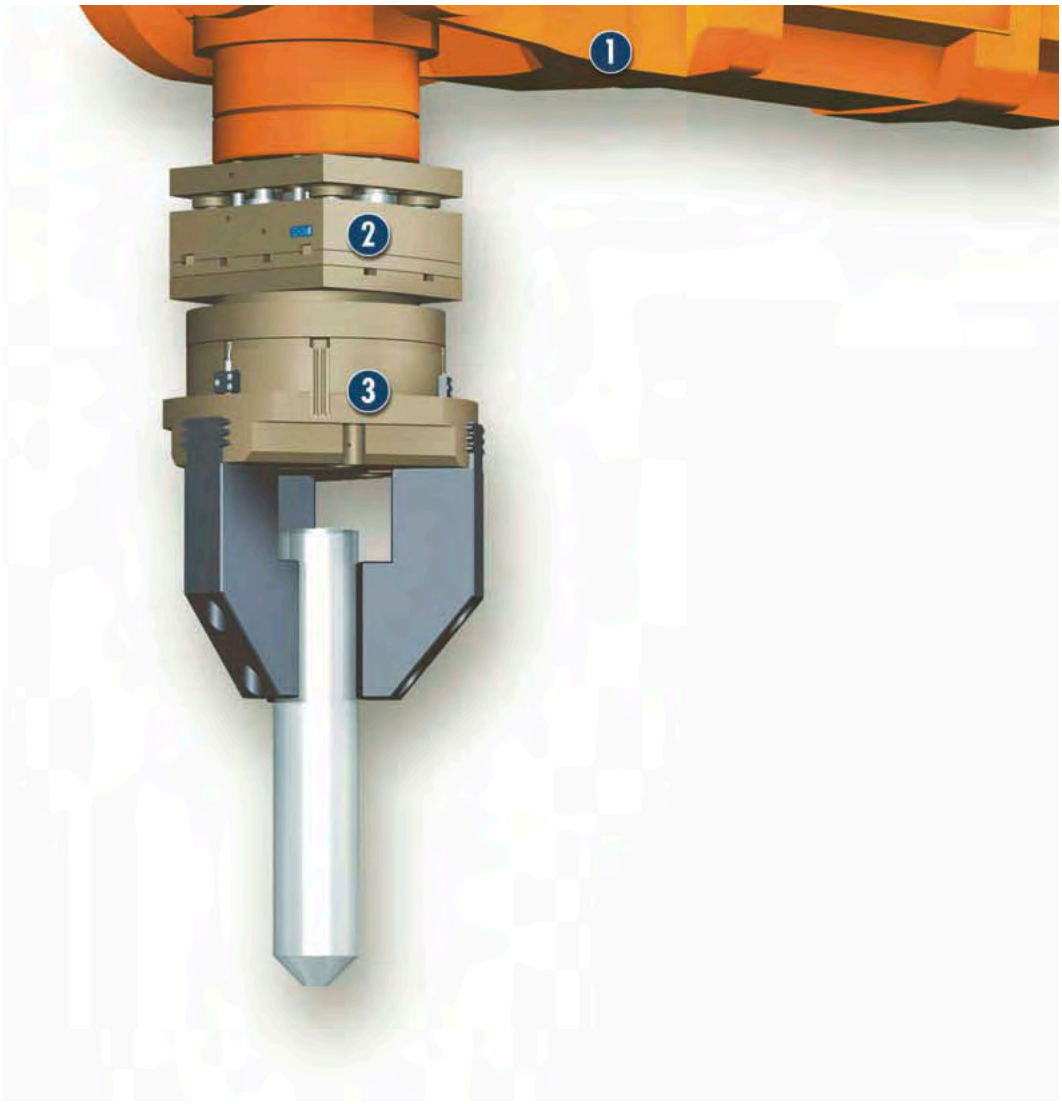
Sizes
100 .. 200

Payload
up to 100 kg

Compensation path XY
up to ± 14 mm

Compensation path Z
up to 12 mm

Application example



Picking up and setting down components from a rack with a 3-finger centric gripper

1. Robot
2. AGE-S 100 Compensation Unit
3. PZN-plus 100 3-Finger Centric Gripper

Compensation Unit

Compensation unit with X, Y and Z axis flexibility

Area of application

For assembling, palletizing and inserting workpieces

Your advantages and benefits

ISO flange
for easy mounting to most types of robots without additional adapter plates

Three compensation directions in one unit
compact design for minimum profile

Centric locking
for fixing the unit rigidly in a defined, centric position

Pneumatic position storage
for secure retention of the offset position

General information on the series

Compensation paths
X, Y direction: up to ± 12 mm
Z direction: up to 14 mm

Guides
Sturdy linear guides

Actuation
Pneumatic, filtered compressed air (10 µm): dry, lubricated or non-lubricated

Operating pressure range
2 bar to 8 bar

Monitoring of centric locking
Via electronic magnetic switch

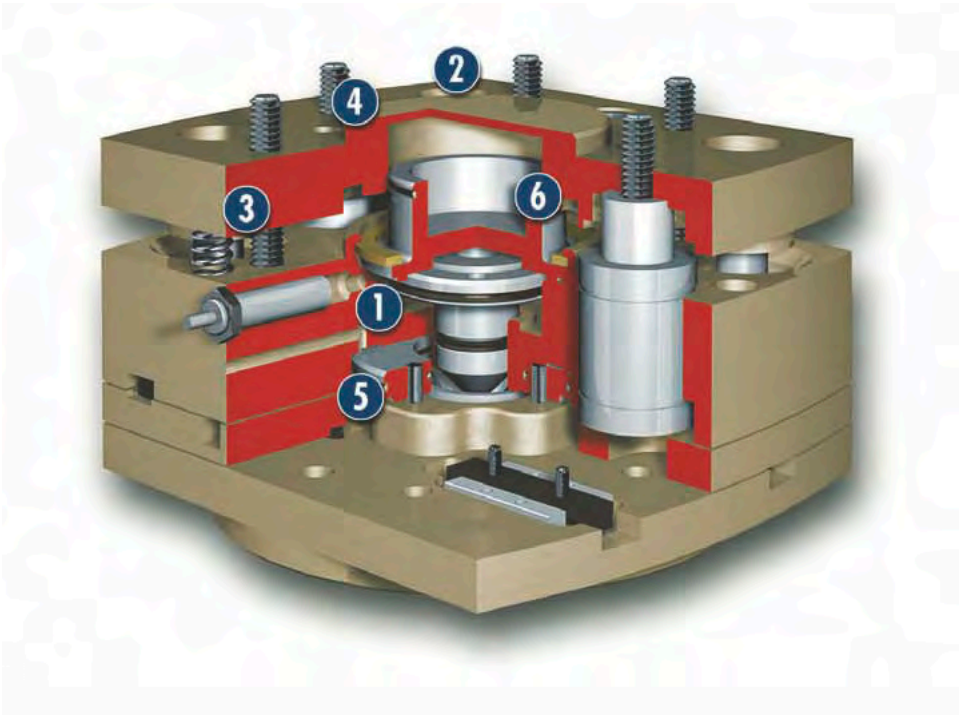
Z-stroke monitoring
Via inductive proximity switches

Ambient temperature
5 °C to 60 °C

Material
Aluminum alloy, hard-anodized
Functional components made from hardened steel

Warranty
24 months

Sectional diagram



1 Position Storage
locking in any position via two pneumatically driven pistons and frictional contact

2 Direct Mounting
by means of standardized ISO 9409 interface for robots

3 Monitoring
locking piston stroke monitoring with electronic magnetic switch

4 Housing
weight-reduced through the use of a hard-anodized, high-strength aluminum alloy

5 Compensating Element
for compensating positioning errors in the X-Y plane

6 Locking Mechanism
pneumatically operated centric locking

Function description

The AGE-S is an expansion to the AGE range (AGE-XY/ AGE-Z) for the medium and heavy load sector and provides perfect compensation in all automation tasks. Robust guidance with excellent stability allows very high loading weights on maximum compensation paths. During handling in directions XY and Z, the unit can be made rigid via the integrated pneumatic locking facility.

Accessories

Accessories from SCHUNK – the suitable supplement for maximum functionality, reliability and performance of all automation modules.

Fittings

IN inductive proximity switches

Sensor cables

MMS magnetic switches

ⓘ For the exact size of the accessories, the availability for this size and the designation and ID, please refer to the additional views at the end of the size in question. You can find more detailed information on our accessory range in the “Accessories” catalog section.

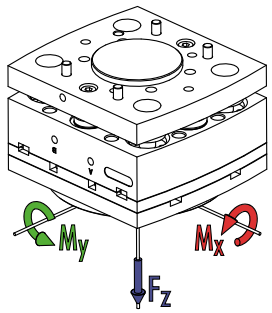
General information on the series

Extreme ambient conditions

Please note that use in extreme ambient conditions (e.g. in the coolant zone, in the presence of abrasive dust) can significantly reduce the tool life span of these units and we cannot accept any liability for this reduction. However, in many cases we have a solution at hand. Please ask for details.

AGE-S-100

Forces and moments

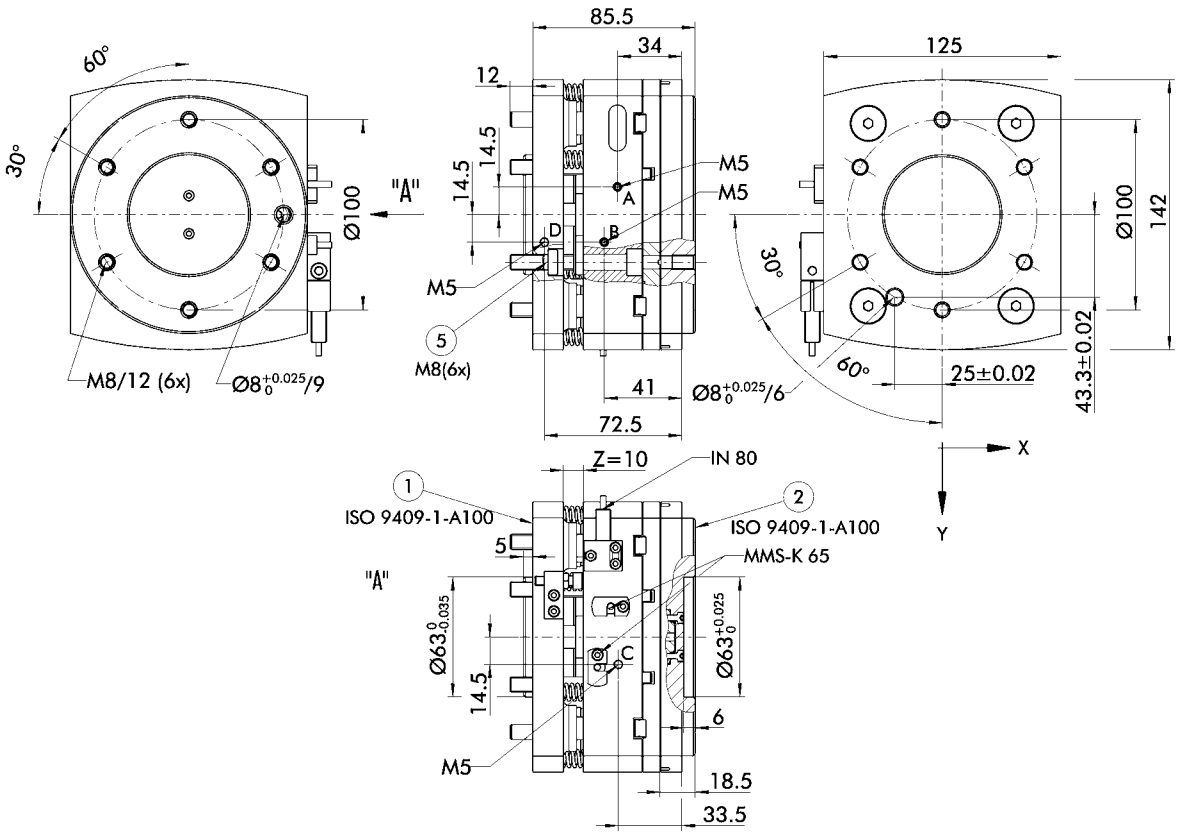


M_x max. 30 Nm
M_y max. 30 Nm
F_z max. 110 N

Technical data

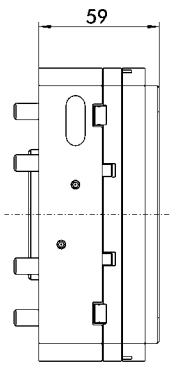
Designation		AGE-S-100-XYZ-0	AGE-S-100-XYZ-P	AGE-S-100-XY-0	AGE-S-100-XY-P	AGE-S-100-Z
	ID	0324502	0324504	0324500	0324503	0324501
X/Y stroke	[mm]	± 4	± 4	± 4	± 4	-
Z stroke	[mm]	10	10	-	-	10
Locking force at 6 bar	[N]	800	800	800	800	-
Max. payload	[kg]	5.5	5.5	5.5	5.5	5.5
Position storage force	[N]	-	1100	-	1100	-
Piston force Z	[N]	800	800	-	-	800
Spring force Z	[N]	240 - 300	240 - 300	-	-	240 - 300
Weight	[kg]	3.6	3.6	2.6	2.6	3.2

Main views

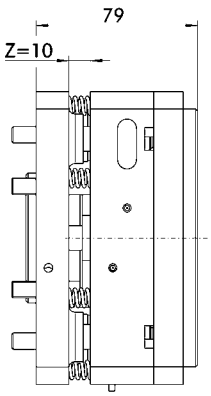


A Unlocked air connection
B Locked air connection
C Air connection position storage XY
D Locked air connection Z
① Robot-side connection
② Tool-side connection
⑤ Through-bore for screw connection with screw (enclosed)

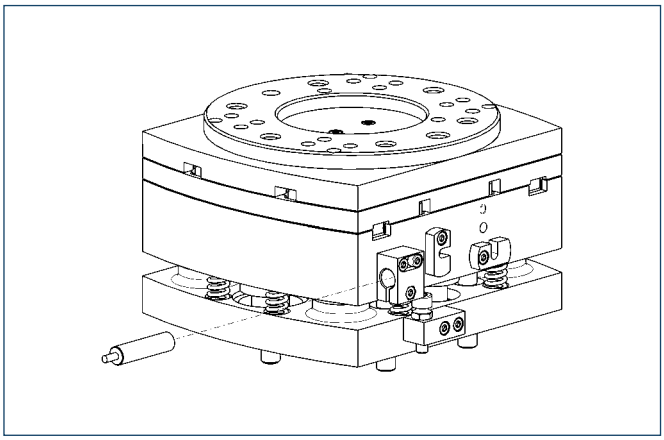
Change in dimension AGE-S-100-XY



Change in dimension AGE-S-100-Z

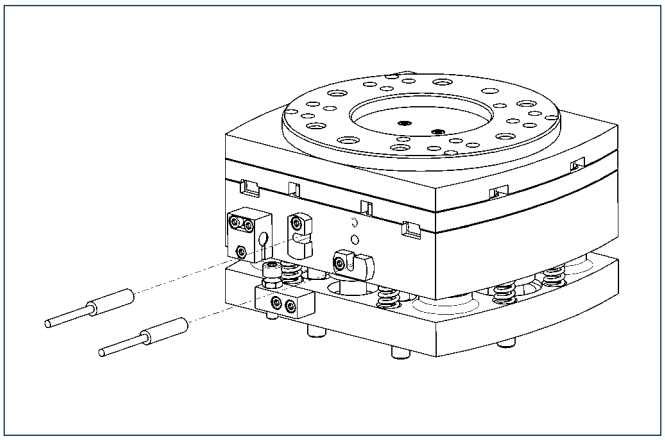


Sensor system



Z stroke monitoring:
Inductive proximity switches, for direct mounting

Designation	ID	Recommended product
IN 80/S-M12	0301578	
IN 80/S-M8	0301478	•
IN-B 80/S-M8	0301477	
INK 80/S	0301550	



Centric locking monitoring:
Electronic magnetic switch

Designation	ID
MMS-K 65/S-PNP	0301423
MMS-K 65/S NPN	0301424

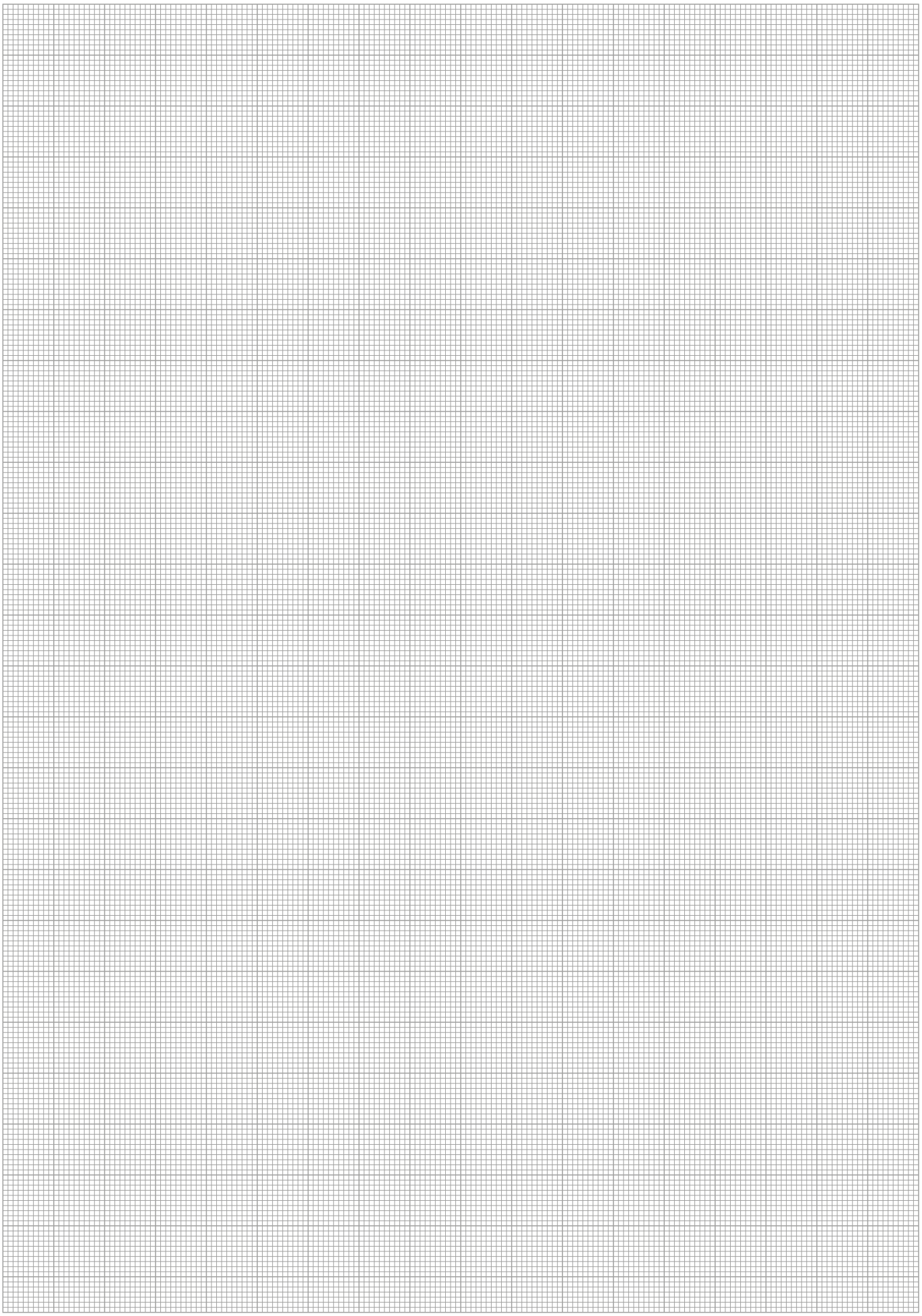
ⓘ Two sensors (closers/S) are required for each compensation unit, plus extension cables as an option.

Extension cables for proximity switches/magnetic switches

Designation	ID
GK 3-M8	0301622
GK 3-M5-PNP/NPN	0301652
KV 10-M12	0301596
KV 10-M8	0301496
KV 20-M12	0301597
KV 20-M8	0301497
KV 3-M12	0301595
KV 3-M8	0301495
W 3-M12	0301503
W 5-M12	0301507
W 3-M5-PNP/NPN	0301650
WK 3-M8	0301594
WK 3-M8 NPN	0301602
WK 5-M8	0301502
WK 5-M8 NPN	9641116

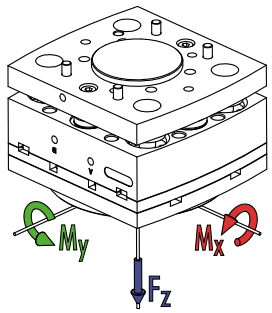
ⓘ Please note the minimum permitted bending radii for the sensor cables, which are generally 35 mm.

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the “Accessories” catalog section.



AGE-S-125

Forces and moments

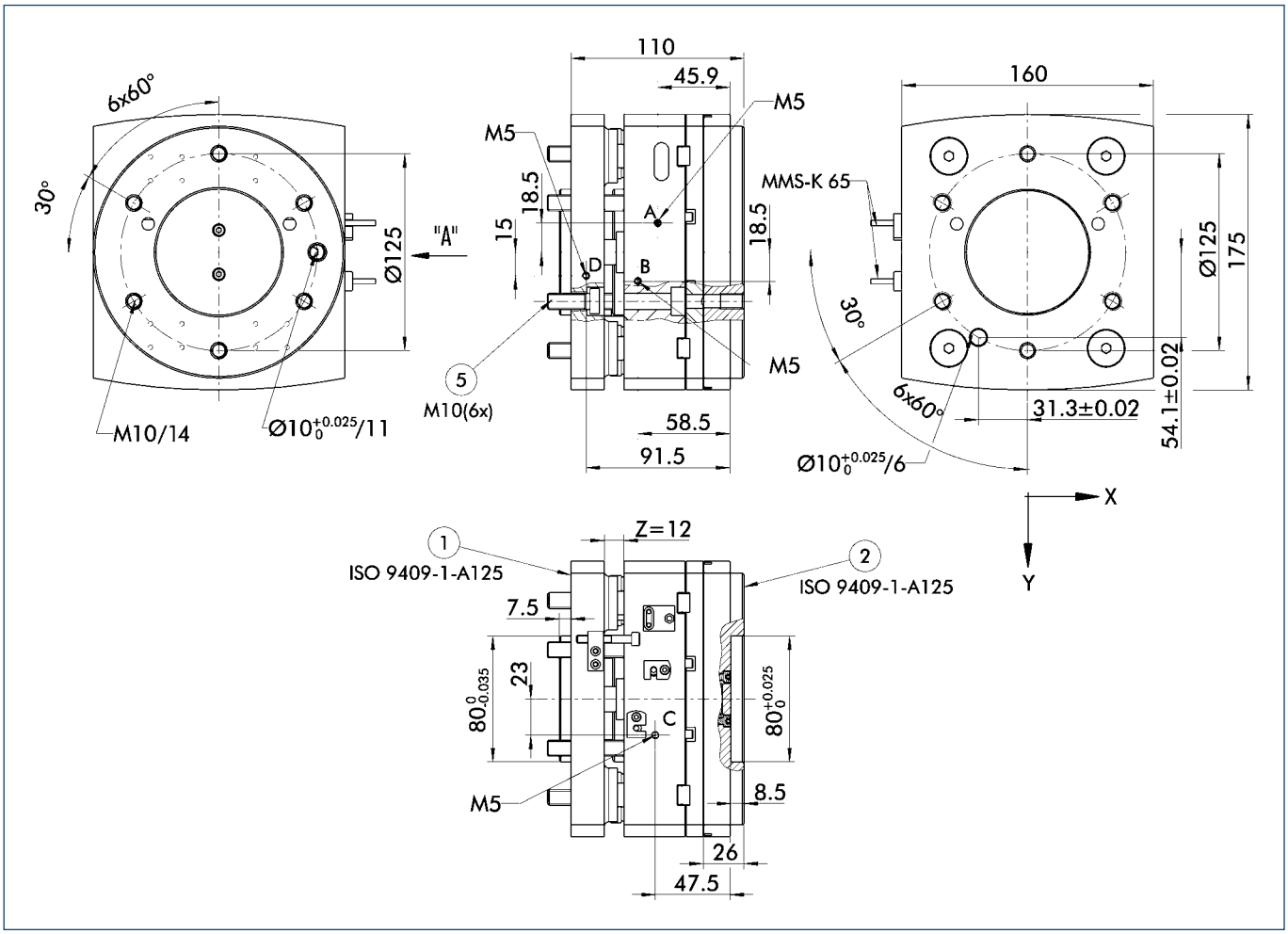


- M_x max. 55 Nm
- M_y max. 55 Nm
- F_z max. 220 N

Technical data

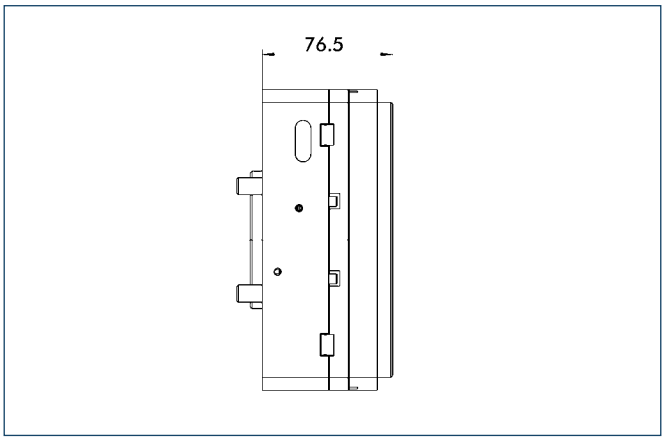
Designation		AGE-S-125-XYZ-0	AGE-S-125-XYZ-P	AGE-S-125-XY-0	AGE-S-125-XY-P	AGE-S-125-Z
	ID	0324527	0324529	0324525	0324528	0324526
X/Y stroke	[mm]	± 7	± 7	± 7	± 7	-
Z stroke	[mm]	12	12	-	-	12
Locking force at 6 bar	[N]	1100	1100	1100	1100	-
Max. payload	[kg]	11	11	11	11	11
Position storage force	[N]	-	1700	-	1700	-
Piston force Z	[N]	1200	1200	-	-	1200
Spring force Z	[N]	360 - 490	360 - 490	-	-	360 - 490
Weight	[kg]	7.4	7.4	5.3	5.3	6.0

Main views

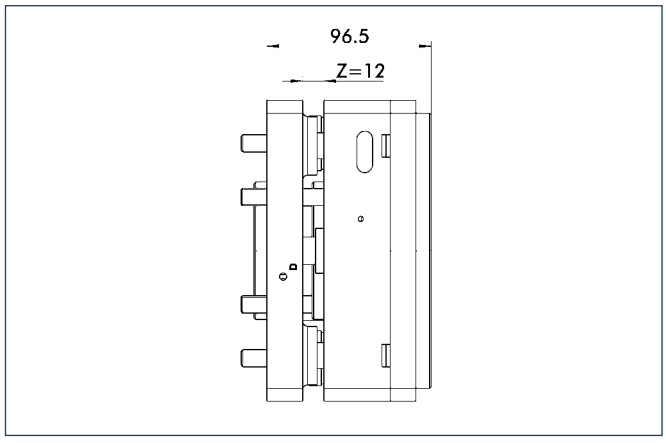


A Unlocked air connection
B Locked air connection
C Air connection position storage XY
D Locked air connection Z
① Robot-side connection
② Tool-side connection
⑤ Through-bore for screw connection with screw (enclosed)

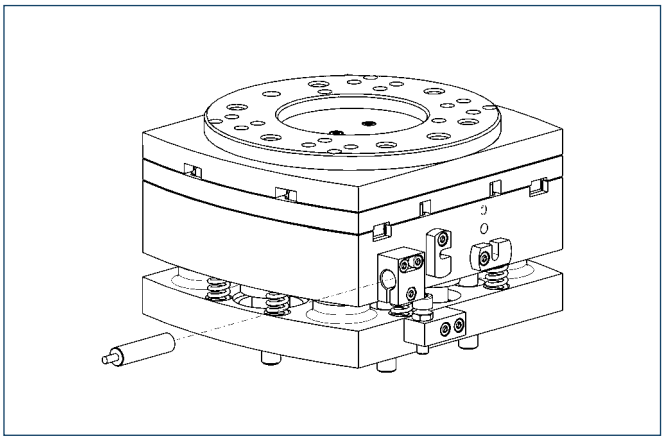
Change in dimension AGE-S-125-XY



Change in dimension AGE-S-125-Z

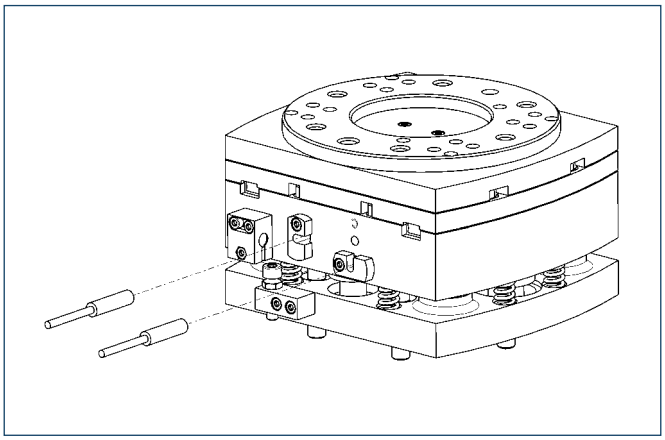


Sensor system



Z stroke monitoring:
Inductive proximity switches, for direct mounting

Designation	ID	Recommended product
IN 80/S-M12	0301578	
IN 80/S-M8	0301478	•
IN-B 80/S-M8	0301477	
INK 80/S	0301550	



Centric locking monitoring:
Electronic magnetic switch

Designation	ID
MMS-K 65/S-PNP	0301423
MMS-K 65/S NPN	0301424

ⓘ Two sensors (closers/S) are required for each compensation unit, plus extension cables as an option.

Extension cables for proximity switches/magnetic switches

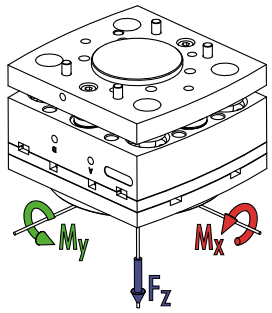
Designation	ID
GK 3-M8	0301622
GK 3-M5-PNP/NPN	0301652
KV 10-M12	0301596
KV 10-M8	0301496
KV 20-M12	0301597
KV 20-M8	0301497
KV 3-M12	0301595
KV 3-M8	0301495
W 3-M12	0301503
W 5-M12	0301507
W 3-M5-PNP/NPN	0301650
WK 3-M8	0301594
WK 3-M8 NPN	0301602
WK 5-M8	0301502
WK 5-M8 NPN	9641116

ⓘ Please note the minimum permitted bending radii for the sensor cables, which are generally 35 mm.

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the “Accessories” catalog section.

AGE-S-160

Forces and moments

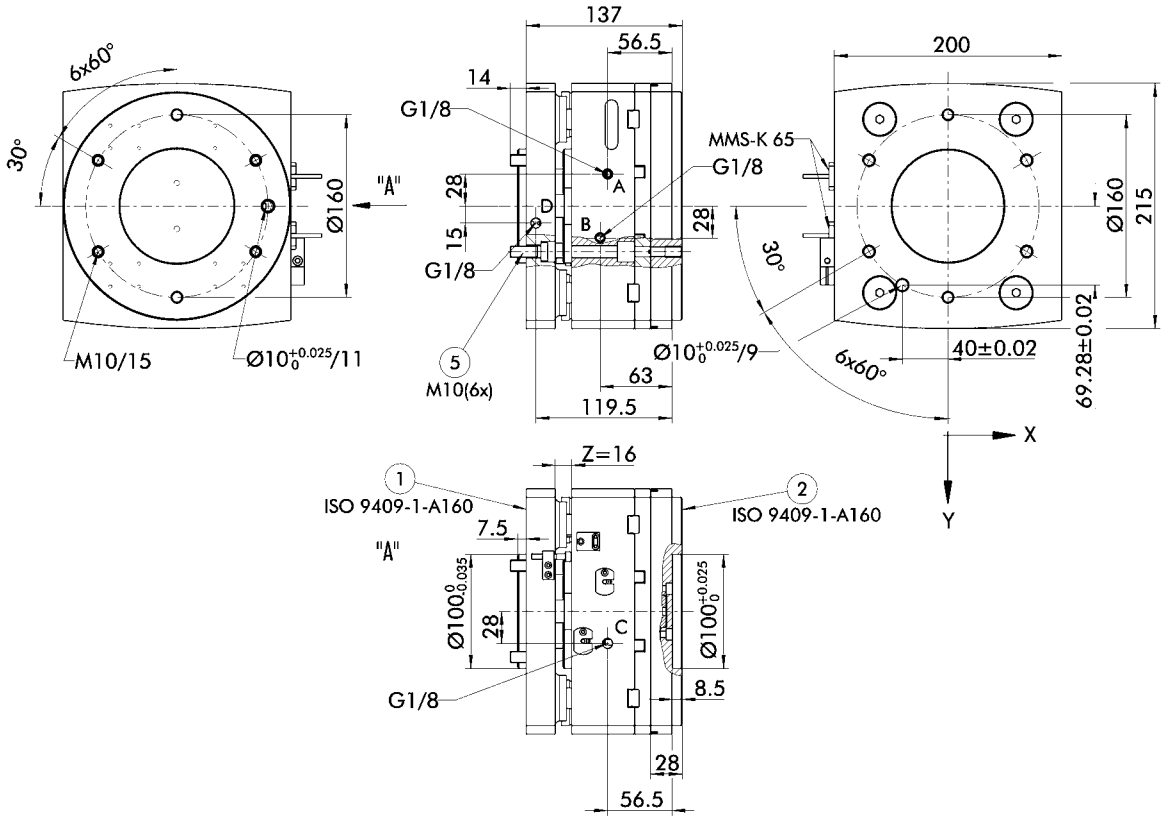


M_x	max. 200 Nm
M_y	max. 200 Nm
F_z	max. 800 N

Technical data

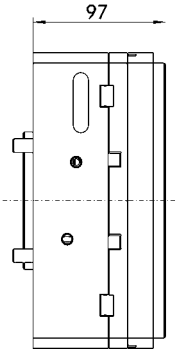
Designation		AGE-S-160-XYZ-0	AGE-S-160-XYZ-P	AGE-S-160-XY-0	AGE-S-160-XY-P	AGE-S-160-Z
	ID	0324562	0324564	0324560	0324563	0324561
X/Y stroke	[mm]	± 10	± 10	± 10	± 10	-
Z stroke	[mm]	14	14	-	-	14
Locking force at 6 bar	[N]	1800	1800	1800	1800	-
Max. payload	[kg]	40	40	40	40	40
Position storage force	[N]	-	2900	-	2900	-
Piston force Z	[N]	1900	1900	-	1900	1900
Spring force Z	[N]	640 - 1000	640 - 1000	-	-	640 - 1000
Weight	[kg]	14.5	14.5	10.5	10.5	11.8

Main views

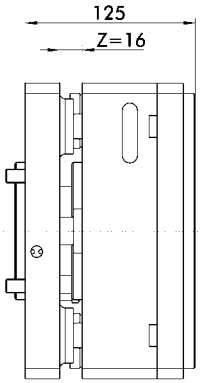


A Unlocked air connection
B Locked air connection
C Air connection position storage XY
D Locked air connection Z
① Robot-side connection
② Tool-side connection
⑤ Through-bore for screw connection with screw (enclosed)

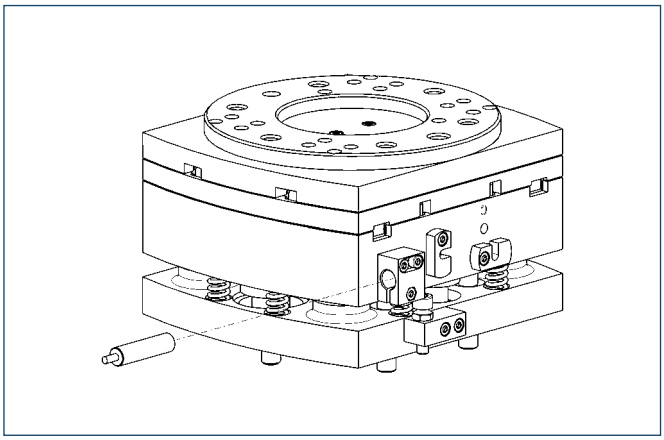
Change in dimension AGE-S-160-XY

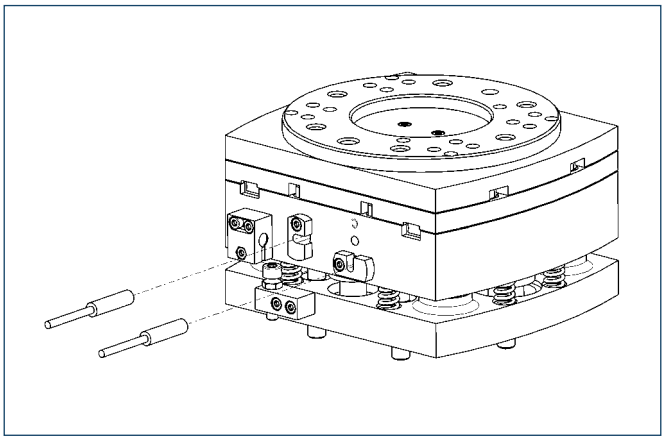


Change in dimension AGE-S-160-Z



Sensor system





Z stroke monitoring:
Inductive proximity switches, for direct mounting

Designation	ID	Recommended product
IN 80/S-M12	0301578	
IN 80/S-M8	0301478	•
IN-B 80/S-M8	0301477	
INK 80/S	0301550	

Centric locking monitoring:
Electronic magnetic switch

Designation	ID
MMS-K 65/S-PNP	0301423
MMS-K 65/S NPN	0301424

ⓘ Two sensors (closers/S) are required for each compensation unit, plus extension cables as an option.

Extension cables for proximity switches/magnetic switches

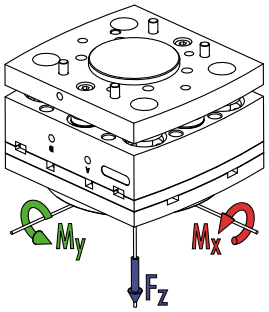
Designation	ID
GK 3-M8	0301622
GK 3-M5-PNP/NPN	0301652
KV 10-M12	0301596
KV 10-M8	0301496
KV 20-M12	0301597
KV 20-M8	0301497
KV 3-M12	0301595
KV 3-M8	0301495
W 3-M12	0301503
W 5-M12	0301507
W 3-M5-PNP/NPN	0301650
WK 3-M8	0301594
WK 3-M8 NPN	0301602
WK 5-M8	0301502
WK 5-M8 NPN	9641116

ⓘ Please note the minimum permitted bending radii for the sensor cables, which are generally 35 mm.

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the “Accessories” catalog section.

AGE-S-200

Forces and moments

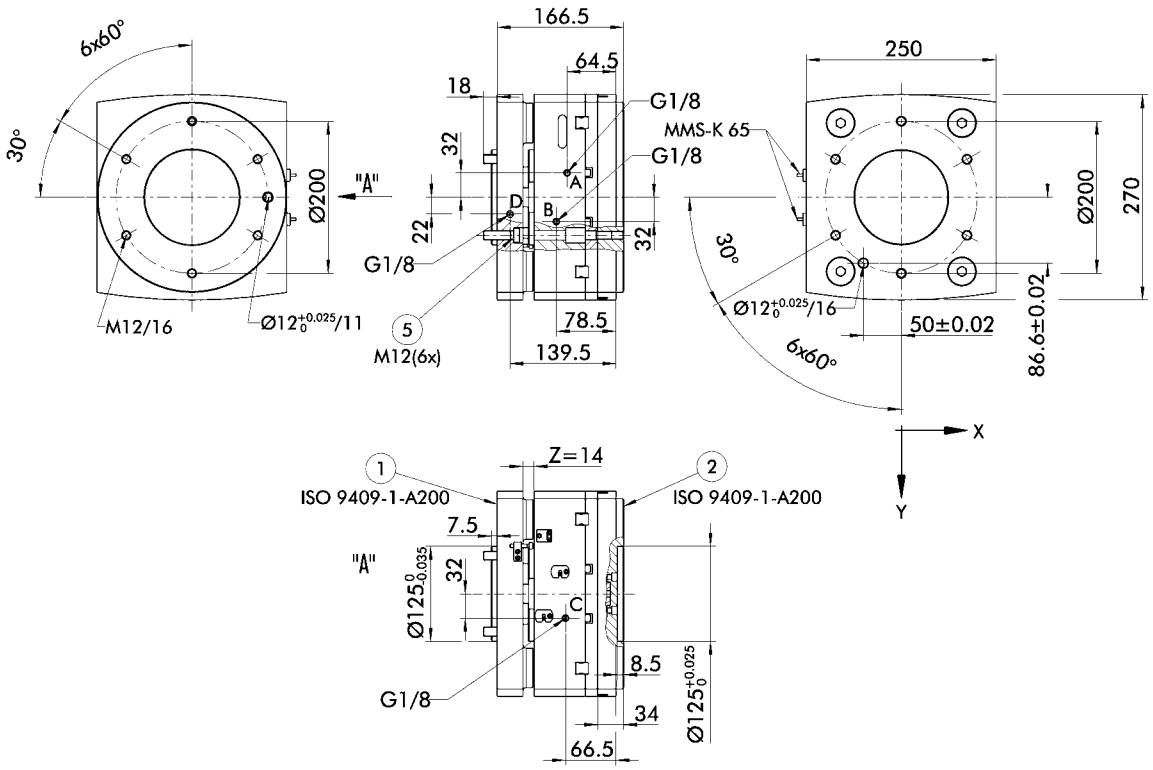


M_x	max. 500 Nm
M_y	max. 500 Nm
F_z	max. 2000 N

Technical data

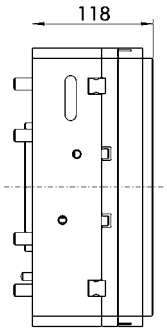
Designation		AGE-S-200-XYZ-0	AGE-S-200-XYZ-P	AGE-S-200-XY-0	AGE-S-200-XY-P	AGE-S-200-Z
	ID	0324602	0324604	0324600	0324603	0324601
X/Y stroke	[mm]	± 12	± 12	± 12	± 12	-
Z stroke	[mm]	14	14	-	-	14
Locking force at 6 bar	[N]	2700	2700	2700	2700	-
Max. payload	[kg]	100	100	100	100	100
Position storage force	[N]	-	4500	-	4500	-
Piston force Z	[N]	3000	3000	-	-	3000
Spring force Z	[N]	1100 - 1500	1100 - 1500	-	-	1100 - 1500
Weight	[kg]	29.5	29.5	21.0	21.0	23.5

Main views

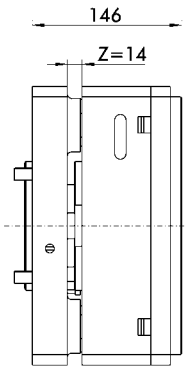


A Unlocked air connection
B Locked air connection
C Air connection position storage XY
D Locked air connection Z
① Robot-side connection
② Tool-side connection
⑤ Through-bore for screw connection with screw (enclosed)

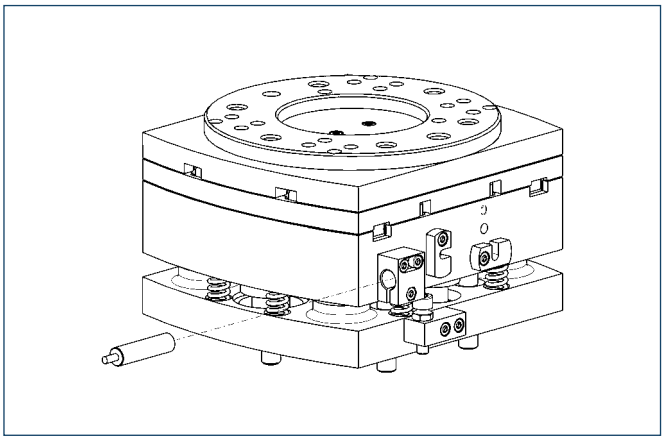
Change in dimension AGE-S-200-XY



Change in dimension AGE-S-200-Z

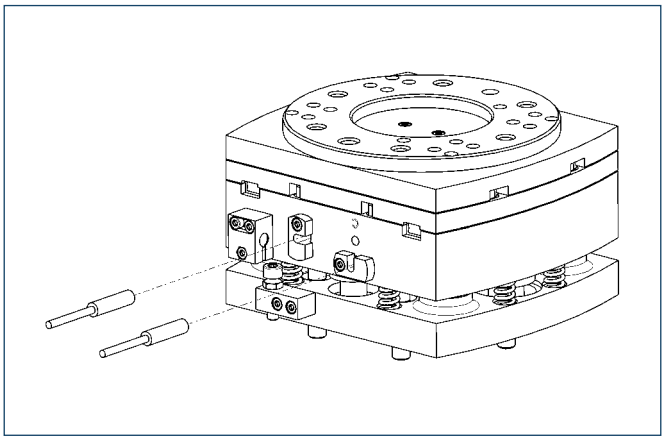


Sensor system



Z stroke monitoring:
Inductive proximity switches, for direct mounting

Designation	ID	Recommended product
IN 80/S-M12	0301578	
IN 80/S-M8	0301478	•
IN-B 80/S-M8	0301477	
INK 80/S	0301550	



Centric locking monitoring:
Electronic magnetic switch

Designation	ID
MMS-K 65/S-PNP	0301423
MMS-K 65/S NPN	0301424

ⓘ Two sensors (closers/S) are required for each compensation unit, plus extension cables as an option.

Extension cables for proximity switches/magnetic switches

Designation	ID
GK 3-M8	0301622
GK 3-M5-PNP/NPN	0301652
KV 10-M12	0301596
KV 10-M8	0301496
KV 20-M12	0301597
KV 20-M8	0301497
KV 3-M12	0301595
KV 3-M8	0301495
W 3-M12	0301503
W 5-M12	0301507
W 3-M5-PNP/NPN	0301650
WK 3-M8	0301594
WK 3-M8 NPN	0301602
WK 5-M8	0301502
WK 5-M8 NPN	9641116

ⓘ Please note the minimum permitted bending radii for the sensor cables, which are generally 35 mm.

You can find more detailed information on, and individual parts for, the above-mentioned accessories in the “Accessories” catalog section.

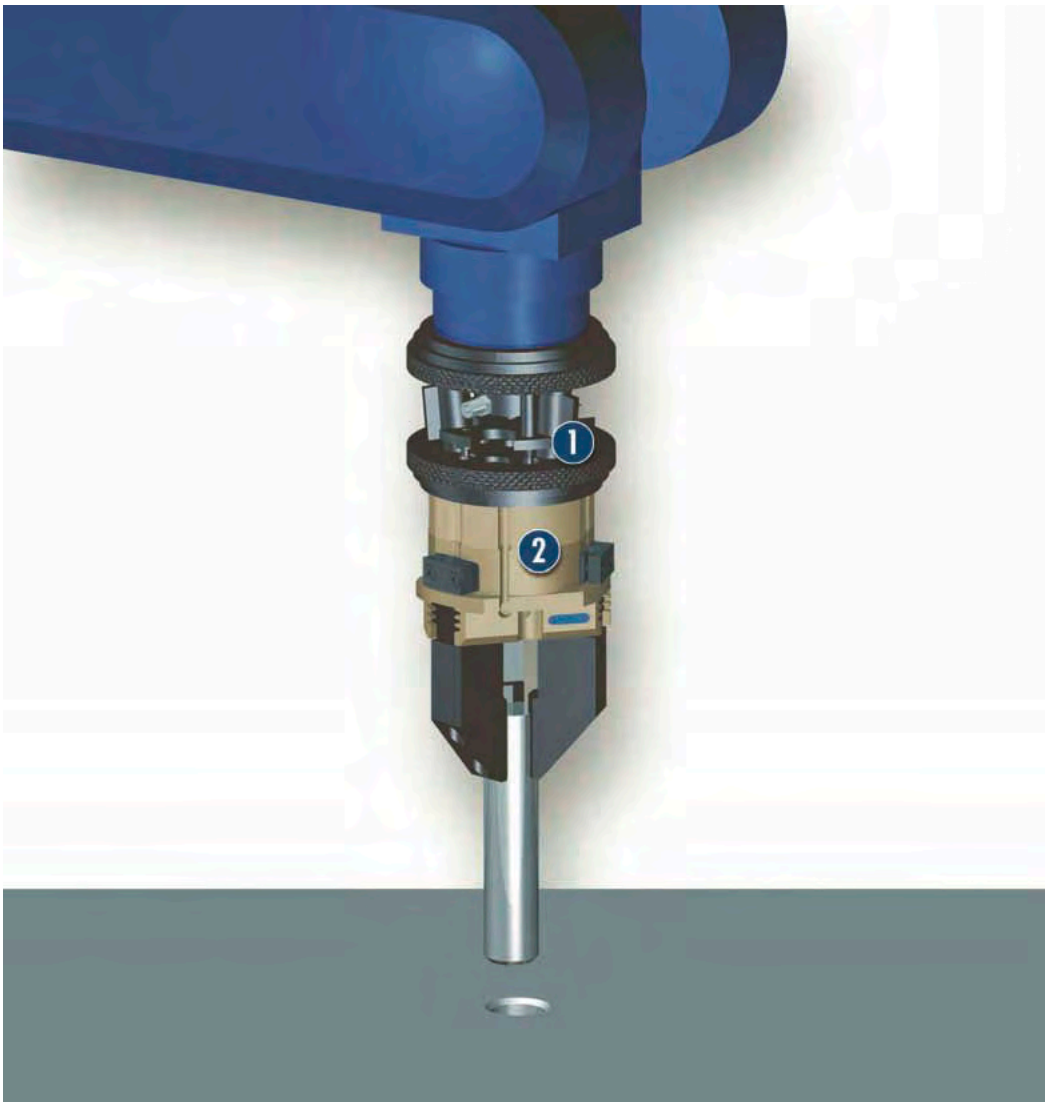
Sizes
01-30 .. 400

Payload
up to 20 kg

Compensation path XY
± 2.2 mm

Compensation bend
1°

Application example



Inserting a bolt into a bore

1 FUS-113B Insertion Unit

2 PZN-plus 80 2-Finger Centric Gripper

Insertion Unit

Symmetrical insertion unit with centric locking and monitoring

Area of application

Assembly tasks with very little play for the parts to be aligned

Your advantages and benefits

Pneumatic, centric locking
resets the unit to a defined zero position and protects the elastomers

Elastomers with layered structure
soft and flexible on insertion and rigid when compressed

Compensates for misalignment
and therefore reduces the risk of jamming

General information on the series

Material
Aluminum, elastomer materials

Maintenance
Maintenance-free

Position during insertion
Vertical

Scope of delivery
Operating manual, maintenance instructions, manufacturer's declaration

Actuation
Pneumatic, dry or lubricated filtered compressed air (10 µm)

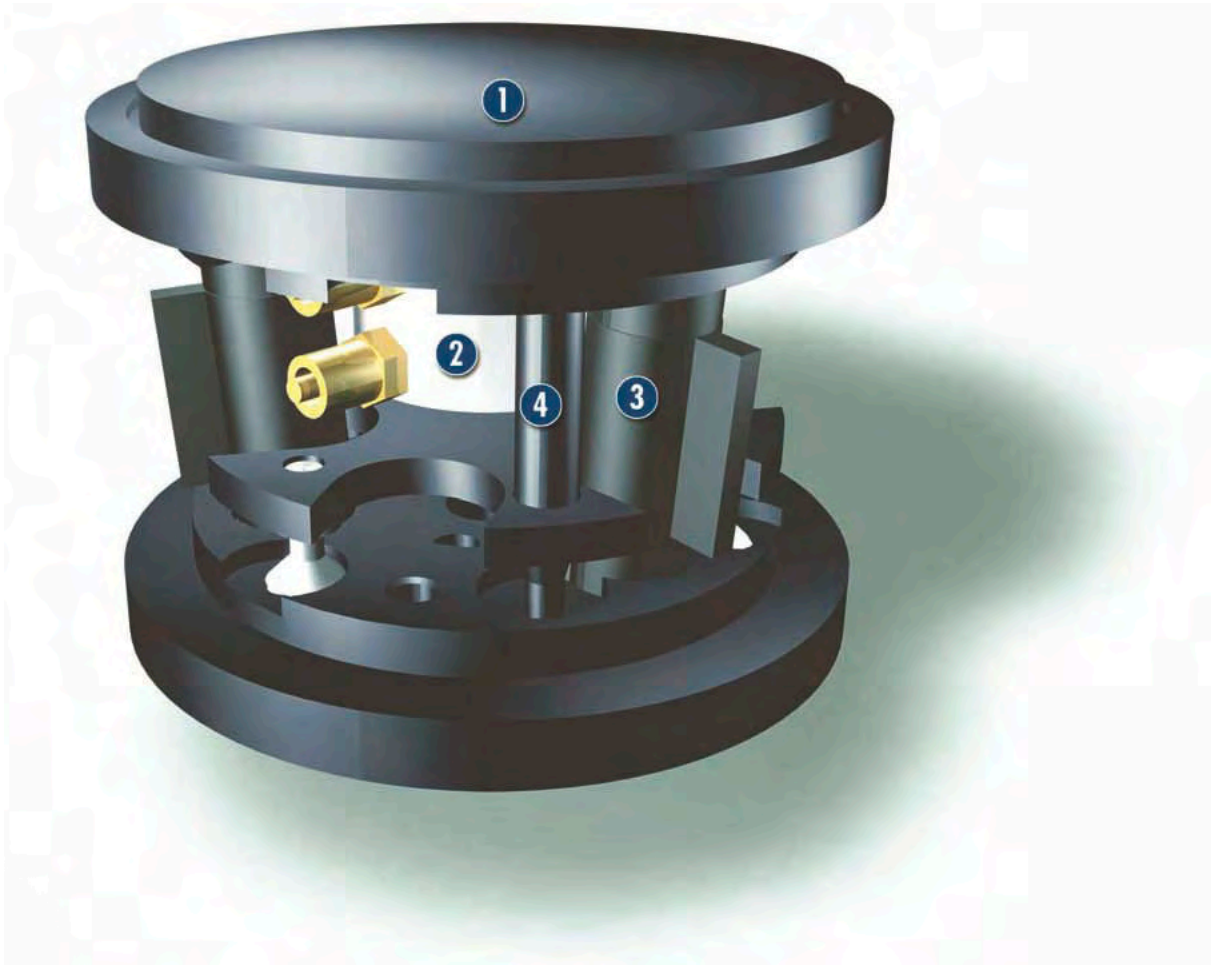
Operating pressure
From 5 bar to 6 bar

Connections
Two plug connections for hose with 4.0 mm diameter

Force maintained in the event of a drop in pressure
Possible via SDV-P pressure maintenance valve

Warranty
24 months

Sectional diagram



1 Adapter Flange
individual screw connection diagrams can be easily integrated

2 Pneumatic Locking
for a secure connection from the machine and tool sides

3 Elastomers
facilitate the compensation movement

4 Overload Bolt
to protect the elastomers

Accessories

Accessories from SCHUNK – the suitable supplement for maximum functionality, reliability and performance of all automation modules.

IN inductive proximity switches

Fittings

ⓘ For the exact size of the accessories, the availability for this size and the designation and ID, please refer to the additional views at the end of the size in question. You can find more detailed information on our accessory range in the "Accessories" catalog section.

General information on the series

Material properties of the shearing cushion

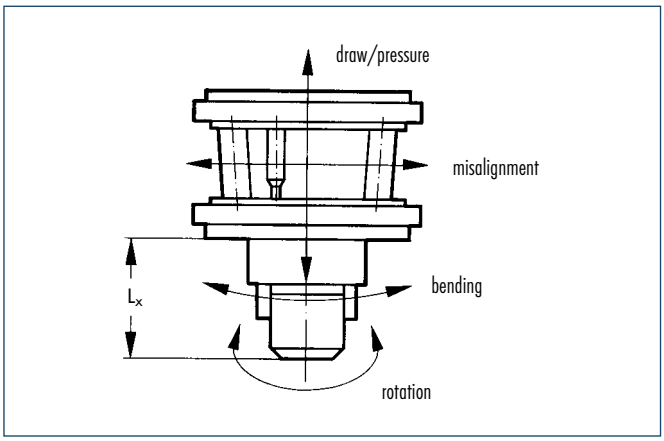
	001-30	001 A	111 B	112 B	113 B	211 A	211 B	211 C	212 A	212 B	212 C	213 A	213 B	213 C	413 C	413 D
ID	320280	320518	320519	320522	320525	320527	320528	320529	320530	320531	320532	320533	320534	320535	320336	320337
ID															320338	320339
Material	CR	CR	CR	CR	NBR	CR	CR	CR	CR	CR	CR	NBR	NBR	NBR	NBR	NBR
Operating temperature	5-60	5-60	5-60	5-60	5-60	5-60	5-60	5-60	5-60	5-60	5-60	5-60	5-60	5-60	5-60	5-60
Oil resistance	0	0	0	0	++	0	0	0	0	0	0	++	++	++	++	++
Resistance to coolant	0	0	0	0	++	0	0	0	0	0	0	++	++	++	++	++
Resistance to ozone	+	+	+	+	-	+	+	+	+	+	+	-	-	-	-	-

++ = very good + = well-suited 0 = suitable to a limited extent

Checklist for selection of FUS insertion unit to fax no. +49-7133-103-2189

Customer: _____

Order number: _____
Department: _____
Contact: _____
Date: _____
Telephone: _____
Fax: _____



1. Distance of the center of compliance to the FUS in mm: _____

2. Max. offset of the parts to be aligned
   Displacement: _____ mm
   Tilting: _____ °
   Rotation: _____ °

3. Size of the insert chamfer (chamfer is mandatory)
   Bolt: _____
   Bore: _____

4. Insertion diameter with tolerance
   Bolt: _____ mm
   Bore: _____ mm

5. Materials of the parts to be aligned
   Bolt: _____
   Bore: _____

6. Insertion direction ☐ vertical ☐ horizontal _____

7. FUS load (tool and workpiece): _____ kg

8. Insertion speed and acceleration: _____

9. Maximum insertion force available: _____ N

10. Environment conditions (coolant, temperature, lubrication of the parts to be aligned, etc.)

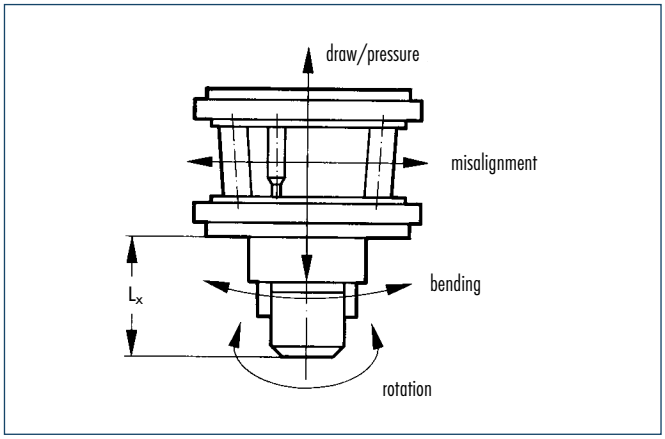
    _____

    _____

11. Pneumatic locking ☐ Yes ☐ No

Mode of operation of the FUS

The coaxial insertion unit function is based on a set of three to six shearing cushions made from an elastomer material which project an assumed rotation point outside of the system which is also intended to be the compensation point. The compensation center is the center of the rotation and translation movements within the space.
If the compensation center is positioned in the mating surface of the workpiece, the workpiece to be inserted can move and rotate around this center. This reduces the required assembly forces as well as the risk that the parts will jam. Compensation of this kind for positioning errors in transverse and angular direction reduces wear on robots and robotic equipment as well as the need for high-precision machines and devices. The insertion unit is to be aligned vertically. Horizontal use is possible if the load bearing capacity and accuracy are limited.



Advantages

- Compensated positioning error sideways, in the axle angle and angle of rotation
- Rigid in the direction of compression for insertion movements
- Flexible in the compensation direction
- Shearing cushions made from elastomer material facilitate intrinsic damping and self centering
- Mechanical overload bolts protect from overload in all directions
- Various different compensation center distances available for parts of differing size
- Various different elastomer materials for the shearing cushions available for a range of rigidities
- Maintenance-free

Pneumatic locking option

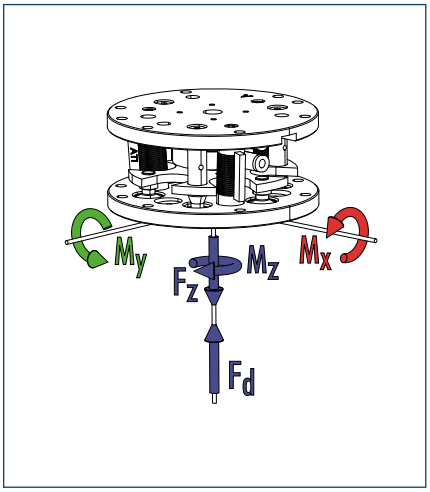
All FUS models are equipped with pneumatic locking.
Operating pressure: 5 bar - 6 bar
Pressure connection: Two plug connections for hose Ø 4.0 mm

Advantages

- Shorter cycle times as vibration is prevented
- Improved repeat accuracy
- Centering of tool and machine side
- Increased shearing cushion life span
- Flexibility can be deactivated
- Locking system does not require additional unit height

FUS-001-30

Moment load

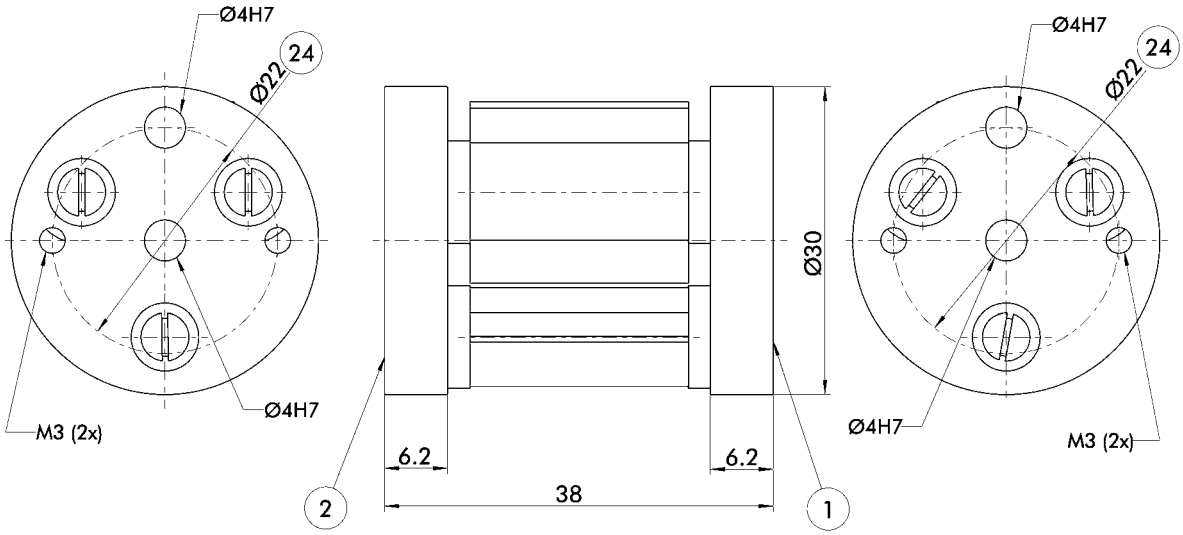


Traction	[N]	9
Pressure	[N]	160
Displacement	[N]	3
Bending	[Nm]	1.1
Rotation	[Nm]	0.1

Technical data

Designation		FUS-001-30
Without locking	**ID**	**0320280**
Tension/pressure	[mm]	0.4/0.4
Max. compensation - Displacement	[mm]	± 1.7
Max. compensation - Bending	[°]	1
Rotation	[°]	4.5
Repeat accuracy without locking	[mm]	± 0.05
Rigidity		
Tension/pressure	[N/mm]	385
Displacement	[N/mm]	7.5
Bending	[Nm/rad]	57
Rotation	[Nm/rad]	0.8
Weight without lock	[kg]	0.05

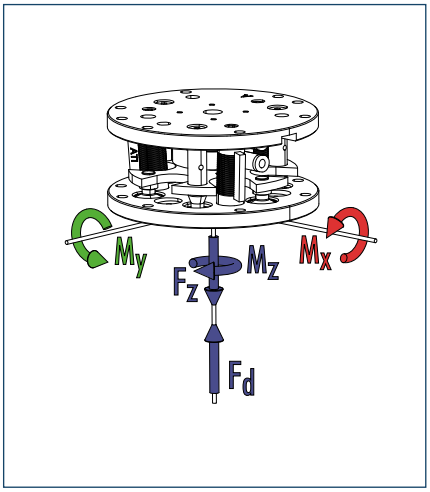
Main views



① Robot-side connection
② Tool-side connection
㉔ Bolt pitch circle

FUS-001

Moment load

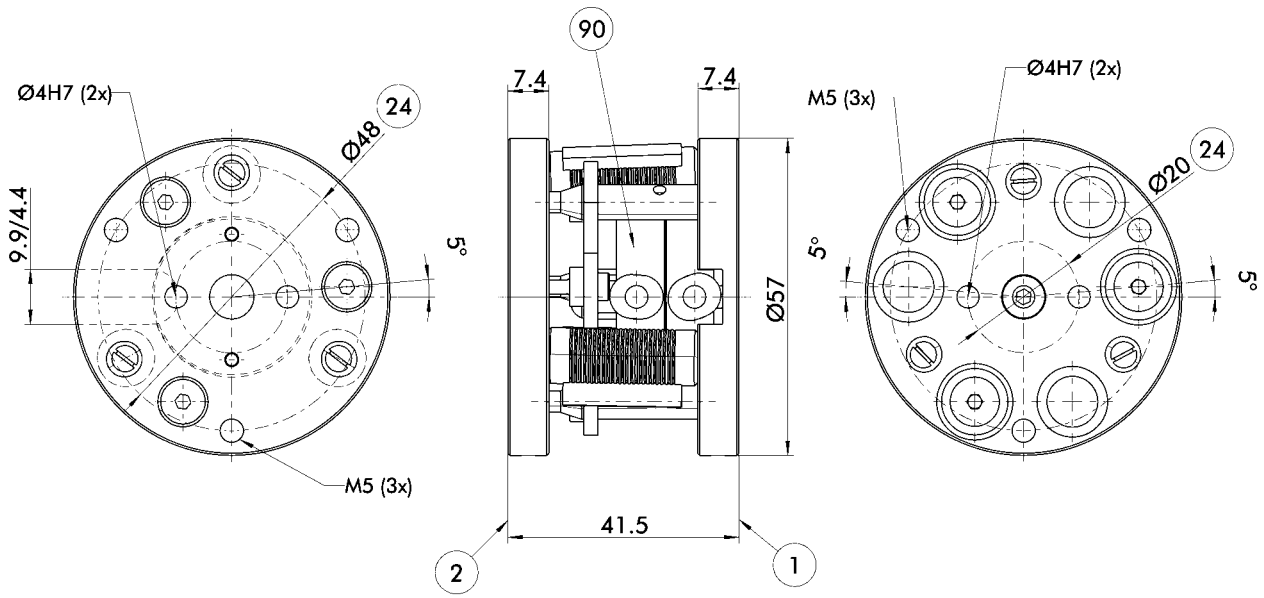


Traction	[N]	22
Pressure	[N]	355
Displacement	[N]	6.5
Bending	[Nm]	3.4

Technical data

Designation		FUS-001
With locking mechanism	**ID**	**0320518**
Max. compensation - Displacement	[mm]	± 1.7
Max. compensation - Bending	[°]	1
Rotation	[°]	4.5
Rigidity		
Displacement	[N/mm]	1.7
Bending	[Nm/rad]	180
Compensation center clearance L_0	[mm]	23
Weight with lock	[kg]	0.18

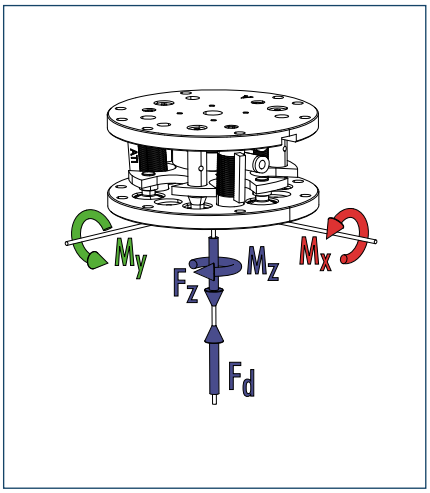
Main views dimensions



① Robot-side connection
② Tool-side connection
24 Bolt pitch circle
90 Pneumatic locking

FUS-100

Moment load

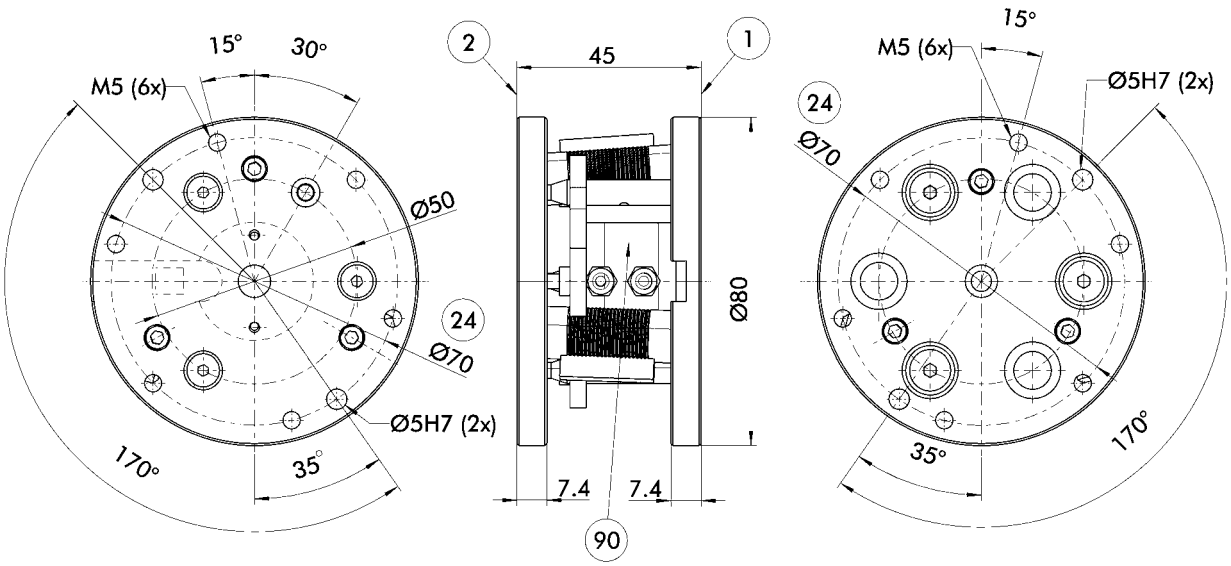


Designation		FUS-111B	FUS-112B	FUS-113B
Traction	[N]	45	45	82
Pressure	[N]	1290	540	1290
Displacement	[N]	9	9	27
Bending	[Nm]	5.2	5.2	8

Technical data

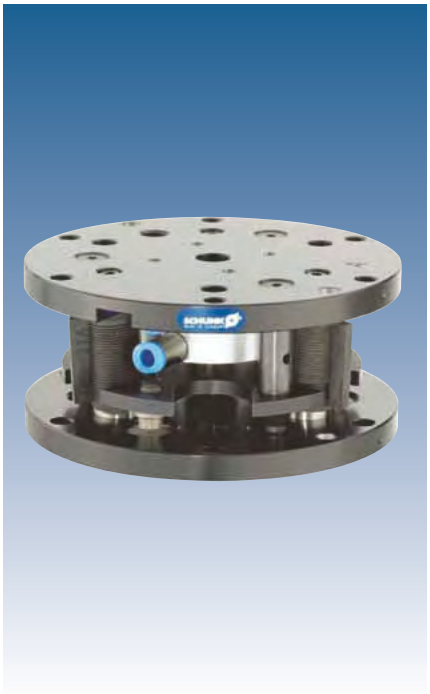
Designation		FUS-111 B	FUS-112 B	FUS-113 B
With locking mechanism	**ID**	**0320519**	**0320522**	**0320525**
Max. compensation - Displacement	[mm]	± 2.2	± 2.2	± 2.2
Max. compensation - Bending	[°]	1.1	1.1	1.1
Rotation	[°]	5	5	5
Rigidity				
Displacement	[N/mm]	11	7	27
Bending	[Nm/rad]	380	180	640
Compensation center clearance L_0	[mm]	118	64	57
Weight with lock	[kg]	0.31	0.31	0.31

Main views

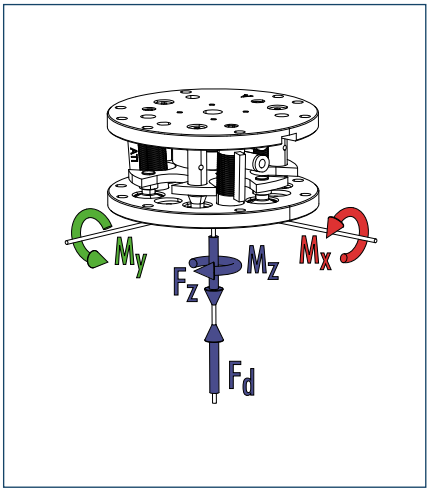


① Robot-side connection
② Tool-side connection
㉔ Bolt pitch circle
㉚ Pneumatic locking

FUS-200



Moment load



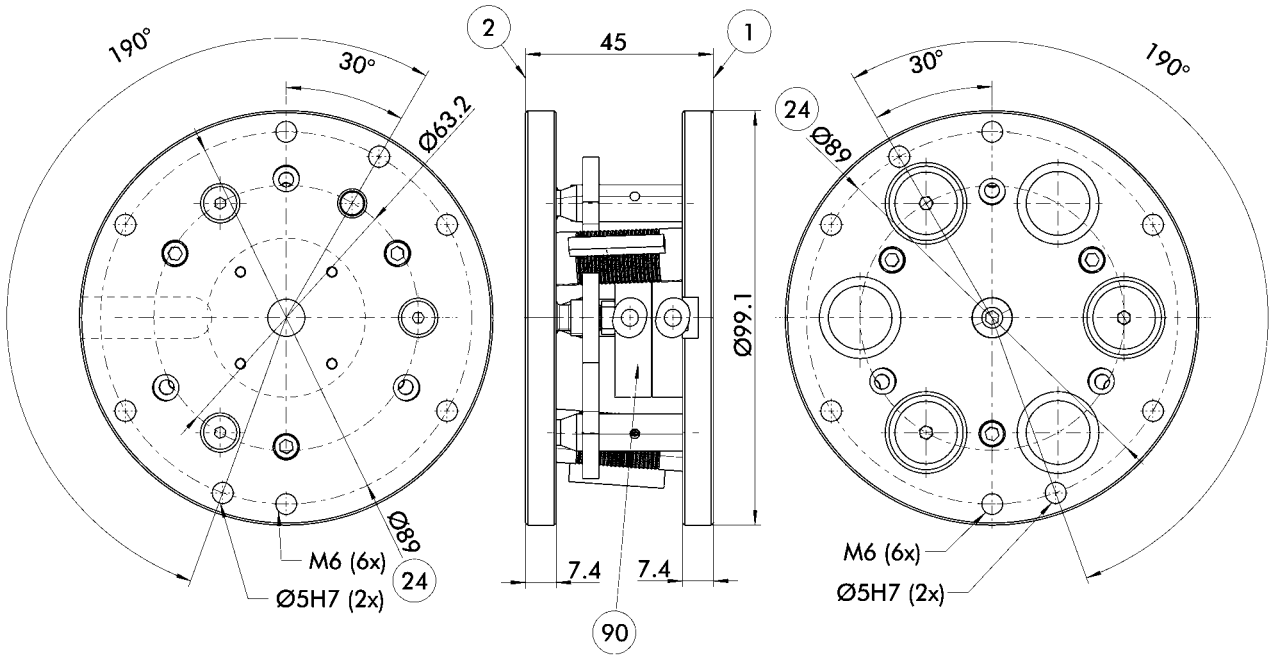
Designation		FUS-211A	FUS-211B	FUS-211C	FUS-212A	FUS-212B	FUS-212C	FUS-213A	FUS-213B	FUS-213C
Traction	[N]	53	53	106	62	62	124	98	98	196
Pressure	[N]	1360	1410	2770	640	730	1360	1360	1400	2770
Displacement	[N]	9	9	18	9	9	18	27	27	54
Bending	[Nm]	6.8	7.3	14.1	6.8	7.3	14.1	8.5	9	17.5

Technical data

Designation		FUS-211A	FUS-211B	FUS-211C	FUS-212A	FUS-212B	FUS-212C	FUS-213A	FUS-213B	FUS-213C
With locking mechanism	**ID**	**0320527**	**0320528**	**0320529**	**0320530**	**0320531**	**0320532**	**0320533**	**0320534**	**0320535**
Max. compensation - Displacement	[mm]	± 2.2	± 2.2	± 2.2	± 2.2	± 2.2	± 2.2	± 2.2	± 2.2	± 2.2
Max. compensation - Bending	[°]	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Rotation	[°]	4	4	4	4	4	4	4	4	4
Rigidity										
Displacement	[N/mm]	11	11	23	7	7	14	26	26	52
Bending	[Nm/rad]	474	552	1025	225	270	495	790	945	1735
Compensation center clearance L_0	[mm]	140	155	148	82	92	87	74	82	79
Weight with lock	[kg]	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

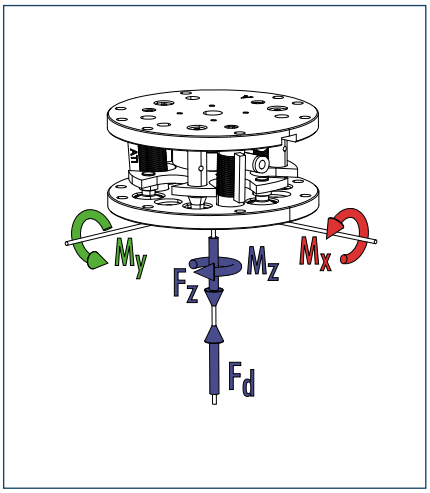
A = 3 elastomers on inner graduated circle B = 3 elastomers on outer graduated circle C = 6 elastomers

Main views



① Robot-side connection
② Tool-side connection
㉔ Bolt pitch circle
㊿ Pneumatic locking

Moment load

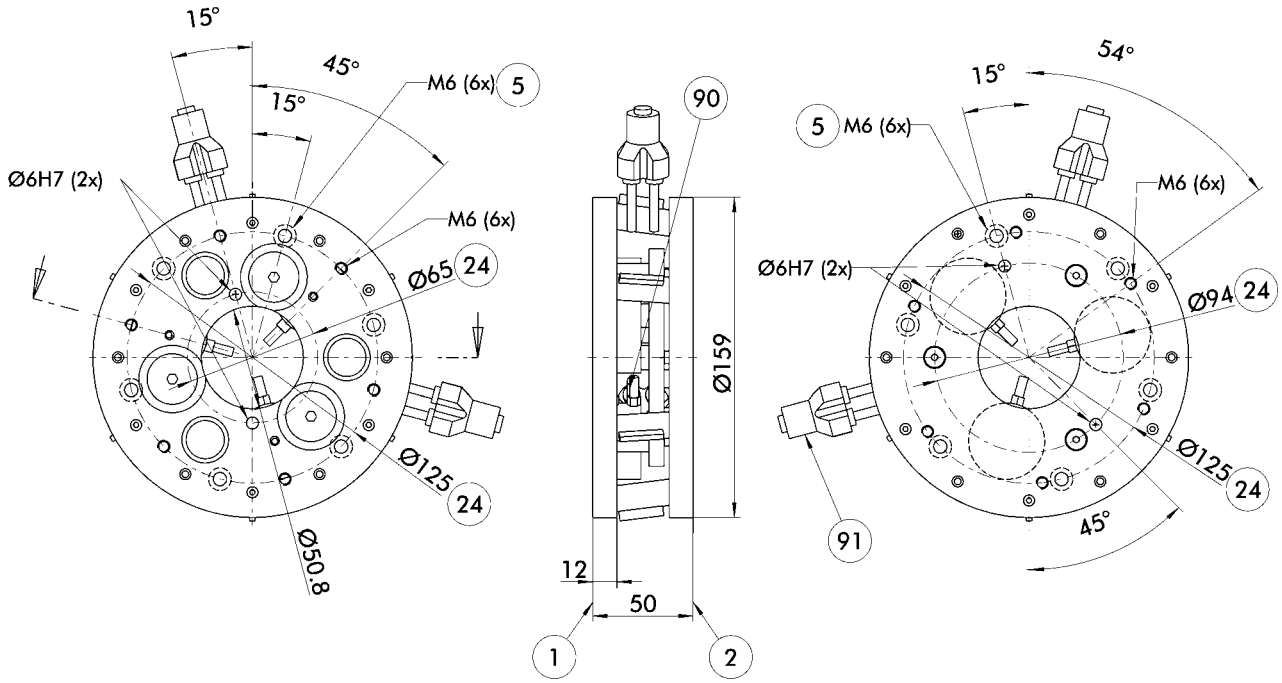


Designation		FUS-413 C	FUS-413 D
Traction	[N]	200	395
Pressure	[N]	2750	5490
Displacement	[N]	27	54
Bending	[Nm]	22.6	45.2
Rotation	[Nm]	33	66

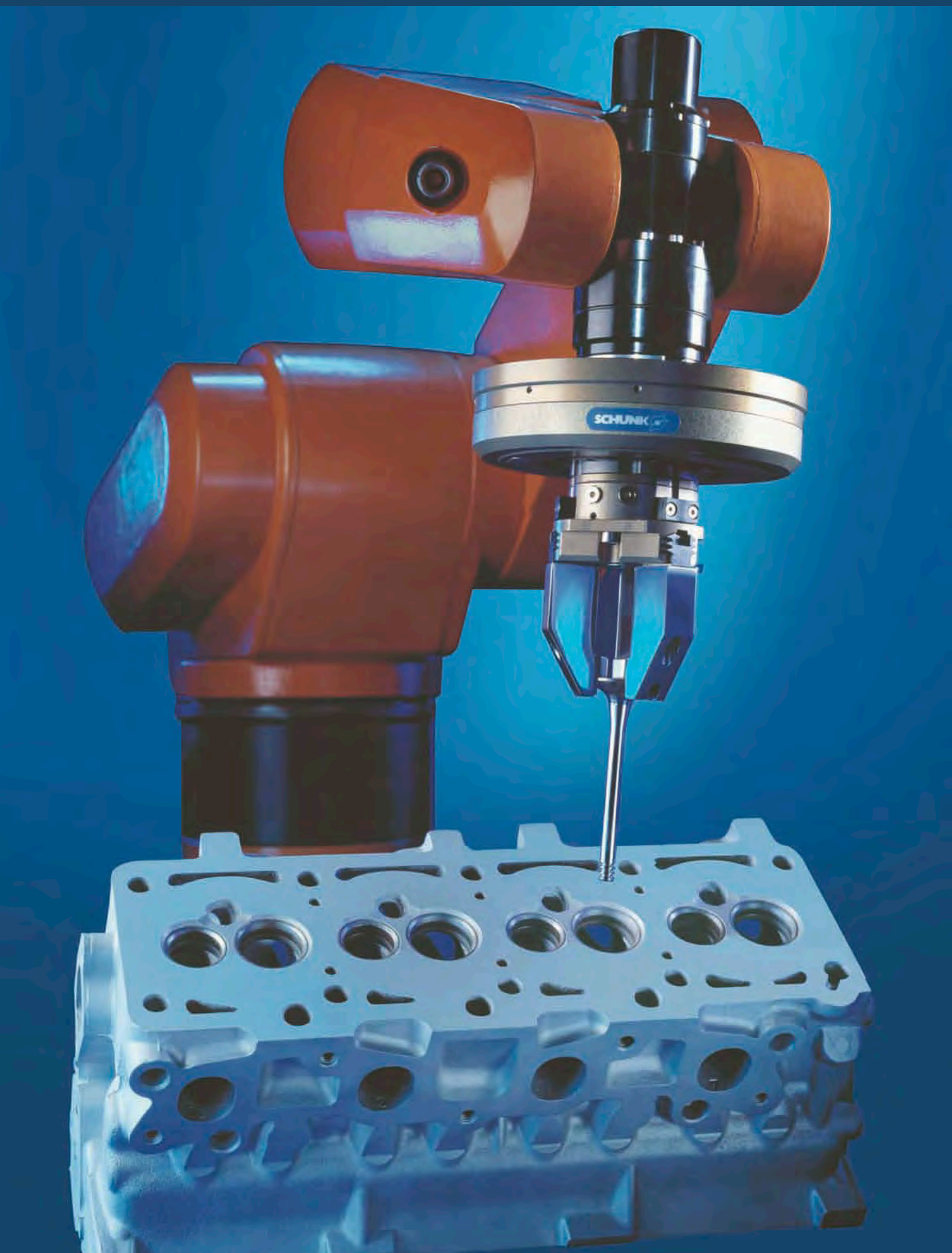
Technical data

Designation		FUS-413 C	FUS-413 D
With locking mechanism	**ID**	**0320338**	**0320339**
Tension/pressure	[mm]	1.1/1.3	1.1/1.3
Max. compensation - Displacement	[mm]	± 2.2	± 2.2
Max. compensation - Bending	[°]	1	1
Rotation	[°]	2.5	2.5
Repeat accuracy without locking	[mm]	± 0.05	± 0.05
Repeat accuracy with locking	[mm]	± 0.01	± 0.01
Rigidity			
Tension/pressure	[N/mm]	6300	12600
Displacement	[N/mm]	60	120
Bending	[N/rad]	9000	1800
Rotation	[N/rad]	330	660
Compensation center clearance L_0	[mm]	225	225
Weight without lock	[kg]	1.1	1.3
Weight with lock	[kg]	1.6	1.8

Main views dimensions with locking mechanism



① Robot-side connection
② Tool-side connection
⑤ Through-bore for screw connection with screw (enclosed)
㉔ Bolt pitch circle
㉚ "Lock" and "Unlock" connections
㉛ Plug connection for hose Ø 4 (2x) supplied as standard


SCHUNK

MEASURING

FTC

Measuring • Force Sensors • Flexible

Size
050

Range of measurement, force
± 300 N

Range of measurement, moments
± 15 Nm

Application example

Robot-supported insertion of a metal pin into a bore

1. FTC-050-80 Force-torque Sensor
2. PZN-plus 100
   3-Finger Centric Gripper with workpiece-specific gripper fingers

Force Sensor

Flexible force-torque sensor for compensating for the workpiece's or tool's component tolerances and positioning inaccuracy

Area of application

For insertion operations or for other assembly operations (pressing-in, adhesion or buffing tasks etc.). In the case of handling tasks in particular, the sensitive collision monitoring system helps to protect the tool as well as the workpiece.

Your advantages and benefits

Measuring the forces and moments [N and Nm]
in all six degrees of freedom

Deflection measurement [mm and degrees]
in all six degrees of freedom

Easy connection to a control system
for the lowest possible assembly and start-up costs

Flexibility up to 1.4 mm and 1.4°
for increased operational safety

Symmetrical measurement cell alignment
for efficient calculation of the tool center point displacement with optimum calculating time

Status display via LED
for checking the operating status directly at the sensor

Mechanical overload protection
to protect the sensor

General information on the series

Material
High-strength, hard-coated aluminum alloy

Scope of delivery
Sensor, software for PC connection, installation connector, operating manual, maintenance instructions, manufacturer's declaration

Accessories
Adapter cable, extension cable for CAN and RS-232 on request

Warranty
24 months

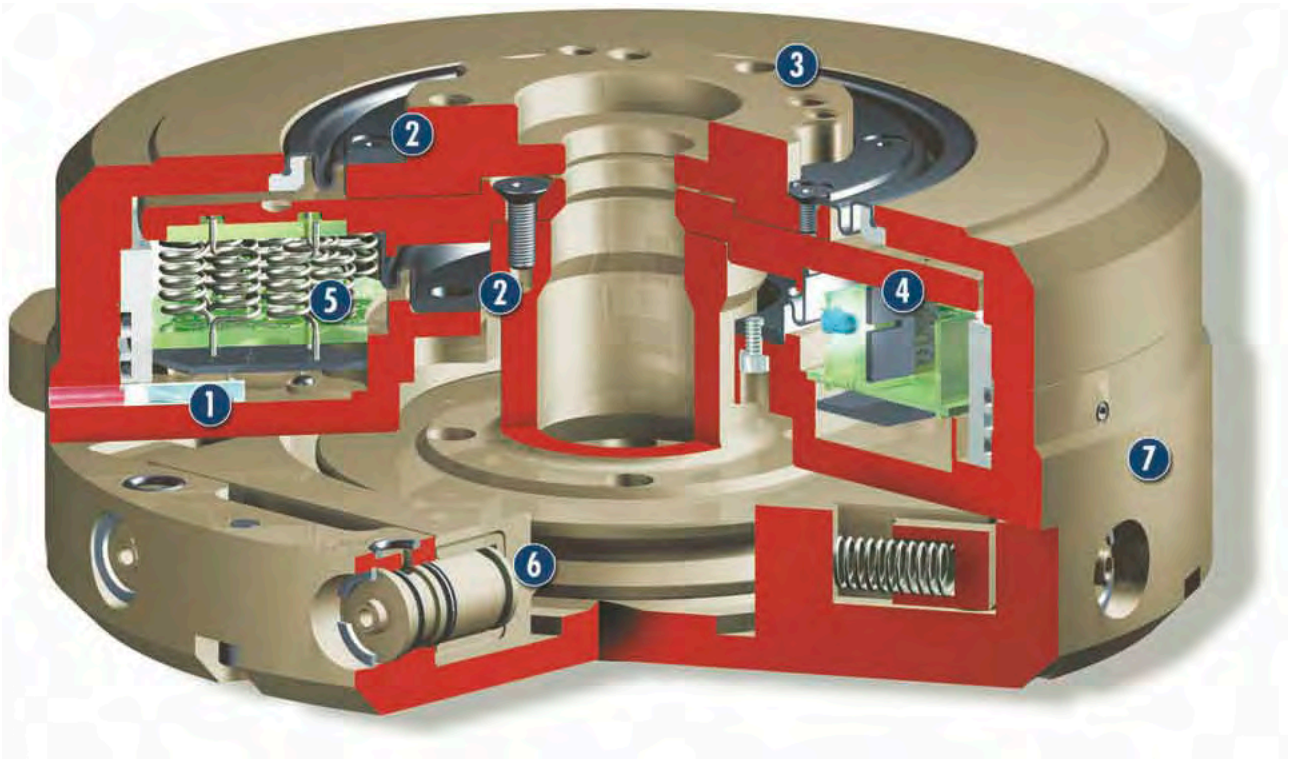
Data interface
CAN from 10 KBaud to 1 MBaud (DeviceNET on request)
RS-232 1200 Baud to 115200 Baud, RS-485 (on request)

Data update rates
Updating the measurement data: 1 ms
Shortest response time < 200 µs at 1 MBaud (CAN)

Software
Test software for monitoring all functionalities and for commissioning, based on Agilent Vee. Compatible with Win 9x, Win NT, Win 2000 and Win XP.

Power connection
8-pin circular connector, cable length 300 mm

Sectional diagram



1 **Optical Fibers**
for displaying the operating status

2 **Bellow Seal**
for protecting against coarse dirt

3 **Direct Mounting**
by means of standardized ISO 9409 interface for robots

4 **Optical Force/Torque Sensor System Controller**
to determine the loads applied

5 **Spring Elements**
to achieve a defined degree of rigidity

6 **Locking Mechanism**
centric locking with defined flexibility; pneumatic drive

7 **Housing**
weight-reduced through the use of a hard-anodized, high-strength aluminum alloy

Function description

The FTC force-torque sensor is a combination of mechanical flexibility and an opto-electronic position measuring system for all six degrees of freedom. The flexibility prevents an erratic increase in the measurement values in the event of contact and therefore facilitates force-controlled assembly operations with the least possible lag. By means of four, high-speed DSP measurement cells, the sensor measures the displacement of two plates positioned one above the other. Spring elements connect the plates, and forces and moments are calculated from the displacements using a rigidity matrix.

The symmetrical alignment of the measurement cells ensures that the stresses in all six degrees of freedom and the displacement of the tool center point can be calculated efficiently, with optimum calculating time. The robot can be steered and controlled quickly and in real time, thanks to measurement value output at intervals of 1kHz.

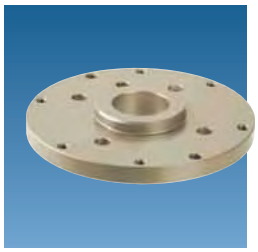
Accessories

Accessories from SCHUNK – the suitable supplement for maximum functionality, reliability and performance of all automation modules.

Fittings

Extension cables

Adapter plates



ⓘ For the exact size of the accessories, the availability for this size and the designation and ID, please refer to the additional views at the end of the size in question. You can find more detailed information on our accessory range in the "Accessories" catalog section.

General information on the series

Programming

Set commands, Get commands, Info commands
All the functions can be triggered by means of simple character transfer.
Therefore a driver is not needed. Integration into any software is possible.

Remote maintenance

PC with sensor (client) and remote maintenance PC (master) must be connected to the internet, and the software (supplied as standard) must be activated on each PC.
Web server solution on request.

Connection

Connection by means of inputs and outputs on request. Monitoring and teaching of all limit values by means of digital input (DI) and digital output (DO) on the customer's control system. A separate module is needed for this.

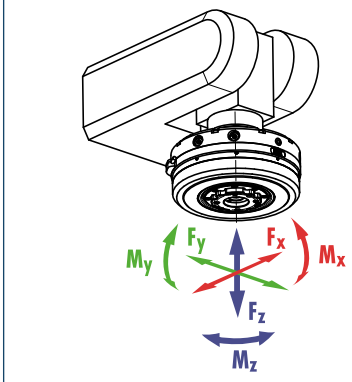
Measuring accuracy

5 % along the main axes for deflection up to ± 1 mm and ± 1 degree.

FTC-050

Forces and moments

	FTC-050-80	FTC-050-40
F_x	max. 300 N	max. 150 N
F_y	max. 300 N	max. 150 N
F_z	max. 300 N	max. 150 N
M_x	max. 7 Nm	max. 4 Nm
M_y	max. 7 Nm	max. 4 Nm
M_z	max. 15 Nm	max. 8 Nm



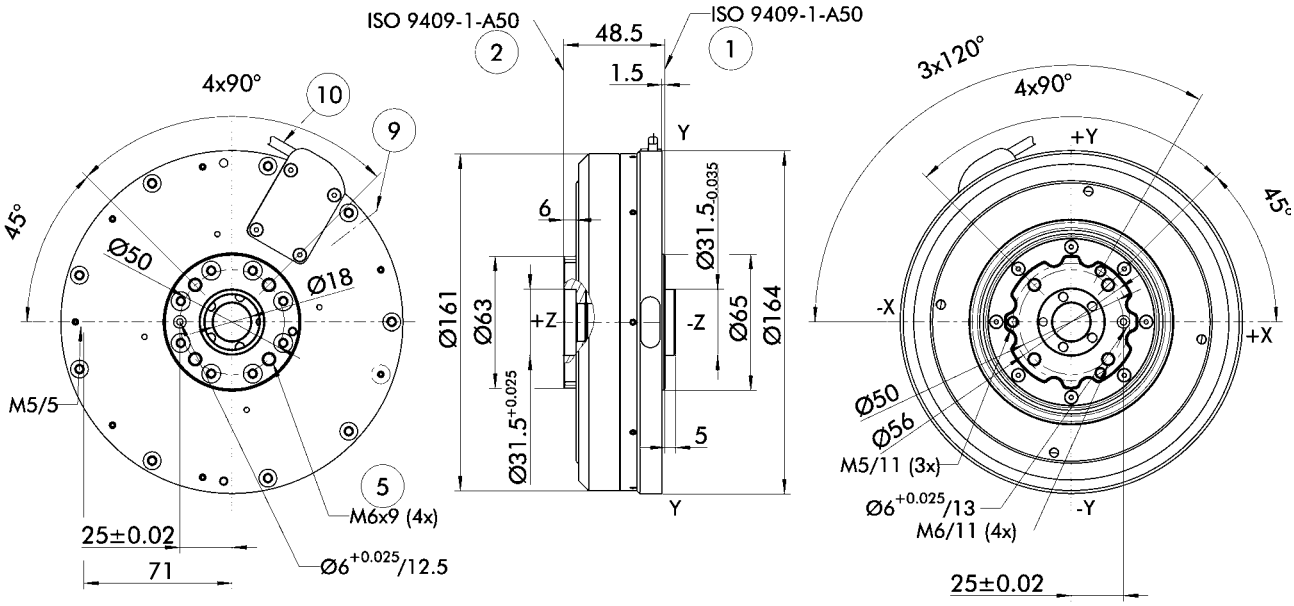
ⓘ In all six degrees of freedom overloads to the specified values are permitted without the sensor being damaged. Permissible external forces and moments in the event that the max. possible motion range of the tool-side flange is exceeded. System butts up to internal stops. If the specified external forces/moments are exceeded, the locking mechanism will be released in the opposite direction to the actuating pressure.

Technical data

Designation		FTC-050-80	FTC-050-80-V	FTC-050-40	FTC-050-40-V
	ID	0322300	0322301	0322302	0322303
Range of measurement, deflection					
Translatory X, Y, Z	[mm]	± 1.0	± 1.0	± 1.0	± 1.0
Rotational α, β, γ	[°]	± 1.0	± 1.0	± 1.0	± 1.0
Area of motion					
Translatory X, Y, Z	[mm]	± 1.4	± 1.4	± 1.4	± 1.4
Rotational α, β, γ	[°]	± 1.4	± 1.4	± 1.4	± 1.4
Overload					
F_x, F_y	[N]	400	400	200	200
F_z	[N]	350	350	180	180
M_x, M_y	[Nm]	14	14	8	8
M_z	[Nm]	25	25	13	13
Locking at 6 bar					
F_x, F_y	[N]	450	450	200	200
F_z	[N]	400	450	230	230
M_x, M_y	[Nm]	20	20	12	12
M_z	[Nm]	35	35	20	20
Robot-side interfaces		ISO 9409-1-A50			
Tool-side interfaces		ISO 9409-1-A50 as well as for gripper model PZN 64			
Mass moment of inertia Ixx, Iyy	[kg cm²]	39.5	85.6	39.5	85.6
Mass moment of inertia Izz	[kg cm²]	58.0	93.7	58.0	93.7
Weight	[kg]	1.56	2.56	1.56	2.56
Min. ambient temperature	[°C]	5	5	5	5
Max. ambient temperature	[°C]	55	55	55	55
Power supply	[VDC]	10 - 26	10 - 26	10 - 26	10 - 26
Power consumption	[W]	1.8	1.8	1.8	1.8
IP rating		65	65	65	65

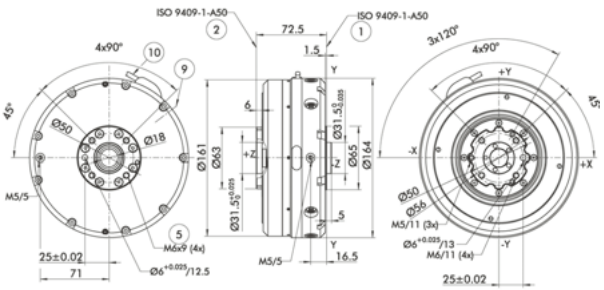
ⓘ Sensor FTC-050 with variable rigidity (80) and (40) springs, sensor FTC-050-XX with pneumatic, single-acting locking system (V), sensor FTC-L-050 light-weight version with variable rigidity (80) and (40) springs.

Main views FTC-050



① Robot-side connection
② Tool-side connection
⑤ Through-bore for screw connection with screw (enclosed)
⑨ Status display
⑩ Connection cable

Dimensions for FTC-050 with lock

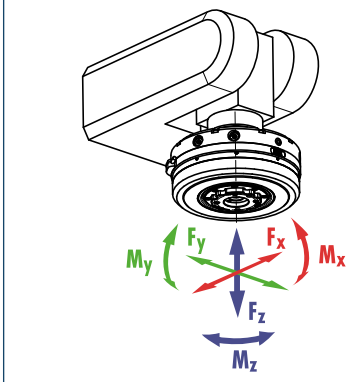


① Robot-side connection
② Tool-side connection
⑤ Through-bore for screw connection with screw (enclosed)
⑨ Status display
⑩ Connection cable

FTCL-050

Forces and moments

	FTCL-050-80	FTCL-050-40
F_x	max. 300 N	max. 150 N
F_y	max. 300 N	max. 150 N
F_z	max. 300 N	max. 150 N
M_x	max. 7 Nm	max. 4 Nm
M_y	max. 7 Nm	max. 4 Nm
M_z	max. 15 Nm	max. 8 Nm



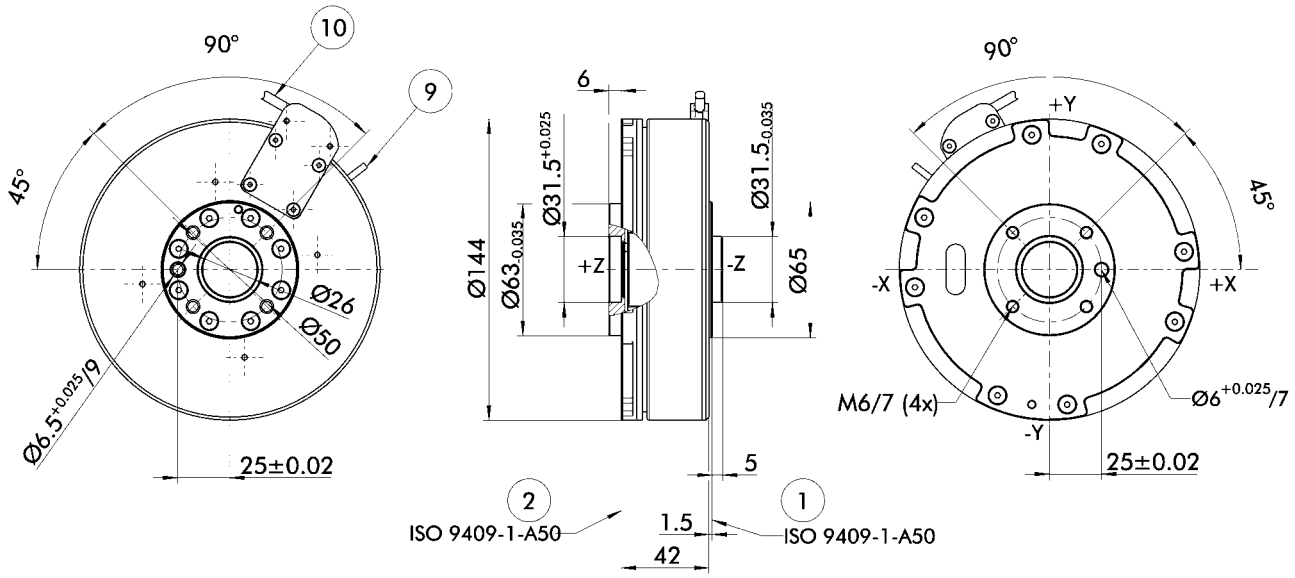
ⓘ In all six degrees of freedom overloads to the specified values are permitted without the sensor being damaged. Permissible external forces and moments in the event that the max. possible motion range of the tool-side flange is exceeded. System butts up to internal stops. If the specified external forces/moments are exceeded, the locking mechanism will be released in the opposite direction to the actuating pressure.

Technical data

Designation		FTCL-050-80	FTCL 50-40
	ID	0322351	0322350
Range of measurement, deflection			
Translatory X, Y, Z	[mm]	± 1.0	± 1.0
Rotational α, β, γ	[°]	± 1.0	± 1.0
Area of motion			
Translatory X, Y, Z	[mm]	± 1.4	± 1.4
Rotational α, β, γ	[°]	± 1.4	± 1.4
Overload			
F_x, F_y	[N]	-	-
F_z	[N]	-	-
M_x, M_y	[Nm]	-	-
M_z	[Nm]	-	-
Locking at 6 bar			
F_x, F_y	[N]	-	-
F_z	[N]	-	-
M_x, M_y	[Nm]	-	-
M_z	[Nm]	-	-
Robot-side interfaces		ISO 9409-1-A50	
Tool-side interfaces		ISO 9409-1-A50 as well as for gripper model PZN 64	
Mass moment of inertia Ixx, Iyy	[kg cm²]	15.1	15.1
Mass moment of inertia Izz	[kg cm²]	24.3	24.3
Weight	[kg]	0.96	0.96
Min. ambient temperature	[°C]	5	5
Max. ambient temperature	[°C]	55	55
Power supply	[VDC]	10 - 26	10 - 26
Power consumption	[W]	1.8	1.8
IP rating		65	65

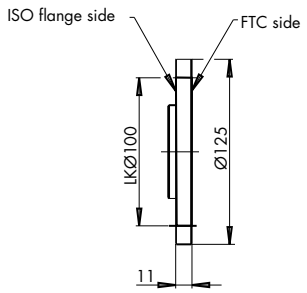
ⓘ Sensor FTC-050 with variable rigidity (80) and (40) springs, sensor FTC-050-XX with pneumatic, single-acting locking system (V), sensor FTC-L-050 light-weight version with variable rigidity (80) and (40) springs.

Main views FTCL-050



① Robot-side connection
② Tool-side connection
⑨ Status display
⑩ Connection cable

Adapter plate



Adapter plate

Designation	ID
A-FTC-050-ISO A100	0322320

Adapter cable

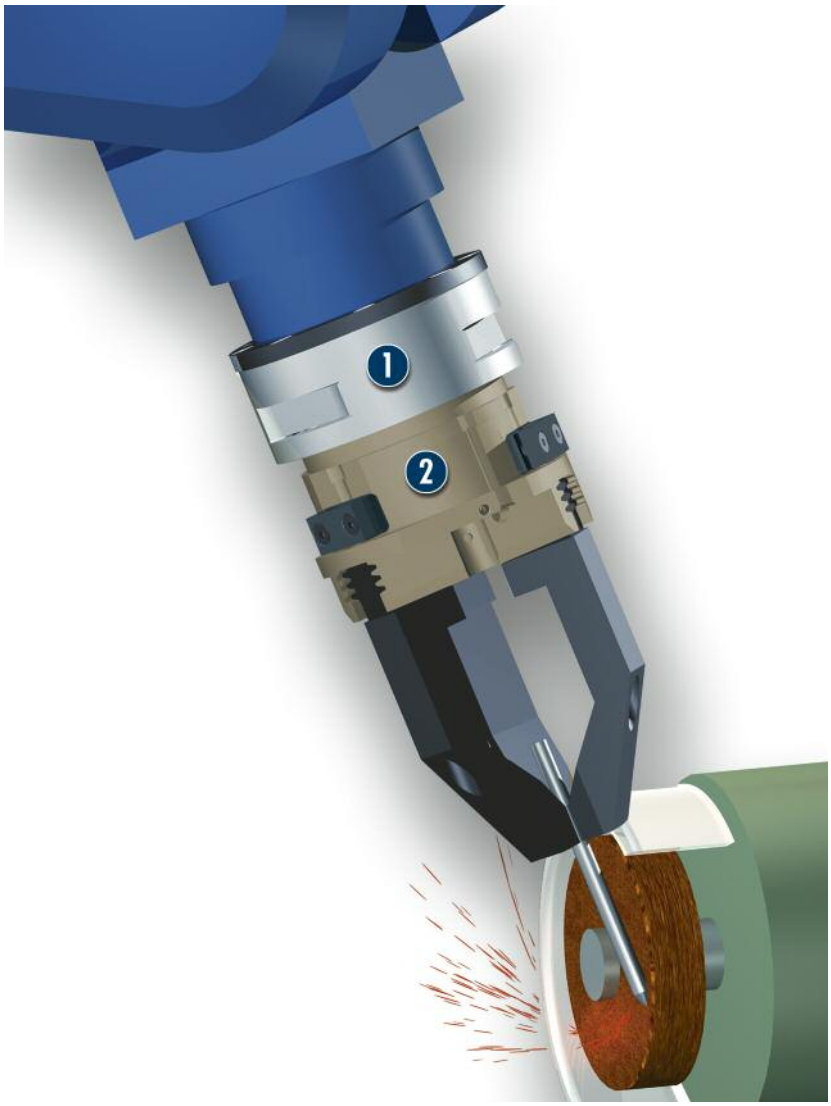
Designation	Interface	Length	ID
FTC-K-RS 232-5	RS-232	5 m	0322340
FTC-K-CAN-5	CAN	5 m	0322341
FTC-K-RS 232-10	RS-232	10 m	0322342
FTC-K-CAN-10	CAN	10 m	0322343

Six series
Nano, Mini, Gamma, Delta, Theta, Omega

Range of measurement, force
± 36 N .. ± 40000 N

Range of measurement, moment
± 0.5 Nm .. ± 6000 Nm

Application example



Robot-supported chamfering of round rods

1. FT-Delta 6-Axis Sensor
2. PZN-plus 64 3-Finger Centric Gripper

Force Sensor

6-axis sensor

Area of application

for precise measuring of forces and moments in all three spatial directions

Your advantages and benefits

Six sizes
with different ranges of measurement

High degree of resolution of measured values
and fast data transfer for virtually real-time force monitoring

Robust design
due to a higher overload range

Rotation and translation of the coordinates system
in all three directions

Robust design and easy to operate
for a long tool life and reduced set-up costs

General information on the sensor element

Working principle
Monolithic measuring element with three measurement harnesses at an angle of 120°. Each harness is fitted with two semiconductor strain gauge bridges which record the deformation in micrometers.

Overload protection
In all six axes, overloads to the values specified above are permitted without the sensor having to be recalibrated. Additional overload bolts protect the sensor from mechanical damage.

Material
Aluminum, stainless steel

Ambient temperature
0 °C to 70 °C, calibrated at 22 °C

Measuring accuracy
less than +/- 1% of the upper range value at 22 °C

Temperature compensation
Hardware side as standard

Splash protection
IP 65 on request

Warranty
12 months

FTD DAQ F/T system

The 6 axis force-torque sensor FTD is available in two different configurations, depending on the size of the sensor:

Sensor with integrated interface board
Delivered as standard:
Sensor with interface board (from Gamma size)
Sensor cable (10 m)
Power supply box
Connecting cable to the PC (2 m)

Sensor with external interface board
Delivered as standard:
Sensor without interface board (sizes Nano and Mini)
Sensor cable (1.8 m)
Power supply box with integrated interface board
Connecting cable to the PC (2 m)

Description of the individual components

6-axis force-torque sensor
Strain gauges (DMS) measure the strains applied in all six degrees of freedom (Fx, Fy, Fz, Tx, Ty and Tz). The DMS signals are amplified in the sensor. Because of the size, the interface board for the Nano and Mini series is not located in the sensor, but in the power supply box (IFPS).

Sensor cables
With the Nano and Mini sensors, the sensor cables are soldered into the sensor. A connector is located on the sensor housing of larger sensors to fix the sensor cable.
The highly-flexible sensor cable protects the sensor signals from electric fields and mechanical strains.

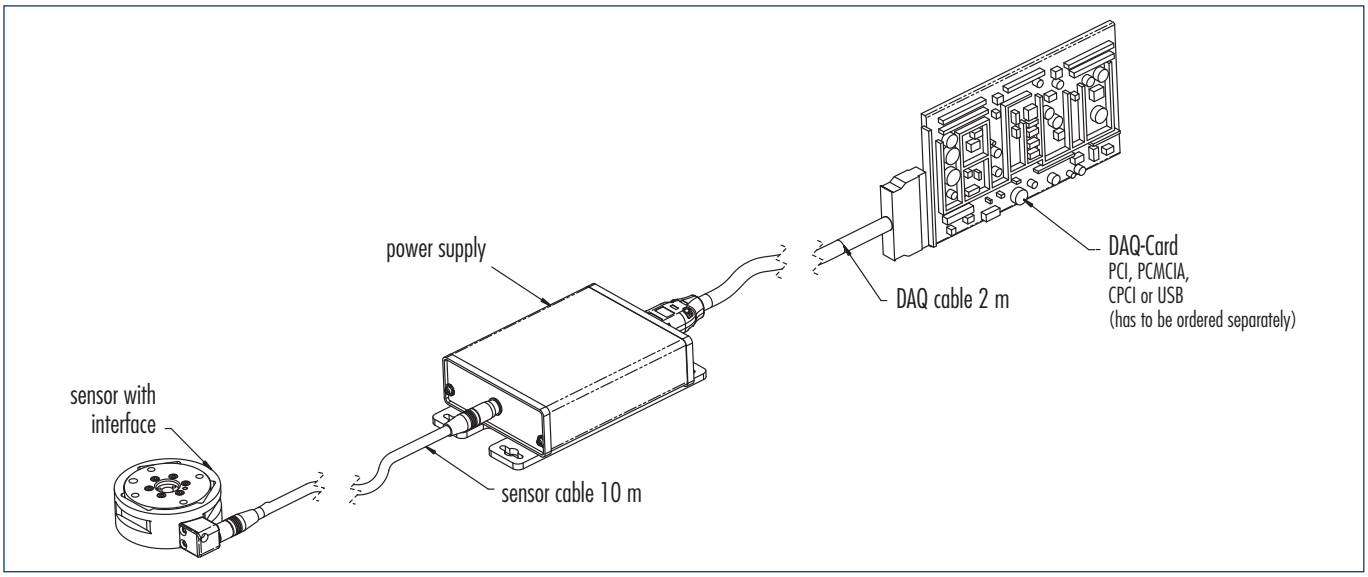
Interface board
The interface board converts the strain gauge signals into a signal which can be used by the DAQ card. To ensure optimum measurement results, the amplification factors are adjusted in line with the sensor used. The sensor and the interface board therefore form a single unit.

Power supply box
The power supply box contains the voltage transformer which converts the PCs 5 V power supply into a voltage which can be used by the sensor.
In the Nano and Mini system the interface board is integrated into the box as well as the voltage transformer.

Connecting cable to the PC
The highly-flexible connecting cable carries the PC voltage to the power supply box and the sensor signals to the DAQ card.

Data acquisition card (DAQ)
The DAQ card converts the sensor's analog DMS signals into digital signals.
DAQ cards are available for a wide variety of BUS systems (PCI, cPCI, PCMICA, USB, ISA).

DAQ F/T system for Gamma and larger sensors



DAQ cards

The DAQ cards available for the sensor are shown in the list below. If you are already using DAQ hardware it could be used in differential or single-ended mode. We recommend differential-ended mode for an optimum, low-noise measurement signal.

Available DAQ cards

ID	Designation	Resolution	Bus	Max. transmission rate
0322005	FTD-DAQ-N1CPCI	16-bit	cPCI	14.2 K datasets/second
0322006	FTD-DAQ-N2CPCI	12-bit	cPCI	28.5 K datasets/second
0322003	FTD-DAQ-N1PCMCIA	16-bit	PCMCIA	28.5 K datasets/second
0322004	FTD-DAQ-N2PCMCIA	12-bit	PCMCIA	28.5 K datasets/second
0322011	FTD-DAQ-M1PCI	16-bit	PCI	250 K datasets/second

ⓘ The max. transmission rate is dependent upon the overall speed of the computer system.

The analog measurement values issued by the sensor are amplified strains from the strain gauges (DMS) and not forces and moments. The software provided converts the DMS signals into forces and moments. In order for the signals to be converted, all six DMS signals must be digitized by the DAQ card.

DAQ software

The DAQ F/T software provided contains Windows ActiveX components, a C library and an example program.

Software features

The automation server ATIDAQFT is a Windows ActiveX component which carries out the following functions:

- Importing the calibration file
- Configuring the sensor system
- Converting the sensor signals which are read in via the DAQ card into forces and moments
- Supporting tool transformation

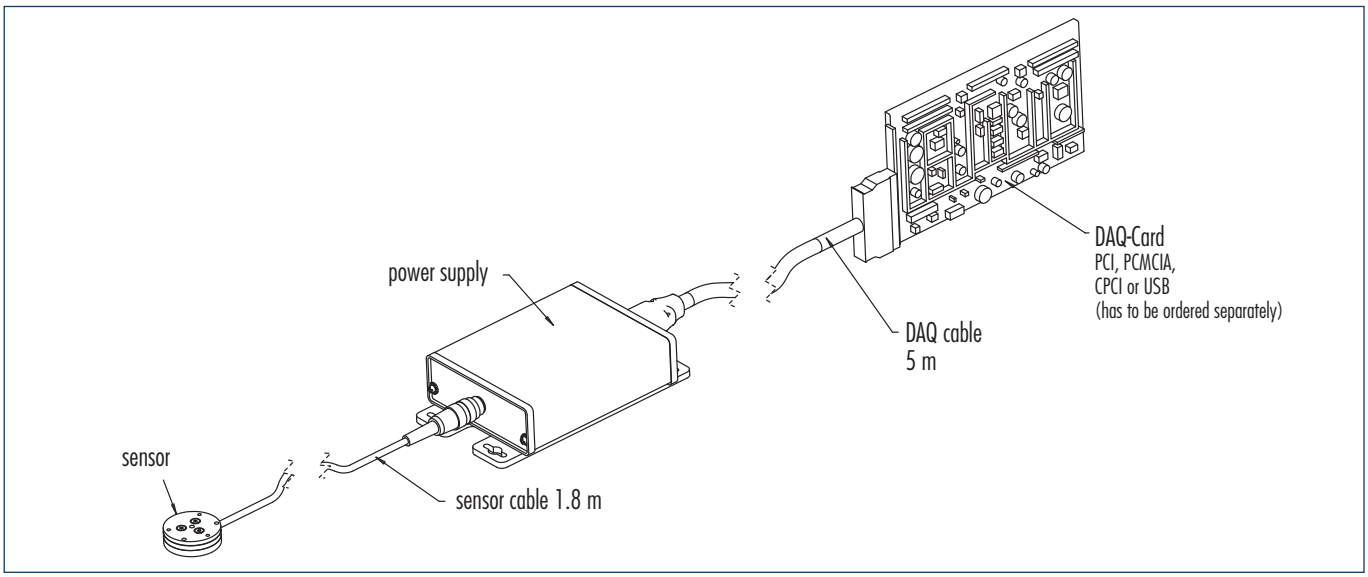
The ATIDAQFT server has been developed for use in an ActiveX environment.
The following programs are examples of those supported.

- LabVIEW™, Microsoft Visual Basic™, Visual Basic for Applications and Visual C++™
- For other operating systems a C library is available with the same range of functions.

Demo program

The Windows DAQ F/T demo program provides visual and numerical representations of forces and moments. A Windows operating system (Windows 95 or later) is required. The Visual Basic 6.0 source code is used as an aid for creating additional application programs. A LabVIEW application program is currently being developed.

DAQ F/T system for Mini and Nano sensors



Stand alone controller, FTS version

The 6 axis force-torque sensor FTS is available in two different configurations, depending on the size of the sensor:

Sensor with integrated MULTIPLEX board
Delivered as standard:
Sensor with MULTIPLEX board (from Gamma size)
Sensor cable
Stand alone controller
Network cable

Sensor with external MULTIPLEX board
Delivered as standard:
Sensor without MULTIPLEX board (sizes Nano and Mini)
Sensor cable
MULTIPLEX box
MULTIPLEX cable
Stand alone controller
Network cable

Description of the individual components

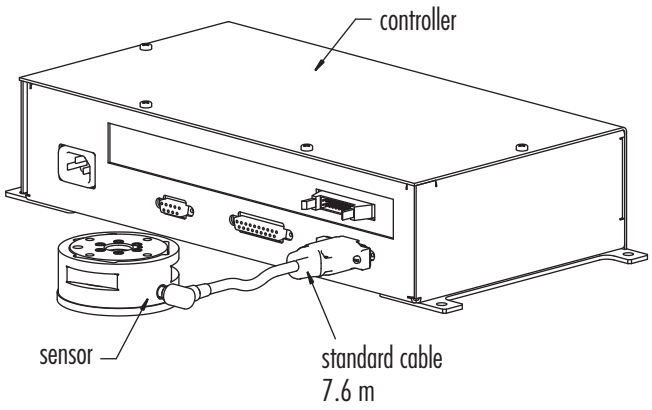
6-axis force-torque sensor
Strain gauges (DMS) measure the strains applied in all six degrees of freedom (Fx, Fy, Fz, Tx, Ty and Tz). The DMS signals are prepared on the MULTIPLEX board. Because of the size, the MULTIPLEX board for the Nano and Mini series is not located in the sensor, but in the MULTIPLEX box.

Sensor cables
With the Nano and Mini sensors, the sensor cables are soldered into the sensor. A connector is mounted onto the sensor housing of larger sensors to fix the sensor cable. The highly-flexible sensor cable protects the sensor signals from electric fields and mechanical strains.

MULTIPLEX board
The MULTIPLEX board amplifies the strain gauge signals and issues them in multiplex form. To ensure optimum measurement results, the amplification factors are adjusted in line with the sensor used. The sensor and the MULTIPLEX board therefore form a single unit. With the Nano and Mini sensors, the MINI MULTIPLEX board is located in an extra box.

Stand alone controller
The stand alone controller is connected to the sensor or to the MULTIPLEX box. It converts the multiplex-form DMS signals into forces and moments. Functions such as tool transformation are implemented in the controller. Communication is carried out via an RS-232 interface. The force and moment measurement values are issued in the form of analog strains. Optically decoupled I/Os facilitate simple integration into the machine control system.

FTS system



Sensor selection schematic

1. Calculating the expected forces and moments

The moment load is usually the determining factor when selecting a sensor. The tool weight and the application process generate the forces which can act upon the sensor in the form of moments. The moment is calculated from the force applied (static and dynamic) multiplied by the lever arm. The lever arm is calculated from the distance from the point of application of the force to the sensor's reference point. At the design stage, forces and moments which could act upon the sensor outside of normal operation also have to be taken into account.

2. Sensor pre-selection on the basis of the forces and moments

Please use the table below.

3. Determining the resolution

Check whether the sensor's resolution matches your requirements. It is possible that a sensor selected on the basis of the forces and moments does not meet the requirements with respect to resolution.
The basic principle is the larger the range of measurement, the lower the resolution.

Example

The maximum expected force acting on the sensor is 98 N (10 kg).
This force acts on the sensor at a distance of 25 cm. The moment is therefore 24.5 Nm.

The FT-Delta-SI-330-30 is suitable for this application. (Range of measurement 330 N and 30 Nm). Overload safety is 230 Nm (Mxy).

Notes on robot applications

During a crash, extremely high forces and moments act on the sensor due to the robot's mass inertia and braking deceleration.
To protect the sensor in these situations, we recommend the use of an OPS or OPR collision and overload protection device.

Brief overview of FT

Designation		Nano	Nano	Nano	Mini	Mini	Gamma	Delta	Theta	Omega	Omega	Omega	Omega
		17	25	43	40	45				160	190	250	331
Max. F_{xy}	[± N]	50	250	36	80	580	130	660	2500	2500	7200	16000	40000
Max. M_{xy}	[± Nm]	0.5	6	0.5	4	20	10	60	400	400	1400	2000	6000
Weight	[kg]	0.01	0.07	0.04	0.05	0.09	0.25	0.91	4.99	2.72	6.35	30.0	43.0
Diameter	[mm]	17	25	43	40	45	75.4	94.5	155	156	190	254	254
Height	[mm]	14.5	21.6	11.5	12.3	15.7	33.3	33.3	61.1	55.9	55.9	95	107

How to order FTS sensors with stand-alone control

FTS-[sensor]-(cable) - ☐ - ☐ - ☐ - ☐

Mains plug
A - Australia
D - Denmark
I - India
Y - Italy
N - North America
U - United Kingdom
T - Unterminated
E - European

Stand alone controller model
CTL 16 bit controller
CON Controller compatible with 12 bit version
CTE 16 bit controller in Euro card version

Mux: Cable length to the MUX box
Standard length 7.6 m
For sensors without MUX box 0

Cable length to the controller
1.8 m is standard with Nano and Mini
Large sensors 7.6 m

Cable outlet
R: Radial standard for all sizes
A: Axial for Nano 17, Nano 25, Mini 40 and Mini 45

Size
Nano 17, Nano 25, Nano 43, Mini 40, Mini 45, Gamma, Delta, Theta, Omega 160, Omega 190, Omega 250 or Omega 331

How to order FTD sensors

FTD-[sensor]-(cable) - ☐ - ☐ - ☐

NO Without DAQ card
(DAQ card available from SCHUNK on request)

Cable length between the power supply box and the DAQ card
Standard length 2 m
M = M series connector
U = Open wires

Cable length between the sensor and the power supply box
Standard length 10 m for Gamma, Delta, Theta and Omega
Standard length 1.8 m for Nano and Mini

Cable outlet
R: Radial, standard for all sizes
A: Axial for Nano 17, Nano 25, Mini 40 and Mini 45

Size
Nano 17, Nano 25, Nano 43, Mini 40, Mini 45, Gamma, Delta, Theta, Omega 160, Omega 190, Omega 250 or Omega 331

FT-Nano-17

Product advantages

One of the smallest 6-axis sensors in the world

Suitable for measuring tasks in the small load range

Robust and compact

- Wire eroded measuring element made from high-strength, stainless steel
- Up to 23-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges

Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

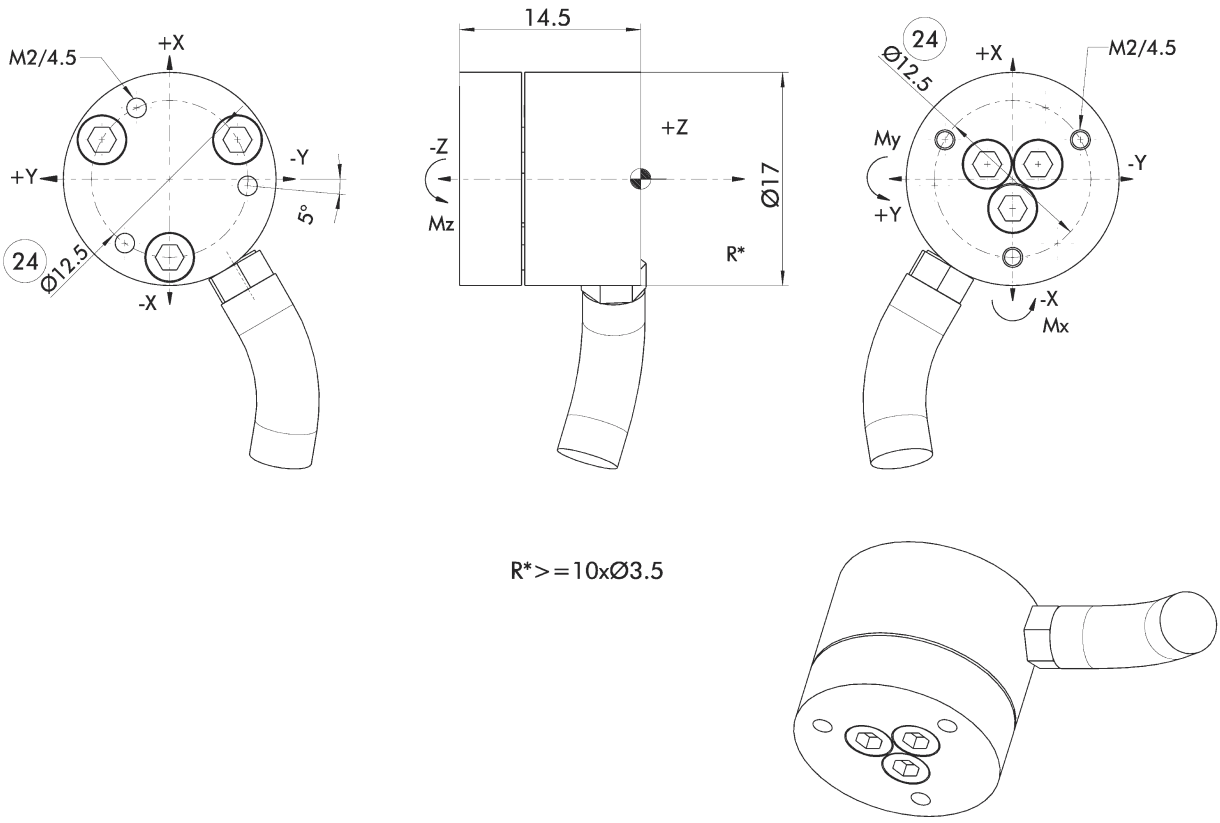
Typical areas of application

- Dental research
- Surgical robots
- The development of multi-limbed robot hands
- Studies into measuring finger strength

Technical data

Designation		FTS-Nano-17	FTD-Nano-17	FTS-Nano-17	FTD-Nano-17	FTS-Nano-17	FTD-Nano-17
Calibration		**SI-12-0.12**	**SI-12-0.12**	**SI-25-0.25**	**SI-25-0.25**	**SI-50-0.5**	**SI-50-0.5**
Resolution		Stand alone	DAQ	Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	9.1	9.1	9.1	9.1	9.1	9.1
Range of measurement, F_x, F_y	[N]	± 12	± 12	± 25	± 25	± 50	± 50
Range of measurement, F_z	[N]	± 17	± 17	± 35	± 35	± 70	± 70
Range of measurement, M_x, M_y	[Nm]	± 0.12	± 0.12	± 0.25	± 0.25	± 0.50	± 0.50
Range of measurement, M_z	[Nm]	± 0.12	± 0.12	± 0.25	± 0.25	± 0.50	± 0.50
Resolution, F_x, F_y	[N]	± 1/160	± 1/1280	± 1/80	± 1/320	± 1/40	± 1/160
Resolution, F_z	[N]	± 1/160	± 1/1280	± 1/80	± 1/640	± 1/40	± 1/320
Resolution, M_x, M_y	[N]	± 1/32	± 1/256	± 1/16	± 1/128	± 1/8	± 1/64
Resolution, M_z	[Nm]	± 1/32	± 1/256	± 1/16	± 1/128	± 1/8	± 1/64
Overload, F_{xy}	[N]	± 350	± 350	± 350	± 350	± 350	± 350
Overload, F_z	[N]	± 800	± 800	± 800	± 800	± 800	± 800
Overload, T_{xy}	[Nm]	± 2.6	± 2.6	± 2.6	± 2.6	± 2.6	± 2.6
Overload, T_z	[Nm]	± 3.1	± 3.1	± 3.1	± 3.1	± 3.1	± 3.1
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	9.3×10^6	9.3×10^6	9.3×10^6	9.3×10^6	9.3×10^6	9.3×10^6
Rigidity, Z axis (KF_z)	[N/m]	12×10^6	12×10^6	12×10^6	12×10^6	12×10^6	12×10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	250	250	250	250	250	250
Rigidity, Z axis (KM_z)	[Nm/rad]	390	390	390	390	390	390
Resonance, frequency F_x, F_y, M_z	[KHz]	7.2	7.2	7.2	7.2	7.2	7.2
Resonance, frequency F_z, M_x, M_y	[KHz]	7.2	7.2	7.2	7.2	7.2	7.2

Main views



24 Bolt pitch circle

FT-Nano-25

Product advantages

One of the smallest 6-axis sensors in the world

Suitable for measuring tasks in the small load range

Robust and compact

- Wire eroded measuring element made from high-strength, stainless steel
- Up to 23-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges

Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

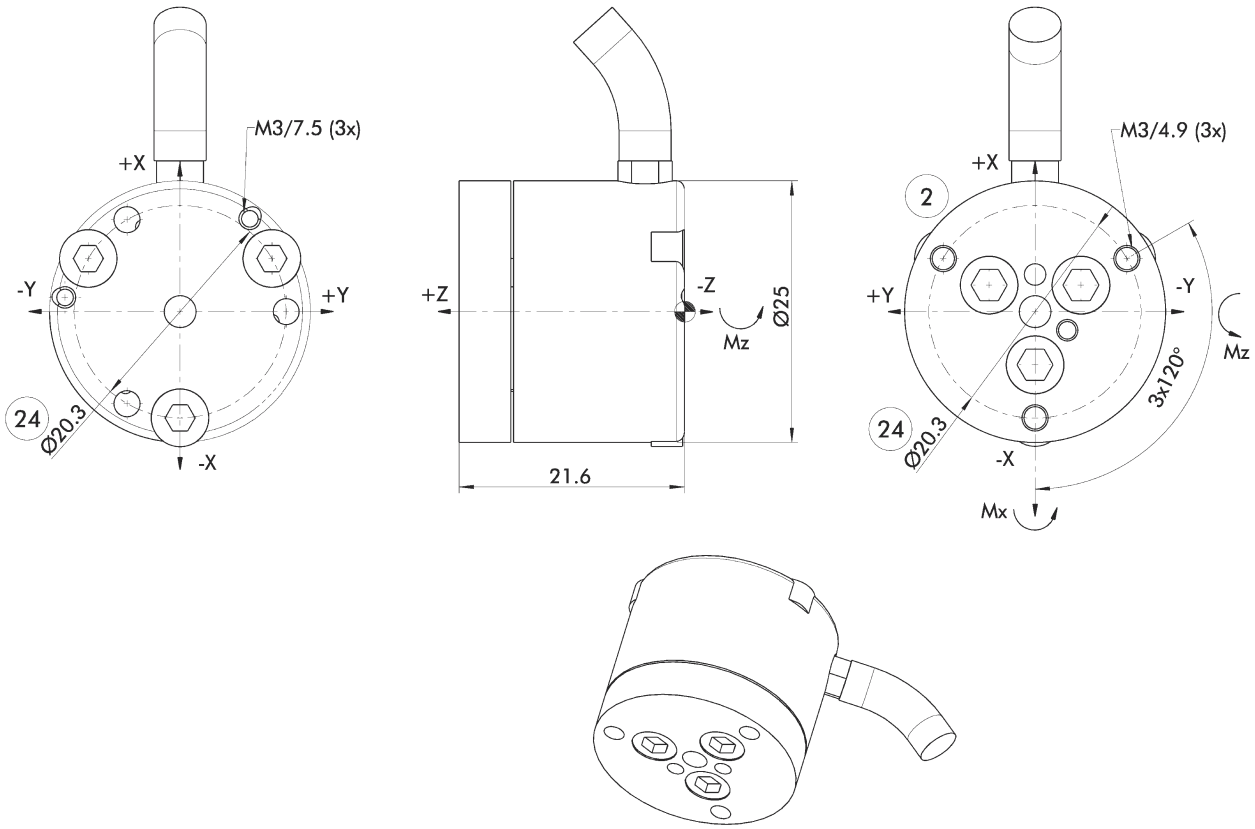
Typical areas of application

- Telerobotics
- Surgical robots
- The development of multi-limbed robot hands
- Studies into measuring finger strength

Technical data

Designation		FTS-Nano-25	FTD-Nano-25	FTS-Nano-25	FTD-Nano-25
Calibration		**SI-125-3**	**SI-125-3**	**SI-250-6**	**SI-250-6**
Resolution		Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	63.4	63.4	63.4	63.4
Range of measurement, F_x, F_y	[N]	± 125	± 125	± 250	± 250
Range of measurement, F_z	[N]	± 500	± 500	± 1000	± 1000
Range of measurement, M_x, M_y	[Nm]	± 3	± 3	± 6	± 6
Range of measurement, M_z	[Nm]	± 3	± 3	± 6	± 6
Resolution, F_x, F_y	[N]	± 1/24	± 1/192	± 1/12	± 1/96
Resolution, F_z	[N]	± 1/8	± 1/64	± 1/4	± 1/32
Resolution, M_x, M_y	[N]	± 1/660	± 1/5280	± 1/330	± 1/2640
Resolution, M_z	[Nm]	± 1/1320	± 1/10560	± 1/660	± 1/5280
Overload, F_{xy}	[N]	± 2325	± 2325	± 2325	± 2325
Overload, F_z	[N]	± 6250	± 6250	± 6250	± 6250
Overload, T_{xy}	[Nm]	± 35	± 35	± 35	± 35
Overload, T_z	[Nm]	± 62	± 62	± 62	± 62
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	53 x 10^6	53 x 10^6	53 x 10^6	53 x 10^6
Rigidity, Z axis (KF_z)	[N/m]	110 x 10^6	110 x 10^6	110 x 10^6	110 x 10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	6440	6440	6440	6440
Rigidity, Z axis (KM_z)	[Nm/rad]	9260	9260	9260	9260
Resonance, frequency F_x, F_y, M_z	[KHz]	3.6	3.6	3.6	3.6
Resonance, frequency F_z, M_x, M_y	[KHz]	3.8	3.8	3.8	3.8

Main views



(2) Tool-side connection
(24) Bolt pitch circle

FT-Nano-43

Product advantages

One of the smallest 6-axis sensors in the world

Suitable for measuring tasks in the small load range

Robust and compact

- Wire eroded measuring element made from high-strength, stainless steel
- Up to 23-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges

Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

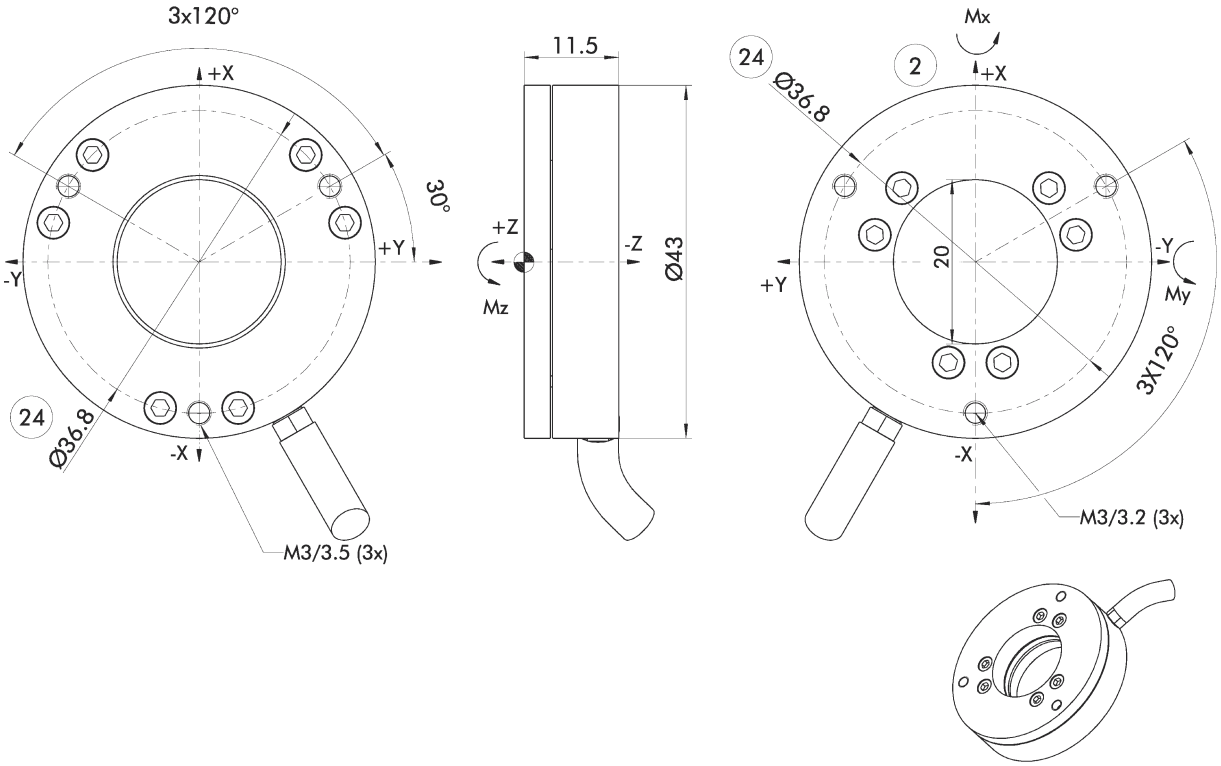
Typical areas of application

- Telerobotics
- Surgical robots
- The development of multi-limbed robot hands
- Studies into measuring finger strength

Technical data

Designation		FTS-Nano-43	FTD-Nano-43	FTS-Nano-43	FTD-Nano-43
Calibration		SI-18-0.25	SI-18-0.25	SI-36-0.5	SI-36-0.5
	ID	0322042	0322520	0322043	0322521
Resolution		Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	39	39	39	39
Range of measurement, F_x, F_y	[N]	± 18	± 18	± 36	± 36
Range of measurement, F_z	[N]	± 18	± 18	± 36	± 36
Range of measurement, M_x, M_y	[Nm]	± 0.25	± 0.25	± 0.5	± 0.5
Range of measurement, M_z	[Nm]	± 0.25	± 0.25	± 0.5	± 0.5
Resolution, F_x, F_y	[N]	± 1/128	± 1/1024	± 1/64	± 1/512
Resolution, F_z	[N]	± 1/128	± 1/1024	± 1/64	± 1/512
Resolution, M_x, M_y	[N]	± 1/10000	± 1/80000	± 1/5000	± 1/40000
Resolution, M_z	[Nm]	± 1/10000	± 1/80000	± 1/5000	± 1/40000
Overload, F_{xy}	[N]	± 300	± 300	± 300	± 300
Overload, F_z	[N]	± 400	± 400	± 400	± 400
Overload, T_{xy}	[Nm]	± 3.4	± 3.4	± 3.4	± 3.4
Overload, T_z	[Nm]	± 5.4	± 5.4	± 5.4	± 5.4
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	5.2×10^6	5.2×10^6	5.2×10^6	5.2×10^6
Rigidity, Z axis (KF_z)	[N/m]	5.2×10^6	5.2×10^6	5.2×10^6	5.2×10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	770	770	770	770
Rigidity, Z axis (KM_z)	[Nm/rad]	1100	1100	1100	1100

Main views



(2) Tool-side connection
(24) Bolt pitch circle

FT-Mini-40

Product advantages

One of the smallest 6-axis sensors in the world

The Mini 40 is a compact, flat sensor.

Robust and compact

- Wire eroded measuring element made from high-strength, stainless steel
- Up to 18-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges

Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

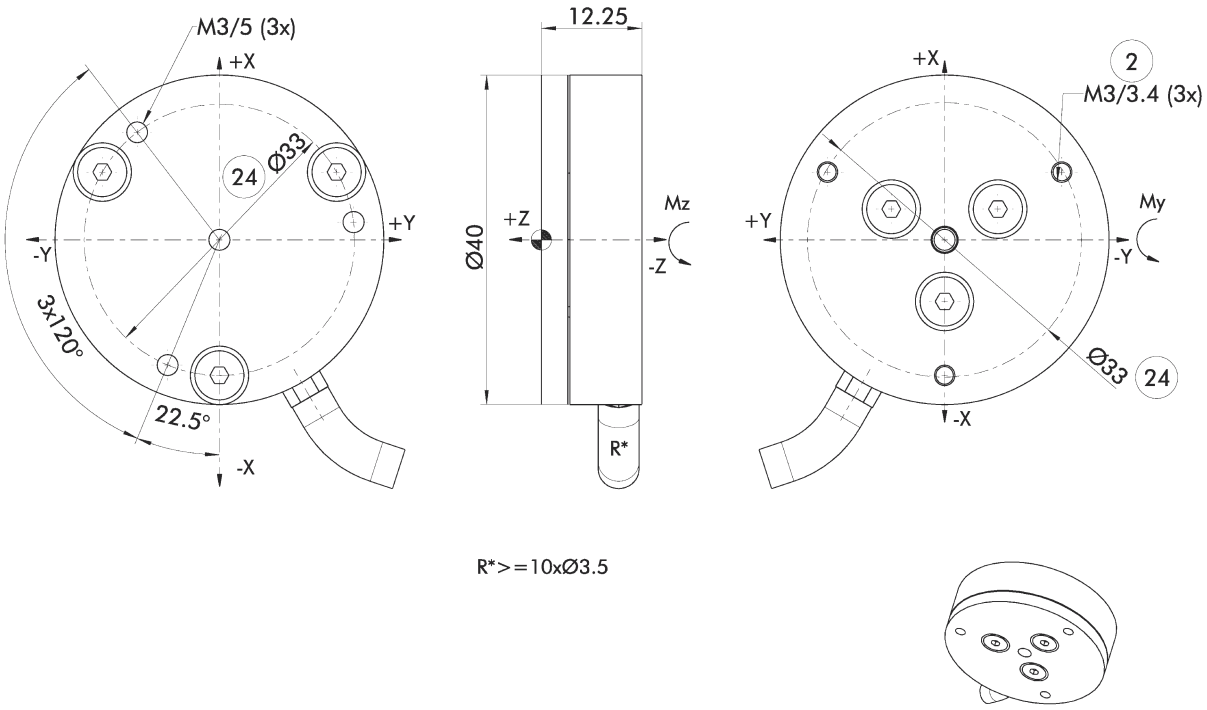
Typical areas of application

- Telerobotics
- Surgical robots
- The development of multi-limbed robot hands
- Studies into measuring finger strength

Technical data

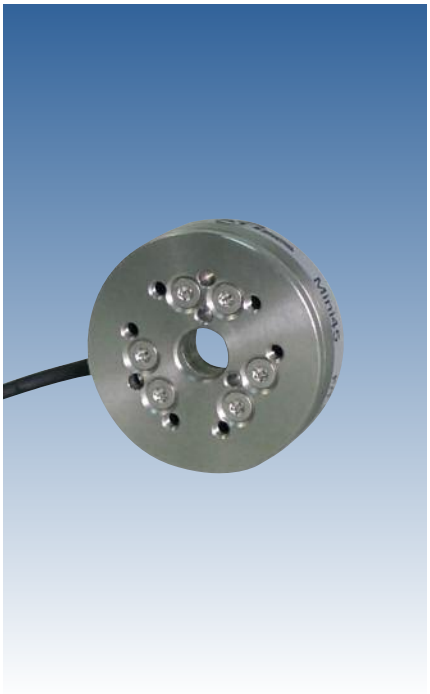
Designation		FTS-Mini-40	FTD-Mini-40	FTS-Mini-40	FTD-Mini-40	FTS-Mini-40	FTD-Mini-40
Calibration		**SI-20-1**	**SI-20-1**	**SI-40-2**	**SI-40-2**	**SI-80-4**	**SI-80-4**
Resolution		Stand alone	DAQ	Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	50	50	50	50	50	50
Range of measurement, F_x, F_y	[N]	± 20	± 20	± 40	± 40	± 80	± 80
Range of measurement, F_z	[N]	± 60	± 60	± 120	± 120	± 240	± 240
Range of measurement, M_x, M_y	[Nm]	± 1	± 1	± 2	± 2	± 4	± 4
Range of measurement, M_z	[Nm]	± 1	± 1	± 2	± 2	± 4	± 4
Resolution, F_x, F_y	[N]	± 1/100	± 1/800	± 1/50	± 1/400	± 2/25	± 1/200
Resolution, F_z	[N]	± 1/50	± 1/400	± 1/25	± 1/200	± 4/25	± 1/100
Resolution, M_x, M_y	[N]	± 1/4000	± 1/32000	± 1/2000	± 1/16000	± 1/1000	± 1/8000
Resolution, M_z	[Nm]	± 1/4000	± 1/32000	± 1/2000	± 1/16000	± 1/1000	± 1/8000
Overload, F_{xy}	[N]	± 870	± 870	± 870	± 870	± 870	± 870
Overload, F_z	[N]	± 2700	± 2700	± 2700	± 2700	± 2700	± 2700
Overload, T_{xy}	[Nm]	± 21	± 21	± 21	± 21	± 21	± 21
Overload, T_z	[Nm]	± 21	± 21	± 21	± 21	± 21	± 21
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	11 x 10^6	11 x 10^6	11 x 10^6	11 x 10^6	11 x 10^6	11 x 10^6
Rigidity, Z axis (KF_z)	[N/m]	23 x 10^6	23 x 10^6	23 x 10^6	23 x 10^6	23 x 10^6	23 x 10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	3300	3300	3300	3300	3300	3300
Rigidity, Z axis (KM_z)	[Nm/rad]	4300	4300	4300	4300	4300	4300
Resonance, frequency F_x, F_y, M_z	[KHz]	3.2	3.2	3.2	3.2	3.2	3.2
Resonance, frequency F_z, M_x, M_y	[KHz]	4.9	4.9	4.9	4.9	4.9	4.9

Main views



(2) Tool-side connection
(24) Bolt pitch circle

FT-Mini-45



Product advantages

One of the smallest 6-axis sensors in the world

The Mini 45 is a compact, flat sensor.

Robust and compact

- Wire eroded measuring element made from high-strength, stainless steel
- Up to 23-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges

Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

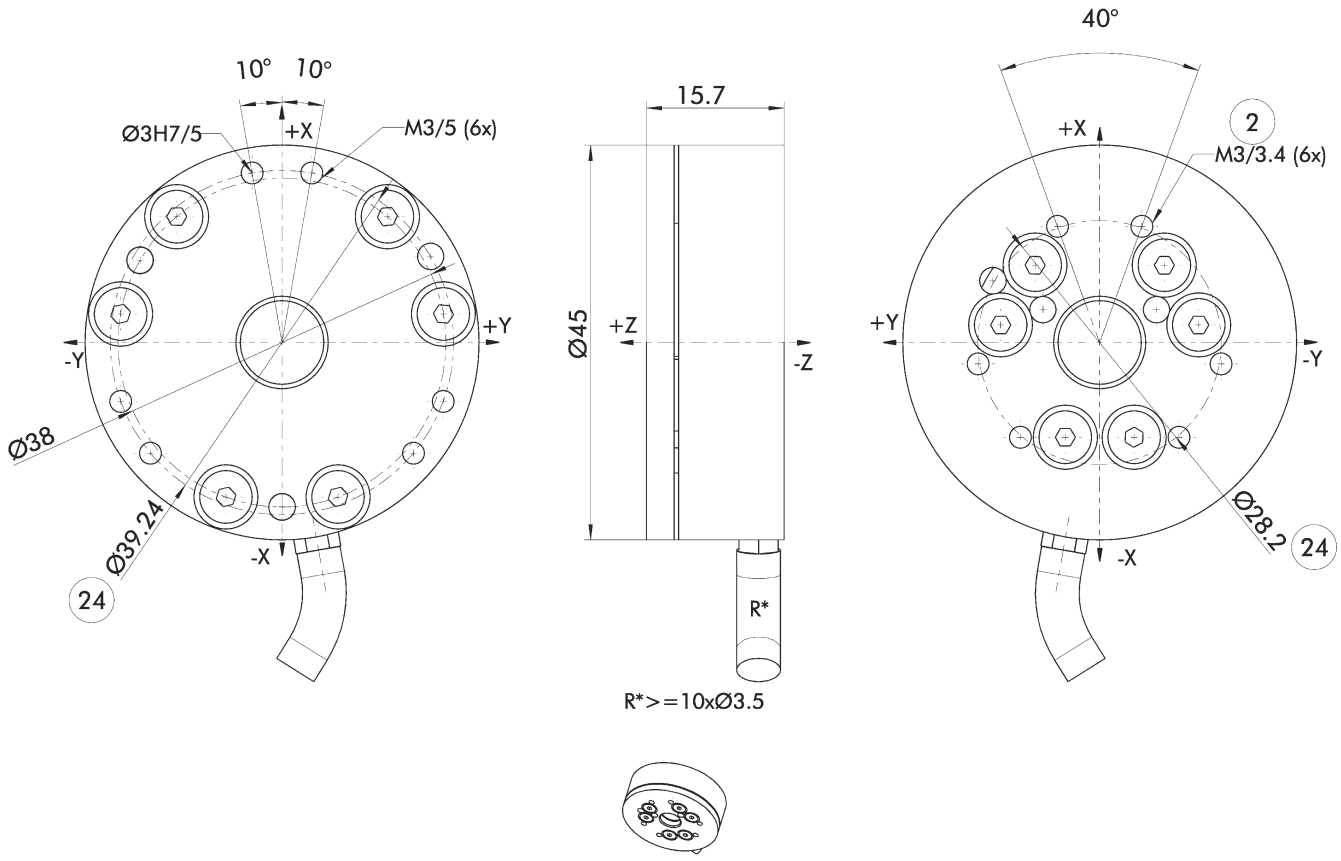
Typical areas of application

- Telerobotics
- Surgical robots
- The development of multi-limbed robot hands
- Studies into measuring finger strength

Technical data

Designation		FTS-Mini-45	FTD-Mini-45	FTS-Mini-45	FTD-Mini-45	FTS-Mini-45	FTD-Mini-45
Calibration		SI-145-5	SI-145-5	SI-290-10	SI-290-10	SI-580-20	SI-580-20
	ID	0322060	0322540	0322061	0322541	0322062	0322542
Resolution		Stand alone	DAQ	Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	90	90	90	90	90	90
Range of measurement, F_x, F_y	[N]	± 145	± 145	± 290	± 290	± 580	± 580
Range of measurement, F_z	[N]	± 290	± 290	± 580	± 580	± 1160	± 1160
Range of measurement, M_x, M_y	[Nm]	± 5	± 5	± 10	± 10	± 20	± 20
Range of measurement, M_z	[Nm]	± 5	± 5	± 10	± 10	± 20	± 20
Resolution, F_x, F_y	[N]	± 1/8	± 1/128	± 1/4	± 1/64	± 1/2	± 1/32
Resolution, F_z	[N]	± 1/8	± 1/64	± 1/4	± 1/32	± 1/2	± 1/16
Resolution, M_x, M_y	[N]	± 1/376	± 1/188	± 1/188	± 1/3008	± 1/94	± 1/1504
Resolution, M_z	[Nm]	± 1/352	± 1/188	± 1/376	± 1/3008	± 1/188	± 1/1504
Overload, F_{xy}	[N]	± 4900	± 4900	± 4900	± 4900	± 4900	± 4900
Overload, F_z	[N]	± 10100	± 10100	± 10100	± 10100	± 10100	± 10100
Overload, T_{xy}	[Nm]	± 100	± 100	± 100	± 100	± 100	± 100
Overload, T_z	[Nm]	± 135	± 135	± 135	± 135	± 135	± 135
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	74.6×10^6	74.6×10^6	74.6×10^6	74.6×10^6	74.6×10^6	74.6×10^6
Rigidity, Z axis (KF_z)	[N/m]	98.4×10^6	98.4×10^6	98.4×10^6	98.4×10^6	98.4×10^6	98.4×10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	16.8×10^3	16.8×10^3	16.8×10^3	16.8×10^3	16.8×10^3	16.8×10^3
Rigidity, Z axis (KM_z)	[Nm/rad]	34.8×10^3	34.8×10^3	34.8×10^3	34.8×10^3	34.8×10^3	34.8×10^3

Main views



(2) Tool-side connection
(24) Bolt pitch circle

FT-Gamma

Product advantages

Robust and compact

- Wire eroded measuring element made from high-strength, stainless steel
- Up to 27-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges

Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

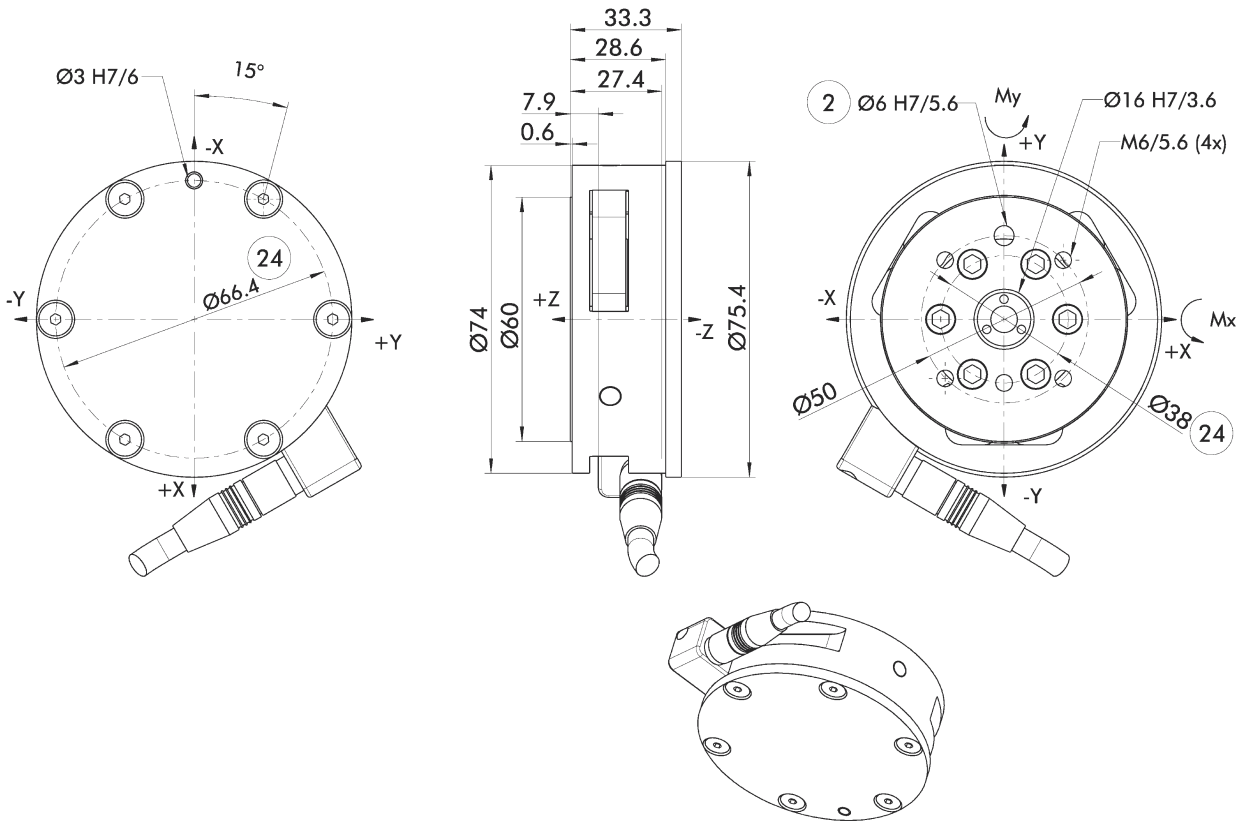
Typical areas of application

- Real-time force monitoring
- Haptics investigations
- Robot set-up
- Tests in automotive engineering

Technical data

Designation		FTS-Gamma	FTD-Gamma	FTS-Gamma	FTD-Gamma	FTS-Gamma	FTD-Gamma
Calibration		**SI-32-2.5**	**SI-32-2.5**	**SI-65-5**	**SI-65-5**	**SI-130-10**	**SI-130-10**
Resolution		Stand alone	DAQ	Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	225	225	225	225	225	225
Range of measurement, F_x, F_y	[N]	± 32	± 32	± 65	± 65	± 130	± 130
Range of measurement, F_z	[N]	± 100	± 100	± 200	± 200	± 400	± 400
Range of measurement, M_x, M_y	[Nm]	± 2.5	± 2.5	± 5	± 5	± 10	± 10
Range of measurement, M_z	[Nm]	± 2.5	± 2.5	± 5	± 5	± 10	± 10
Resolution, F_x, F_y	[N]	± 1/80	± 1/640	± 1/40	± 1/320	± 1/20	± 1/160
Resolution, F_z	[N]	± 1/40	± 1/320	± 1/20	± 1/160	± 1/10	± 1/80
Resolution, M_x, M_y	[N]	± 1/1000	± 1/8000	± 1/667	± 3/16000	± 1/400	± 1/3200
Resolution, M_z	[Nm]	± 1/1000	± 1/8000	± 1/667	± 3/16000	± 1/400	± 1/3200
Overload, F_{xy}	[N]	± 1210	± 1210	± 1210	± 1210	± 1210	± 1210
Overload, F_z	[N]	± 4050	± 4050	± 4050	± 4050	± 4050	± 4050
Overload, T_{xy}	[Nm]	± 78	± 78	± 78	± 78	± 78	± 78
Overload, T_z	[Nm]	± 82	± 82	± 82	± 82	± 82	± 82
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	9.1×10^6	9.1×10^6	9.1×10^6	9.1×10^6	9.1×10^6	9.1×10^6
Rigidity, Z axis (KF_z)	[N/m]	18×10^6	18×10^6	18×10^6	18×10^6	18×10^6	18×10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	11×10^3	11×10^3	11×10^3	11×10^3	11×10^3	11×10^3
Rigidity, Z axis (KM_z)	[Nm/rad]	16×10^3	16×10^3	16×10^3	16×10^3	16×10^3	16×10^3
Resonance, frequency F_x, F_y, M_z	[KHz]	1.4	1.4	1.4	1.4	1.4	1.4
Resonance, frequency F_z, M_x, M_y	[KHz]	2	2	2	2	2	2

Main views



(2) Tool-side connection
(24) Bolt pitch circle

FT-Delta

Product advantages

- Wire eroded measuring element made from high-strength, stainless steel
- Special overload bolts make the Delta an extremely robust transducer
- Up to 148-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges

Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

Sensor also available in the following protection classes

IP 60 dust-proof version
IP 65 splash-proof version, suitable for use in damp environments
IP 68 immersion-proof version down to 10 m
For further information or drawings please feel free to contact us. We will be happy to help.

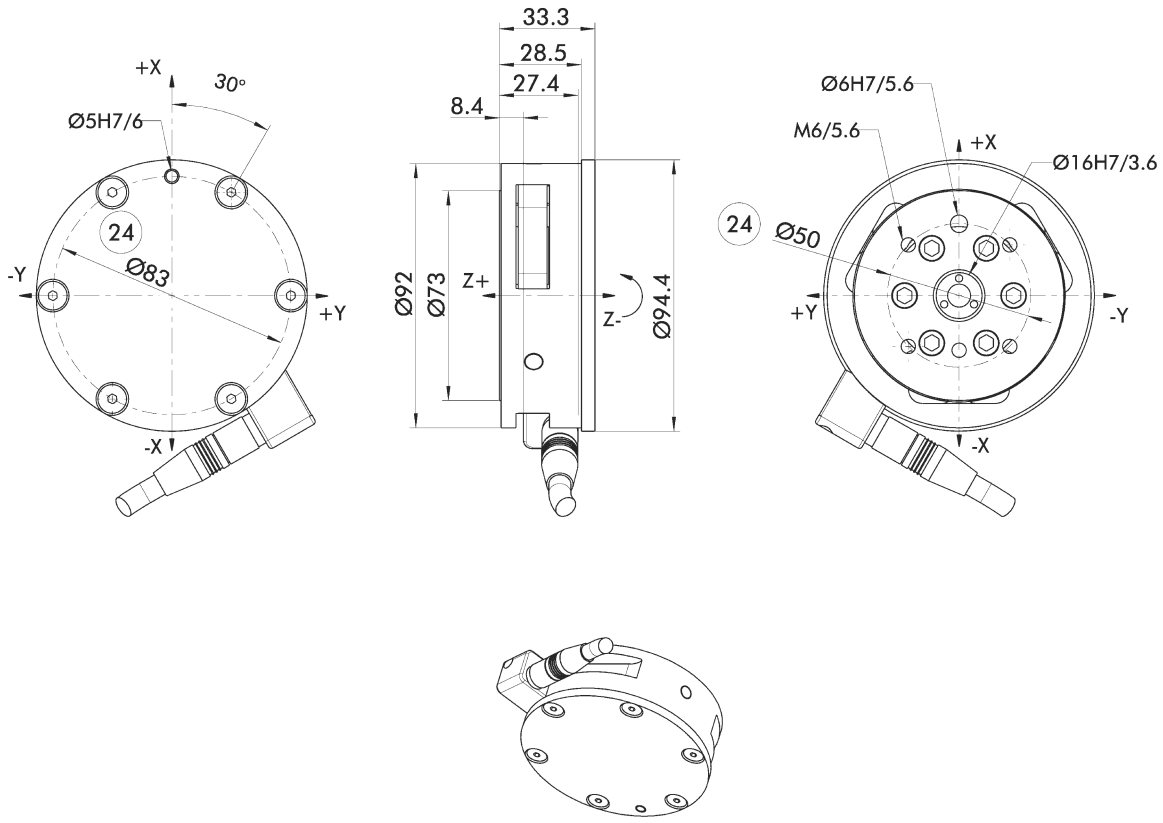
Typical areas of application

- Real-time force monitoring
- Haptics investigations
- Robot set-up
- Rehabilitation research

Technical data

Designation		FTS-Delta	FTD-Delta	FTS-Delta	FTD-Delta	FTS-Delta	FTD-Delta
Calibration		**SI-165-15**	**SI-165-15**	**SI-330-30**	**SI-330-30**	**SI-660-60**	**SI-660-60**
Resolution		Stand alone	DAQ	Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	913	913	913	913	913	913
Range of measurement, F_x, F_y	[N]	± 165	± 165	± 330	± 330	± 660	± 660
Range of measurement, F_z	[N]	± 495	± 495	± 990	± 990	± 1980	± 1980
Range of measurement, M_x, M_y	[Nm]	± 15	± 15	± 30	± 30	± 60	± 60
Range of measurement, M_z	[Nm]	± 15	± 15	± 30	± 30	± 60	± 60
Resolution, F_x, F_y	[N]	± 1/16	± 1/128	± 1/8	± 1/64	± 1/4	± 1/32
Resolution, F_z	[N]	± 1/8	± 1/64	± 1/4	± 1/32	± 1/2	± 1/16
Resolution, M_x, M_y	[N]	± 1/264	± 1/2112	± 3/400	± 3/3200	± 3/200	± 1/1600
Resolution, M_z	[Nm]	± 1/264	± 1/2112	± 3/400	± 3/3200	± 3/200	± 1/1600
Overload, F_{xy}	[N]	± 3500	± 3500	± 3500	± 3500	± 3500	± 3500
Overload, F_z	[N]	± 11900	± 11900	± 11900	± 11900	± 11900	± 11900
Overload, T_{xy}	[Nm]	± 230	± 230	± 230	± 230	± 230	± 230
Overload, T_z	[Nm]	± 420	± 420	± 420	± 420	± 420	± 420
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	37×10^6	37×10^6	37×10^6	37×10^6	37×10^6	37×10^6
Rigidity, Z axis (KF_z)	[N/m]	61×10^6	61×10^6	61×10^6	61×10^6	61×10^6	61×10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	52×10^3	52×10^3	52×10^3	52×10^3	52×10^3	52×10^3
Rigidity, Z axis (KM_z)	[Nm/rad]	94×10^3	94×10^3	94×10^3	94×10^3	94×10^3	94×10^3
Resonance, frequency F_x, F_y, M_z	[KHz]	1.5	1.5	1.5	1.5	1.5	1.5
Resonance, frequency F_z, M_x, M_y	[KHz]	1.7	1.7	1.7	1.7	1.7	1.7

Main views



(24) Bolt pitch circle

FT-Theta

Product advantages

- Wire eroded measuring element made from high-strength, stainless steel
- Special overload bolts make the Theta an extremely robust transducer
- Up to 20-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges

Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

Sensor also available in the following protection classes

IP 60 dust-proof version
IP 65 splash-proof version, suitable for use in damp environments
IP 68 immersion-proof version down to 10 m
For further information or drawings please feel free to contact us. We will be happy to help.

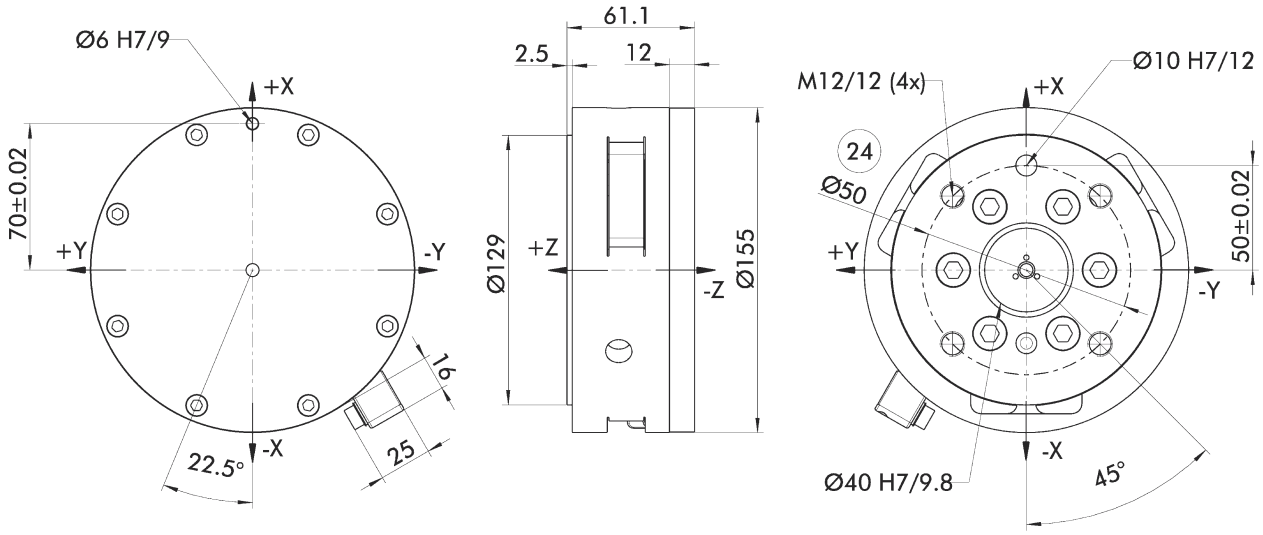
Typical areas of application

- Rehabilitation research
- Robot set-up
- Orthopedics research
- Product tests
- Telerobotics
- Part assembly and machining in precision systems

Technical data

Designation		FTS-Theta	FTD-Theta	FTS-Theta	FTD-Theta	FTS-Theta	FTD-Theta
Calibration		SI-1000-120	SI-1000-120	SI-1500-240	SI-1500-240	SI-2500-400	SI-2500-400
Resolution		Stand alone	DAQ	Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	4990	4990	4990	4990	4990	4990
Range of measurement, F_x, F_y	[N]	± 1000	± 1000	± 1500	± 1500	± 2500	± 2500
Range of measurement, F_z	[N]	± 2500	± 2500	± 3750	± 3750	± 6250	± 6250
Range of measurement, M_x, M_y	[Nm]	± 120	± 120	± 240	± 240	± 400	± 400
Range of measurement, M_z	[Nm]	± 120	± 120	± 240	± 240	± 400	± 400
Resolution, F_x, F_y	[N]	± 1/2	± 1/16	± 1	± 1/8	± 1	± 1/8
Resolution, F_z	[N]	± 1/2	± 1/16	± 1	± 1/8	± 3/2	± 1/4
Resolution, M_x, M_y	[N]	± 1/40	± 1/160	± 1/20	± 3/80	± 1/10	± 1/80
Resolution, M_z	[Nm]	± 1/40	± 1/320	± 1/20	± 3/160	± 1/10	± 1/80
Overload, F_{xy}	[N]	± 25000	± 25000	± 25000	± 25000	± 25000	± 25000
Overload, F_z	[N]	± 61000	± 61000	± 61000	± 61000	± 61000	± 61000
Overload, T_{xy}	[Nm]	± 2490	± 2490	± 2490	± 2490	± 2490	± 2490
Overload, T_z	[Nm]	± 2680	± 2680	± 2680	± 2680	± 2680	± 2680
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	73×10^6	73×10^6	73×10^6	73×10^6	73×10^6	73×10^6
Rigidity, Z axis (KF_z)	[N/m]	125×10^6	125×10^6	125×10^6	125×10^6	125×10^6	125×10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	3.4×10^3	3.4×10^3	3.4×10^3	3.4×10^3	3.4×10^3	3.4×10^3
Rigidity, Z axis (KM_z)	[Nm/rad]	5.4×10^3	5.4×10^3	5.4×10^3	5.4×10^3	5.4×10^3	5.4×10^3
Resonance, frequency F_x, F_y, M_z	[KHz]	0.68	0.68	0.68	0.68	0.68	0.68
Resonance, frequency F_z, M_x, M_y	[KHz]	0.82	0.82	0.82	0.82	0.82	0.82

Main views



(24) Bolt pitch circle

FT-Omega-160

Product advantages

Industrial
· 40 mm center bore, freely usable

Robust and compact
· Wire eroded measuring element made from high-strength, stainless steel
· Up to 14-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges
Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

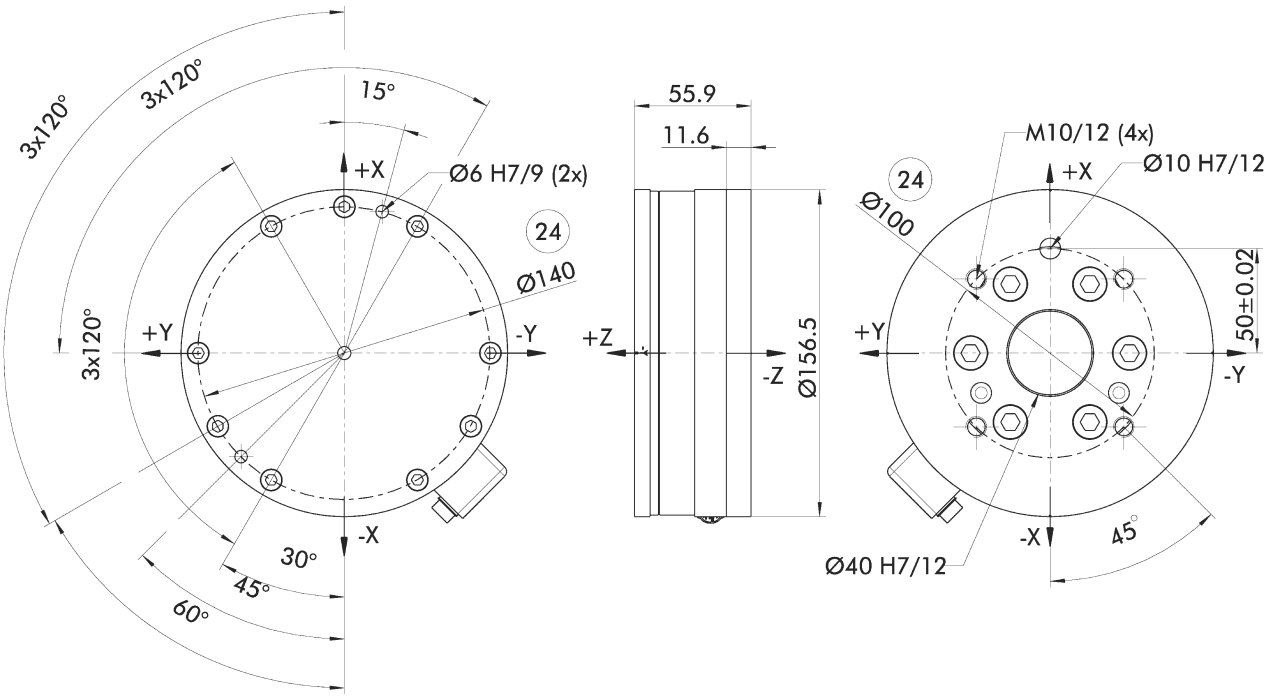
Sensor also available in the following protection classes
IP 60 dust-proof version
IP 65 splash-proof version, suitable for use in damp environments
IP 68 immersion-proof version down to 10 m
For further information or drawings please feel free to contact us. We will be happy to help.

Typical areas of application
· Rehabilitation research
· Robot set-up
· Orthopedics research
· Product tests
· Telerobotics
· Part assembly and machining in precision systems

Technical data

Designation		FTS-Omega-160	FTD-Omega-160	FTS-Omega-160	FTD-Omega-160	FTS-Omega-160	FTD-Omega-160
Calibration		**SI-1000-120**	**SI-1000-120**	**SI-1500-240**	**SI-1500-240**	**SI-2500-400**	**SI-2500-400**
Resolution		Stand alone	DAQ	Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	2720	2720	2720	2720	2720	2720
Range of measurement, F_x, F_y	[N]	± 1000	± 1000	± 1500	± 1500	± 2500	± 2500
Range of measurement, F_z	[N]	± 2500	± 2500	± 3750	± 3750	± 6250	± 6250
Range of measurement, M_x, M_y	[Nm]	± 120	± 120	± 240	± 240	± 400	± 400
Range of measurement, M_z	[Nm]	± 120	± 120	± 240	± 240	± 400	± 400
Resolution, F_x, F_y	[N]	± 1/4	± 1/16	± 1/2	± 1/8	± 1	± 1/8
Resolution, F_z	[N]	± 1/2	± 1/16	± 1	± 1/8	± 3/2	± 3/16
Resolution, M_x, M_y	[N]	± 1/40	± 1/160	± 1/20	± 3/80	± 1/10	± 1/80
Resolution, M_z	[Nm]	± 1/40	± 1/320	± 1/20	± 3/160	± 1/10	± 1/80
Overload, F_{xy}	[N]	± 17500	± 17500	± 17500	± 17500	± 17500	± 17500
Overload, F_z	[N]	± 48000	± 48000	± 48000	± 48000	± 48000	± 48000
Overload, T_{xy}	[Nm]	± 1730	± 1730	± 1730	± 1730	± 1730	± 1730
Overload, T_z	[Nm]	± 1890	± 1890	± 1890	± 1890	± 1890	± 1890
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	70×10^6	70×10^6	70×10^6	70×10^6	70×10^6	70×10^6
Rigidity, Z axis (KF_z)	[N/m]	119×10^6	119×10^6	119×10^6	119×10^6	119×10^6	119×10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	3.3×10^3	3.3×10^3	3.3×10^3	3.3×10^3	3.3×10^3	3.3×10^3
Rigidity, Z axis (KM_z)	[Nm/rad]	5.3×10^3	5.3×10^3	5.3×10^3	5.3×10^3	5.3×10^3	5.3×10^3
Resonance, frequency F_x, F_y, M_z	[KHz]	1.3	1.3	1.3	1.3	1.3	1.3
Resonance, frequency F_z, M_x, M_y	[KHz]	1	1	1	1	1	1

Main views



24 Bolt pitch circle

FT-Omega-190

Product advantages

Robust and compact

- Wire eroded measuring element made from high-strength, stainless steel
- Up to 14-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges

Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

Sensor also available in the following protection classes

IP 60 dust-proof version
IP 65 splash-proof version, suitable for use in damp environments
IP 68 immersion-proof version down to 10 m
For further information or drawings please feel free to contact us. We will be happy to help.

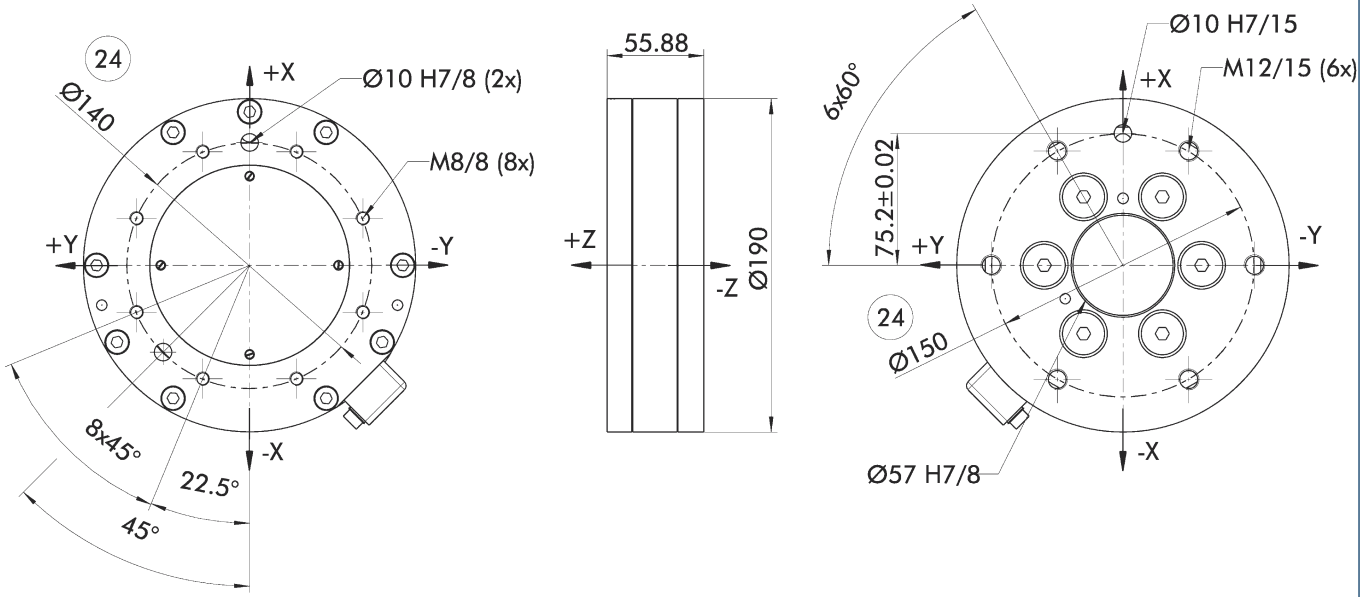
Typical areas of application

- Product tests
- Telerobotics
- Load feedback
- Part assembly and machining in precision systems

Technical data

Designation		FTS-Omega-190	FTD-Omega-190	FTS-Omega-190	FTD-Omega-190	FTS-Omega-190	FTD-Omega-190
Calibration		**SI-1800-350**	**SI-1800-350**	**SI-3600-700**	**SI-3600-700**	**SI-7200-1400**	**SI-7200-1400**
Resolution		Stand alone	DAQ	Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	6.35	6.35	6.35	6.35	6.35	6.35
Range of measurement, F_x, F_y	[N]	± 1800	± 1800	± 3600	± 3600	± 7200	± 7200
Range of measurement, F_z	[N]	± 4500	± 4500	± 9000	± 9000	± 18000	± 18000
Range of measurement, M_x, M_y	[Nm]	± 350	± 350	± 700	± 700	± 1400	± 1400
Range of measurement, M_z	[Nm]	± 350	± 350	± 700	± 700	± 1400	± 1400
Resolution, F_x, F_y	[N]	± 3/4	± 3/32	± 3/2	± 3/16	± 3	± 3/8
Resolution, F_z	[N]	± 3/2	± 5/32	± 3	± 5/16	± 6	± 5/8
Resolution, M_x, M_y	[N]	± 5/48	± 5/384	± 5/24	± 5/192	± 5/12	± 5/96
Resolution, M_z	[Nm]	± 5/72	± 5/576	± 5/36	± 5/288	± 5/18	± 5/144
Overload, F_{xy}	[N]	± 35700	± 35700	± 35700	± 35700	± 35700	± 35700
Overload, F_z	[N]	± 111000	± 111000	± 111000	± 111000	± 111000	± 111000
Overload, T_{xy}	[Nm]	± 5500	± 5500	± 5500	± 5500	± 5500	± 5500
Overload, T_z	[Nm]	± 8100	± 8100	± 8100	± 8100	± 8100	± 8100
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	252 x 10^6	252 x 10^6	252 x 10^6	252 x 10^6	252 x 10^6	252 x 10^6
Rigidity, Z axis (KF_z)	[N/m]	369 x 10^6	369 x 10^6	369 x 10^6	369 x 10^6	369 x 10^6	369 x 10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	1.575 x 10^3	1.575 x 10^3	1.575 x 10^3	1.575 x 10^3	1.575 x 10^3	1.575 x 10^3
Rigidity, Z axis (KM_z)	[Nm/rad]	3-331 x 10^3	3-331 x 10^3	3-331 x 10^3	3-331 x 10^3	3-331 x 10^3	3-331 x 10^3

Main views



(24) Bolt pitch circle

FT-Omega-250

Product advantages

Robust and compact

- Wire eroded measuring element made from high-strength, stainless steel
- Up to 14-fold overload safety with respect to the range of measurement

Measurement signal resistant to interference due to use of silicium strain gauges

Silicium strain gauges provide a signal which is 75 times stronger than conventional foil strain gauges. The silicium strain gauges reduce signal noise to practically nothing.

Sensor also available in the following protection classes

IP 60 dust-proof version
IP 65 splash-proof version, suitable for use in damp environments
IP 68 immersion-proof version down to 10 m
For further information or drawings please feel free to contact us. We will be happy to help.

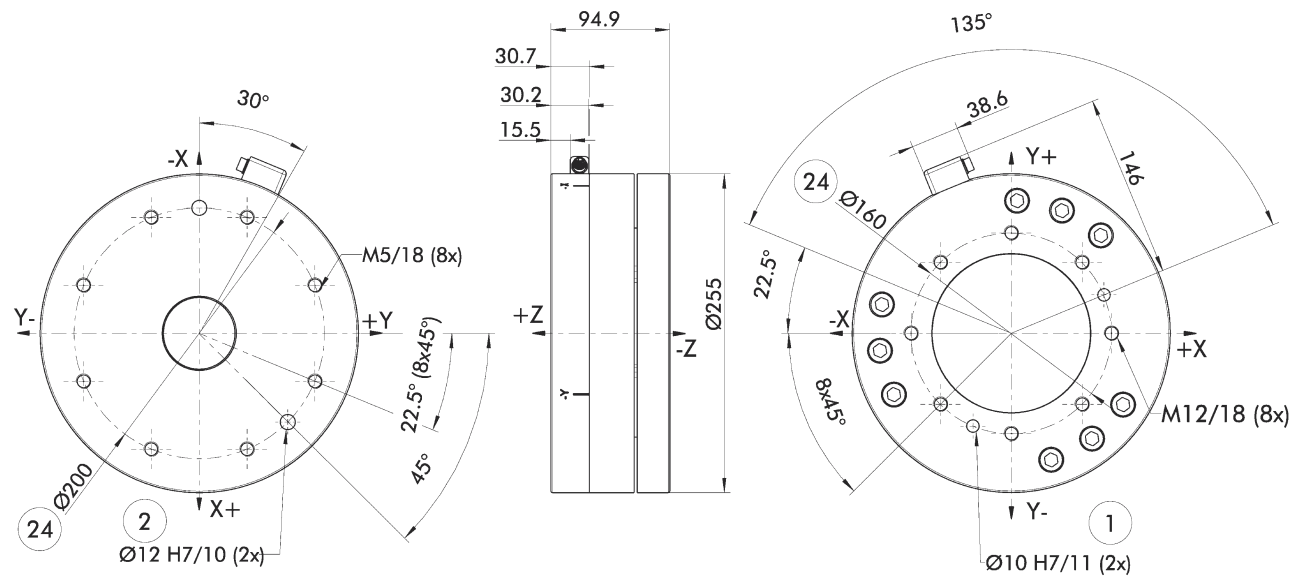
Typical areas of application

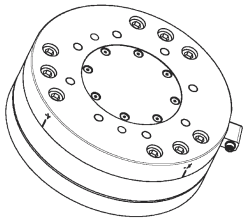
- Product tests
- Telerobotics
- Load feedback
- Part assembly and machining in precision systems

Technical data

Designation		FTS-Omega-250	FTD-Omega-250	FTS-Omega-250	FTD-Omega-250	FTS-Omega-250	FTD-Omega-250
Calibration		**SI-4000-500**	**SI-4000-500**	**SI-8000-1000**	**SI-8000-1000**	**SI-16000-2000**	**SI-16000-2000**
Resolution		Stand alone	DAQ	Stand alone	DAQ	Stand alone	DAQ
Mass	[g]	30	30	30	30	30	30
Range of measurement, F_x, F_y	[N]	± 4000	± 4000	± 8000	± 8000	± 16000	± 16000
Range of measurement, F_z	[N]	± 8000	± 8000	± 16000	± 16000	± 32000	± 32000
Range of measurement, M_x, M_y	[Nm]	± 500	± 500	± 1000	± 1000	± 2000	± 2000
Range of measurement, M_z	[Nm]	± 500	± 500	± 1000	± 1000	± 2000	± 2000
Resolution, F_x, F_y	[N]	± 1 3/4	± 7/32	± 3 1/2	± 7/16	± 7	± 7/8
Resolution, F_z	[N]	± 2 3/4	± 11/32	± 5 1/2	± 11/16	± 11	± 1 3/8
Resolution, M_x, M_y	[N]	± 7/32	± 7/256	± 7/16	± 7/28	± 7/8	± 7/64
Resolution, M_z	[Nm]	± 3/16	± 3/128	± 3/8	± 3/64	± 3/4	± 3/32
Overload, F_{xy}	[N]	± 160000	± 160000	± 160000	± 160000	± 160000	± 160000
Overload, F_z	[N]	± 320000	± 320000	± 320000	± 320000	± 320000	± 320000
Overload, T_{xy}	[Nm]	± 20000	± 20000	± 20000	± 20000	± 20000	± 20000
Overload, T_z	[Nm]	± 24000	± 24000	± 24000	± 24000	± 24000	± 24000
Rigidity, force XY axis (KF_x, KF_y)	[N/m]	420 x 10^6	420 x 10^6	420 x 10^6	420 x 10^6	420 x 10^6	420 x 10^6
Rigidity, Z axis (KF_z)	[N/m]	550 x 10^6	550 x 10^6	550 x 10^6	550 x 10^6	550 x 10^6	550 x 10^6
Rigidity, force XY axis (KM_x, KM_y)	[Nm/rad]	3.0 x 10^6	3.0 x 10^6	3.0 x 10^6	3.0 x 10^6	3.0 x 10^6	3.0 x 10^6
Rigidity, Z axis (KM_z)	[Nm/rad]	6.2 x 10^6	6.2 x 10^6	6.2 x 10^6	6.2 x 10^6	6.2 x 10^6	6.2 x 10^6

Main views





① Robot-side connection
② Tool-side connection
㉔ Bolt pitch circle

Machining

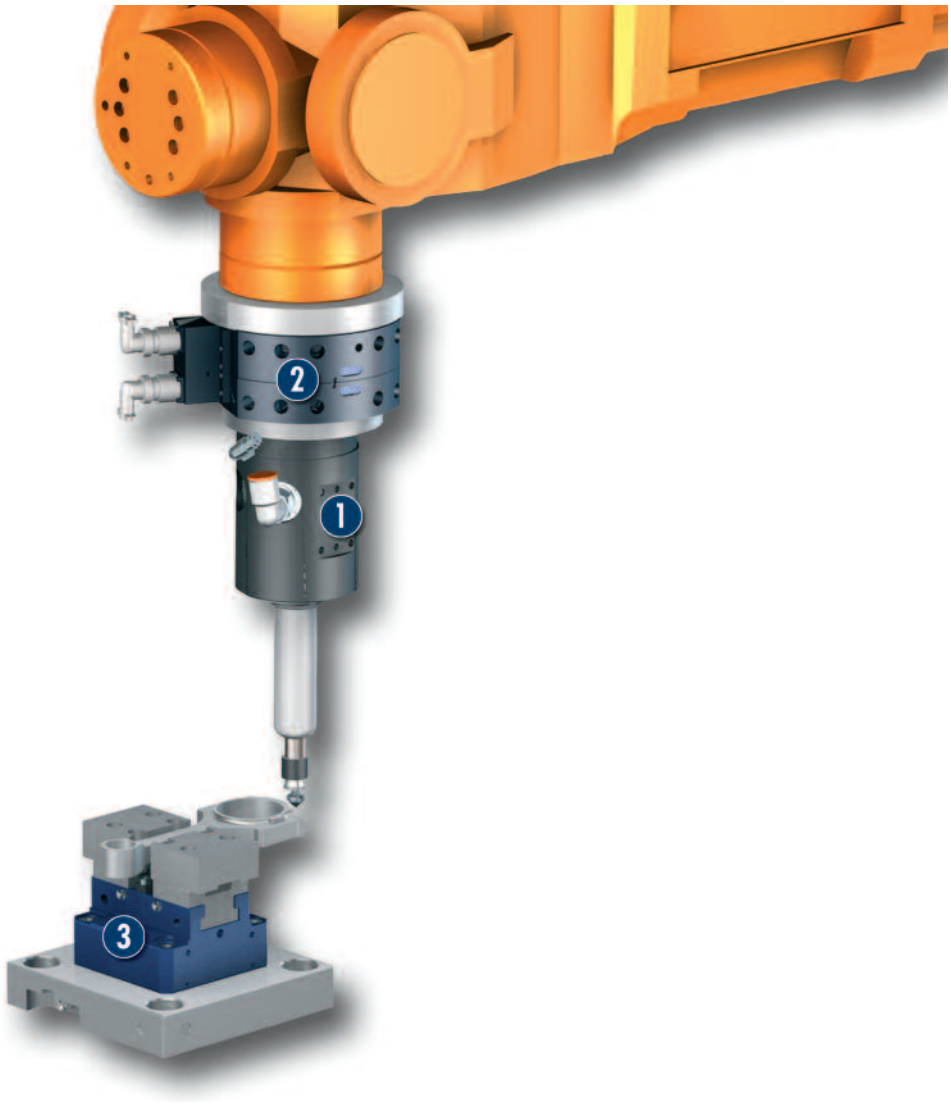
MACHINING

Sizes
150 .. 660

Max. speed
65000 RPM

Power consumption
150 W .. 660 W

Application example



Robot-controlled deburring of case connecting rods

Flexible Deburring Spindle FDB 300

Quick-change System SWS 41

Clamping Force Block KSP 100

Deburring Spindle

Flexible deburring spindle for use on robot

Area of application

Standard solution for flexible and robot-controlled deburring of various workpieces

Your advantages and benefits

Flexible high-frequency spindle
for maximum flexibility during deburring

Adjustable rigidity of spindle
for clean chamfering edges in any installation position

High RPMs
for fast feed rates

Flexible use
on robot arm or as a stationary unit

General information on the series

Mounting
on back or side

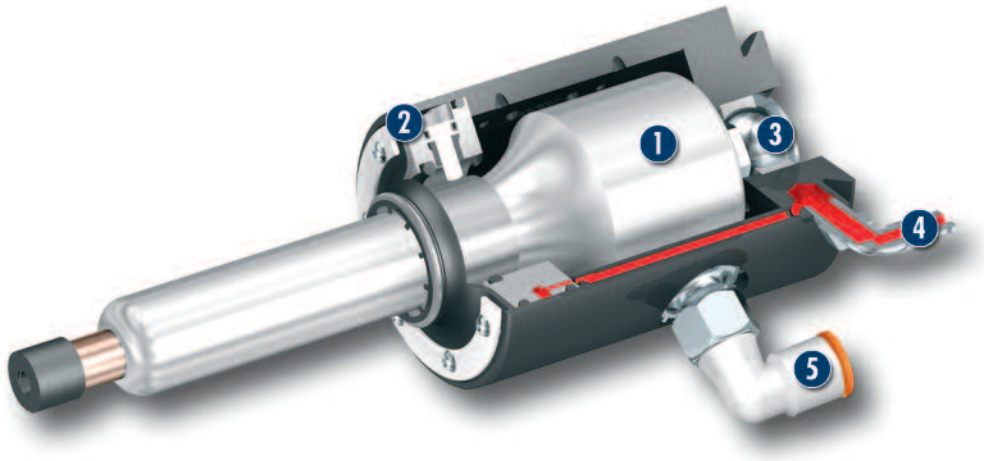
Drive
quiet-running compressed air spindle (less than 70 dbA)

Scope of delivery
spindle with collet and pneumatic screw connection

Warranty
24 months

Actuation
pneumatic, via filtered compressed air (10 µm): dry and non-lubricated

Sectional diagram



Pneumatic Spindle
High-performance spindle up to 65,000 RPM

Ring Cylinder
for adapting the pressure force to the workpiece

Bearing Point
of the pendulum suspension of the pneumatic motor

Air Connection
for actuation of the ring cylinder

Air Connection
with large diameter for pneumatic motor

Functional description

The unit is driven by a pneumatic spindle with a speed of up to 65,000 RPM depending on the size. The spindle is mounted on pendulum bearings in order to follow tolerances of the machining contour. The maximum path at the milling tip is +/- 9 mm. The force (rigidity) needed for the pendulum motion of the spindle is regulated via a second air connection. Depending on the pressure, a force of 3.1 N to 42.3 N is applied to the cutting surface.

Options and special information

Universal

Due to flexible mounting options, the FDB is not restricted to use on the robot arm. It can also be used as a permanently mounted tool with a moving workpiece.

Accessories

Accessories from SCHUNK – the suitable supplement for maximum functionality, reliability and performance of all automation modules.

Collets

Adapter plates

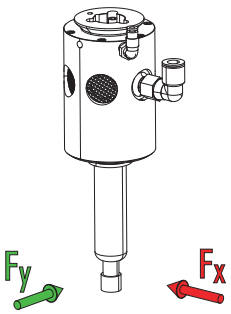
Fittings

General information on the series

Please note that the unit is not suitable for use with coolants.

FDB 150

Forces and moments

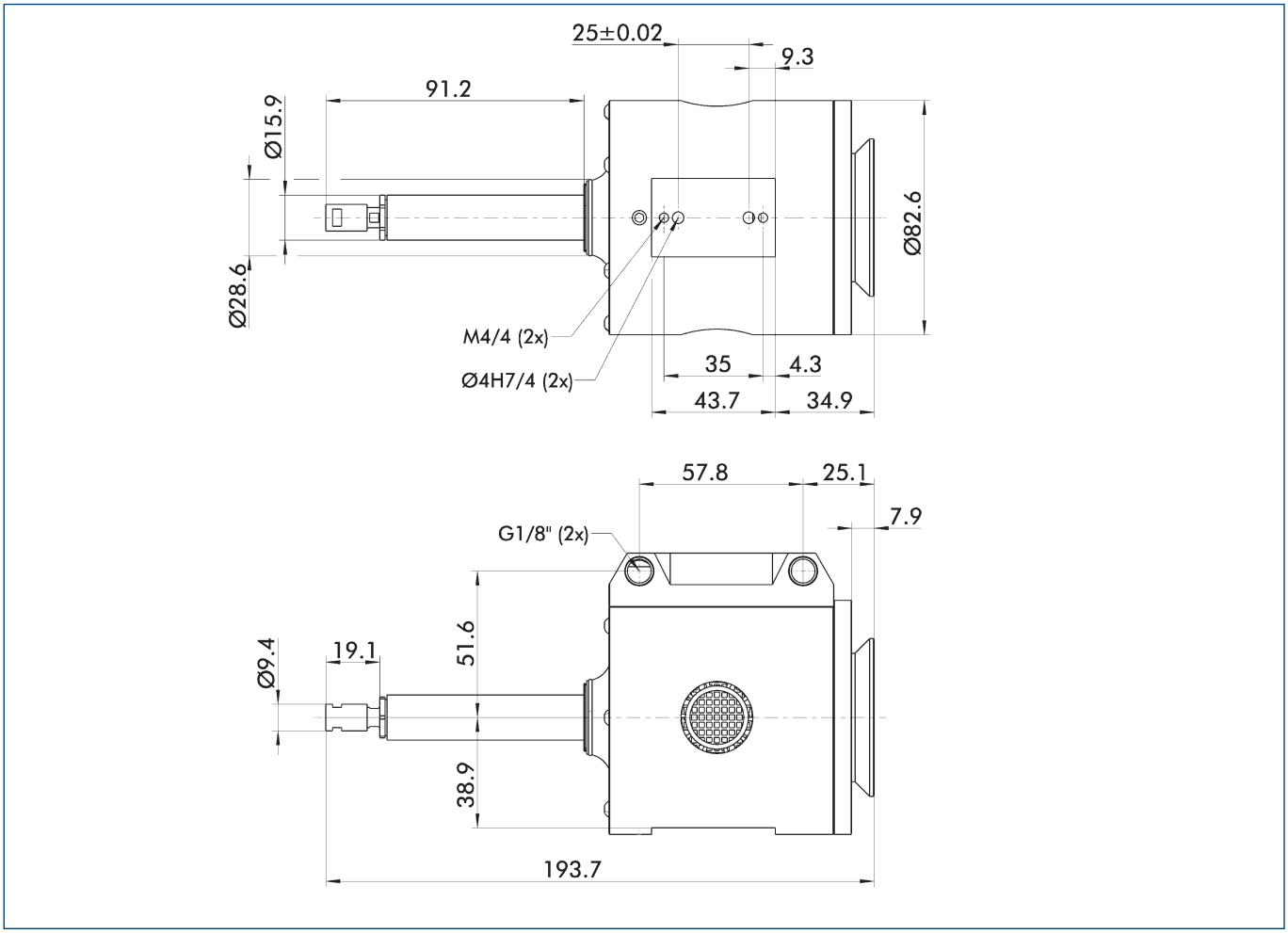


F_x max. 6.7 N
F_y max. 6.7 N

Technical data

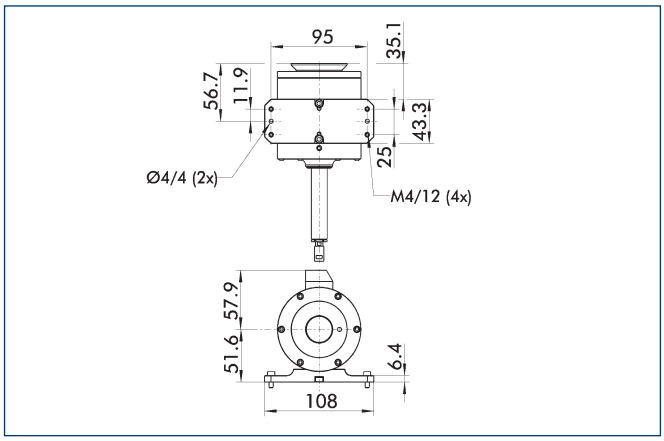
Designation		FDB 150
	ID	0322200
Weight	[kg]	1.11
Max. compensation path	[mm]	5.0
Recommended compensation path	[mm]	2.5
Min. compensation force	[N]	3.1
Max. compensation force	[N]	6.7
Min. compensation pressure	[bar]	1.4
Max. compensation pressure	[bar]	4.1
No-load speed	[RPM]	65000
Air consumption without load	[l/s]	1.4
Air consumption blocked	[l/s]	3.8
Collet diameter	[mm]	3.0
Power	[W]	150.0

Main views



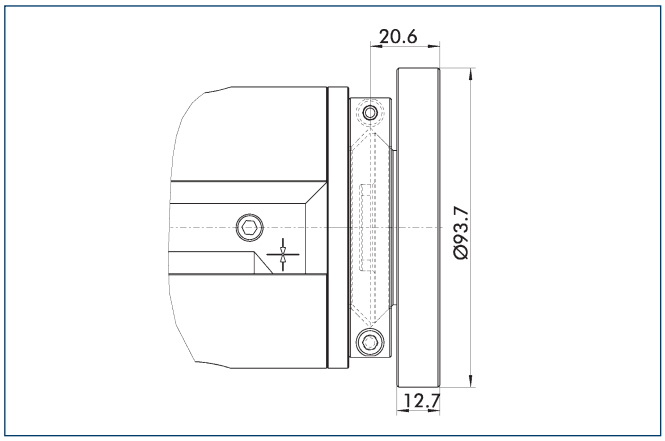
The drawing shows the basic version of the deburring spindle without dimensional consideration of the options described below.

Adapter plates, radial



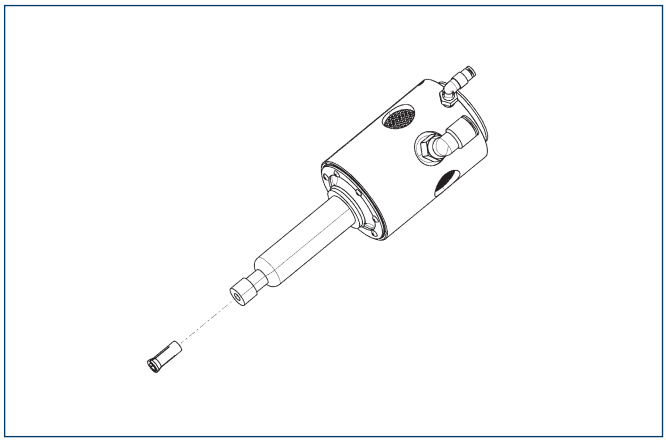
Designation	ID
FDB-APL-1054	0322212

Adapter plates, axial



Designation	ID
FDB-APL-1005	0322210

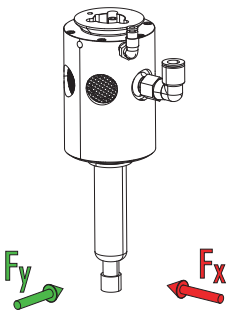
Collets



Designation	ID	Diameter
Collets FDB-C-12142	**0322221**	3 mm
Collets FDB-C-12149	**0322224**	1/8 "

FDB 300

Forces and moments

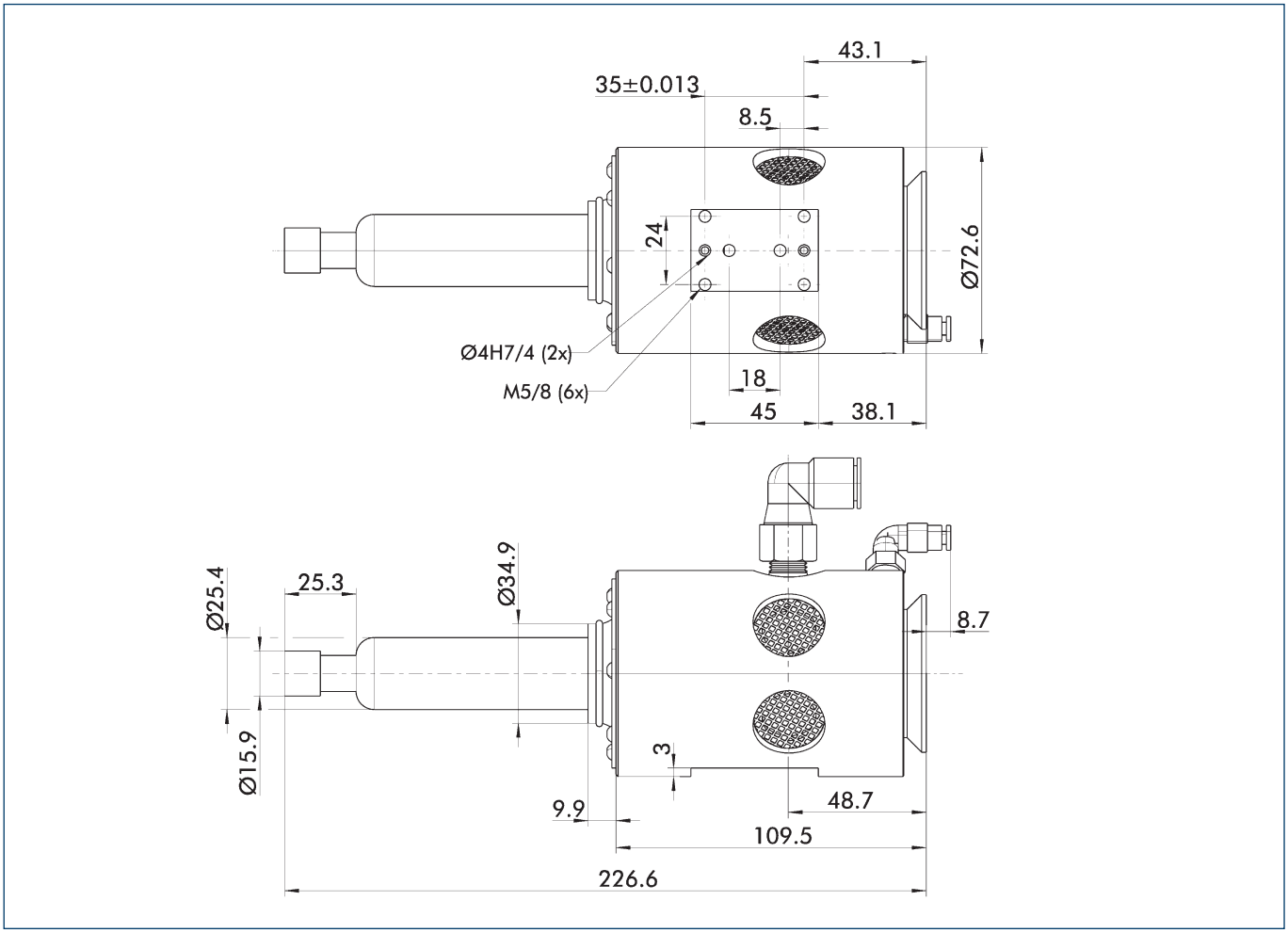


F_x max. 42.3 N
F_y max. 42.3 N

Technical data

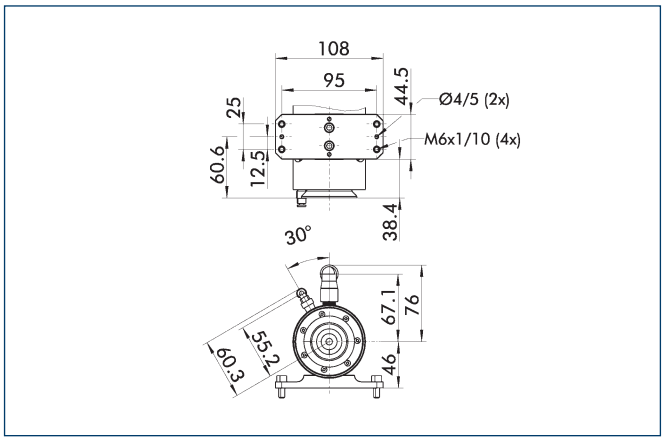
Designation		FDB 300
	ID	0322202
Weight	[kg]	1.15
Max. compensation path	[mm]	8.0
Recommended compensation path	[mm]	4.0
Min. compensation force	[N]	6.7
Max. compensation force	[N]	42.3
Min. compensation pressure	[bar]	0.3
Max. compensation pressure	[bar]	4.1
No-load speed	[RPM]	30000
Air consumption without load	[l/s]	2.8
Air consumption blocked	[l/s]	10.2
Collet diameter	[mm]	6.0
Power	[W]	300.0

Main views

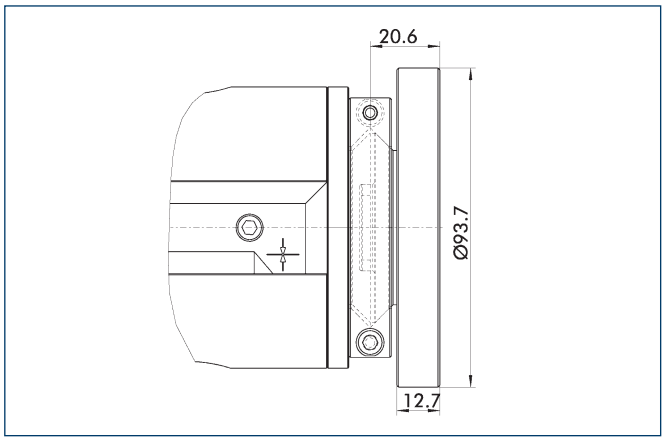


The drawing shows the basic version of the deburring spindle without dimensional consideration of the options described below.

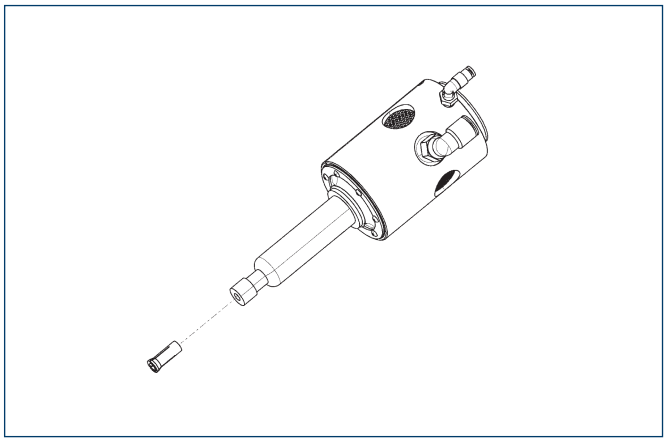
Adapter plates, radial



Adapter plates, axial



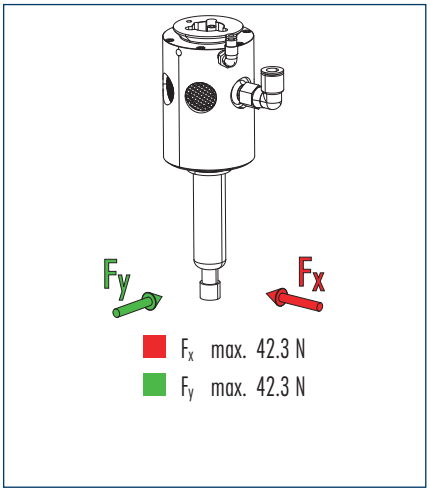
Collets



Designation	ID	Diameter
Collets FDB-C-12442	**0322220**	3 mm
Collets FDB-C-12443	**0322226**	1/8 "
Collets FDB-C-12445	**0322222**	6 mm
Collets FDB-C-12446	**0322225**	1/4 "

FDB 340

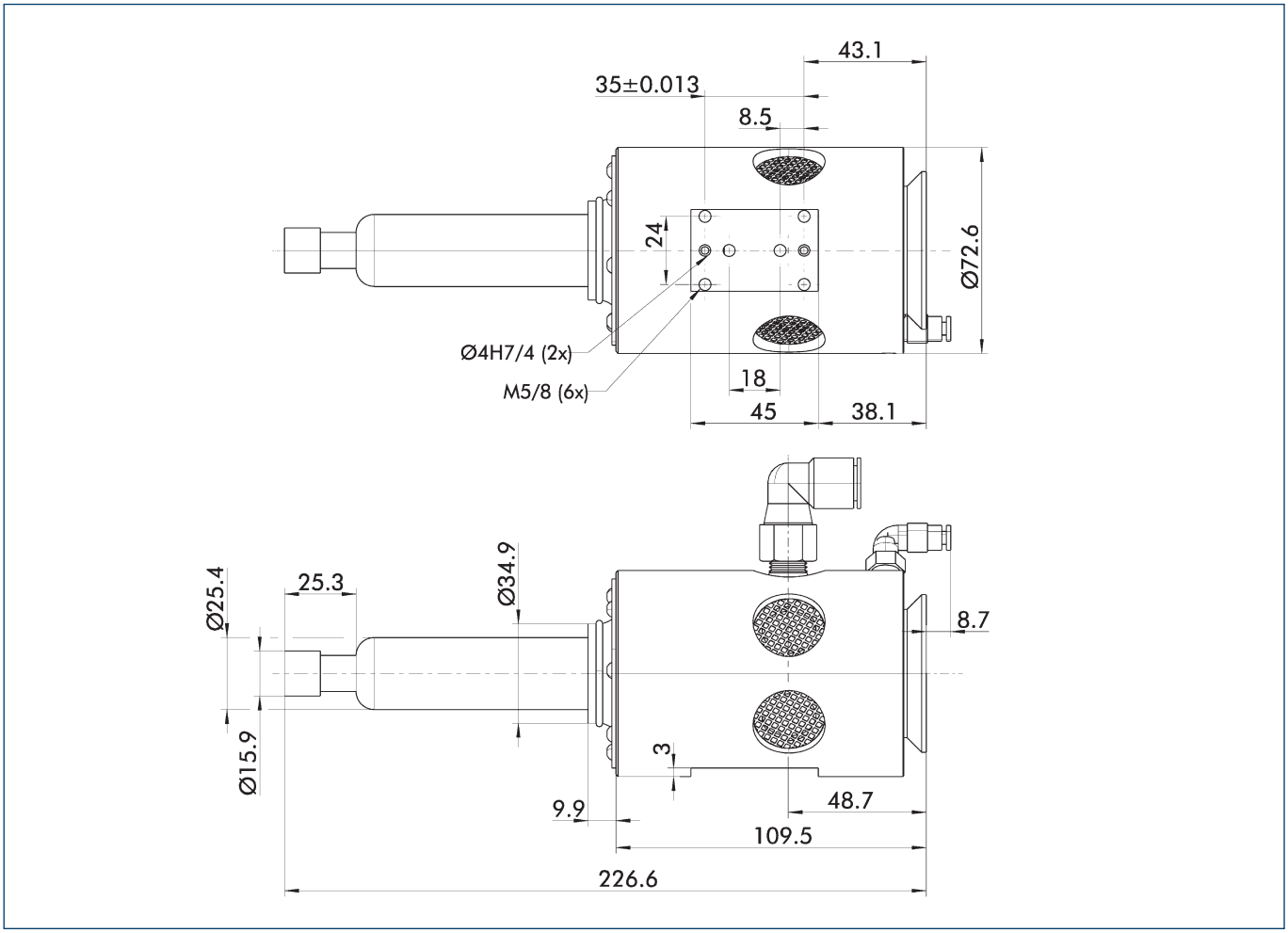
Forces and moments



Technical data

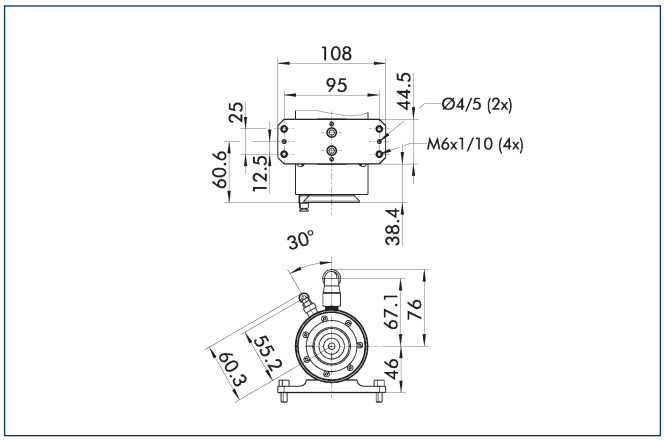
Designation		FDB 340
	ID	0322201
Weight	[kg]	1.15
Max. compensation path	[mm]	8.0
Recommended compensation path	[mm]	4.0
Min. compensation force	[N]	6.7
Max. compensation force	[N]	42.3
Min. compensation pressure	[bar]	0.3
Max. compensation pressure	[bar]	4.1
No-load speed	[RPM]	40000
Air consumption without load	[l/s]	2.8
Air consumption blocked	[l/s]	10.2
Collet diameter	[mm]	6.0
Power	[W]	340.0

Main views



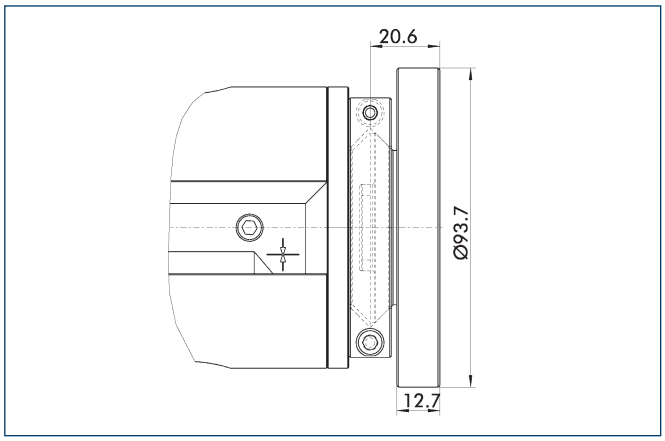
The drawing shows the basic version of the deburring spindle without dimensional consideration of the options described below.

Adapter plates, radial



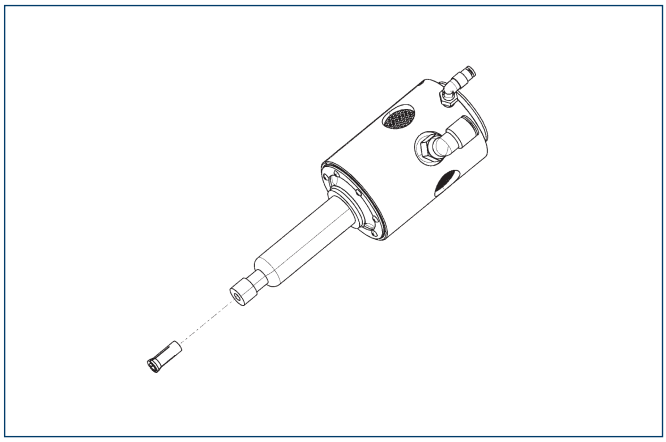
Designation	ID
FDB-APL-1003	0322213

Adapter plates, axial

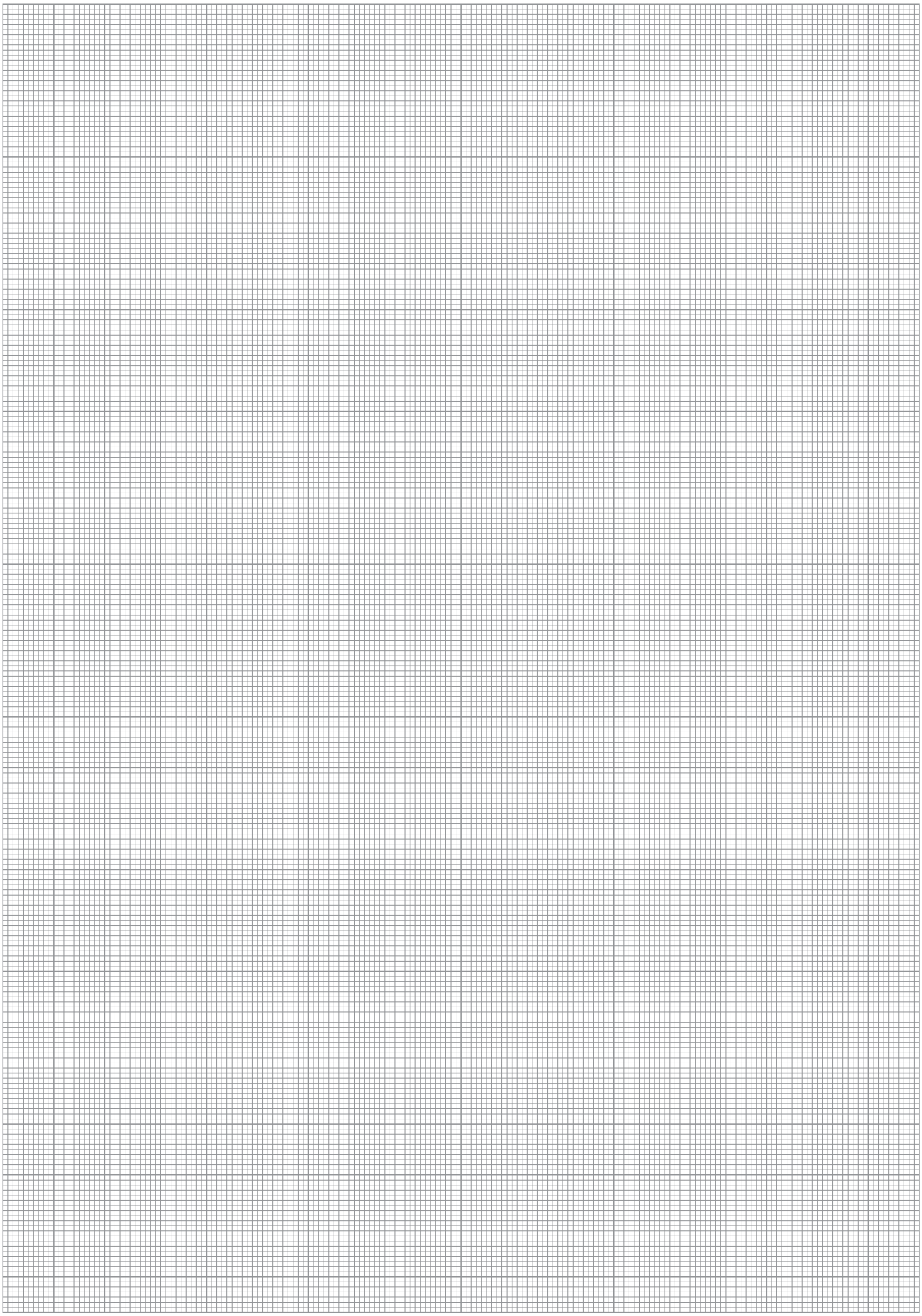


Designation	ID
FDB-APL-1005	0322210

Collets

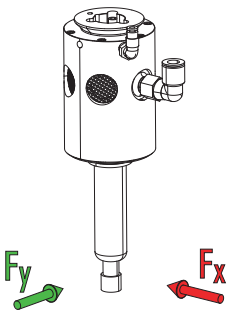


Designation	ID	Diameter
Collets FDB-C-12442	**0322220**	3 mm
Collets FDB-C-12443	**0322226**	1/8 "
Collets FDB-C-12445	**0322222**	6 mm
Collets FDB-C-12446	**0322225**	1/4 "



FDB 660

Forces and moments

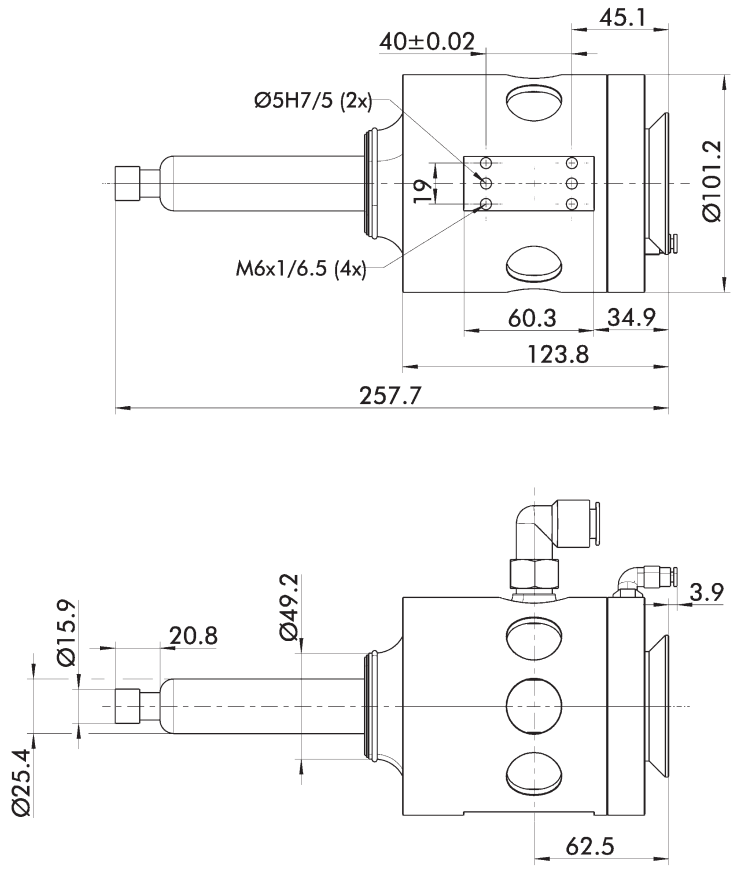


F_x max. 42.3 N
F_y max. 42.3 N

Technical data

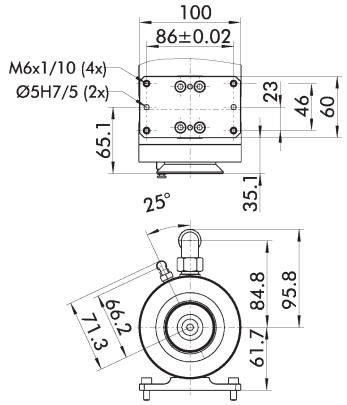
Designation		FDB 660
	ID	0322203
Weight	[kg]	2.2
Max. compensation path	[mm]	9.0
Recommended compensation path	[mm]	4.5
Min. compensation force	[N]	6.7
Max. compensation force	[N]	42.3
Min. compensation pressure	[bar]	0.3
Max. compensation pressure	[bar]	4.1
No-load speed	[RPM]	40000
Air consumption without load	[l/s]	5.4
Air consumption blocked	[l/s]	17.9
Collet diameter	[mm]	6.0
Power	[W]	660.0

Main views



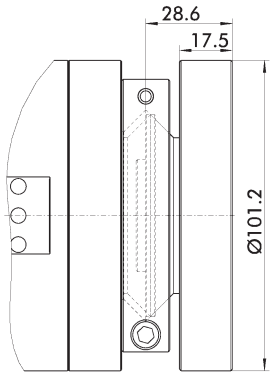
The drawing shows the basic version of the deburring spindle without dimensional consideration of the options described below.

Adapter plates, radial



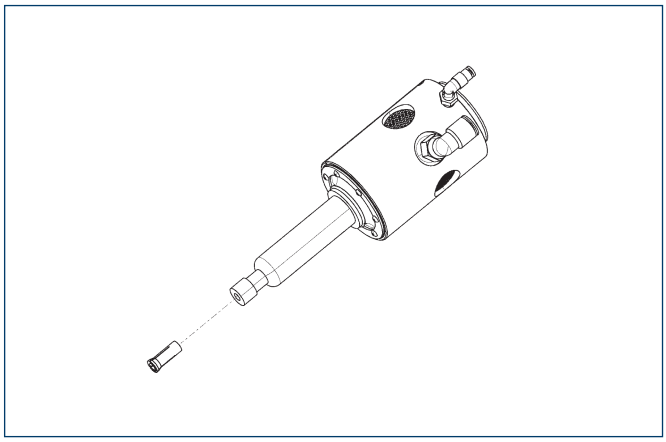
Designation	ID
FDB-APL-1029	0322214

Adapter plates, axial

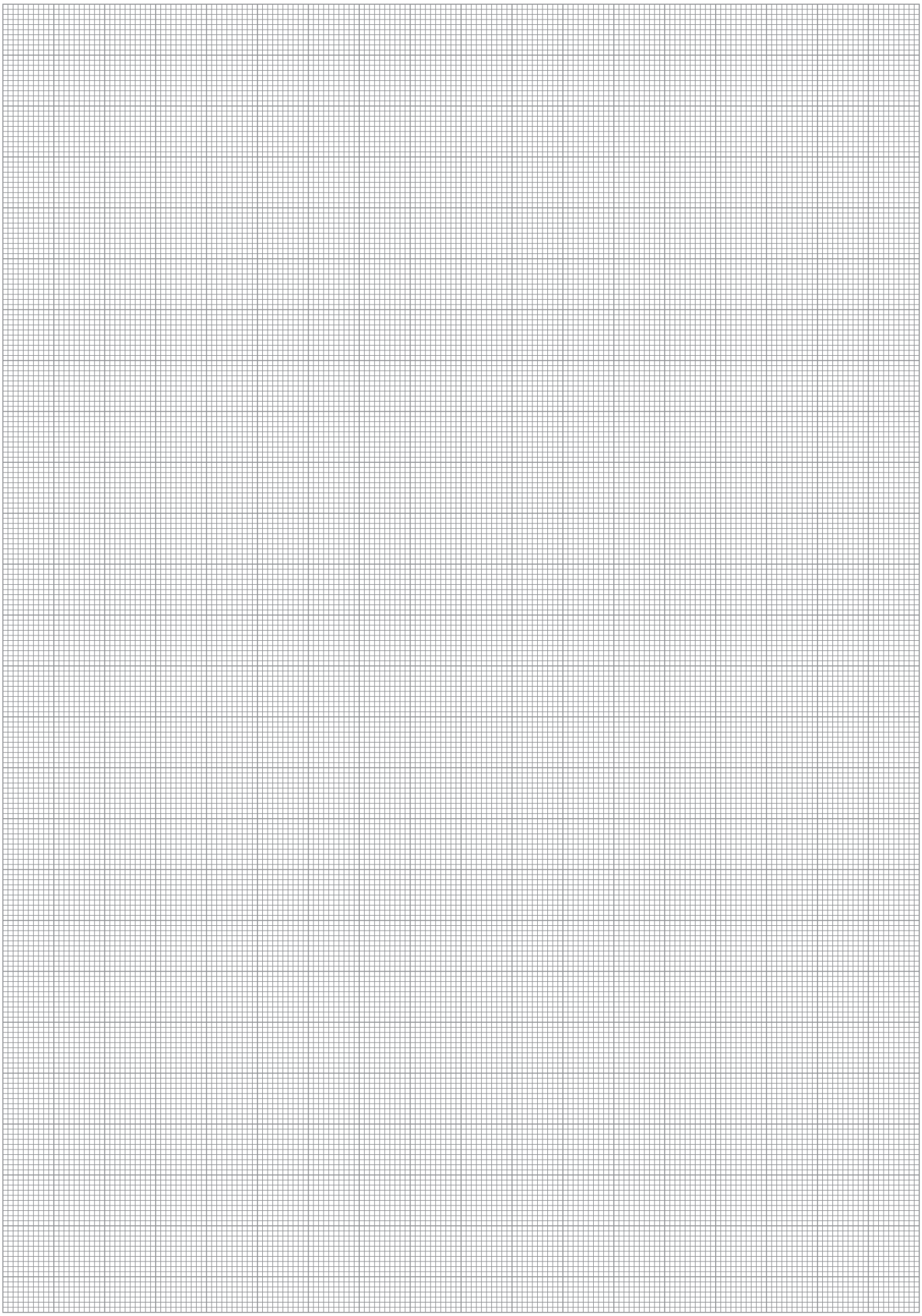


Designation	ID
FDB-APL-1028	0322211

Collets



Designation	ID	Diameter
Collets FDB-C-12442	**0322220**	3 mm
Collets FDB-C-12443	**0322226**	1/8 "
Collets FDB-C-12445	**0322222**	6 mm
Collets FDB-C-12446	**0322225**	1/4 "



Accessories

ACCESSORIES

Inductive Proximity Switches

Inductive proximity switches are used to monitor the current position of automation components. They are available from SCHUNK in the versions IN (sensor with 30 cm molded cable and cable connector) or INK (sensor with 2 m long feeder cable and litz wires for wiring).

Function description

With their oscillator coil, inductive proximity switches produce a high-frequency, alternating magnetic field. This field occurs on the active surface of the sensor. If a metal object enters the field, it draws energy from the magnetic field, thereby reducing the oscillation amplitude. This change is detected, and the sensor switches.

Your advantages and benefits

Mounting through bracket
for simple, fast assembly

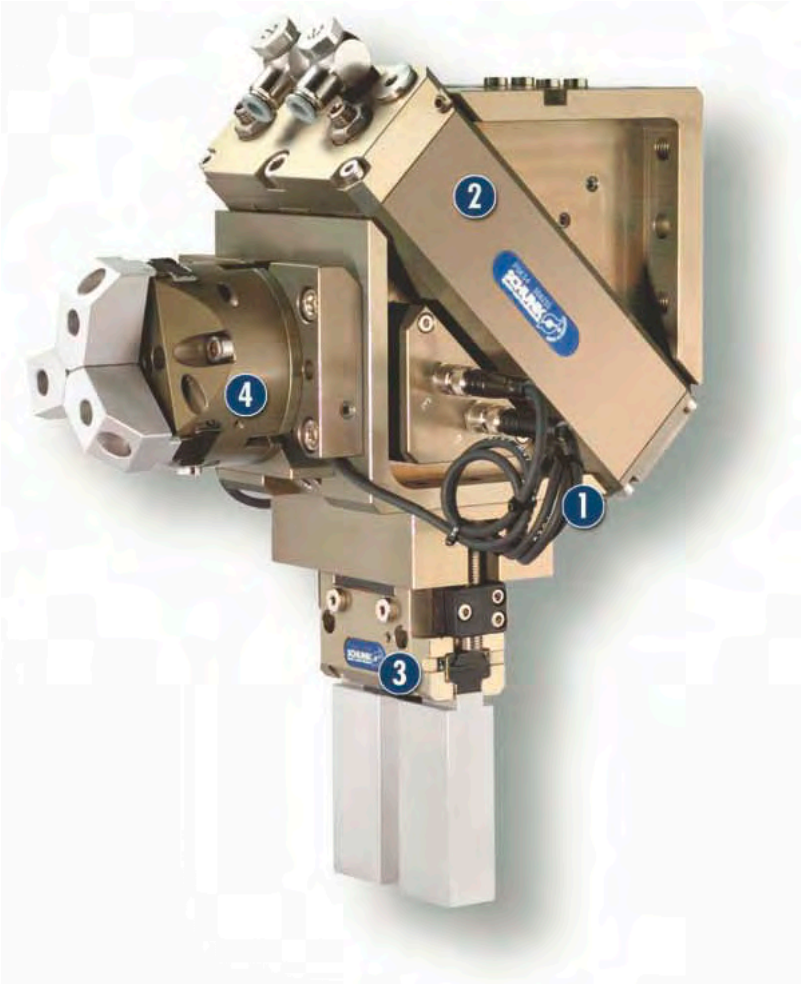
Version with LED display
for checking the switching state directly at the sensor

Version with connector
for easy, rapid replacement of the extension cable

Ultra-flexible PUR cable
for a long life and resistance to many chemicals

Proximity switch can be installed flush
for minimal interfering contours in the application

Application example



1 **Plug-in IN Sensors**

2 **PSK Swivel Head**

3 **PGN 2-Finger Parallel Gripper with ABR finger blanks**

4 **PZN 3-Finger Centric Gripper with workpiece-specific gripper fingers**

Area of application

For monitoring of gripping and rotary modules, linear modules and robot accessories. Inductive SCHUNK sensors detect metals without contact and are resistant to vibration, dust and humidity.

General information

Protection class according to DIN 40050

IP 67 in connected condition for use in clean or dusty environments or in the event of contact with water. Contact with other media (cooling lubricants, acidic or caustic substances, etc.) frequently does not impair the function, but this cannot be guaranteed by SCHUNK.

Voltage

10 – 30 V DC, residual ripple < 15 %

Switching method

PNP switching

Warranty

24 months

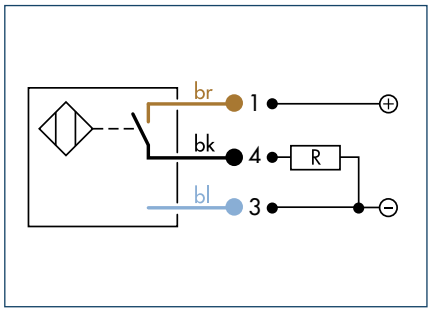
Notes

SCHUNK gripping, rotary and linear modules and robot accessory components must always be ordered from SCHUNK with the matching sensors, as these are ideally adapted to work together.

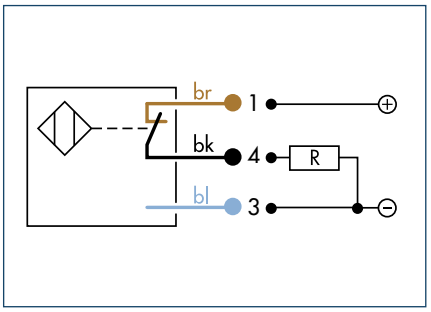
If major characteristics such as switching distance, switching function, hysteresis and voltage are largely the same, then proximity switches from other manufacturers may be used instead of inductive proximity switches (IN, INK) from SCHUNK.

However, if proximity switches from other manufacturers are used, SCHUNK cannot guarantee either their function or their functional reliability.

Circuit diagram of closer



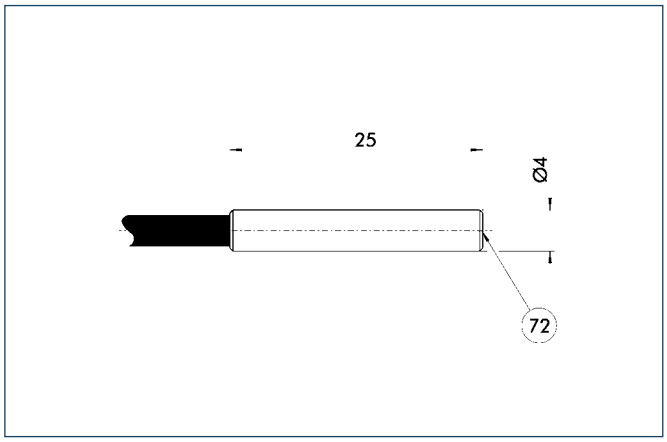
Circuit diagram of opener



Technical data

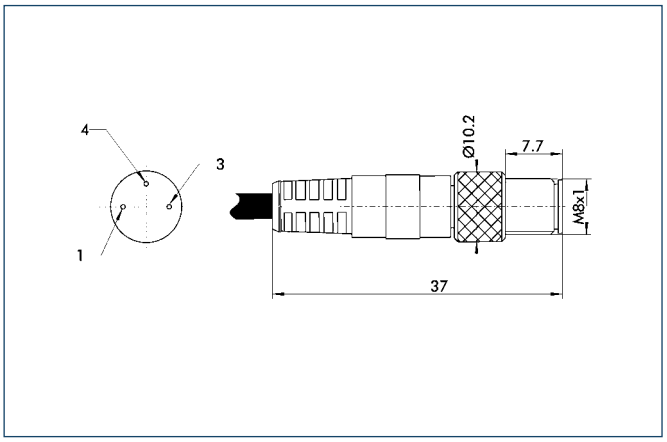
Description		IN 40-S-M8	IN 40-S-M12	INK 40-S	IN 40-O-M8	IN 40-O-M12	INK 40-O	IN 40-S-M5-PNP	IN 40-S-M5-NPN
	ID	0301474	0301574	0301555	0301484	0301584	0301556	0301491	0301492
Switching function		Closer	Closer	Closer	Opener	Opener	Opener	Closer	Closer
Switching distance	[mm]	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hysteresis of nominal switching distance		< 15%	< 15%	< 15%	< 15%	< 15%	< 15%	< 15%	< 15%
Switching method		PNP	PNP	PNP	PNP	PNP	PNP	PNP	NPN
Cable length	[cm]	30.0	30.0	200.0	30.0	30.0	200.0	30.0	30.0
Cable connector/cable end		M8	M12	Open wire	M8	M12	Open wire	M8	M8
Type of voltage		DC	DC	DC	DC	DC	DC	DC	DC
Nominal voltage	[V]	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Min. voltage	[V]	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Max. voltage	[V]	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Voltage drop	[V]	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Max. power on contact	[A]	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Min. ambient temperature	[°C]	-25.0	-25.0	-25.0	-25.0	-25.0	-25.0	-25.0	-25.0
Max. ambient temperature	[°C]	70.0	70.0	70.0	70.0	70.0	70.0	70.0	70.0
Max. switching frequency	[Hz]	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0
IP class (sensor)		67	67	67	67	67	67	67	67
IP class (connector, plugged in)		67	67	67	67	67	67	67	67
LED display on sensor		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cable diameter	[mm]	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Min. bending radius (dynamic)	[mm]	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Min. bending radius (static)	[mm]	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
No. of wires		3	3	3	3	3	3	3	3
Wire cross section	[mm²]	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

IN 40 sensor

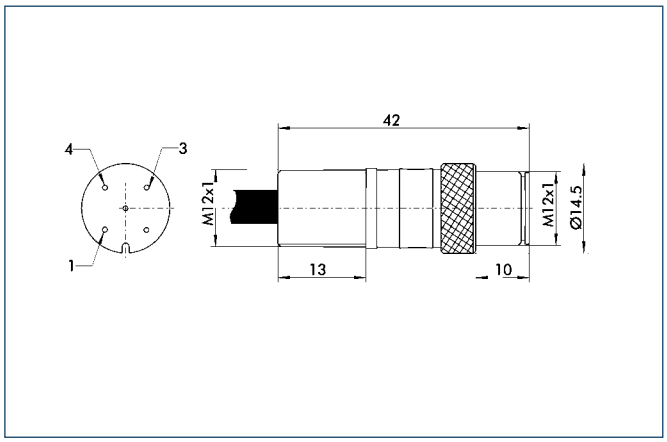


(72) Active sensor surface

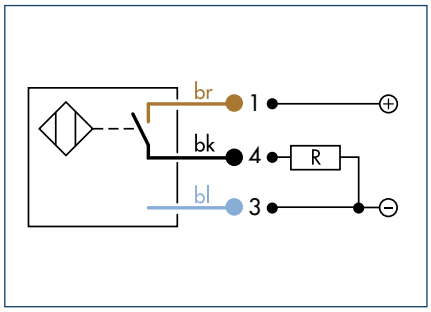
M8 connector



M12 connector



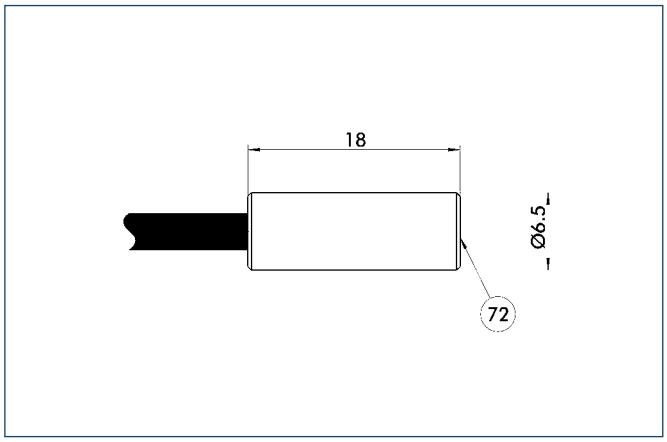
Circuit diagram of closer



Technical data

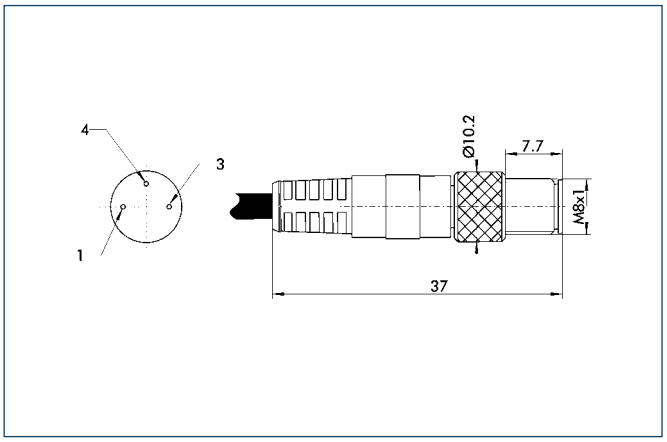
Description		IN 60-S-M8	IN 60-S-M12	INK 60-S
ID		0301485	0301585	0301553
Switching function		Closer	Closer	Closer
Switching distance	[mm]	1.5	1.5	1.5
Hysteresis of nominal switching distance		< 15%	< 15%	< 15%
Switching method		PNP	PNP	PNP
Cable length	[cm]	30.0	30.0	200.0
Cable connector/cable end		M8	M12	Open wire
Type of voltage		DC	DC	DC
Nominal voltage	[V]	24.0	24.0	24.0
Min. voltage	[V]	10.0	10.0	10.0
Max. voltage	[V]	30.0	30.0	30.0
Voltage drop	[V]	1.5	1.5	1.5
Max. power on contact	[A]	0.2	0.2	0.2
Min. ambient temperature	[°C]	-25.0	-25.0	-25.0
Max. ambient temperature	[°C]	70.0	70.0	70.0
Max. switching frequency	[Hz]	1000.0	1000.0	1000.0
IP class (sensor)		67	67	67
IP class (connector, plugged in)		67	67	67
LED display on sensor		No	No	No
Cable diameter	[mm]	3.5	3.5	3.5
Min. bending radius (dynamic)	[mm]	35.0	35.0	35.0
Min. bending radius (static)	[mm]	17.5	17.5	17.5
No. of wires		3	3	3
Wire cross section	[mm^2]	0.14	0.14	0.14

IN 60/S sensor

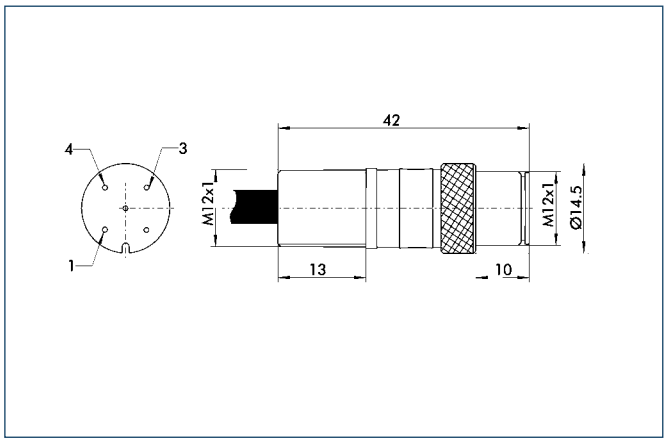


(72) Active sensor surface

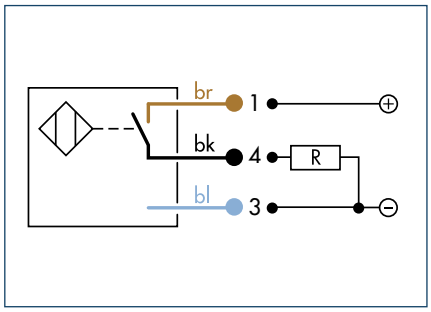
M8 connector



M12 connector



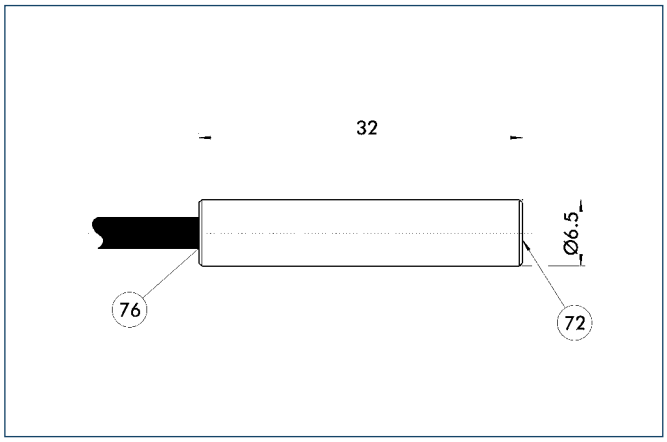
Circuit diagram of closer



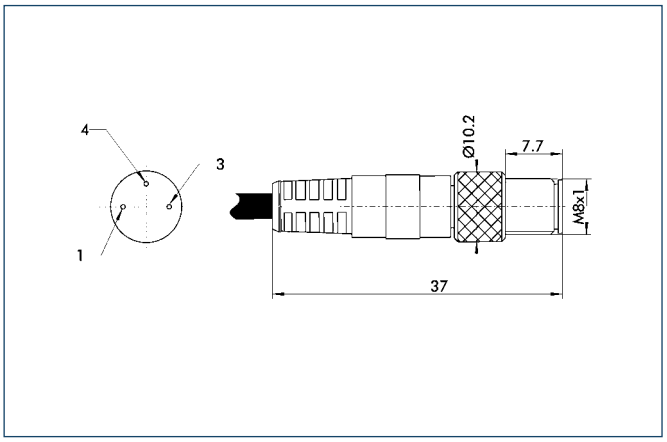
Technical data

Description		IN 65-S-M8	IN 65-S-M12	INK 65-S
ID		0301476	0301576	0301554
Switching function		Closer	Closer	Closer
Switching distance	[mm]	1.5	1.5	1.5
Hysteresis of nominal switching distance		< 15%	< 15%	< 15%
Switching method		PNP	PNP	PNP
Cable length	[cm]	30.0	30.0	200.0
Cable connector/cable end		M8	M12	Open wire
Type of voltage		DC	DC	DC
Nominal voltage	[V]	24.0	24.0	24.0
Min. voltage	[V]	10.0	10.0	10.0
Max. voltage	[V]	30.0	30.0	30.0
Voltage drop	[V]	1.5	1.5	1.5
Max. power on contact	[A]	0.2	0.2	0.2
Min. ambient temperature	[°C]	-25.0	-25.0	-25.0
Max. ambient temperature	[°C]	70.0	70.0	70.0
Max. switching frequency	[Hz]	1000.0	1000.0	1000.0
IP class (sensor)		67	67	67
IP class (connector, plugged in)		67	67	67
LED display on sensor		Yes	Yes	No
Cable diameter	[mm]	3.5	3.5	3.5
Min. bending radius (dynamic)	[mm]	35.0	35.0	35.0
Min. bending radius (static)	[mm]	17.5	17.5	17.5
No. of wires		3	3	3
Wire cross section	[mm^2]	0.14	0.14	0.14

IN 65/S sensor

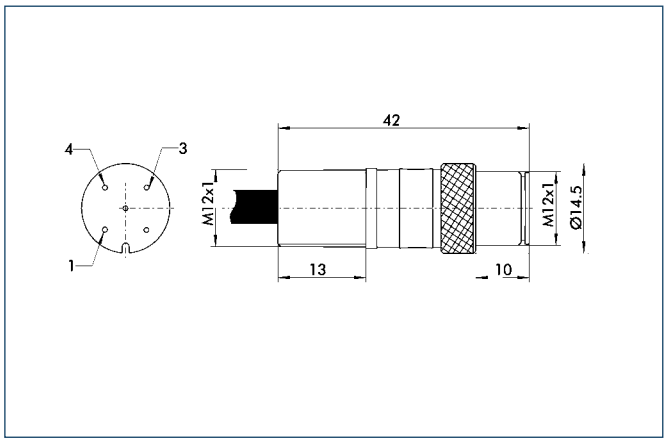


M8 connector

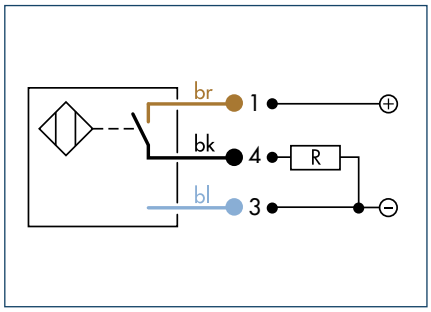


(72) Active sensor surface
(76) LED

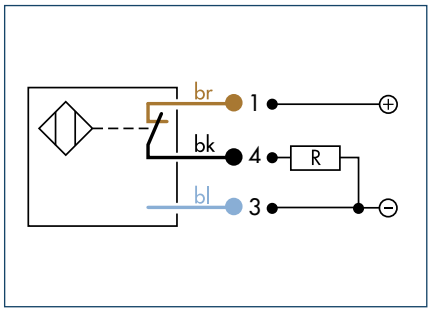
M12 connector



Circuit diagram of closer



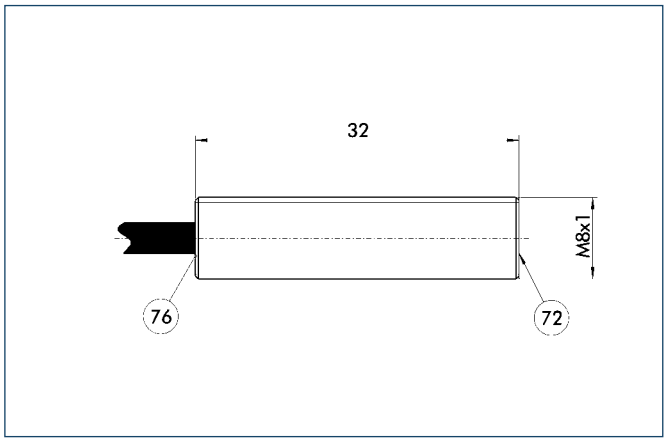
Circuit diagram of opener



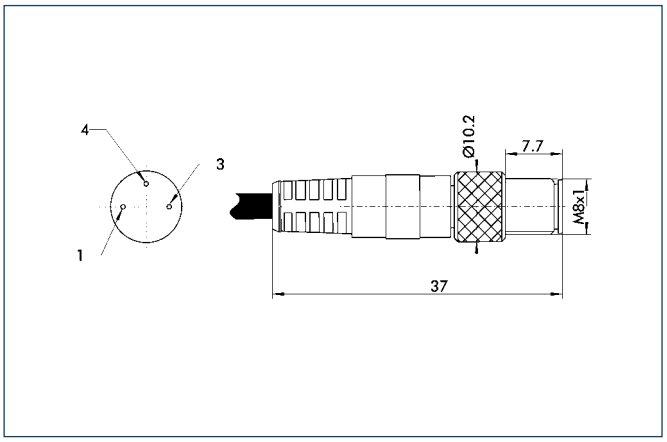
Technical data

Description		IN 80-S-M8	IN 80-S-M12	INK 80-S	IN 80-O-M8	IN 80-O-M12	INK 80-O
	ID	0301478	0301578	0301550	0301488	0301588	0301551
Switching function		Closer	Closer	Closer	Opener	Opener	Opener
Switching distance	[mm]	1.5	1.5	1.5	1.5	1.5	1.5
Hysteresis of nominal switching distance		< 15%	< 15%	< 15%	< 15%	< 15%	< 15%
Switching method		PNP	PNP	PNP	PNP	PNP	PNP
Cable length	[cm]	30.0	30.0	200.0	30.0	30.0	200.0
Cable connector/cable end		M8	M12	Open wire	M8	M12	Open wire
Type of voltage		DC	DC	DC	DC	DC	DC
Nominal voltage	[V]	24.0	24.0	24.0	24.0	24.0	24.0
Min. voltage	[V]	10.0	10.0	10.0	10.0	10.0	10.0
Max. voltage	[V]	30.0	30.0	30.0	30.0	30.0	30.0
Voltage drop	[V]	1.5	1.5	1.5	1.5	1.5	1.5
Max. power on contact	[A]	0.2	0.2	0.2	0.2	0.2	0.2
Min. ambient temperature	[°C]	-25.0	-25.0	-25.0	-25.0	-25.0	-25.0
Max. ambient temperature	[°C]	70.0	70.0	70.0	70.0	70.0	70.0
Max. switching frequency	[Hz]	1000.0	1000.0	1000.0	1000.0	1000.0	1000.0
IP class (sensor)		67	67	67	67	67	67
IP class (connector, plugged in)		67	67	67	67	67	67
LED display on sensor		Yes	Yes	Yes	Yes	Yes	Yes
Cable diameter	[mm]	3.5	3.5	3.5	3.5	3.5	3.5
Min. bending radius (dynamic)	[mm]	35.0	35.0	35.0	35.0	35.0	35.0
Min. bending radius (static)	[mm]	17.5	17.5	17.5	17.5	17.5	17.5
No. of wires		3	3	3	3	3	3
Wire cross section	[mm²]	0.14	0.14	0.14	0.14	0.14	0.14

IN 80 sensor

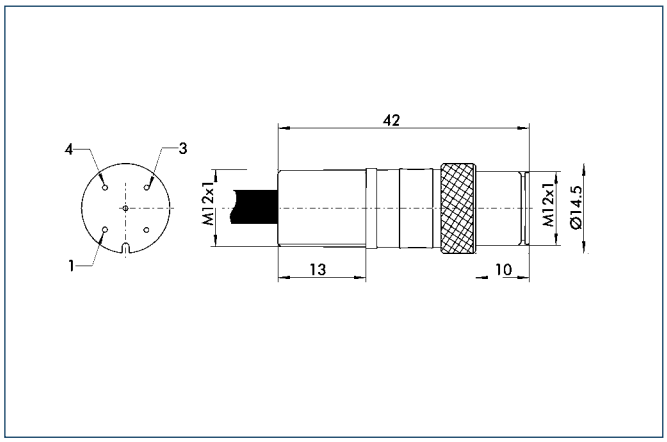


M8 connector



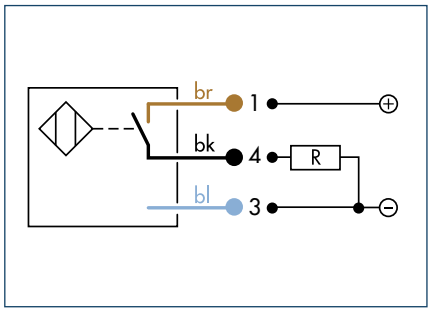
(72) Active sensor surface
(76) LED

M12 connector



IN B-80/80SL

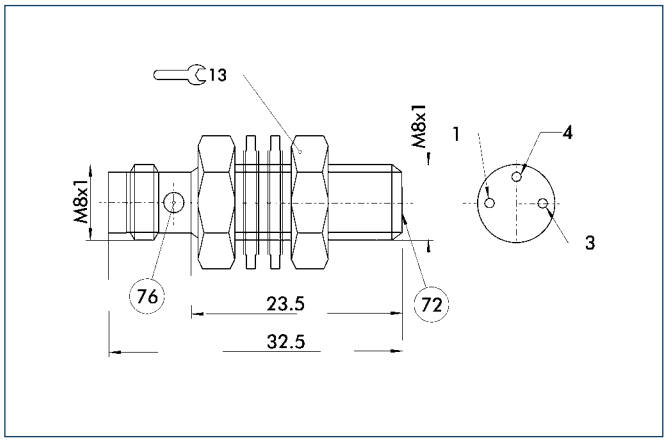
Circuit diagram of closer



Technical data

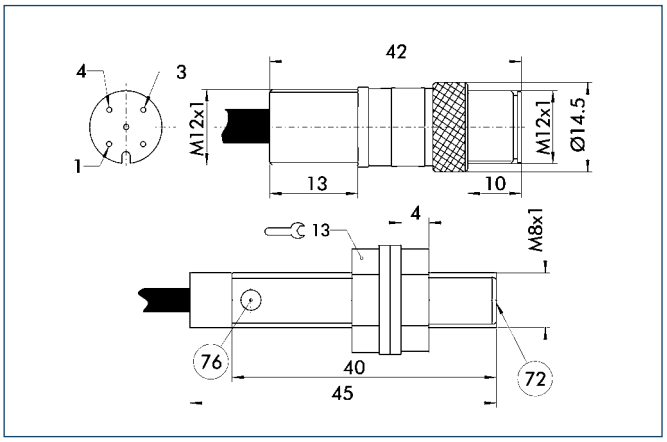
Description		IN 80-SL-M12	INK 80-SL
	ID	0301529	0301579
Switching function		Closer	Closer
Switching distance	[mm]	3.0	3.0
Hysteresis of nominal switching distance		< 15%	< 15%
Switching method		PNP	PNP
Cable length	[cm]	30.0	200.0
Cable connector/cable end		M12	Open wire
Type of voltage		DC	DC
Nominal voltage	[V]	24.0	24.0
Min. voltage	[V]	10.0	10.0
Max. voltage	[V]	30.0	30.0
Voltage drop	[V]	1.5	1.5
Max. power on contact	[A]	0.2	0.2
Min. ambient temperature	[°C]	-25.0	-25.0
Max. ambient temperature	[°C]	70.0	70.0
Max. switching frequency	[Hz]	1000.0	1000.0
IP class (sensor)		67	67
IP class (connector, plugged in)		67	67
LED display on sensor		Yes	Yes
Cable diameter	[mm]	3.5	3.5
Min. bending radius (dynamic)	[mm]	35.0	35.0
Min. bending radius (static)	[mm]	17.5	17.5
No. of wires/contacts		3	3
Wire cross section	[mm^2]	0.14	0.14

IN B-80 sensor



(72) Active sensor surface
(76) LED

IN 80/SL sensor



(72) Active sensor surface
(76) LED

Magnetic Switches

Magnetic switches are used for monitoring the position of automation components. They detect the approach of a magnet without contact and, above a certain switching threshold, enable their output.

Function description

Magnetic switches react to magnetic fields. The resistors in the sensor consist of several ferromagnetic and non-magnetic layers. Two shielded and two non-shielded resistors are combined in a bridge circuit, which produces a signal proportional to the magnetic field when one is present. Above a threshold value, an output signal is switched via a comparator, and the sensor reacts.

Your advantages and benefits

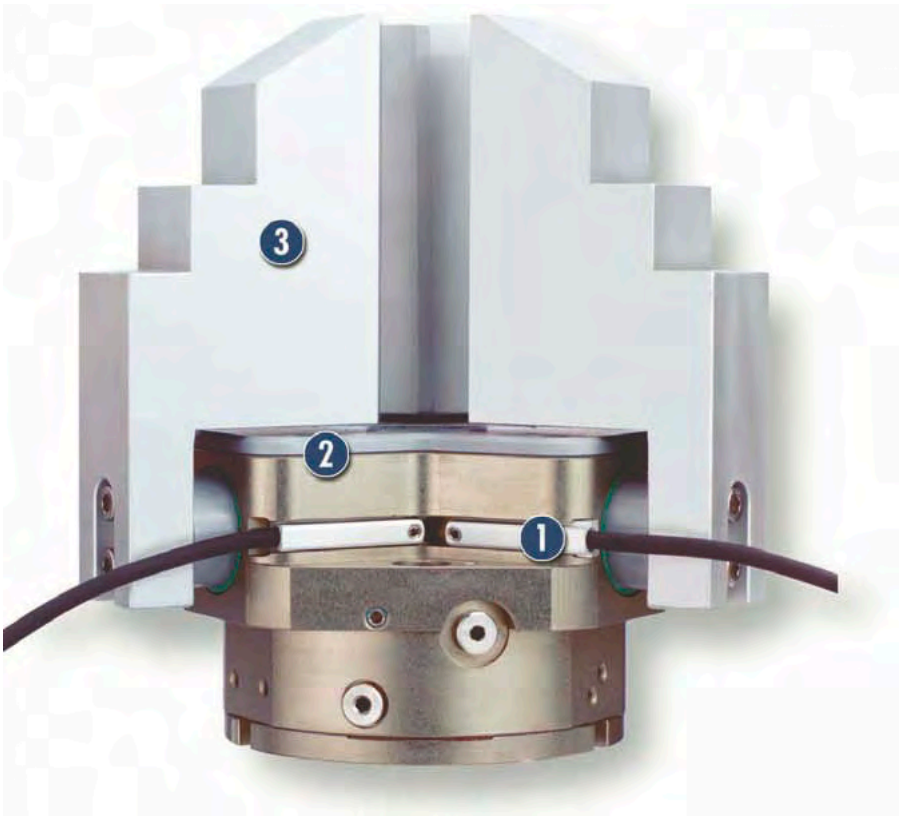
Installation in the sensor slot
for space-saving, simple and fast assembly

Version with LED display (MMS 22)
for checking the switching position directly at the sensor

Version with connector
for easy, rapid replacement of the extension cable

Ultra-flexible PUR cable
for a long life and resistance to many chemicals

Application example



Area of application

For use in the monitoring of gripping and rotary modules, linear modules and robot accessories. Magnetic switches from SCHUNK detect metals without contact or wear and are resistant to vibration, dust and humidity. Magnetic switches are fitted in slots and therefore do not form any additional interfering contours.

1 **MMS Electronic Magnetic Switches for mounting in the C-slot of the gripper**

2 **Sealed 3-Finger Centric Gripper**

3 **Workpiece-specific Gripper Fingers**

General information

Material
Sensor housing: PA in the MMS 22, aluminum in the MMS 30
Cable: with PUR sheath

Fastening
Clamps in the sensor slot

Protection class according to DIN 40050
IP 67 in connected condition for use in clean or dusty environments or in the event of contact with water. Contact with other media (cooling lubricants, acidic or caustic substances, etc.) frequently does not impair the function, but this cannot be guaranteed by SCHUNK.

Voltage
10 – 30 V DC at < 10 % residual ripple

Switching method
PNP switching / NPN switching

Warranty
24 months

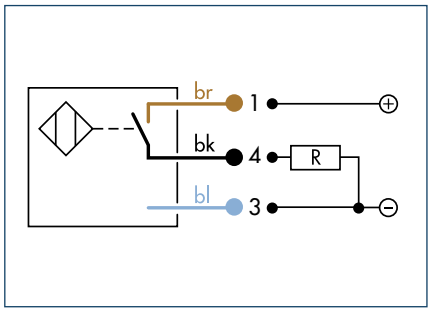
Notes

SCHUNK gripper, rotary and linear modules and robot accessory components that are to be monitored with electromagnetic slot-fitted switches can generally only be reliably monitored with the appropriate electromagnetic switches from SCHUNK.

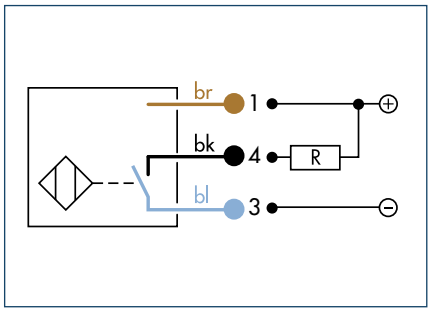
Sensors and products are matched on the basis of the relationships between the parameters type and field strength of the magnet, distance, wall thickness and wall material of the magnet and the sensor, and the orientation and sensitivity of the sensor itself.

For this reason, sensors from other manufacturers employed in SCHUNK products rarely give satisfactory switching results.

Circuit diagram of closer



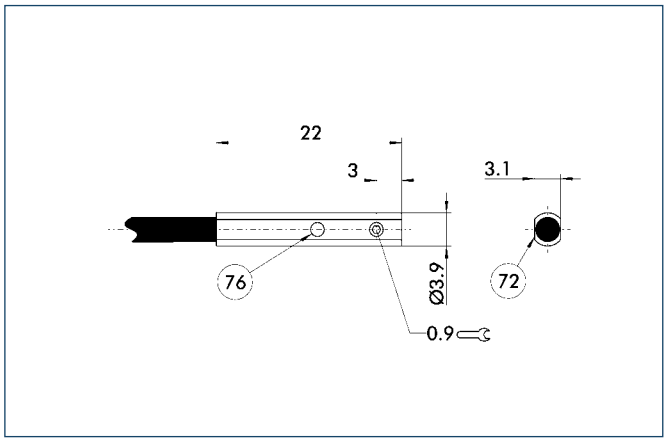
Circuit diagram of NPN closer



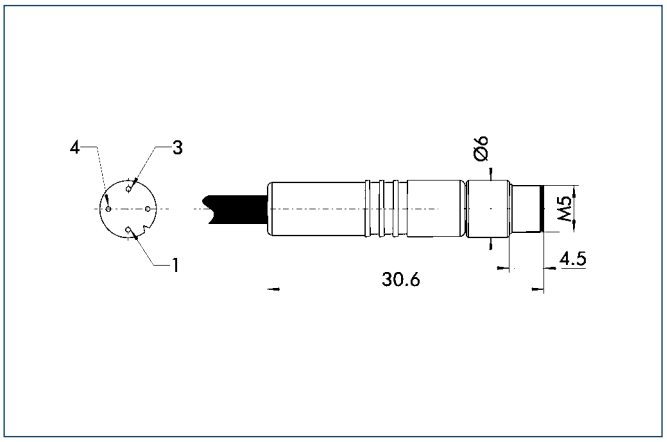
Technical data

Description		MMS 22-S-M5-PNP	MMS 22-S-M5-NPN	MMS 22-S-M8-PNP	MMS 22-S-M8-NPN	MMSK 22-S-PNP	MMSK 22-S-NPN
	ID	0301438	0301439	0301432	0301433	0301434	0301435
Switching function		Closer	Closer	Closer	Closer	Closer	Closer
Switching method		PNP	NPN	PNP	NPN	PNP	NPN
Cable length	[cm]	30.0	30.0	30.0	30.0	200.0	200.0
Cable connector/cable end		M5	M5	M8	M8	Open wire	Open wire
Type of voltage		DC	DC	DC	DC	DC	DC
Nominal voltage	[V]	24.0	24.0	24.0	24.0	24.0	24.0
Min. voltage	[V]	10.0	10.0	10.0	10.0	10.0	10.0
Max. voltage	[V]	30.0	30.0	30.0	30.0	30.0	30.0
Voltage drop	[V]	1.5	1.5	1.5	1.5	1.5	1.5
Max. power on contact	[A]	0.2	0.2	0.2	0.2	0.2	0.2
Min. ambient temperature	[°C]	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Max. ambient temperature	[°C]	70.0	70.0	70.0	70.0	70.0	70.0
Typical switching time	[s]	0.001	0.001	0.001	0.001	0.001	0.001
IP class (sensor)		67	67	67	67	67	67
IP class (connector, plugged in)		67	67	67	67	67	67
LED display on sensor		Yes	Yes	Yes	Yes	Yes	Yes
Cable diameter	[mm]	2.1	2.1	2.1	2.1	2.1	2.1
Min. bending radius (dynamic)	[mm]	21.0	21.0	21.0	21.0	21.0	21.0
Min. bending radius (static)	[mm]	10.5	10.5	10.5	10.5	10.5	10.5
No. of wires		3	3	3	3	3	3
Wire cross section	[mm²]	0.14	0.14	0.14	0.14	0.14	0.14

MMS 22 sensor

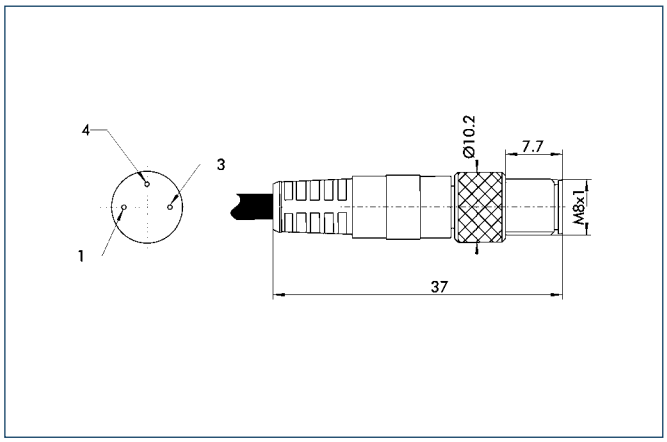


M5 connector



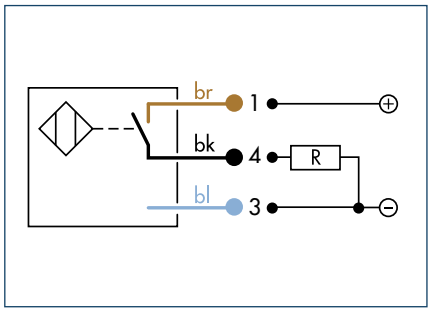
(72) Active sensor surface
(76) LED

M8 connector

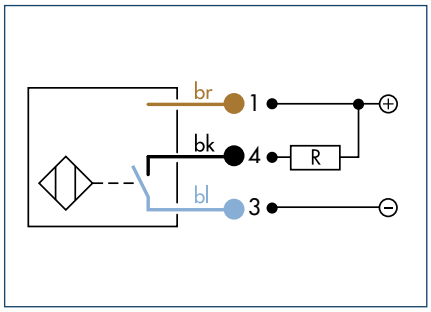


MMS 22-SA

Circuit diagram of closer



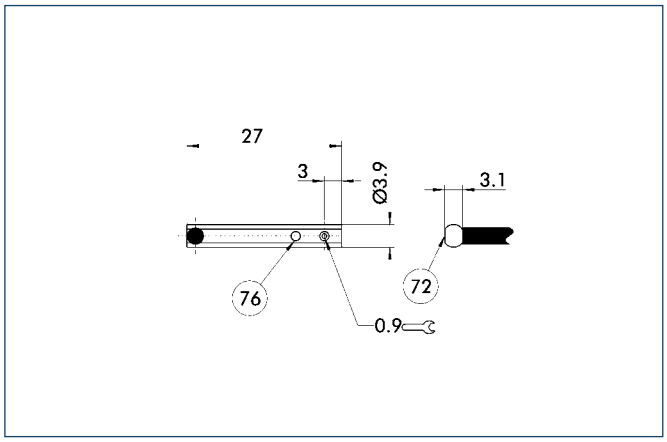
Circuit diagram of NPN closer



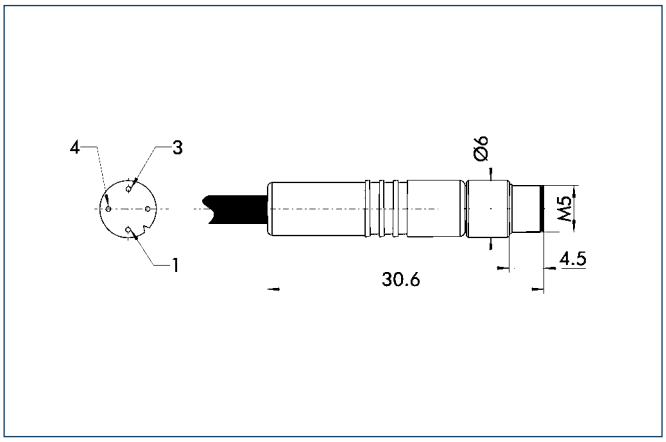
Technical data

Description		MMS 22-S-M5-PNP-SA	MMS 22-S-M5-NPN-SA	MMS 22-S-M8-PNP-SA	MMS 22-S-M8-NPN-SA	MMSK 22-S-PNP-SA	MMSK 22-S-NPN-SA
	ID	0301448	0301449	0301442	0301443	0301444	0301445
Switching function		Closer	Closer	Closer	Closer	Closer	Closer
Switching method		PNP	NPN	PNP	NPN	PNP	NPN
Cable length	[cm]	30.0	30.0	30.0	30.0	200.0	200.0
Cable connector/cable end		M5	M5	M8	M8	Open wire	Open wire
Type of voltage		DC	DC	DC	DC	DC	DC
Nominal voltage	[V]	24.0	24.0	24.0	24.0	24.0	24.0
Min. voltage	[V]	10.0	10.0	10.0	10.0	10.0	10.0
Max. voltage	[V]	30.0	30.0	30.0	30.0	30.0	30.0
Voltage drop	[V]	1.5	1.5	1.5	1.5	1.5	1.5
Max. power on contact	[A]	0.2	0.2	0.2	0.2	0.2	0.2
Min. ambient temperature	[°C]	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0
Max. ambient temperature	[°C]	70.0	70.0	70.0	70.0	70.0	70.0
Typical switching time	[s]	0.001	0.001	0.001	0.001	0.001	0.001
IP class (sensor)		67	67	67	67	67	67
IP class (connector, plugged in)		67	67	67	67	67	67
LED display on sensor		Yes	Yes	Yes	Yes	Yes	Yes
Cable diameter	[mm]	2.1	2.1	2.1	2.1	2.1	2.1
Min. bending radius (dynamic)	[mm]	21.0	21.0	21.0	21.0	21.0	21.0
Min. bending radius (static)	[mm]	10.5	10.5	10.5	10.5	10.5	10.5
No. of wires		3	3	3	3	3	3
Wire cross section	[mm²]	0.14	0.14	0.14	0.14	0.14	0.14

MMS 22-SA sensor

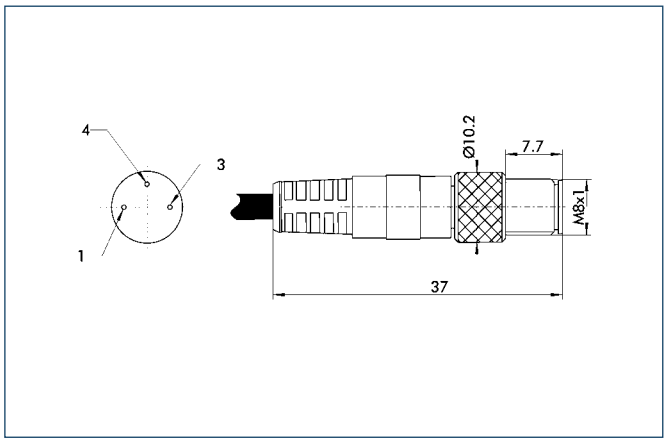


M5 connector



(72) Active sensor surface
(76) LED

M8 connector



Sensor Tester

The SST sensor tester enables the rapid testing and adjustment of inductive sensors, magnetic switches and reed contacts. The necessary power is supplied by a 9 V compound battery.

Function description

The sensor is connected to the M8 - M12 or terminal connection of the sensor tester and the ON button pressed. The sensor position is displayed visually by LEDs and output acoustically via a signal buzzer.

Your advantages and benefits

Visual and acoustic signal
for simple function checking and adjustment

For 2- and 3-wire DC technology
enabling the connection of reed contacts, capacitive and inductive sensors

Tests possible without dismantling sensors
for short maintenance times

Connections for M8 and M12 or open cable ends possible
ensuring suitability for all SCHUNK sensors

PNP and NPN sensors can be tested

Operating voltage with 9 V compound battery
for mobile use

Automatic cut-off function
for an extended battery life

Application example

1 Sensor tester SST

2 Inductive proximity switches IN 80

3 Metal plate

Area of application

Sensor testing and adjustment of the switching point (sensor calibration)

General information

Scope of delivery

Sensor tester incl. assembly and operating manual with manufacturer's declaration, 9 V compound battery

Notes

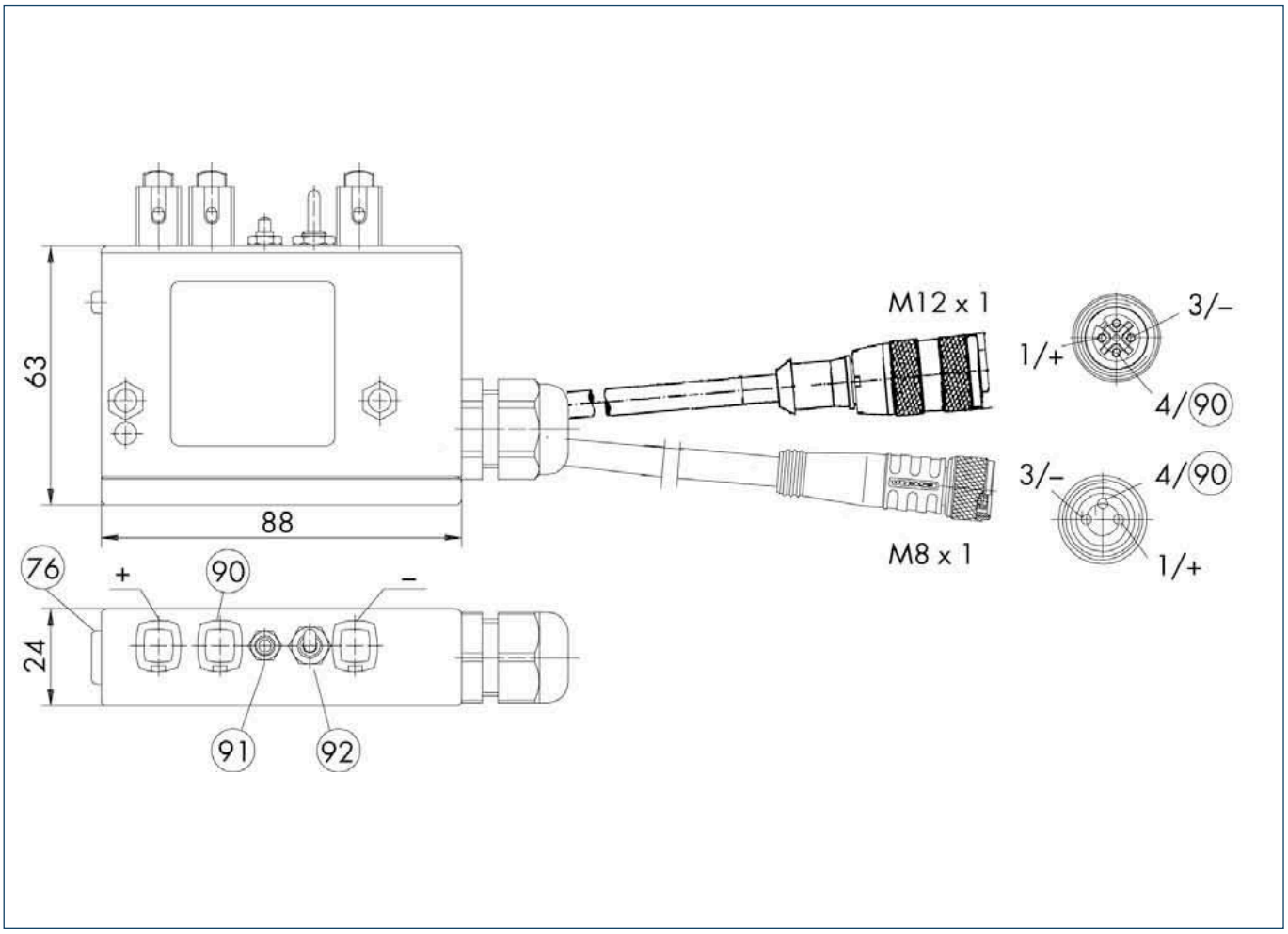
Please note that only one SST input (M8 or M12 or cable terminal input) can be used at once.

If the toggle switch is towards the sticker (nameplate), PNP is selected, if not, NPN.

Technical data

Description	SST
ID	0301400
Battery	9 V DC (compound battery Type LR 61)
Connection 1	M12*1
Connection 2	M8*1
Connection 3	direct clamping
Housing material	plastic
IP class	20

Main views



76 LED
90 Output
91 ON button
92 PNP/NPN changeover switch

Pressure Maintenance Valves and Fittings

for connection and mounting of pneumatic hoses

Your advantages and benefits

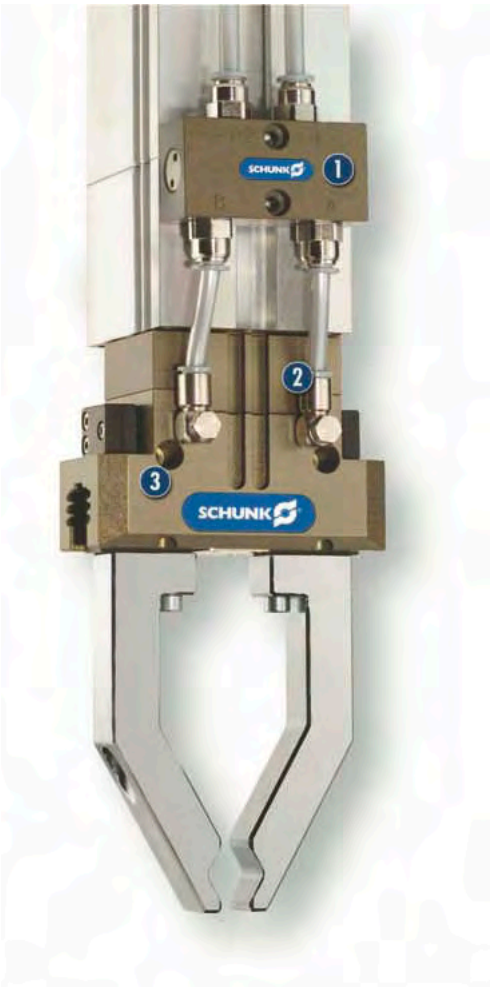
Suitable
for all SCHUNK gripper, rotary and linear modules, in addition to robot accessories

Flexible utilization
for use on pneumatic hoses from various manufacturers

Fittings as plug-in connections
for fast hose attachment

SDV-P pressure maintenance valve
prevents loss of pressure

Application example



Area of application

for secure hose connections in automation solutions

1. SDV-P Pressure Maintenance Valve
2. SWV Banjo Fitting
3. PGN-plus 2-Finger Parallel Gripper with workpiece-specific gripper fingers

General information

Warranty
24 months

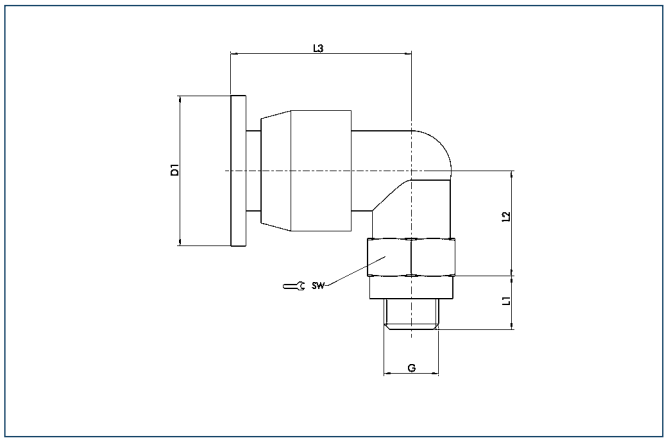
WV elbow fitting

Version as plug-in connection for fast and easy connection to the pneumatic energy supplies

Technical data

Description		WV-G1/8-6	WV-G1/8-8	WV-G1/4-6
	ID	9937129	9936730	9937170
For hose diameter	[mm]	6.0	8.0	6.0
Threaded connection	[″]	G1/8	G1/8	G1/4
Max. pressure	[bar]	20.0	20.0	20.0
Min. ambient temperature	[°C]	-10.0	-10.0	-10.0
Max. ambient temperature	[°C]	60.0	60.0	60.0

Main view WV



Variable	WV-G 1-8-6	WV-G 1-8-8	WV-G 1-4-6
G	1/8"	1/8"	1/4"
L_1	5	5	7
L_2	13.5	16	15.5
L_3	22	25.5	23.5
D_1	12	14	12
SW	13	13	17

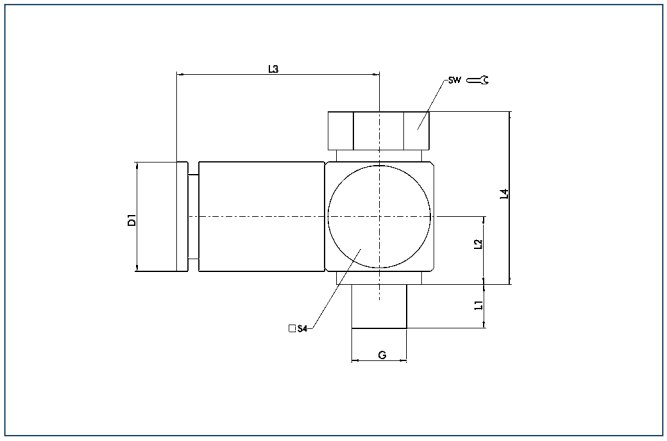
SWV banjo fitting

Version as plug-in connection for fast and easy connection to the pneumatic energy supplies

Technical data

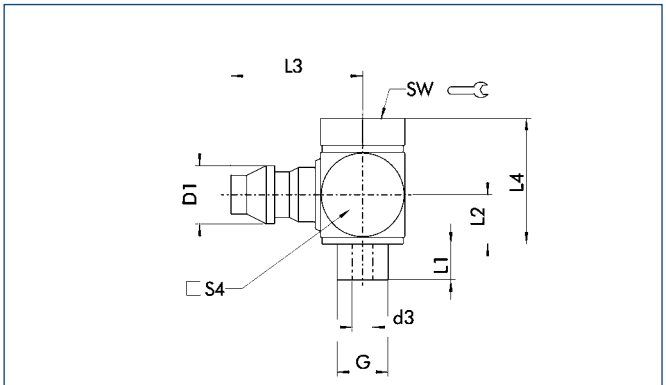
Description		SWV-M3-4	SWV-M5-6	SWV-G4-6	SWV-G8-6	SWV-G4-8
	ID	9210505	9936171	9937128	9937152	9936728
For hose diameter	[mm]	4.0	6.0	6.0	6.0	8.0
Threaded connection	[″]	M 3	M 5	G1/4	G1/8	G1/4
Max. pressure	[bar]	20.0	20.0	20.0	20.0	20.0
Min. ambient temperature	[°C]	-10.0	-10.0	-10.0	-10.0	-10.0
Max. ambient temperature	[°C]	60.0	60.0	60.0	60.0	60.0

Main view SWV



Variable	SWV-M5-6	SWV-G8-6	SWV-G4-6	SWV-G4-8
G	M5	G1/8"	G1/4"	G1/4"
L_1	4	6.5	8	8
L_2	6.2	8.25	8.4	15.3
L_3	18.5	22.5	24.5	25
L_4	15.8	20.5	21.6	21.6
D_1	10	12	12	13.5
SW	8	14	17	17
S4	10	15	19	19

Main view SWV-M3



Variable	SWV-M3-4
G	M3
d_3	1.1
L_1	2
L_2	2.5
L_3	7.3
L_4	7.3
D_1	3.4
SW	5
S4	5

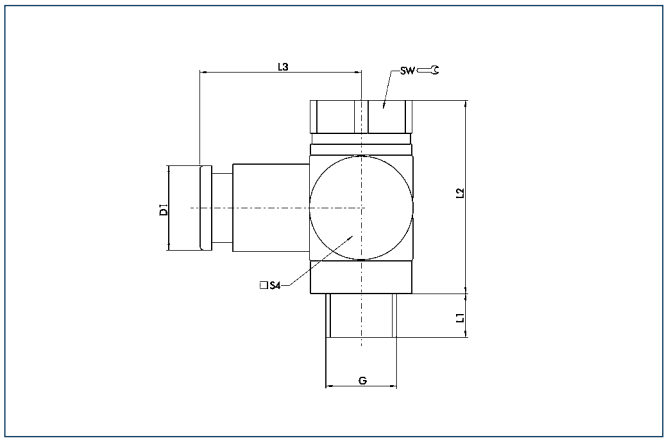
DSV banjo fitting with one-way flow control valve

Version as plug-in connection for fast and
easy connection to the pneumatic energy supplies

Technical data

Description		DSV-M3-4	DSV-M5-6	DSV-G8-6	DSV-G4-6	DSV-G4-8
	ID	9720005	9936160	9936159	9936161	9936162
Hose	[mm]	3.0	6.0	6.0	6.0	8.0
Min. operating temperature	[°C]	-10.0	-10.0	-10.0	-10.0	-10.0
Max. operating temperature	[°C]	60.0	60.0	60.0	60.0	60.0
Max. operating pressure	[bar]	20.0	20.0	20.0	20.0	20.0

Main view DSV



Variable	DSV-M3-4	DSV-M5-6	DSV-G8-6	DSV-G4-6	DSV-G8-8
G	M3	M5	G1/8"	G1/4"	G1/8"
L_1	2.5	4	5	6.5	5
$L_{2\ max.}$	29	21.5	30	32	30
L_3	11	21	22.5	24.5	23
D_1	4.8	10.4	12	12	14
SW	knurl	8	14	17	14

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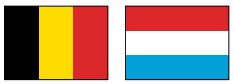

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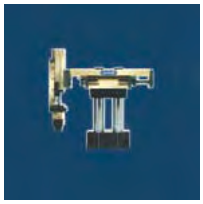

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☐ Highlights
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☐ Lathe Chucks

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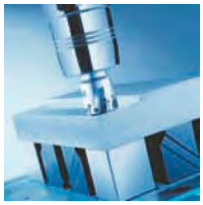

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