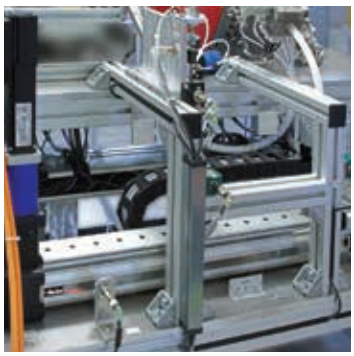
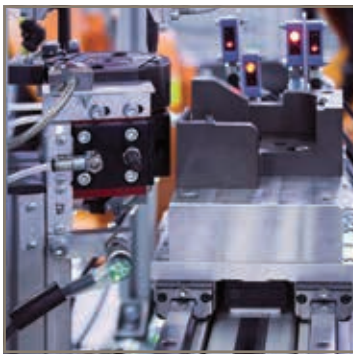
aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Handling Products

Comprising an innovative range of
Grippers, Rotary Tables and Slide Tables

PDE2669TCUK April 2016



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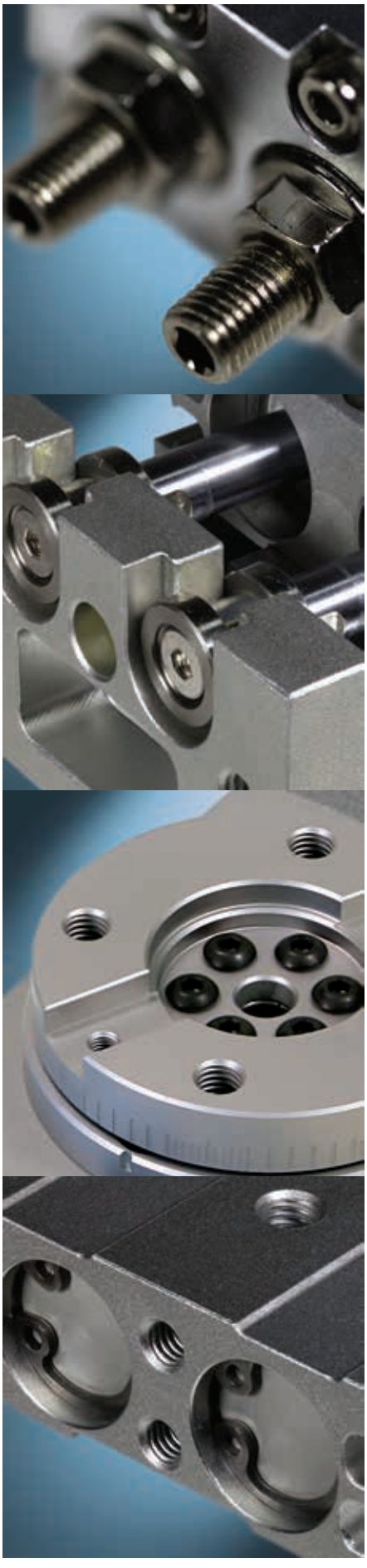

Handling Products

A pneumatic range of Grippers, Rotary Actuators and Slide Tables.

Parker is about motion control engineering, manufacturing, application expertise and unparalleled customer service.

Parker products are everywhere — from laboratories, cleanrooms and factory floors, to mines, foundries and satellites in space – our products are used anywhere machines, processes and people depend on reliable high-performance motion control.

Today's industrial handling applications demand the best in quality and productivity. Likewise, high-technology applications demand performance in quality throughput and precision.

Contents

page

Important
Before attempting any external or internal work on the cylinder or any connected components, make sure the cylinder is vented and disconnect the air supply in order to ensure isolation of the air supply.

Note
All technical data in this catalogue are typical data only.
Air quality is essential for maximum cylinder service life (see ISO 8573).

WARNING

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Complete Automation Solution

Parker Pneumatic Division is a single source supplier for all your automation needs. Selecting the right product for your application is easy with Parker Hannifin's extensive offering of pneumatic grippers, slide tables and rotary tables. Integration into your automation system is fast and simple using a variety of online e-configurators and CAD drawings.

Holding

Angular Grippers P5GA Series

- Bores 12, 16, 20, 25 and 32mm
- Working angle of -10° to + 30°
- Closed force of 13N to 203N

See page - 5

Parallel Grippers P5GB Series

- Bores 12, 16, 20, 25 and 32mm
- Working stroke of 6mm to 16mm
- Closed force of 10N to 170N

See page - 18

Parparallel Grippers P5GD Precision Series

- Bores 10, 16, 20 and 25mm
- Working stroke of 4mm to 14mm
- Closed force of 22N to 130N

See page - 26

180° Angular Grippers P5GL Series

- Bores 10, 16, 20 and 25mm
- Working angle of -3° to 180°
- Closed force of 11N to 152N

See page - 37

Rotating

Rotary Actuators P5RS Series

- Bores 16, 20, 25 and 32mm
- Rotation angle of 0 to 190°
- Working torque from 1.21 to 9.86Nm

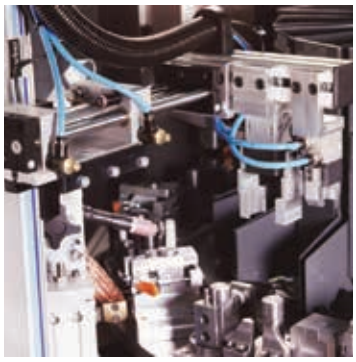
See page - 47

Moving

Slides P5SS Series

- Bores 6, 8, 12, 16, 20 and 25mm
- Strokes 10mm to 150mm

See page - 63



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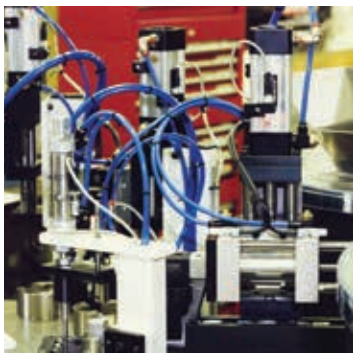

Grippers
P5G Series

Sizes 10, 12, 16, 20, 25 and 32 mm

Parker

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Contents

Important
Before attempting any external or internal work on the cylinder or any connected components, make sure the cylinder is vented and disconnect the air supply in order to ensure isolation of the air supply.

Note
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General technical data




Series	P5GA					P5GB					P5GD				P5GL			
Size	12	16	20	25	32	12	16	20	25	32	10	16	20	25	10	16	20	25
Total stroke (mm)	-					6	9	12	14	16	4	6	10	14	-			
Total operating angle (°)	-10° to +30°					-					-				-3° to +180°			
Total Force* (N) - Closed side	13	30	57	113	203	10	26	70	120	170	22	68	94	130	11	36	73	152
Total Force* (N) - Open side	17	40	77	147	270	16	48	94	140	200	34	90	132	208	-			
Total Torque* (Nm) - Closed side	0.40	0.90	1.70	3.40	6.10	-					-				0.32	1.08	2.20	4.56
Total Torque* (Nm) - Open side	0.50	1.20	2.30	4.40	8.10	-					-				-			
Ø Piston bore (mm)	12	16	20	25	32	12	16	20	25	32	10	16	20	25	10	16	20	25
Ø Air port size (mm)	M3	M5				M3	M5				M3	M5			M5			
Air consumption (cm^3 cycle) **	0.7	3	6	11	18	0.7	3	7	14	21	0.5	2	6	14	2	7	14	28
Repeatability (mm)	-					± 0.04					± 0.01				-			
Repeatability (°)	± 0.04					-					-				± 0.2			
Max. work frequency (Hz)	3					3					3				1			
Min. closing time (s)	0.01	0.01	0.02	0.02	0.03	0.015	0.02	0.05	0.07	0.09	0.015	0.02	0.05	0.07	0.1	0.1	0.15	0.15
Weight (g)	53	103	193	327	525	66	144	255	479	719	55	125	250	450	80	150	320	600
Max. jaw length (mm)	30	40	60	70	85	30	40	60	70	85	50	55	80	100	60	70	80	90
Max. temperature (°C)	-5° to +60°					-5° to +60°					-10° to +60°				-10° to +60°			
Air pressure (bar)	1.5 to 7					1.5 to 7					2 to 7	1.5 to 7			1 to 6			
Operation	Dry air, lubricated or unlubricated					Dry air, lubricated or unlubricated					Dry air, lubricated or unlubricated				Dry air, lubricated or unlubricated			

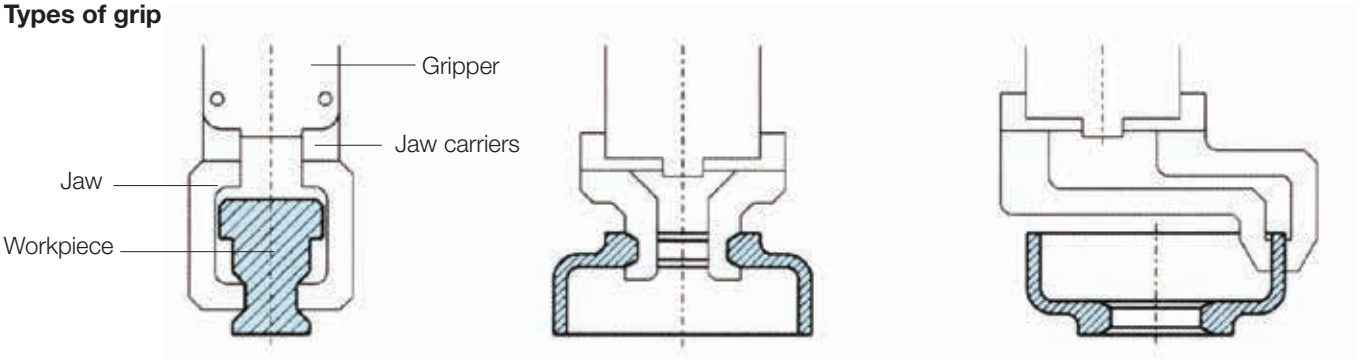
* At 5 bar at closing, force depends on position of the holding point, values are for 30mm, 20mm for P5GD
** Cycle = opening + closing (without jaws)

Operating and environmental data

Operating medium	For best possible service life and trouble-free operation dry, filtered compressed air to ISO 8573-1:2010 quality class 3.4.3 should be used. This specifies a dew point of +3C for indoor operation (a lower dew point should be selected for outdoor operation) and is in line with the air quaility from most standard compressors with a standard filter.
Operating pressure	See above
Ambient temperature	See above
Pre-lubricated	Further lubrication is normally not necessary. If additional lunbrication is introduced it must be continued.
Corrosion resistance	Resistance to corrosion and chemicals.

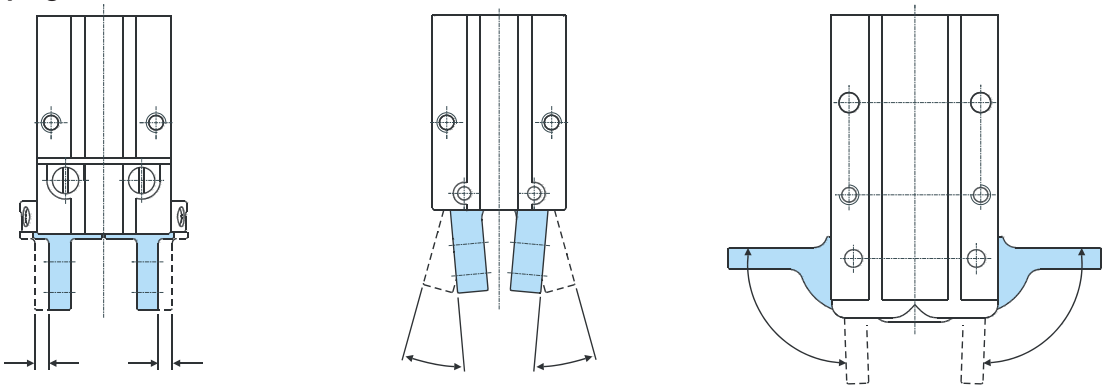
Choice of gripper

Types of grip



Internal grip | External grip | Internal External grip

Types of clamping

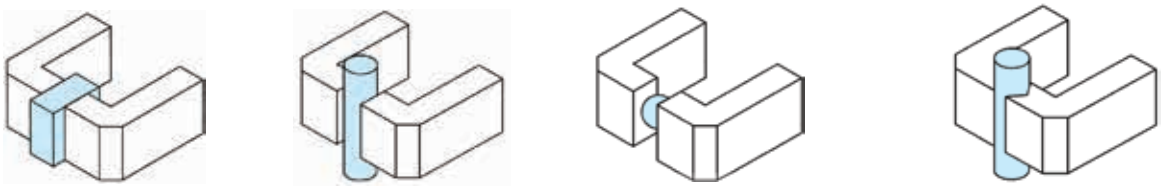


Parallel clamping
Workpieces of different diameter or thickness

Angular clamping
Jaw release
Longer jaws

180° clamping
Total jaw release

Contact between workpiece/jaw



Surface/surface | Line/surface | Point/surface | Double line/surface

Main points to note in selecting grippers :

- The weight of the workpiece to be moved
- Geometry and volume of the workpiece
- The type of gripper (parallel or angular)
- Dynamic movement of gripper and workpiece combination
- Environment (shocks, additional external forces...)
- Coefficient of friction between workpiece and jaws (see chart below)

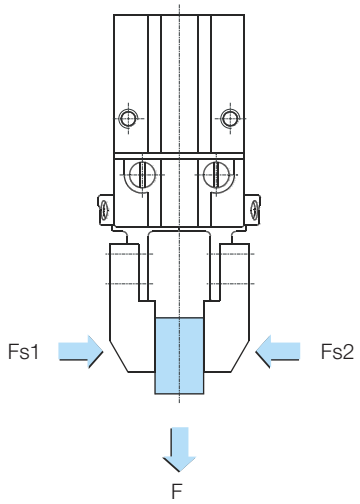
Workpiece material	Jaw material	Coefficient of friction μ
Steel	Steel	0,25
Steel	Aluminium	0,35
Steel	Plastic	0,50
Aluminium	Aluminium	0,49
Aluminium	Plastic	0,70
Plastic	Plastic	1

Formula calculation for clamping force

For internal or external clamping

Fs1 = Fs2

$$Fs = Fs1 + Fs2 = \frac{F}{\mu} \times So$$



Fs : Clamping force (N)
F : Force acting on jaws (N)
(When static F corresponds to the weight of the workpiece in N)
μ : Coefficient of friction between the workpiece and jaws (μ < 1)
So : Safety factor (between 2 and 4, refer to chart below)

Safety factor So	Type of use
2	Normal use
3	Movement in several directions (slow acceleration or decelerations)
4	Shocks, fast accelerations or decelerations

P5GA - Angular double acting, square jaw carriers

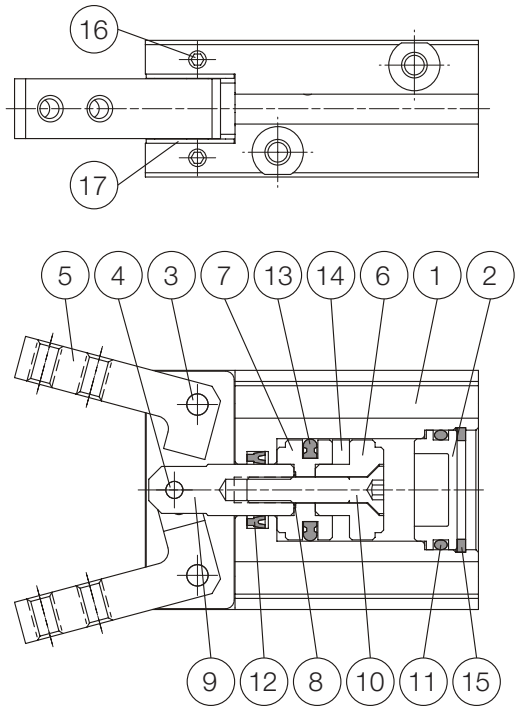
The P5GA is a compact angular gripper with a closed angle of -10° and an open angle of +30°.
With double acting mechanism the gripper is suitable for internal or external gripping applications.
For flexible installation mounting is available on three sides and the anodised body has recessed sensor grooves.

- Bore sizes Ø 12, 16, 20, 25 and 32 mm
- Double acting
- Anodised corrosion protection
- Magnetic piston as standard
- Optional sensors

General technical data

Size	12	16	20	25	32
Total operating angle (°)	-10° to +30°				
Total Force* (N) - Closed side	13	30	57	113	203
Total Force* (N) - Open side	17	40	77	147	270
Total Torque* (Nm) - Closed side	0.40	0.90	1.70	3.40	6.10
Total Torque* (Nm) - Open side	0.50	1.20	2.30	4.40	8.10
Ø Piston bore (mm)	12	16	20	25	32
Ø Air port size (mm)	M3	M5			
Air consumption (cm^3 cycle) **	0.7	3	6	11	18
Repeatability (°)	± 0.04				
Max. work frequency (Hz)	3				
Min. closing time (s)	0.01	0.01	0.02	0.02	0.03
Weight (g)	53	103	193	327	525
Max. jaw length (mm)	30	40	60	70	85
Max. temperature (°C)	-5° to +60°				
Air pressure (bar)	1.5 to 7				
Operation	Dry air, lubricated or unlubricated				

* At 5 bar, L=30mm.
** Cycle = opening + closing (without jaws)



Pos	Part	Specification
1	Body	Aluminium alloy
2	Sealing cap	Aluminium alloy
3	Jaw spindle	Medium carbon steel
4	Retaining pin	Bearing steel
5	Jaw carrier	Medium carbon steel
6	Lower piston half	Aluminium alloy
7	Upper piston half	Aluminium alloy
8	Gasket	NBR
9	Piston rod	Stainless steel

Pos	Part	Specification
10	Piston retaining screw	Stainless steel
11	O ring	NBR
12	U cup	NBR
13	Piston seal	NBR
14	Magnet	Magnetic material
15	Circlip	Spring steel
16	Set screw	SCM
17	Guide plate	Stainless steel
	Note on materials	RoHS Compliant

How to select the correct model (or required clamp force) according to the weight of workpiece.

The friction coefficient of the workpiece will be influenced by the shape and shifting condition but in connection with the weight of workpiece, the safety factor of clamping force is as shown below. Please select your model according to the result of below calculation.

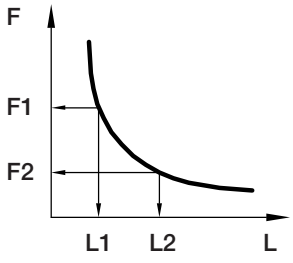
- Clamp force only W: (FxN) = 1:5
- Shifting under normal condition W: (FxN) = 1:10
- Shifting under acceleration W: (FxN) = 1:20

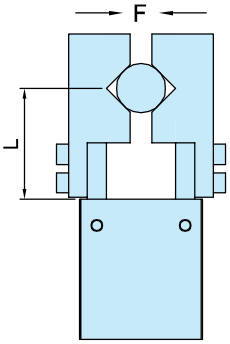
W = Weight of workpiece
F : Clamp force per jaw
(Please refer to clamp force performance chart)
N : Number of finger blanks

To obtain gripping power from performance data, if the distance to the workpiece's center of gravity is L when manufacturing the small jaw, gripping power F is expressed as follows

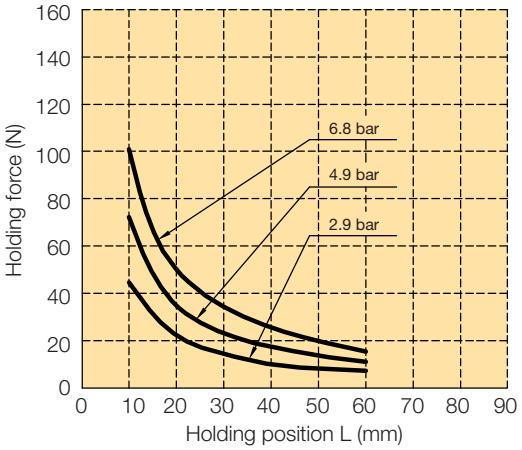
When L = L1, then F = F1

When L = L2, then F = F2

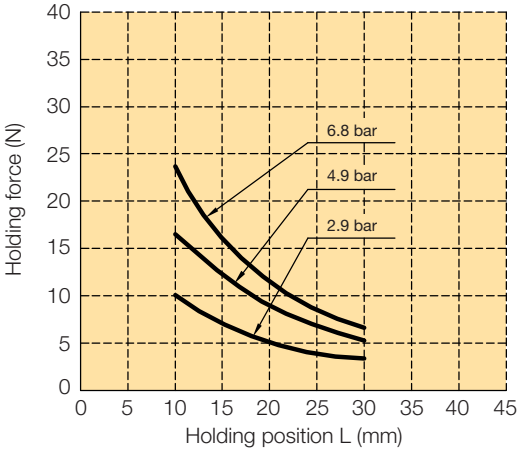




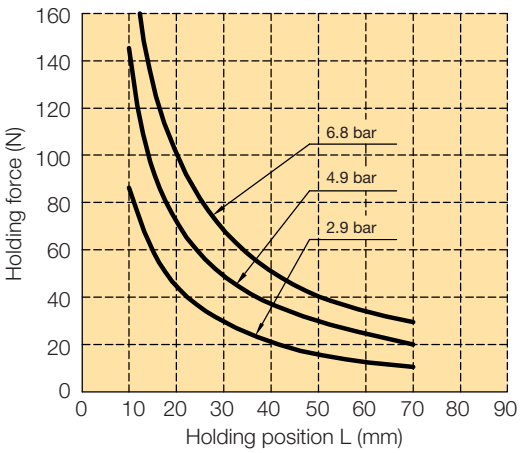
P5GA-020MSG030B



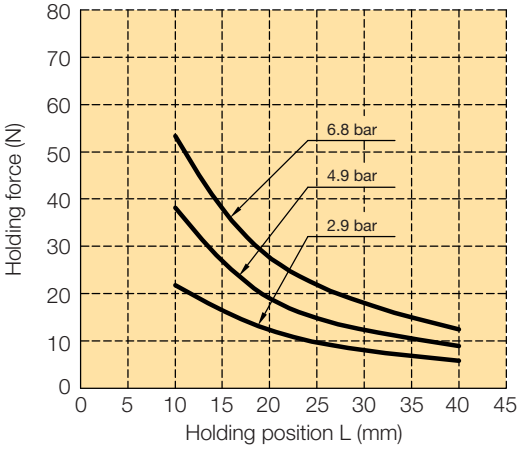
P5GA-012MSG030B



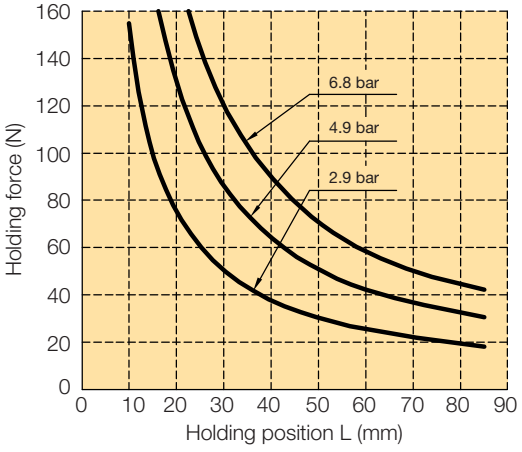
P5GA-025MSG030B



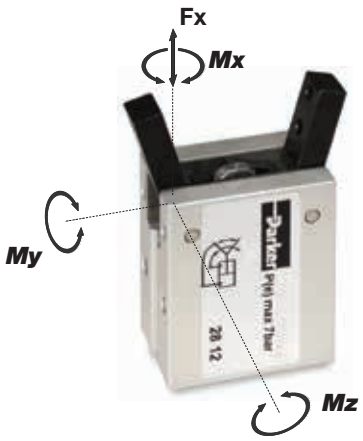
P5GA-016MSG030B



P5GA-032MSG030B



P5GA - Permissible force and torques on each jaw carrier



Static

Size	12	16	20	25	32
Fx	40N	60N	100N	100N	100N
Mx	0,5Nm	0,9 Nm	2,2 Nm	2,2 Nm	2,2 Nm
My	0,5Nm	0,9 Nm	2,2 Nm	2,2 Nm	2,2 Nm
Mz	0,20Nm	0,45 Nm	0,85 Nm	1,70 Nm	2,05 Nm

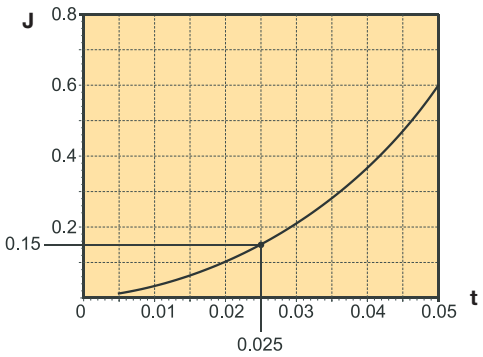
Mz at 5 bar.

Recommandation is to use a flow control to limit the speed for opening to reduce impact at the end of the stroke.

Dynamic

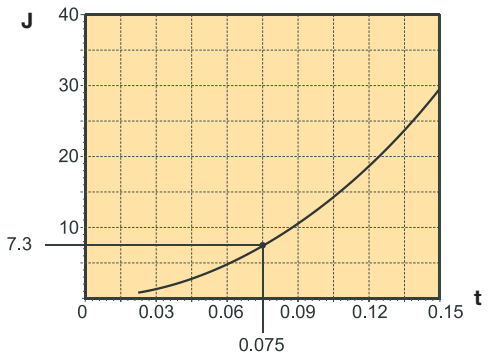
Inertia of one of the 2 jaws (kgcm²) closing or opening time (t) in seconds :

Size 12



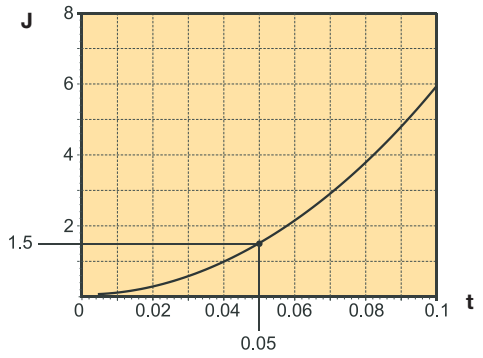
$J = 240 \times t^2$

Size 20



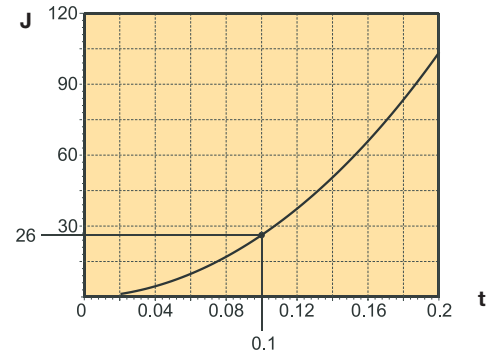
$J = 1300 \times t^2$

Size 16



$J = 600 \times t^2$

Size 25 & 32



$J = 2600 \times t^2$

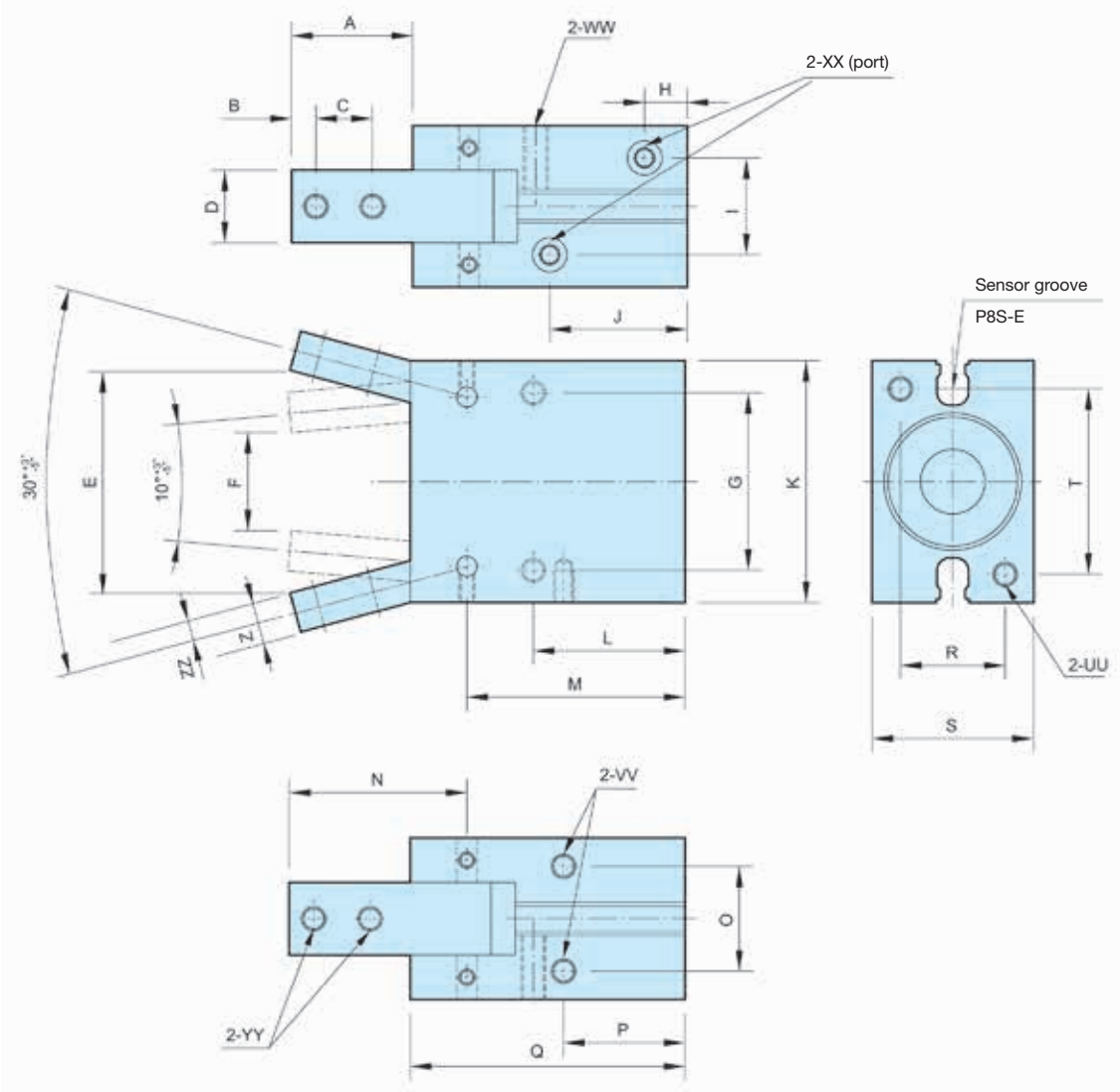
For a 0,15 kgcm² inertia one of the 2 jaws, the closing or opening time of the gripper is 0,025s for a **size 12**.

These indications must not be exceeded if :

- any extra forces are exerted on the workpiece or on the jaws, in addition to the force or the clamping torque.
- handling forces (acceleration, shocks, ...) must also be added.

These values are cumulative if the forces act in different directions at the same time.

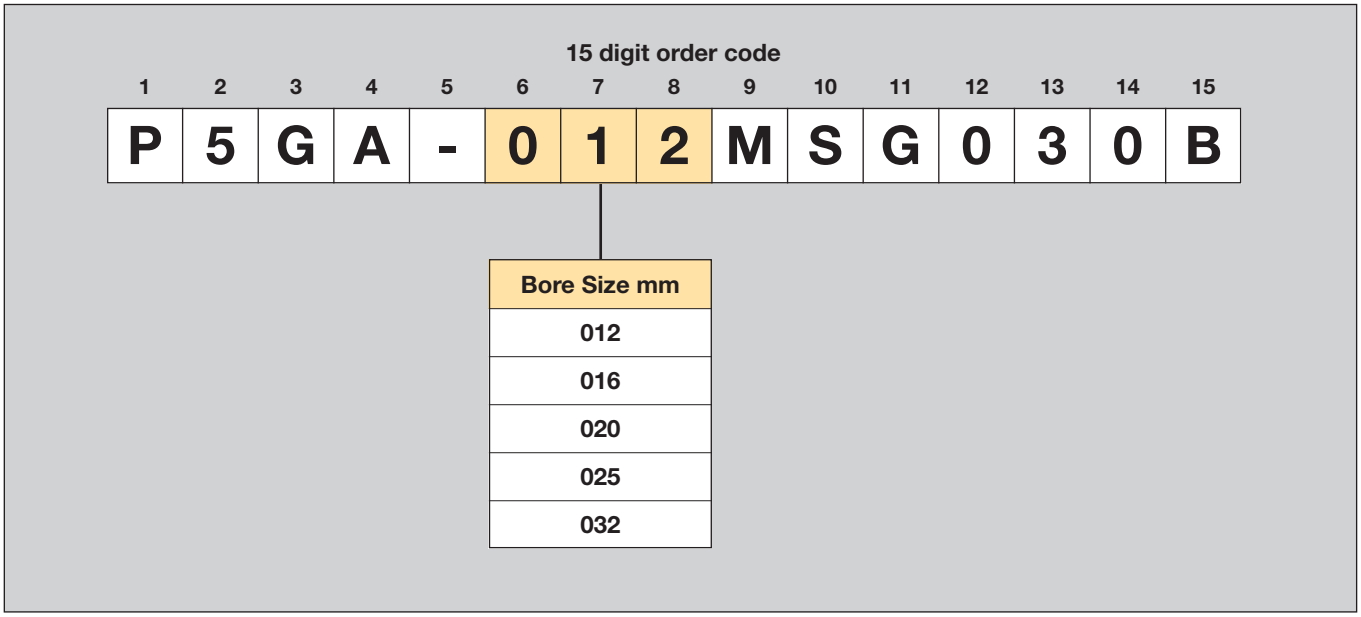
Dimensions (mm)



Bore mm	A	B	C	D 0/-0.03	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
12	15,4	3	6	7	26,3	9	20	7,5	10,2	23,5	28	20	32,9	21,5	10,2	16	39	10	16	22
16	17,5	3	8	9	31,1	14	24	7,5	12	22	34	22,5	35	25	14	18	42,5	14	22	26
20	22	4	10	12	40,1	18	30	8	13	25	45	25	39,5	32,5	16	19	50	16	26	35
25	26	5	12	14	47,9	21	36	8,5	18	28	52	28,5	45,5	38,5	20	21,5	58	20	32	40
32	30	6	14	18	55,1	24	44	10,5	24	34	60	37,5	54	44	26	30	68	26	40	46

Bore mm	UU	VV	WW	XX	YY	Z	ZZ
12	M3 x 5 depth	M3 x 5 depth	M3 x 5 depth	M3 x 5 depth	M3	5	2,5
16	M4 x 7 depth	M4 x 7 depth	M4 x 7 depth	M5 x 5 depth	M3	6	3
20	M5 x 8 depth	M5 x 8 depth	M5 x 8 depth	M5 x 5 depth	M4	7	3,5
25	M6 x 10 depth	M6 x 10 depth	M6 x 10 depth	M5 x 5 depth	M5	9	4
32	M6 x 10 depth	M6 x 10 depth	M6 x 10 depth	M5 x 5 depth	M6	10	5

Order Key Code



Note : All grippers are supplied magnetic for optional sensing

P5GA - Angular Grippers

Bore mm	Order code
12	**P5GA-012MSG030B**
16	**P5GA-016MSG030B**
20	**P5GA-020MSG030B**
25	**P5GA-025MSG030B**
32	**P5GA-032MSG030B**

P8S Sensors Series

The P8S family of sensors provides a broad range of reed and solid state sensor types with flying lead or M8 options available. Mounting on all grippers is within the integrated sensor grooves allowing for compact installation.

Electronic sensors

The electronic sensors utilise “Solid State” technology, providing operation with no moving parts. These switches are available in NPN and PNP type, both provide built in short circuit and transient protection as standard. The solid state operation allows for high switching on off frequency, ideal for applications where long service life is required.

Technical data

Design	GMR (Giant Magnetic Resistance) magneto-resistive function
Installation	Mounts within cylinder switch groove
Outputs	PNP or NPN, normally open
Voltage range	5-30 V DC
Voltage drop	1.5 V max
Switching current	50 mA max
Switch rating	1.5 W max
Leakage current	0.01 mA max
Internal consumption	10 mA max (NPN) 12 mA max (PNP)
On/off switching frequency	1000 Hz max
Encapsulation	IP 67 (NEMA 6)
Temperature range	–10°C to +70°C
Indication	LED Red (NPN) LED Green (PNP)
Cable	Polyurethane

Reed sensors

Reed type sensors are based on proven reed switch technology and provide reliable function in many applications.
Simple installation and the available AC voltage range are advantages for this range of sensors.

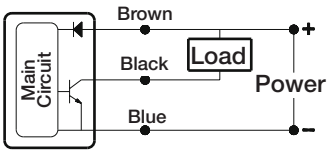
Technical data

Design	Reed element
Installation	Mounts within cylinder switch groove
Outputs	Normally open
Voltage range	5-120 V DC/AC
Voltage drop	2.5 V max
Switching current	100 mA max
Switch rating	10 W max
Encapsulation	IP 67 (NEMA 6)
Temperature range	–10°C to +70°C
Indication	LED Red
Cable	Polyurethane

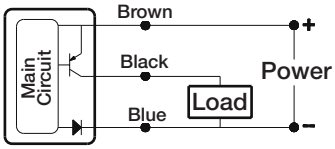
Electronic sensors

Schematic

NPN type



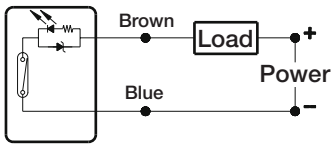
PNP type



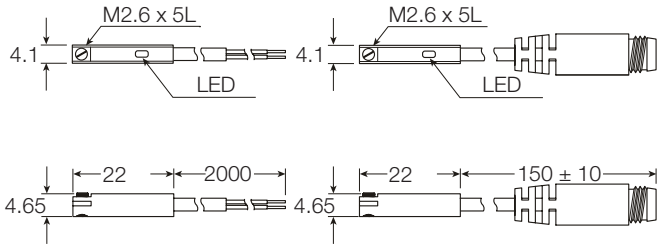
Reed sensors

Schematic

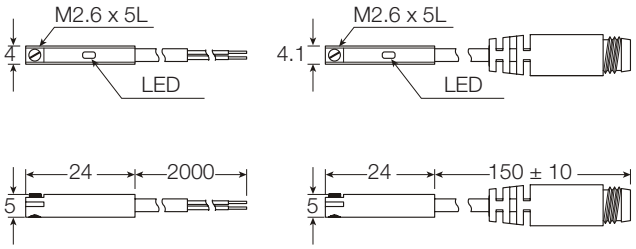
Reed type



Dimensions

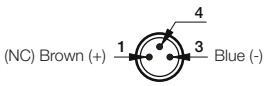


Dimensions

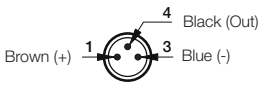


M8 Quick Connector

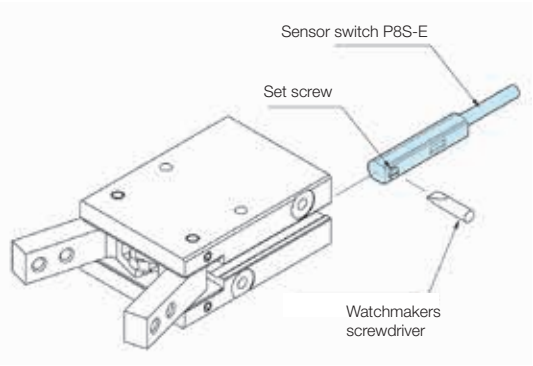
2 wire QC wiring



3 wire QC wiring



Installation of Sensor



Electronic and Reed Sensors

Size	Description	Order code
Flush Mount Style		
PNP Type, normally open	0.165 m cable and M8 screw male connector	**P8S-EPSUS**
PNP Type, normally open	2 m PUR cable without connector	**P8S-EPFXS**
NPN Type, normally open	0.165 m cable and M8 screw male connector	**P8S-ENSUS**
NPN Type, normally open	2 m PUR cable without connector	**P8S-ENFXS**
Reed Type, normally open	0.15 m cable and M8 screw male connector	**P8S-ERSUS**
Reed Type, normally open	2 m PUR cable without connector	**P8S-ERFXS**

P5GB - Parallel double acting, square jaw carriers

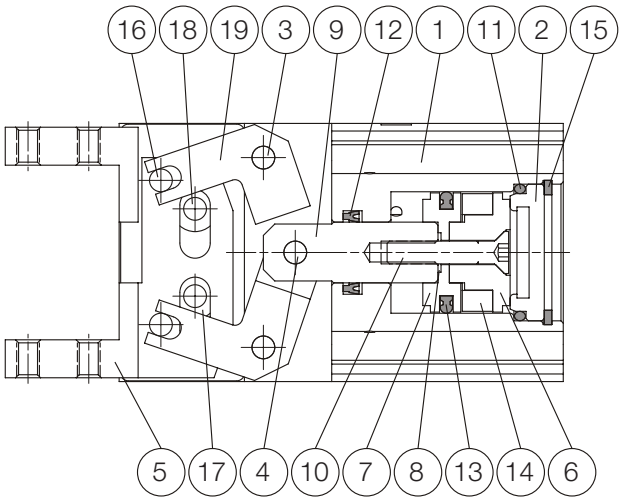
Available with a comprehensive range of bore sizes Ø12 - 32 mm the P5GB double acting parallel gripper is an accurate workpiece holding device. The anodised aluminium body has flexible installation mountings on three sides and recessed sensor grooves.

- Bore sizes Ø12, 16, 20, 25 and 32 mm
- Double acting
- Anodised corrosion protection
- Magnetic piston as standard
- Optional sensors

General technical data

Size	12	16	20	25	32
Total stroke (mm)	6	8	12	14	16
Total Force* (N) - Closed side	10	26	70	120	170
Total Force* (N) - Open side	16	48	94	140	200
Ø Piston bore (mm)	12	16	20	25	32
Ø Air port size (mm)	M3	M5			
Air consumption (cm^3 cycle) **	0.7	3	7	14	21
Repeatability (mm)	± 0.04				
Max. work frequency (Hz)	3				
Min. closing time (s)	0.015	0.02	0.05	0.07	0.09
Weight (g)	66	144	255	419	719
Max. jaw length (mm)	30	40	60	70	85
Max. temperature (°C)	-5° to +60°				
Air pressure (bar)	1.5 to 7				
Operation	Dry air, lubricated or unlubricated				

* At 5 bar, L=30mm.
** Cycle = opening + closing (without jaws)



Pos	Part	Specification
1	Body	Aluminium alloy
2	Sealing cap	Aluminium alloy
3	Lever spindle	Medium carbon steel
4	Retaining pin	Bearing steel
5	Jaw carrier	Medium carbon steel
6	Lower piston half	Aluminium alloy
7	Upper piston half	Aluminium alloy
8	Gasket	NBR
9	Piston rod	Stainless steel
10	Piston retaining screw	Stainless steel
11	O ring	NBR
12	U cup	NBR

Pos	Part	Specification
13	Piston seal	NBR
14	Magnet	Magnetic material
15	Circlip	Spring steel
16	Lever pin	Bearing steel
17	Guide plate	Stainless steel
18	Jaw spindle	Medium carbon steel
19	Lever	Medium carbon steel
20	Set screw	SCM (Not shown)
21	Set screw	SCM (Not shown)
22	Washer for gripper	Stainless steel (Not shown)
	Note on materials	RoHS Compliant

How to select the correct model (or required clamp force) according to the weight of workpiece.

The friction coefficient of the workpiece will be influenced by the shape and shifting condition but in connection with the weight of workpiece, the safety factor of clamping force is as shown below. Please select your model according to the result of below calculation.

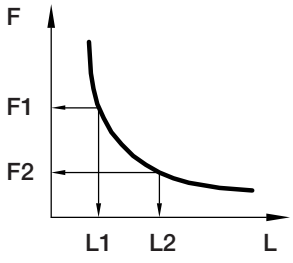
- Clamp force only W: (FxN) = 1:5
- Shifting under normal condition W: (FxN) = 1:10
- Shifting under acceleration W: (FxN) = 1:20

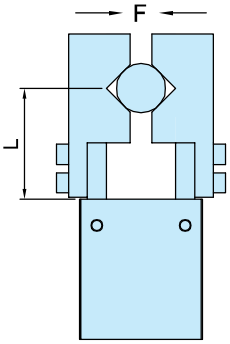
W = Weight of workpiece
F : Clamp force per jaw
(Please refer to clamp force performance chart)
N : Number of finger blanks

To obtain gripping power from performance data, if the distance to the workpiece's center of gravity is L when manufacturing the small jaw, gripping power F is expressed as follows

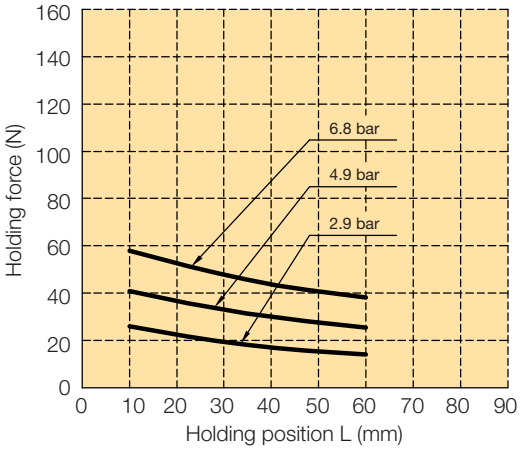
When L = L1, then F = F1

When L = L2, then F = F2

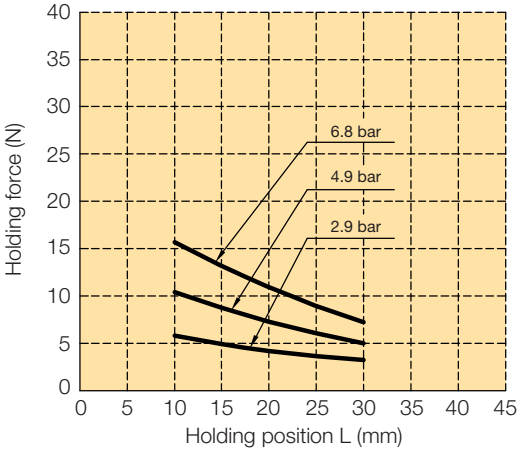




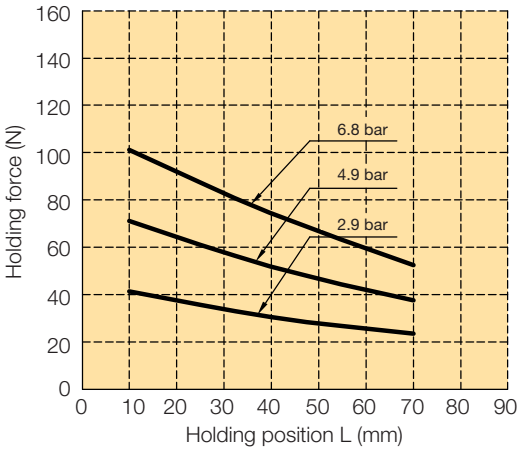
P5GB-020MSG012B



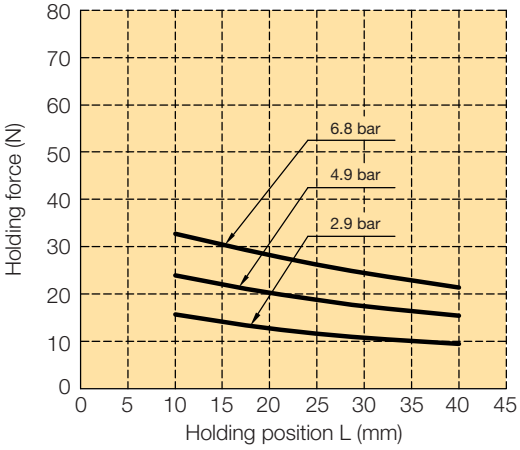
P5GB-012MSG006B



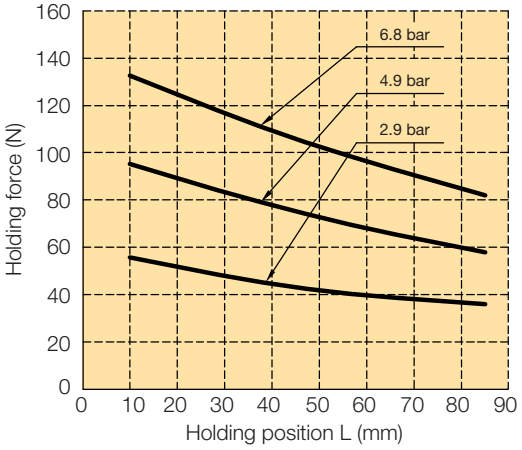
P5GB-025MSG014B



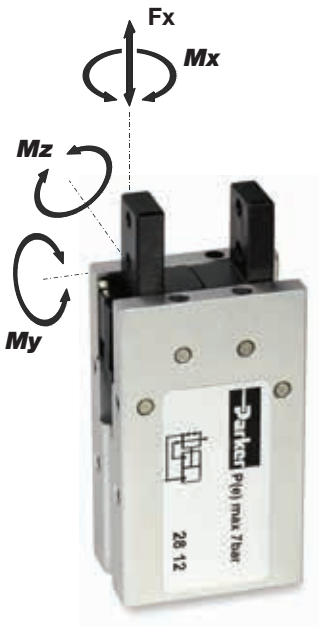
P5GB-016MSG008B



P5GB-032MSG016B



P5GB - Permissible force and torques on jaw carriers



Static

Size	12	16	20	25 & 32
Fx	30N	50N	75N	125N
Mx	0,26Nm	0,67 Nm	1,32 Nm	1,94 Nm
My	0,26Nm	0,67 Nm	1,32 Nm	1,94 Nm
Mz	0,26Nm	0,67 Nm	1,32 Nm	1,94 Nm

Mass of one of the 2 jaws (g) / closing and opening time (s) :

Size	12	16	20	25 & 32
m 0,2s	40g	80g	150g	250g
m 0,07s	25g	45g	75g	100g
m 0,05s	20g	35g	50g	–
m 0,02s	15g	25g	–	–
m 0,01s	10g	–	–	–

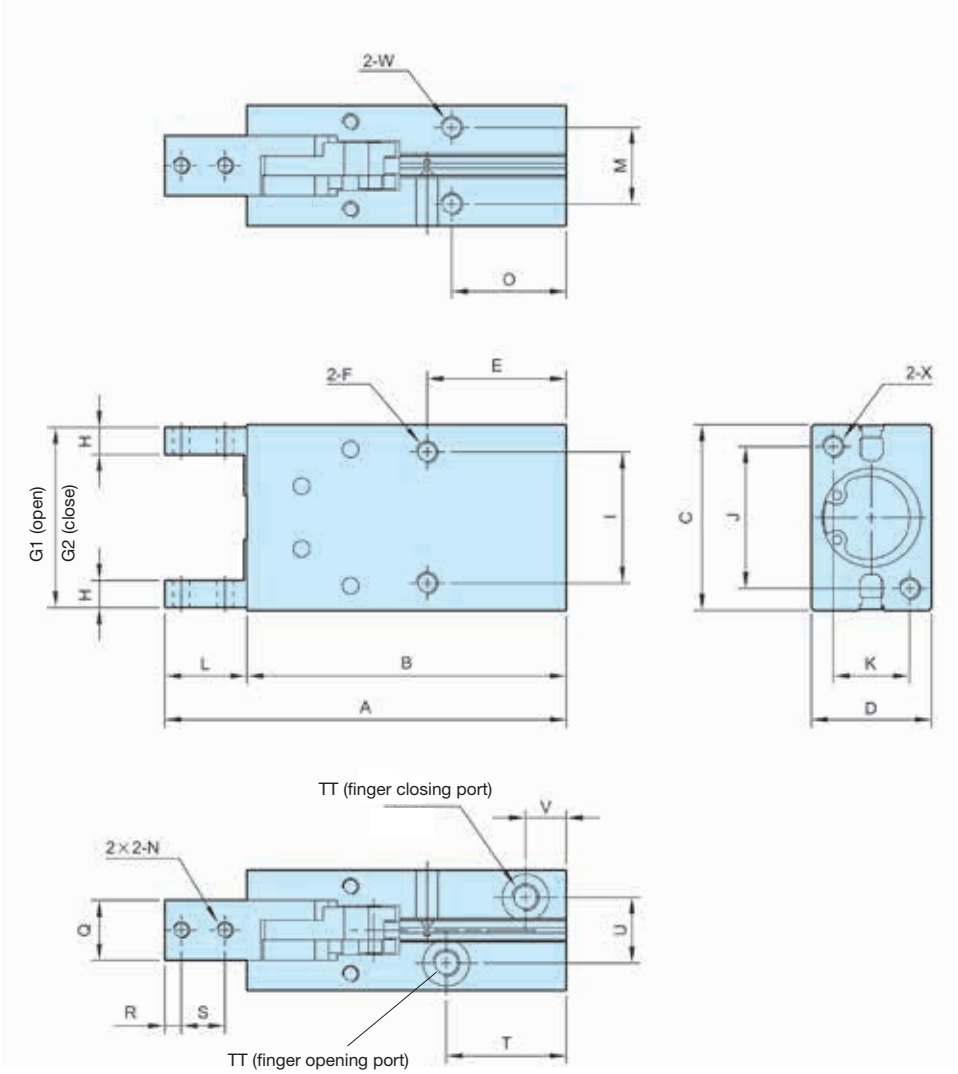
m is the permissible mass of the jaw for using gripper without flow controllers. If the mass of jaw is higher, use flow controllers to reduce the jaw-carriers speed.
m 0,2 s gives the max. mass of jaw to fix on one of the jaw-carriers for a 0,2 s closing time.

These indications must not be exceeded if:

- any extra forces are exerted on the workpiece or the jaws, in addition to the force of the clamping torque.
- handling forces (acceleration, shocks..) must also be added.

These values are cumulative if the forces act in different directions at the same time.

Dimensions (mm)



Bore mm	A	B	C	D	E	F	G1	G2	H	I	J	K	L	M	N	O	Q 0/-0.03	R
12	63,5	50,5	28	16	20	M3 x 0.5 x 5 depth	27	21	4	18	17	10	13	10	M3 x 0.5	16	7	3
16	73,5	58,5	34	22	25,5	M4 x 0.7 x 11 depth	33	25	5	24	26	14	15	14	M3 x 0.5	21	11	3
20	88,5	69,5	45	26	25	M5 x 0.8 x 8 depth	44	32	6	30	35	16	19	16	M4 x 0.7	19	12	4
25	102,5	78,5	52	32	28	M6 x 1.0 x 10 depth	51	37	8	36	40	20	24	20	M5 x 0.8	22	14	5
32	120,5	90,5	60	40	34	M6 x 1.0 x 10 depth	59	43	10	44	46	24	30	26	M6 x 1.0	26	20	7

Bore mm	S	T	TT	U	V	W	X
12	6	23	M5 x 0,8 x 5 depth	10,2	7,5	M3 x 0.5 x 5 depth	M3 x 0.5 x 5 depth
16	8	22	M5 x 0,8 x 5 depth	12	7,5	M4 x 0.7 x 7 depth	M4 x 0.7 x 7 depth
20	10	26	M5 x 0,8 x 5 depth	13	8	M5 x 0.8 x 8 depth	M5 x 0.8 x 8 depth
25	12	29	M5 x 0,8 x 5 depth	18	8,5	M6 x 1.0 x 10 depth	M6 x 1.0 x 10 depth
32	15	35	M5 x 0,8 x 5 depth	24	10,5	M6 x 1.0 x 10 depth	M6 x 1.0 x 10 depth

Order Key Code

15 digit order code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	5	G	B	-	0	1	2	M	S	G	0	0	6	B

Bore Size mm
012
016
020
025
032

Stroke	
006	6mm bore 12
008	8mm bore 16
012	12mm bore 20
014	14mm bore 25
016	16mm bore 32

Note : All grippers are supplied magnetic for optional sensing

P5GB - Parallel Grippers

Bore mm	Order code
12	**P5GB-012MSG006B**
16	**P5GB-016MSG008B**
20	**P5GB-020MSG012B**
25	**P5GB-025MSG014B**
32	**P5GB-032MSG016B**

P8S Sensors Series

The P8S family of sensors provides a broad range of reed and solid state sensor types with flying lead or M8 options available. Mounting on all grippers is within the integrated sensor grooves allowing for compact installation.

Electronic sensors

The electronic sensors utilise “Solid State” technology, providing operation with no moving parts. These switches are available in NPN and PNP type, both provide built in short circuit and transient protection as standard. The solid state operation allows for high switching on off frequency, ideal for applications where long service life is required.

Technical data

Design	GMR (Giant Magnetic Resistance) magneto-resistive function
Installation	Mounts within cylinder switch groove
Outputs	PNP or NPN, normally open
Voltage range	5-30 V DC
Voltage drop	1.5 V max
Switching current	50 mA max
Switch rating	1.5 W max
Leakage current	0.01 mA max
Internal consumption	10 mA max (NPN) 12 mA max (PNP)
On/off switching frequency	1000 Hz max
Encapsulation	IP 67 (NEMA 6)
Temperature range	–10°C to +70°C
Indication	LED Red (NPN) LED Green (PNP)
Cable	Polyurethane

Reed sensors

Reed type sensors are based on proven reed switch technology and provide reliable function in many applications.
Simple installation and the available AC voltage range are advantages for this range of sensors.

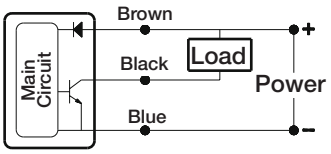
Technical data

Design	Reed element
Installation	Mounts within cylinder switch groove
Outputs	Normally open
Voltage range	5-120 V DC/AC
Voltage drop	2.5 V max
Switching current	100 mA max
Switch rating	10 W max
Encapsulation	IP 67 (NEMA 6)
Temperature range	–10°C to +70°C
Indication	LED Red
Cable	Polyurethane

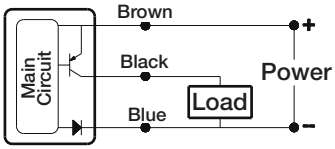
Electronic sensors

Schematic

NPN type



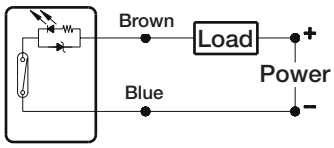
PNP type



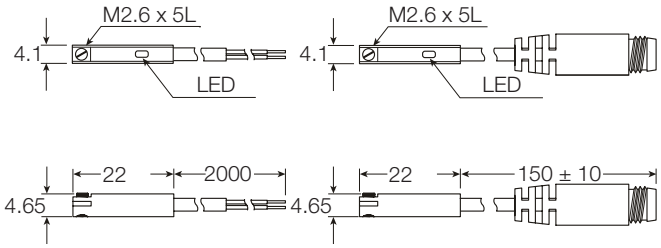
Reed sensors

Schematic

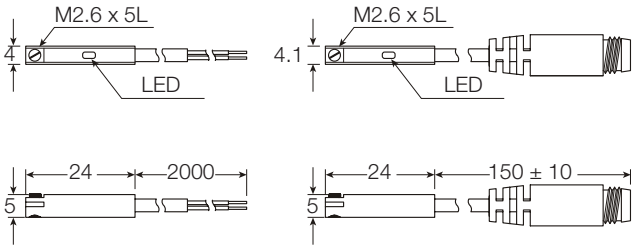
Reed type



Dimensions

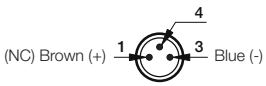


Dimensions

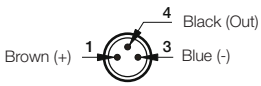


M8 Quick Connector

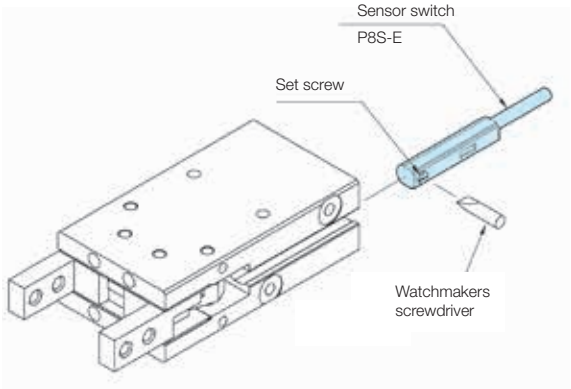
2 wire



3 wire



Installation of Sensor

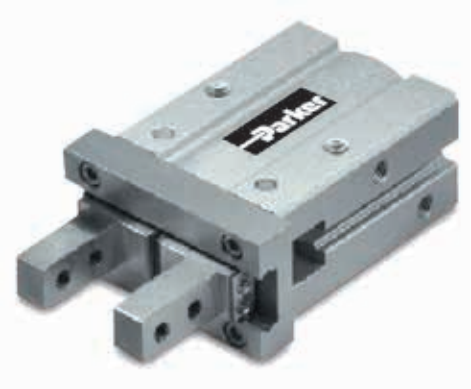


Electronic and Reed Sensors

Size	Description	Order code
Flush Mount Style		
PNP Type, normally open	0.165 m cable and M8 screw male connector	**P8S-EPSUS**
PNP Type, normally open	2 m PUR cable without connector	**P8S-EPFXS**
NPN Type, normally open	0.165 m cable and M8 screw male connector	**P8S-ENSUS**
NPN Type, normally open	2 m PUR cable without connector	**P8S-ENFXS**
Reed Type, normally open	0.15 m cable and M8 screw male connector	**P8S-ERSUS**
Reed Type, normally open	2 m PUR cable without connector	**P8S-ERFXS**

P5GD - Parallel precision guided double acting, square jaw carriers

The P5GD is a parallel double acting gripper with integral linear guides that provide rigidity and high precision for the stainless steel jaw carriers. The anodised aluminium body has mounting points on four sides and integral sensors grooves.



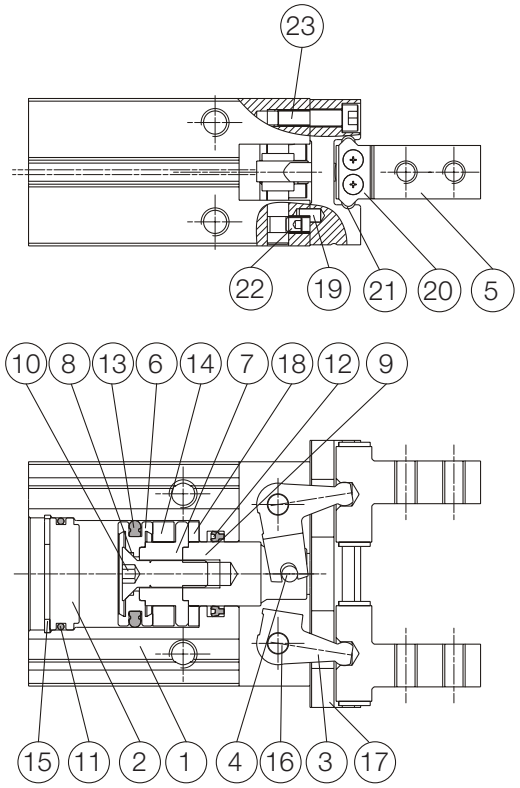
- Bore sizes Ø 10, 16, 20 and 25 mm
- Double acting
- Stainless steel jaw carriers
- Anodised corrosion protection
- Magnetic piston as standard
- Optional sensors

General technical data

Size	10	16	20	25
Total stroke (mm)	4	6	10	14
Total Force* (N) - Closed side	22	68	94	130
Total Force* (N) - Open side	34	90	132	208
Ø Piston bore (mm)	10	16	20	25
Ø Port size (mm)	M3	M5		
Air consumption (cm^3 cycle) **	0.5	2	6	14
Repeatability (mm)	± 0.01			
Max. work frequency (Hz)	3			
Min. closing time (s)	0.015	0.02	0.05	0.07
Weight (g)	55	125	250	460
Max. jaw length (mm)	50	55	80	100
Max. temperature (°C)	-10° to +60°			
Pressure (bar)	2 to 7	1.5 to 7		
Operation	Dry air, lubricated or unlubricated			

* At 5 bar, L=20mm.

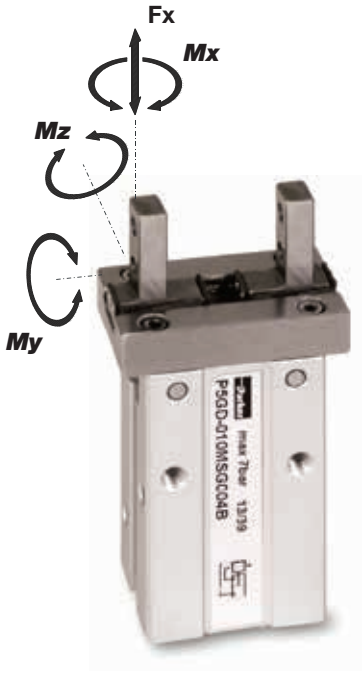
** Cycle = opening + closing (without jaws)



Pos	Part	Specification
1	Body	Aluminium alloy
2	Sealing cap	Aluminium alloy
3	Lever	Stainless steel
4	Retaining pin	Carbon steel
5	Jaw carrier	Stainless steel
6	Lower piston half	Aluminium alloy
7	Upper piston half	Aluminium alloy
8	Gasket	NBR
9	Piston rod	Stainless steel
10	Piston retaining screw	Stainless steel
11	O ring	NBR
12	U cup	NBR

Pos	Part	Specification
13	Piston seal	NBR
14	Magnet	Magnetic material
15	Circlip	Spring steel
16	Lever pin	Bearing steel
17	Guide plate	Stainless steel
18	Buffer	PU
19	Pin	Carbon steel
20	Roller stopper	Stainless steel
21	Steel ball	Stainless steel
22	Screw	Carbon steel
23	Screw	Stainless steel
	Note on materials	RoHS Compliant

P5GD - Permissible force and torques on jaw carriers



Static

Size	10	16	20	25
Fx	60 N	100 N	150 N	255 N
Mx	0.26 Nm	0.68 Nm	1.32 Nm	1.94 Nm
My	0.53 Nm	1.36 Nm	2.65 Nm	3.88 Nm
Mz	0.26 Nm	0.68 Nm	1.32 Nm	1.94 Nm

Mass of one of the 2 jaws (g) / closing and opening time (s) :

Size	10	16	20	25
m 0.2 s	40 g	80 g	150 g	250 g
m 0.07 s	25 g	45 g	75 g	100 g
m 0.05 s	20 g	35 g	50 g	–
m 0.02 s	15 g	25 g	–	–
m 0.01 s	10 g	–	–	–

m is the permissible mass of the jaw for using gripper without flow controllers. If the mass of jaw is higher, use flow controllers to reduce the jaw-carriers speed.
m 0.2 s gives the max. mass of jaw to fix on one of the jaw-carriers for a 0.2 s closing time.

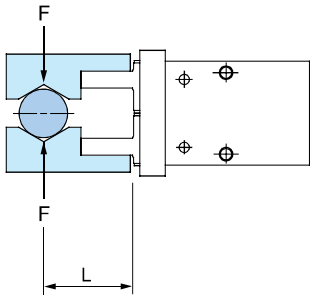
These indications must not be exceeded if:
- any extra forces are exerted on the workpiece or the jaws, in addition to the force of the clamping torque.
- handling forces (acceleration, shocks..) must also be added.

These values are cumulative if the forces act in different directions at the same time.

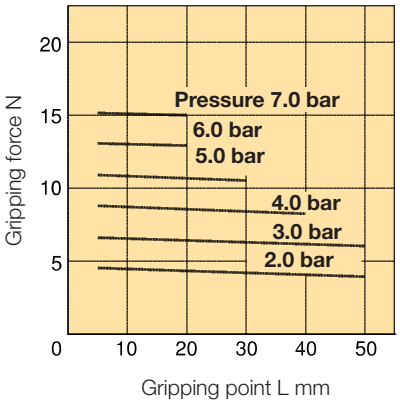
Calculate of allowable external force (when moment load is applied)	Calculation example
Allowable load F (N) = $\dfrac{\text{M (maximum allowable moment) (N.m)}}{\text{L x } 10^{-3} \text{ *}}$ (* Unit conversion constant)	When a static load of f = 10N is operating, which applies pitch moment point L = 30mm from the P5GD-016MSG006B guide **Allowable load F =** $\dfrac{0.68}{30 \text{ x } 10^{-3}}$ **= 22.7 (N)** **Load f = 10 (N) < 22.7 (N)** Therefore, it can be used.

Effective gripping force: Double acting / External gripping force

Expressing the effective gripping force.
The effective gripping force shown in the graphs below is expressed as F, which is the impellent force of one finger, when both fingers and attachments are in full contact with the work piece as shown in the fugure below.



Size 10



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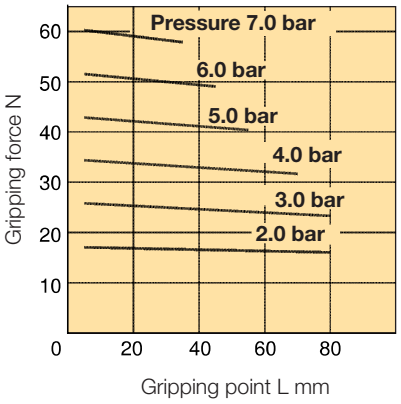

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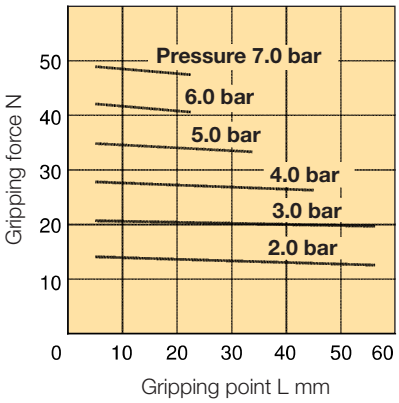

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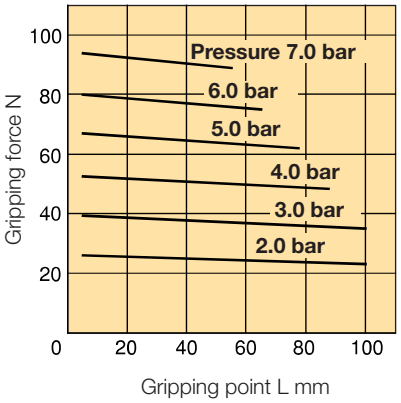
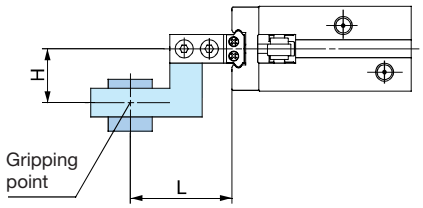


Confirmation of gripping point: External gripping

The air gripper should be operated so that the work piece gripping point "L" and the amount of overhang "H" stay within the range shown for each operating pressure given in the graphs below.

If the work piece gripping point goes beyond the range limits, this will have an adverse effect on the life of the air gripper.



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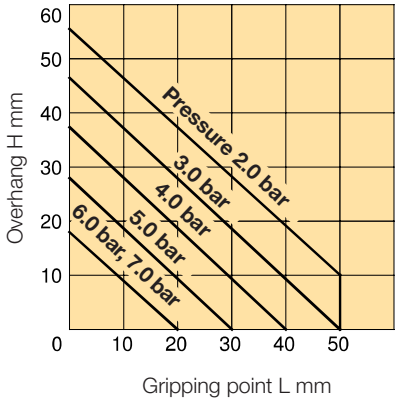

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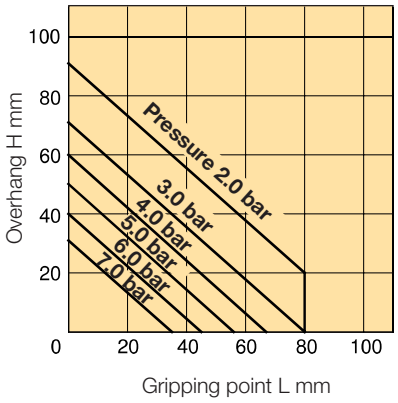
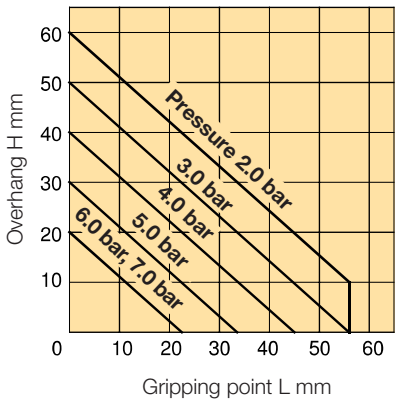
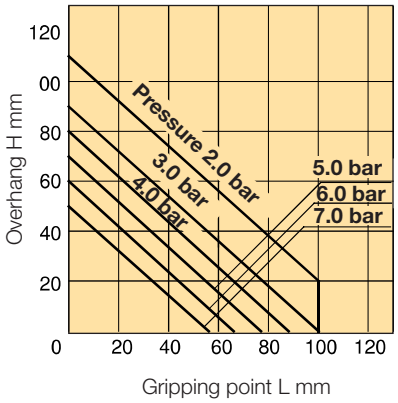


Size 16



Size 25



Effective gripping force: Double acting / Internal gripping force

Expressing the effective gripping force.
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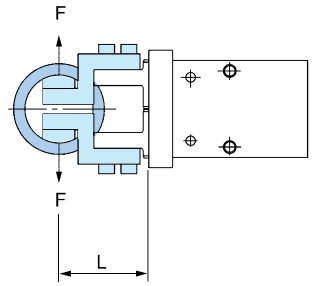

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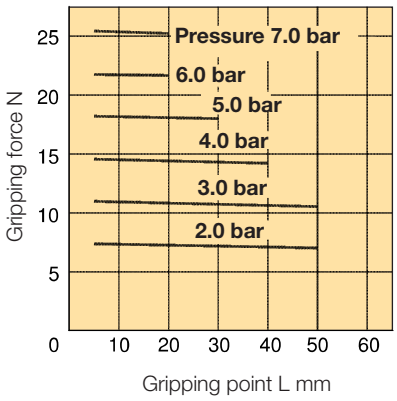

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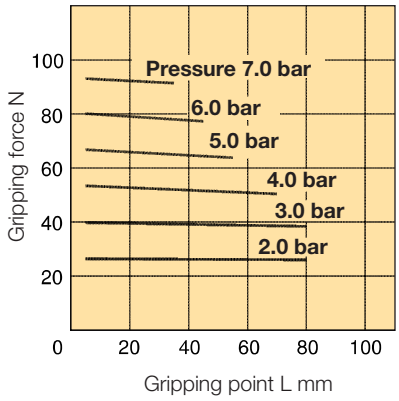

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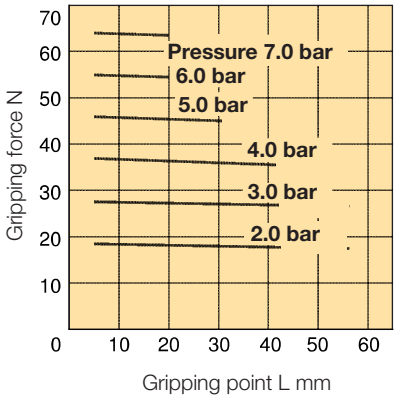

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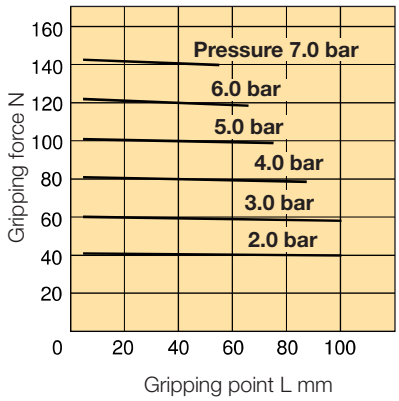

Confirmation of gripping point: Internal gripping

The air gripper should be operated so that the work piece gripping point "L" and the amount of overhang "H" stay within the range shown for each operating pressure given in the graphs below.

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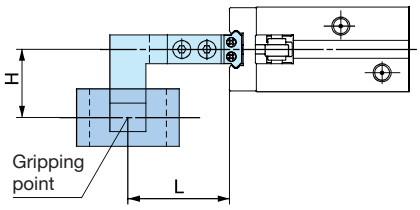

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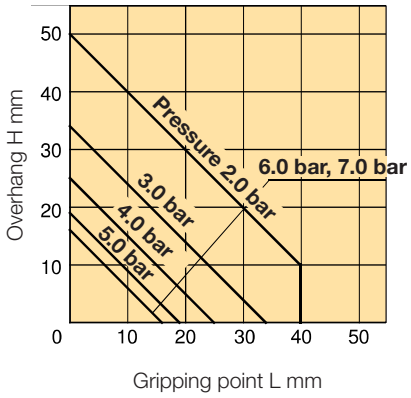

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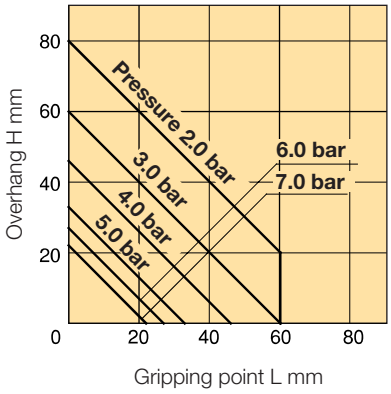

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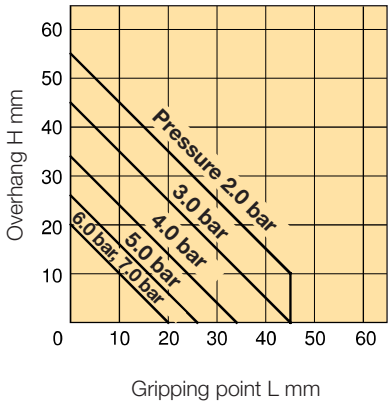

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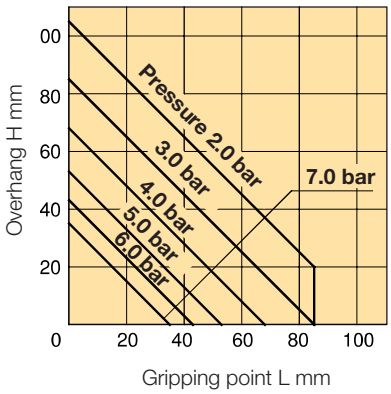
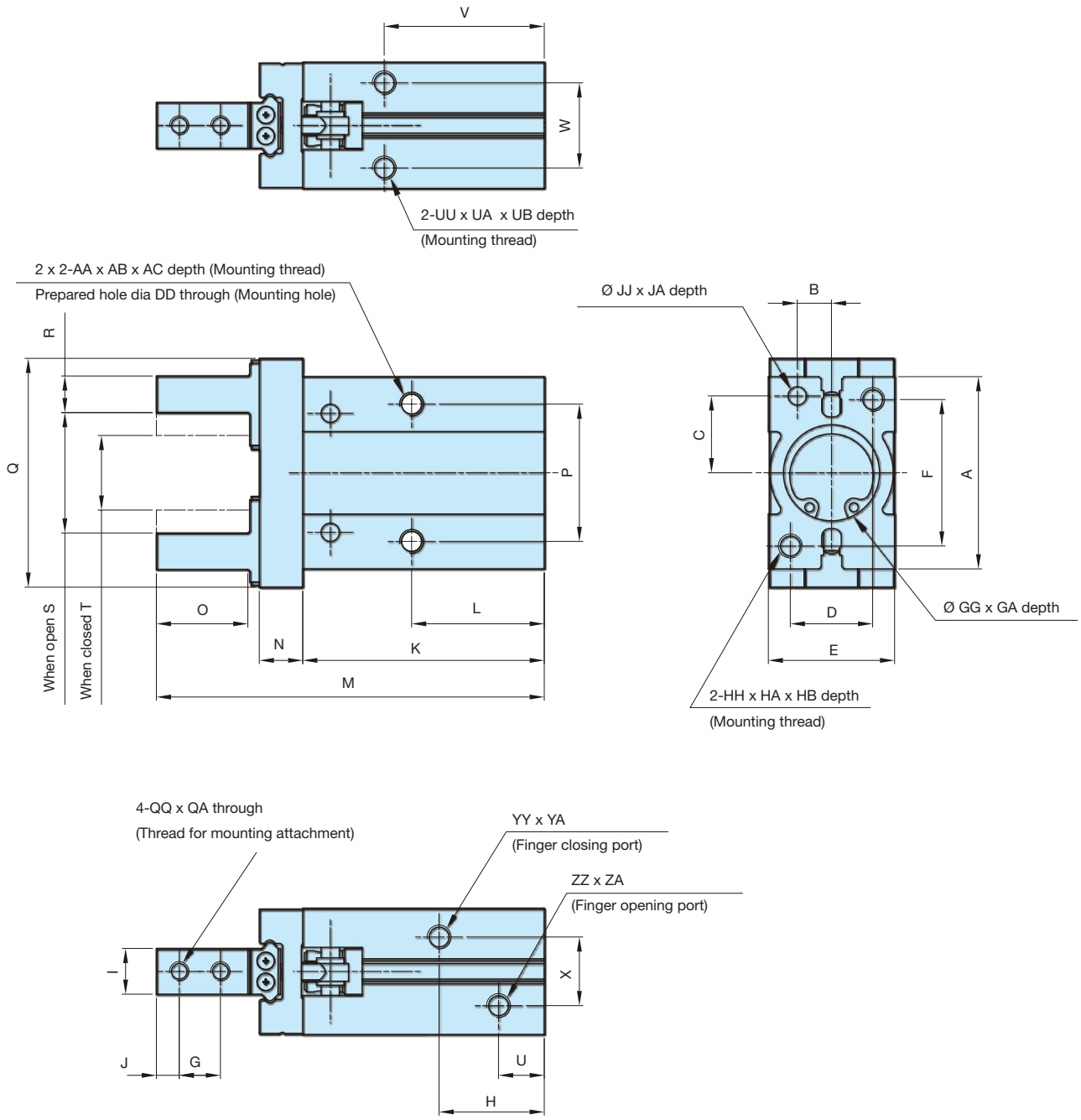


Dimensions (mm)



Bore mm	A	AA	AB	AC	B	C	D	DD	E	F	G	GG	GA	H	HH	HA	HB	I	J	JJ	JA	K	L	M
10	23	M3	0.5	5.5	5.2 $^{+0.025}_{0}$	7.6 $^{+0.02}_{-0.02}$	12	2.6	16.4 $^{+0.05}_{-0.05}$	18	5.7	11H9 $^{+0.043}_{0}$	2	19	M3	0.5	6	5 $^{0}_{-0.05}$	3	2H9 $^{+0.025}_{0}$	3	37.8	23	57
16	30.6	M4	0.7	8	6.5 $^{+0.025}_{0}$	11 $^{+0.02}_{-0.02}$	15	3.4	23.6 $^{+0.05}_{-0.05}$	22	7	17H9 $^{+0.043}_{0}$	2	19	M4	0.7	8	8 $^{0}_{-0.05}$	4	3H9 $^{+0.025}_{0}$	3	42.5	24.5	67.3
20	42	M5	0.8	10	7.5 $^{+0.030}_{0}$	16.8 $^{+0.02}_{-0.02}$	18	3.4	27.6 $^{+0.05}_{-0.05}$	32	9	21H9 $^{+0.052}_{0}$	3	23	M5	0.8	10	10 $^{0}_{-0.05}$	5	4H9 $^{+0.030}_{0}$	4	52.8	29	84.8
25	52	M6	1	12	10 $^{+0.002}_{-0.0}$	21.8 $^{+0.02}_{-0.02}$	22	5.1	33.6 $^{+0.05}_{-0.05}$	40	12	21H9 $^{+0.052}_{0}$	3.5	23.5	M6	1	12	12 $^{0}_{-0.05}$	6	4H9 $^{+0.02}_{-0.02}$	4	63.6	30	102.7

Bore mm	N	O	P	Q	QQ	QA	R	S	T	U	UU	UA	UB	V	W	X	YY	YA	ZZ	ZA
10	6	12	16	29	M2.5	0.45	4 $^{0}_{-0.1}$	15.2 $^{+2.2}_{0}$	11.2 $^{0}_{-0.7}$	9	M3	0.5	6	27	11.4	10	M3	0.5	M3	0.5
16	7.5	15	24	38	M3	0.5	5 $^{0}_{-0.1}$	20.9 $^{+2.2}_{-0.2}$	14.9 $^{0}_{-0.7}$	8.5	M4	0.7	4.5	30	16	13	M5	0.8	M5	0.8
20	9.5	20	30	50	M4	0.7	8 $^{0}_{-0.1}$	26.3 $^{+2.2}_{-0.2}$	16.3 $^{0}_{-0.7}$	10	M5	0.8	8	35	18.6	15	M5	0.8	M5	0.8
25	11	25	36	63	M5	0.8	10 $^{0}_{-0.1}$	33.3 $^{+2.2}_{-0.2}$	19.3 $^{0}_{-0.8}$	9.7	M6	1	10	36.5	22	20	M5	0.8	M5	0.8

Order Key Code

15 digit order code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	5	G	D	-	0	1	0	M	S	G	0	0	4	B

Bore Size mm
010
016
020
025

Stroke	
004	4mm bore 10
006	6mm bore 16
010	10mm bore 20
014	14mm bore 25

Note : All grippers are supplied magnetic for optional sensing

P5GD - Parallel Grippers

Bore mm	Order code
10	**P5GD-010MSG004B**
16	**P5GD-016MSG006B**
20	**P5GD-020MSG010B**
25	**P5GD-025MSG014B**

P8S Sensors Series

The P8S family of sensors provides a broad range of reed and solid state sensor types with flying lead or M8 options available. Mounting on all grippers is within the integrated sensor grooves allowing for compact installation.

Electronic sensors

The electronic sensors utilise “Solid State” technology, providing operation with no moving parts. These switches are available in NPN and PNP type, both provide built in short circuit and transient protection as standard. The solid state operation allows for high switching on off frequency, ideal for applications where long service life is required.

Technical data

Design	GMR (Giant Magnetic Resistance) magneto-resistive function
Installation	Mounts within cylinder switch groove
Outputs	PNP or NPN, normally open
Voltage range	5-30 V DC
Voltage drop	1.5 V max
Switching current	50 mA max
Switch rating	1.5 W max
Leakage current	0.01 mA max
Internal consumption	10 mA max (NPN) 12 mA max (PNP)
On/off switching frequency	1000 Hz max
Encapsulation	IP 67 (NEMA 6)
Temperature range	–10°C to +70°C
Indication	LED Red (NPN) LED Green (PNP)
Cable	Polyurethane

Reed sensors

Reed type sensors are based on proven reed switch technology and provide reliable function in many applications.
Simple installation and the available AC voltage range are advantages for this range of sensors.

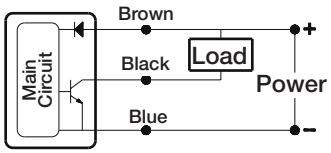
Technical data

Design	Reed element
Installation	Mounts within cylinder switch groove
Outputs	Normally open
Voltage range	5-120 V DC/AC
Voltage drop	2.5 V max
Switching current	100 mA max
Switch rating	10 W max
Encapsulation	IP 67 (NEMA 6)
Temperature range	–10°C to +70°C
Indication	LED Red
Cable	Polyurethane

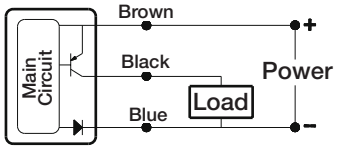
Electronic sensors

Schematic

NPN type



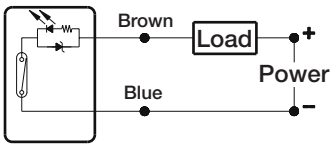
PNP type



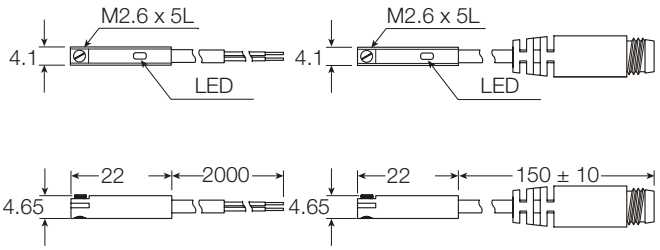
Reed sensors

Schematic

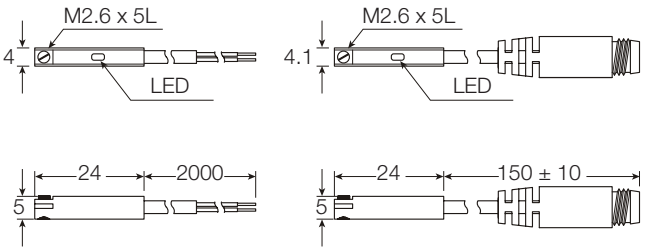
Reed type



Dimensions

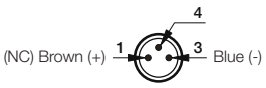


Dimensions

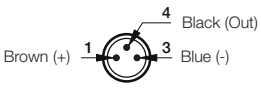


M8 Quick Connector

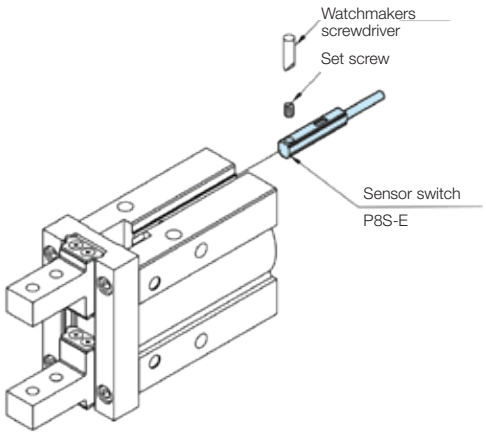
2 wire



3 wire



Installation of Sensor



Electronic and Reed Sensors

Size	Description	Order code
Flush Mount Style		
PNP Type, normally open	0.165 m cable and M8 screw male connector	**P8S-EPSUS**
PNP Type, normally open	2 m PUR cable without connector	**P8S-EPFXS**
NPN Type, normally open	0.165 m cable and M8 screw male connector	**P8S-ENSUS**
NPN Type, normally open	2 m PUR cable without connector	**P8S-ENFXS**
Reed Type, normally open	0.15 m cable and M8 screw male connector	**P8S-ERSUS**
Reed Type, normally open	2 m PUR cable without connector	**P8S-ERFXS**

P5GL - 180° Angular double acting, cam style, square jaw carriers

The P5GL is a 180° angular gripper of compact size and lightweight construction. With double acting movement high gripping forces are achieved via internal cams. The anodised body has mounting points on four sides and sensors can be fitted in any of the four integral grooves.

- Bore sizes Ø10, 16, 20 and 25mm
- Double acting
- Anodised corrosion protection
- Magnetic piston as standard
- Optional sensors

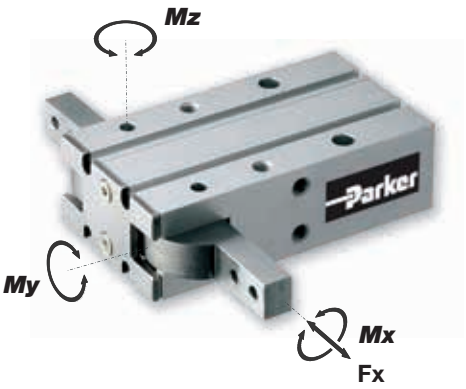
General technical data

Size	10	16	20	25
Total operating angle (°)	-3° to +180°			
Total Force* (N) - Closed side	11	36	73.00	152
Total Force* (N) - Open side	-			
Total Torque* (Nm) - Closed side	0.32	1.08	2.20	4.56
Total Torque* (Nm) - Open side	-			
Ø Piston bore (mm)	10	16	20	25
Ø Port size (mm)	M5			
Air consumption (cm^3 cycle) **	2	7	14	28
Repeatability (mm)	± 0.02			
Max. work frequency (Hz)	1			
Min. closing time (s)	0.1	0.1	0.15	0.15
Weight (g)	80	150	320	600
Max. jaw length (mm)	60	70	80	90
Max. temperature (°C)	-10° to +60°			
Pressure (bar)	1 to 6			
Operation	Dry air, lubricated or unlubricated			

* At 5 bar, L=30mm.

** Cycle = opening + closing (without jaws)

P5GL - Permissible force and torques on each jaw carrier



Static

Size	10	16	20	25
Fx	35N	60N	100N	140N
Mx	0,5Nm	2 Nm	4 Nm	7 Nm
My	0,5Nm	2 Nm	4 Nm	7 Nm
Mz	0,5Nm	1 Nm	2 Nm	7 Nm

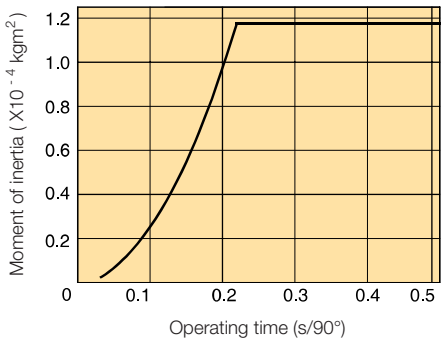
Mz at 5 bar.

Recommendation is to use flow control to limit the speed of opening to reduce impact at the end of the stroke.

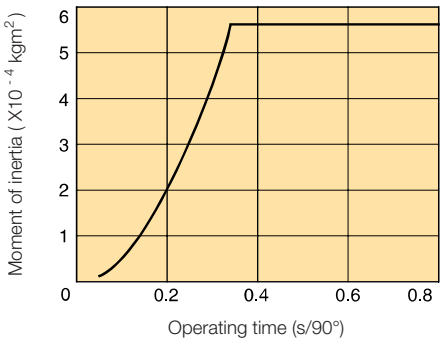
Dynamic

Inertia of one of the 2 jaws (kgcm²) closing or opening time (s) :

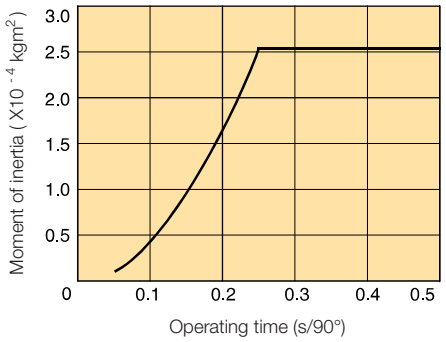
P5GL-010MSG180B



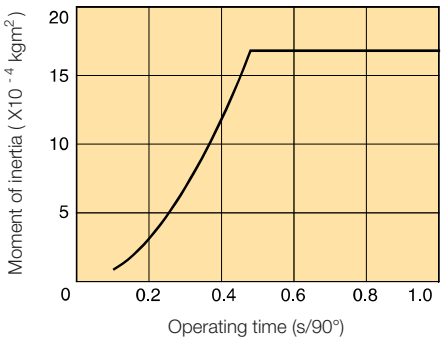
P5GL-020MSG180B



P5GL-016MSG180B



P5GL-025MSG180B



For a inertia of one of the 2 jaws of 0,22 kgcm², the opening or closing time of the gripper is 0,15 s for a **size 10**.

These indications must not be exceeded if:

- any extra forces are exerted on the workpiece or on the jaws, in addition to the force or to the clamping torque.
- handling forces (acceleration, shocks, ...) must also be added.

These values are cumulative if the forces act in different directions at the same time.

Effective holding force

Indication of effective holding force

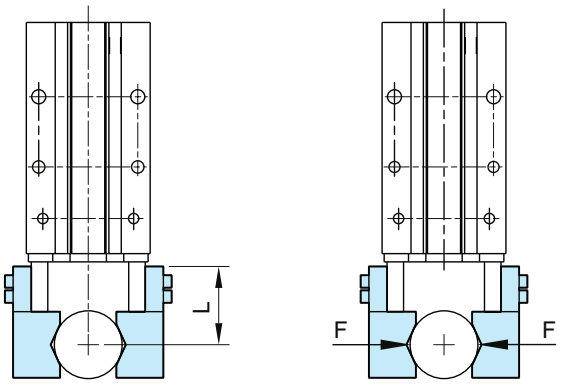
1. Although the condition differs according to the coefficient of friction between the attachment and work, select a model that can produce a holding force of 10 to 20 times the work.
2. Further allowance should be provided when great acceleration or impact is expected during work transfer.

EX.)
For setting the holding force to be at least 20 times the work weight;
Required holding force = 0.05kg X 20 X 9.8m/s^2 = 10N min.

When P5GL-016MSG180B is selected, the holding force is determined to be 17N according to the holding point distance (L = 30mm) and the pressure (5kgf/cm^2).

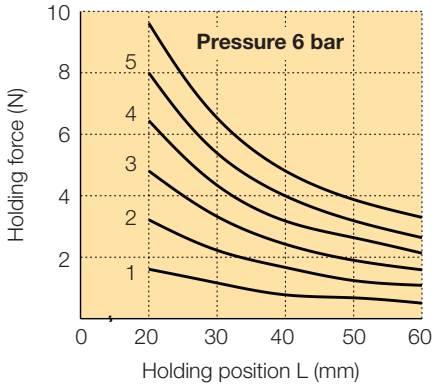
3. The holding force shown in the table represents the holding force of one finger when all fingers and attachments are in contact with the work.

L: Holding point distance **F:** Thrust of one finger

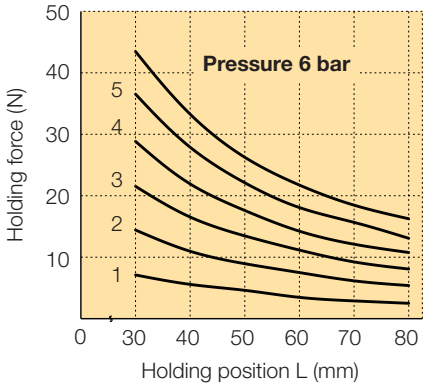


External hold

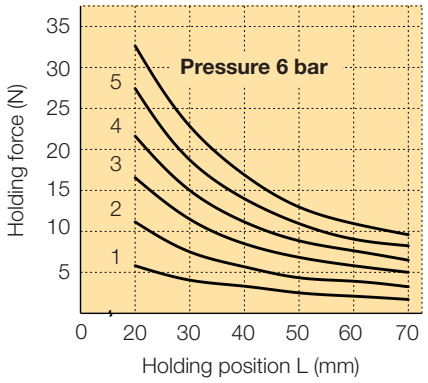
P5GL-010MSG180B



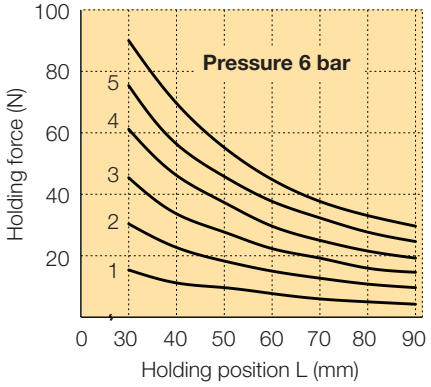
P5GL-020MSG180B



P5GL-016MSG180B

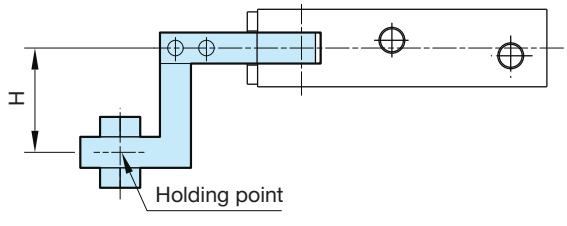


P5GL-025MSG180B

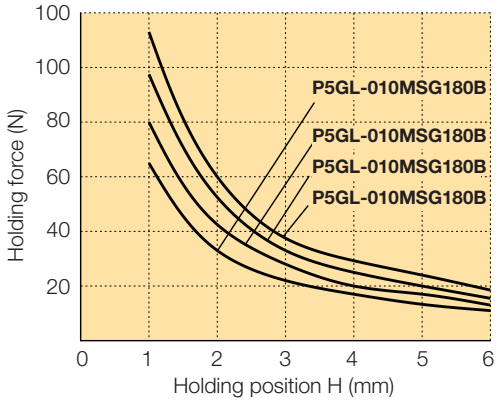


Confirmation of holding point

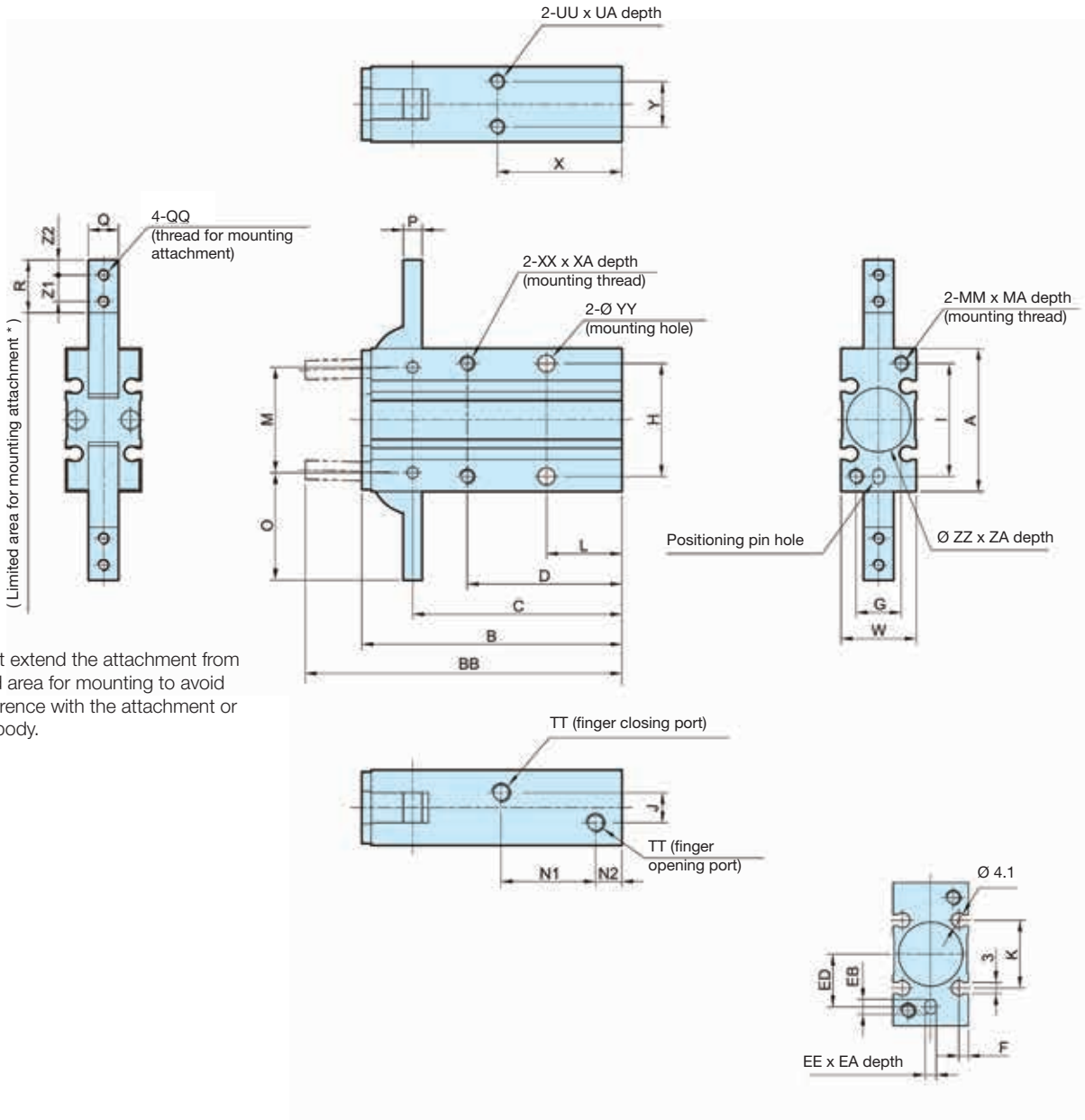
Work should be held at a point within the tange of overhanging distance (H) for a given pressure indicated in the tables. When the work is held at a point outside of the recommended range for a given pressure, it may cause adverse effect on the product life.



P5GL



Dimensions (mm)



* Do not extend the attachment from limited area for mounting to avoid interference with the attachment or main body.

Bore mm	A	B	BB	C	D	EE	EA	EB	ED	F	G	H	I	J	K	L	M	MA	MM	N1	N2	O	P	Q
10	30	58	71	47,5	35	3H9 $^{+0.025}_{0}$	3	4	9	2	9	24	24	3	13	18	22	6	M3 x 0.5	23	7	23,5	4	6 $^{+0.005}_{-0.025}$
16	38	69	84	55,5	41	3H9 $^{+0.025}_{0}$	3	4	15	2,5	12	30	30	8	18	20	28	8	M4 x 0.7	25	7	28,5	5	8 $^{+0.005}_{-0.025}$
20	48	86	106	69	50	4H9 $^{+0.030}_{0}$	4	5	19	3	16	36	38	12	20	25	36	10	M5 x 0.8	32	8	37	8	10 $^{+0.005}_{-0.025}$
25	58	107	131	86	60	4H9 $^{+0.030}_{0}$	4	5	23	3	18	42	46	14	24	30	45	12	M6 x 1	42	8	45	10	12 $^{+0.005}_{-0.025}$

Bore mm	QH	QQ	R	TT	UA	UU	W	X	XA	XX	Y	YY	ZA	ZZ	Z1	Z2
10	3,4	M3 x 0.5	12	M5 x 0.8 x 5 depth	4	M3 x 0.5	15	30	6	M3 x 0.5	9	3,4	1,5	11H9 $^{+0.043}_{0}$	6	3
16	3,4	M3 x 0.5	14	M5 x 0.8 x 5 depth	5	M4 x 0.7	20	33	8	M4 x 0.7	12	4,5	1,5	17H9 $^{+0.043}_{0}$	7	4
20	4,5	M4 x 0.7	18	M5 x 0.8 x 5 depth	8	M5 x 0.8	26	42	10	M5 x 0.8	14	5,5	1,5	21H9 $^{+0.052}_{0}$	9	5
25	5,5	M5 x 0.8	22,5	M5 x 0.8 x 5 depth	10	M6 x 1	30	50	12	M6 x 1	16	6,6	1,5	26H9 $^{+0.052}_{0}$	12	6

Order Key Code

15 digit order code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	5	G	L	-	0	1	0	M	S	G	1	8	0	B

Bore Size mm
010
016
020
025

Note : All grippers are supplied magnetic for optional sensing

P5GL - 180° Angular Grippers

Bore mm	Order code
10	**P5GL-010MSG180B**
16	**P5GL-016MSG180B**
20	**P5GL-020MSG180B**
25	**P5GL-025MSG180B**

Reed sensors

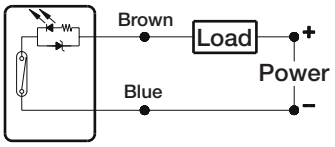
Reed type sensors are based on proven reed switch technology and provide reliable function in many applications.
Simple installation and the available AC voltage range are advantages for this range of sensors.

Technical data

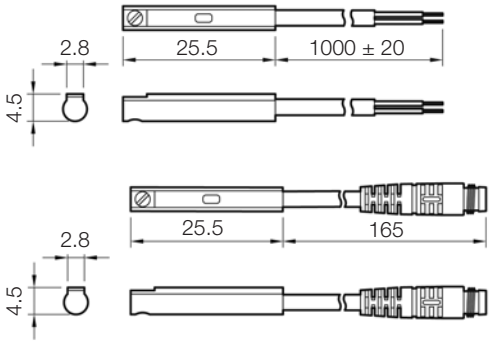
Design	Reed element
Installation	Mounts within cylinder switch groove
Outputs	Normally open
Voltage range	5-120 V DC/AC
Voltage drop	2.5 V max
Switching current	100 mA max
Switch rating	10 W max
Encapsulation	IP 67 (NEMA 6)
Temperature range	–10°C to +70°C
Indication	LED Red
Cable	Polyurethane

Schematic

Reed type

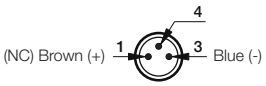


Dimensions

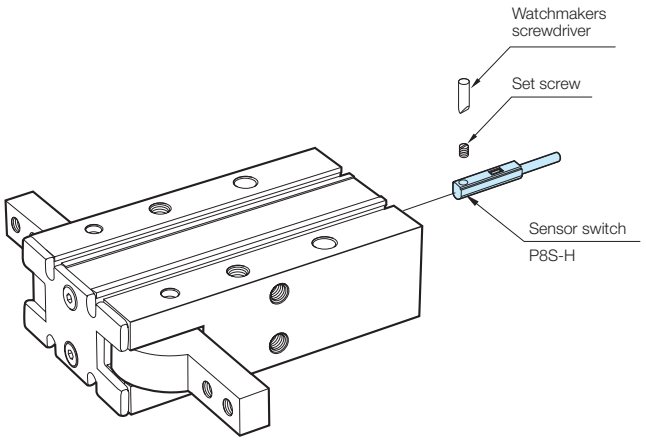


M8 Quick Connector

2 wire QC wiring



Installation of Sensor



Reed Sensors

Size	Description	Order code
Flush Mount Style		
Reed Type, normally open	0.15 m PUR cable and M8 screw male connector	**P8S-HRSUS**
Reed Type, normally open	1 m PUR cable without connector	**P8S-HRFCS**

Connecting cables with one connector

The cables have an integral snap-in female connector.

Type of cable	Cable/connector	Weight kg	Order code
Cables for sensors, complete with one female connector			
Cable, Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344341**
Cable, Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344342**
Cable, Super Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344343**
Cable, Super Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344344**
Cable, Polyurethane	3 m, 8 mm Snap-in connector	0,01	**9126344345**
Cable, Polyurethane	10 m, 8 mm Snap-in connector	0,20	**9126344346**

Male connectors for connecting cables

Cable connectors for producing your own connecting cables. The connectors can be quickly attached to the cable without special tools. Only the outer sheath of the cable is removed. The connectors are available for M8 and M12 screw connectors and meet protection class IP 65.

Connector	Weight kg	Order code
M8 screw connector	0,017	**P8SCS0803J**
M12 screw connector	0,022	**P8SCS1204J**

Ready to use connecting cables with connectors at each end

As accessories the system comprises a large number of different cables in order to meet all requirements that may arise and to make the installation simple, fast and reliable.

Cables with moulded 8 mm snap-in round contacts in both ends. The cables are available in two types, one with a straight male and female connectors respectively, and one with a straight 3-pole male connector in one end and an angled 3-pole female connector in the other end.

Technical data

Contacts

Moulded 8 mm snap-in male/female contacts.

Enclosure	IP67

Cable

Conductor	3x0,25 mm² (32x0,10 mm²)
Sheath	PVC/PUR
Colour	Black

Installation and Maintenance for P5GA, P5GB, P5GD and P5GL Grippers

Disconnect air and electrical supplies before attempting repair or maintenance.
See ISO 4414-1982 for safety requirements covering the installation and use of pneumatic equipment.

Selection

❶ Do not apply a load over the operating limit range.

Select the model considering max. allowable load and allowable moment. When the grippers are used outside of the normal operating limits, excessive loads can cause wear that can lead to malfunction, shorter life expectancy and safety concerns.

❷ Do not apply excessive forces and impacts.

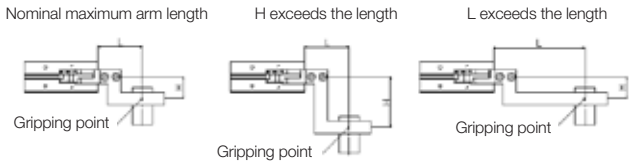
This may cause problems and possible failure.

Mounting

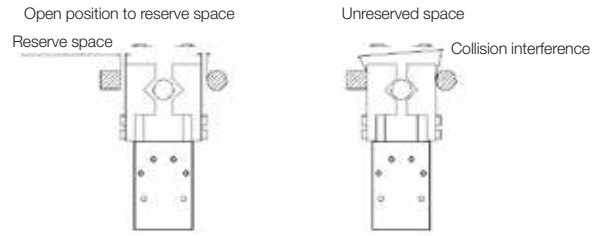
1. Use air as media. When piping, make sure the pipeline is completely cleaned to maintain the cleanness of the air.
2. Install an air filter in the gripper pipeline to eliminate / reduce moisture and replace the filter element periodically.
3. Avoid using the gripper in moist, oily or dusty environments.
4. When installing the gripper, tighten the fix screw according to normal specified torque standard.
5. When the gripper is operating do not put your hands on/near the grippers to prevent injuries.
6. To prevent gripper malfunction or injuries please do not exceed the capacity range of gripper when operating.
7. When installing and operating the gripper, avoid vibration and instant impact caused by any external force.
8. Apply lithium lubricant to the slide track of the gripper to prevent rust and extend the gripper life cycle.

Operation

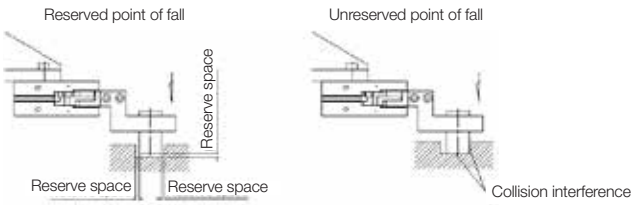
1. When designing the operation path for the gripper, well planned path and reserve extra space is suggested to prevent impact occur. External impact could endanger the safety of the operator and cause damage to the equipment.
2. When designing the finger blanks, the strength of material should be able to bear the weight of the workpiece. Finger blanks should be lightweight. Over size/weight could affect the grippers ability to function normally.
3. Please take note of the 'maximum arm length' specified in the catalogue. Finger blanks exceeding the specified length will cause the gripping force to drop rapidly.



4. The bore size of the gripper should correspond to the size/weight of the workpiece. Several grippers can be used to grip large/heavy work piece. Overloading the gripper cylinder is strictly prohibited.
5. Avoid allowing the fingers to sustain lateral force and torque force. This may cause the fingers to loosen resulting in excessive wear.
6. Be cautious when the power is off for periods of time or when experiencing power failure. This could cause a drop in the air pressure and cause the workpiece to fall or become loose.
7. The gripping contact area should be reduced when the finger blanks are designed for gripping small / thinner workpiece. Holding small / thinner workpiece with large contact areas will cause the workpiece to shift / loosen easily.
8. Notice the position when installing the gripper. You should avoid lateral impact to the gripper when the fingers are at the opening position. This may cause the fingers to break easily.



9. When configuring the gripper to certain designated position and unloading the workpiece, clearance must be reserved at the point of fall to avoid direct collision interference.



Environment

❶ Do not use in atmosphere where the gripper contacts directly with liquid such as cutting oil.

Conditions where the gripper is exposed directly to cutting oil, coolant and oil mist may lead to vibration, increase of moving part resistance, air leakage, etc.

❷ Do not use in atmosphere where the gripper contacts directly with material such as powder dust, dust, spatter etc.

❸ Do not use in direct sun light.

❹ Do not use in environment where there is heat source.

Use a cover when there is a heat source around the gripper, or if temperature of product increases and exceeds operating temperature range by emissive heat.

❺ Do not subject it to excessive vibration and/or impact.

This results in damage and/or malfunction.

Contact Parker if the gripper is used in the above conditions.

Specifying air quality (purity) in accordance with ISO8573-1:2010, the international standard for Compressed Air Quality

ISO8573-1 is the primary document used from the ISO8573 series as it is this document which specifies the amount of contamination allowed in each cubic metre of compressed air.

ISO8573-1 lists the main contaminants as Solid Particulate, Water and Oil. The purity levels for each contaminant are shown separately in tabular form, however for ease of use, this document combines all three contaminants into one easy to use table.

ISO8573-1:2010 CLASS	Solid Particulate				Water		Oil
	Maximum number of particles per m^3			Mass Concentration mg/m^3	Vapour Pressure Dewpoint	Liquid g/m^3	Total Oil (aerosol liquid and vapour)
	0,1 - 0,5 micron	0,5 - 1 micron	1 - 5 micron				mg/m^3
0	As specified by the equipment user or supplier and more stringent than Class 1						
1	≤ 20 000	≤ 400	≤ 10	-	≤ -70 °C	-	0,01
2	≤ 400 000	≤ 6 000	≤ 100	-	≤ -40 °C	-	0,1
3	-	≤ 90 000	≤ 1 000	-	≤ -20 °C	-	1
4	-	-	≤ 10 000	-	≤ +3 °C	-	5
5	-	-	≤ 100 000	-	≤ +7 °C	-	-
6	-	-	-	≤ 5	≤ +10 °C	-	-
7	-	-	-	5 - 10	-	≤ 0,5	-
8	-	-	-	-	-	0,5 - 5	-
9	-	-	-	-	-	5 - 10	-
X	-	-	-	> 10	-	> 10	> 10

Specifying air purity in accordance with ISO8573-1:2010

When specifying the purity of air required, the standard must always be referenced, followed by the purity class selected for each contaminant (a different purity class can be selected for each contamination if required).

An example of how to write an air quality specification is shown below:

ISO 8573-1:2010 Class 1.2.1

ISO 8573-1:2010 refers to the standard document and its revision, the three digits refer to the purity classifications selected for solid particulate, water and total oil. Selecting an air purity class of 1.2.1 would specify the following air quality when operating at the standard's reference conditions :

Class 1 - Particulate

In each cubic metre of compressed air, the particulate count should not exceed 20,000 particles in the 0.1 - 0.5 micron size range, 400 particles in the 0.5 - 1 micron size range and 10 particles in the 1 - 5 micron size range.

Class 2 - Water

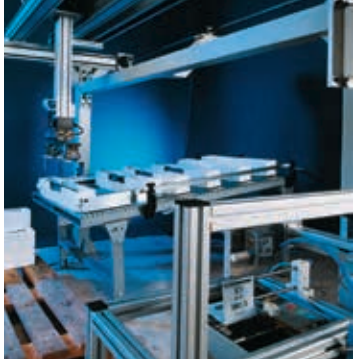
A pressure dewpoint (PDP) of -40°C or better is required and no liquid water is allowed.

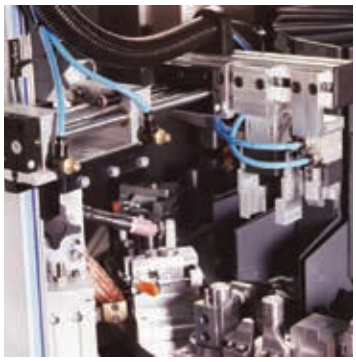
Class 1 - Oil

In each cubic metre of compressed air, not more than 0.01mg of oil is allowed. This is a total level for liquid oil, oil aerosol and oil vapour.

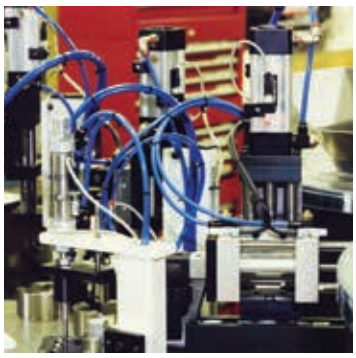
ISO8573-1:2010 Class zero

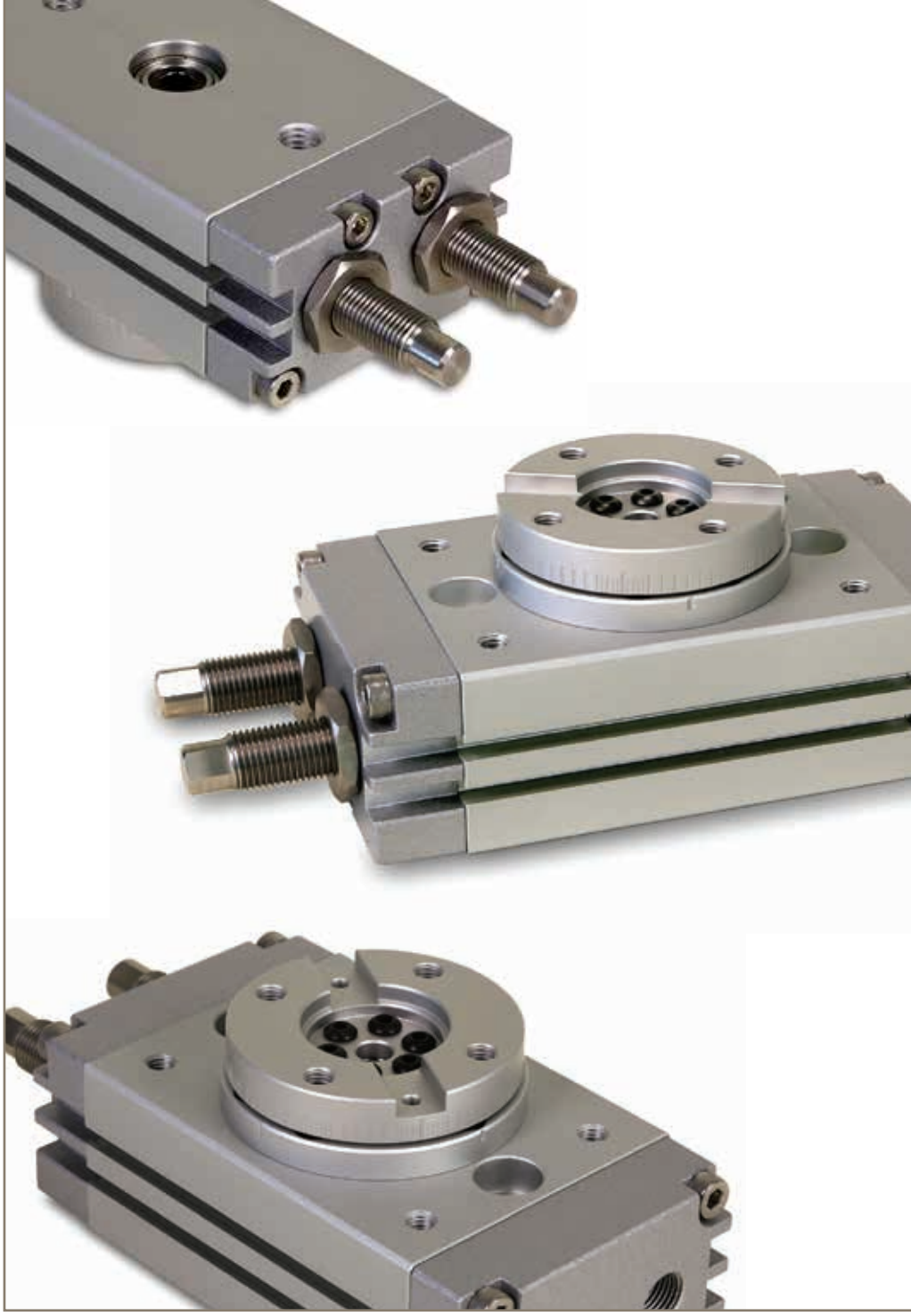
- **Class 0 does not mean zero contamination.**
- **Class 0 requires the user and the equipment manufacturer to agree contamination levels as part of a written specification.**
- **The agreed contamination levels for a Class 0 specification should be within the measurement capabilities of the test equipment and test methods shown in ISO8573 Pt 2 to Pt 9.**
- **The agreed Class 0 specification must be written on all documentation to be in accordance with the standard.**
- **Stating Class 0 without the agreed specification is meaningless and not in accordance with the standard.**
- **A number of compressor manufacturers claim that the delivered air from their oil-free compressors is in compliance with Class 0.**
- **If the compressor was tested in clean room conditions, the contamination detected at the outlet will be minimal. Should the same compressor now be installed in typical urban environment, the level of contamination will be dependent upon what is drawn into the compressor intake, rendering the Class 0 claim invalid.**
- **A compressor delivering air to Class 0 will still require purification equipment in both the compressor room and at the point of use for the Class 0 purity to be maintained at the application.**
- **Air for critical applications such as breathing, medical, food, etc typically only requires air quality to Class 2.2.1 or Class 2.1.1.**
- **Purification of air to meet a Class 0 specification is only cost effective if carried out at the point of use.**





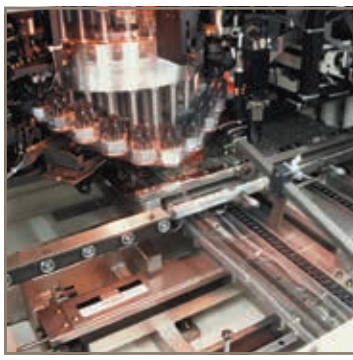
aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding





Rotary Tables
P5RS Series

Sizes 16, 20, 25 and 32 mm



Parker

ENGINEERING YOUR SUCCESS.

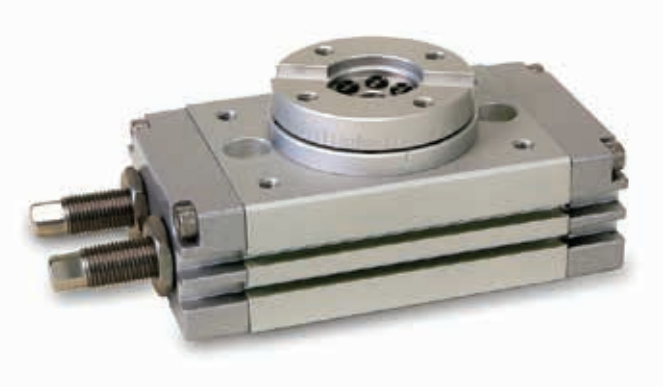
Contents

Important
Before attempting any external or internal work on the cylinder or any connected components, make sure the cylinder is vented and disconnect the air supply in order to ensure isolation of the air supply.

Note
All technical data in this catalogue are typical data only.
Air quality is essential for maximum cylinder service life (see ISO 8573).

P5RS - Rotary Actuators

The P5RS rotary table units provide precise control even under heavy loads, with specially designed load fixing and centring capabilities. End stroke cushioning using an adjusting bolt or optional shock absorber offers dependable linear cushioning enabling objects to be carried and positioned safely and securely.



- Bores Ø16, 20, 25 and 32 mm
- Twin rack and pinion
- Adjustable between 0° and 190°
- Magnetic piston standard
- Stroke adjusters standard
- Optional shock absorbers bores Ø20 and 25 mm
- Easy mounting of work piece

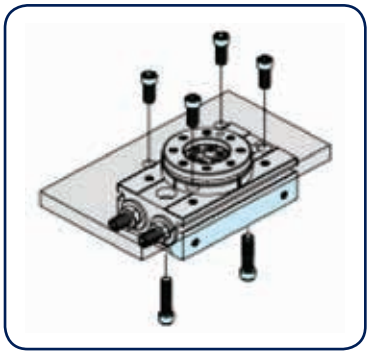
General technical data

Size	16	20	25	32
Total stroke (°)	0 to 190			
Total torque (Nm)*	1.21	2.51	4.91	9.86
Ø Piston bore (mm)	2 x 16	2 x 20	2 x 25	2 x 32
Ø Air port size (mm)	G1/8			
Volume (cm^3/190°)	6.6	13.5	20.1	34.1
Air consumption (cm^3/90°)	37	77	114	194
Air consumption (cm^3/190°)	79	162	241	409
Rotating time (s/90°)* elastic bumpers	0,2 to 1 for 90°			
Rotating time (s/90°)* hydraulic shocks	0,2 to 0,7 for 90°			
Sensing	Magnet in			
Max kinetic energy (mJ) elastic bumpers	7	40	81	320
Max kinetic energy (mJ) hydraulic shocks			294	1600
Minimum angle to not decrease energy capacity (°)	43	40	81	320
Axial load (a) pull (N)	74	137	197	296
Axial load (b) push (N)	78	137	363	451
Radial load (N)	78	147	196	314
Allowable moment (Nm)	2.4	4	5.3	9.7
Hollow shaft diameter (mm)	6	10	13	13
End stroke threads size	M10 x 1,0	M12 x 1,0	M14 x 1,5	M20 x 1,5
Weight (g) elastic bumpers	700	1160	1570	3070
Weight (g) hydraulic shocks	700	1160	1570	3070
Max. temperature (°C)	-5° to +60°			
Air pressure (bar)	1 to 9			
Type of drive	Twin rack inbetween 1 pinion			
Operation	Dry air, lubricated or unlubricated			

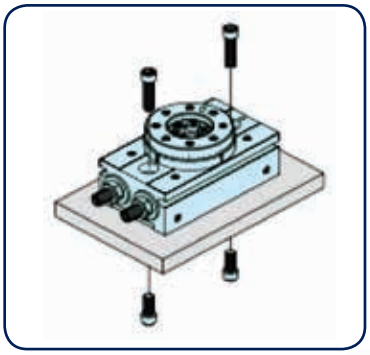
* At 5 bar

Flexible Installation

Top Mounting



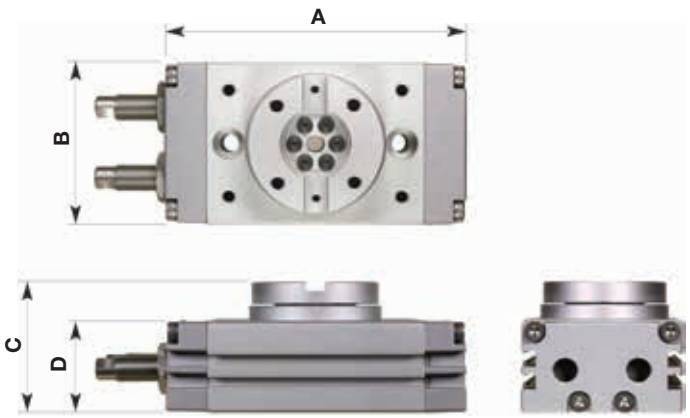
Bottom Mounting



Hollow Axis to accomodate piping and wiring

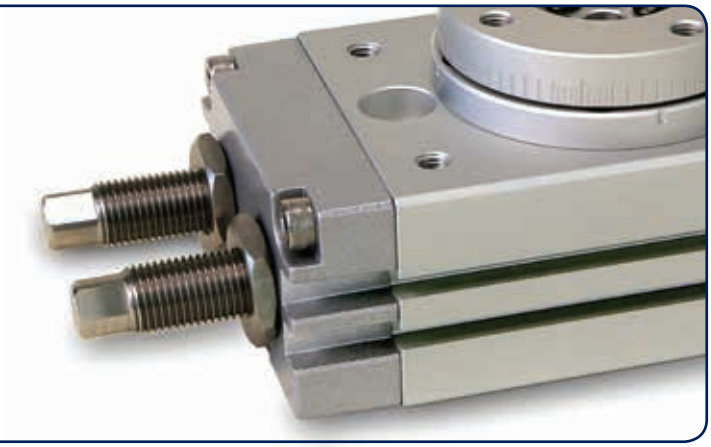
Model	Diameter (mm)
P5RS-016	6
P5RS-020	10
P5RS-020	13
P5RS-025	13

Installation Sizes



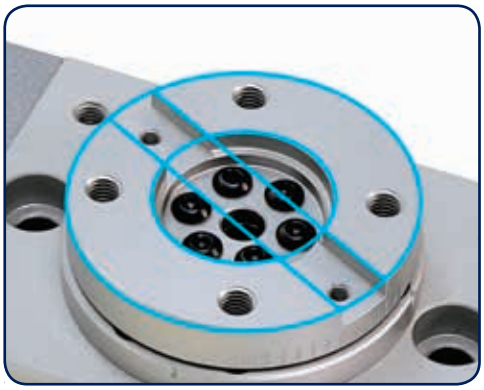
Bore	Order code	A (mm)	B (mm)	C (mm)	D (mm)	Weight (Kg)
16	P5RS-016DSG190B	108	58	47	33	0.7
20	P5RS-020DSG190B	128	68	55	38	1.16
25	P5RS-020DSG190B	135.5	77	58.5	41.5	1.57
32	P5RS-025DSG190B	170	94	69.5	49.5	3.07

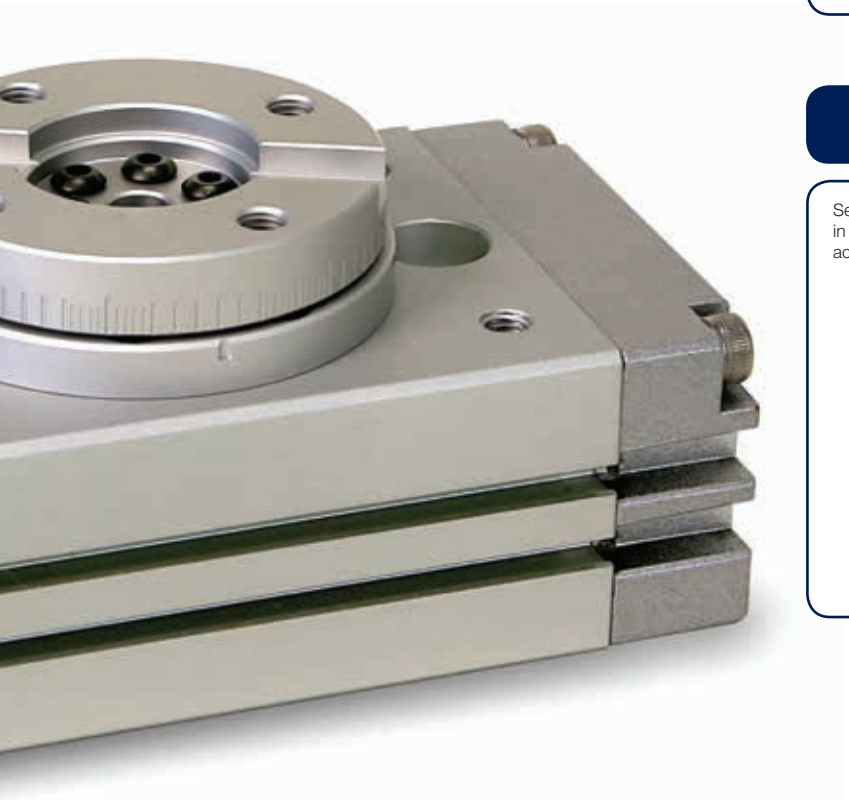
0 to 190° Rotation angle adjustment



Optional Shock Absorbers

Accurate workpiece location

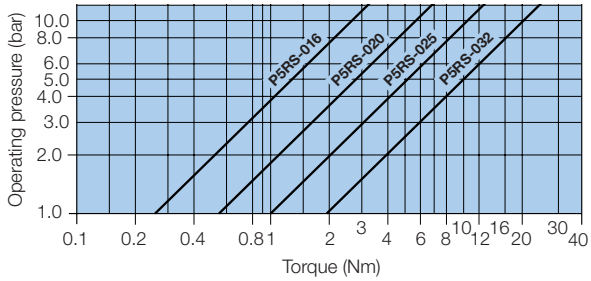




Integrated protected sensor grooves

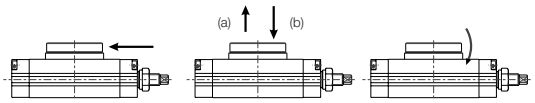
Technical Information

Theoretical Torque



Allowable Load

Set the load and moment to be applied to the table within the allowable values shown in the table below. (Values outside of limitations will cause excessive play, deteriorate accuracy and shorten service life).

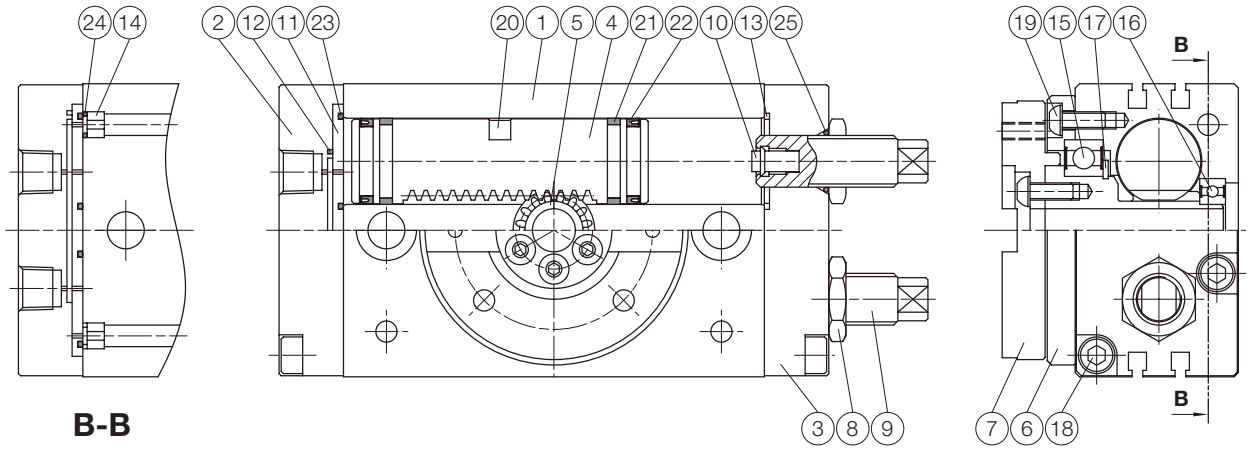


Model	Allowable radial load (N)	Allowable thrust load (N)		Allowable moment (Nm)
		(a)	(b)	
P5RS-016	78	74	78	2.4
P5RS-020	147	137	137	4
P5RS-020	196	197	363	5.3
P5RS-025	314	296	451	9.7

Operating and environmental data

Operating medium	For best possible service life and trouble-free operation dry, filtered compressed air to ISO 8573-1:2010 quality class 3.4.3 should be used. This specifies a dew point of +3°C for indoor operation (a lower dew point should be selected for outdoor operation) and is in line with the air quality from most standard compressors with a standard filter.
Operating pressure	1 bar to 9 bar
Ambient temperature	-5 °C to +60 °C
Pre-lubricated	Further lubrication is normally not necessary. If additional lubrication is introduced it must be continued.
Corrosion resistance	Resistance to corrosion and chemicals.

Material specification

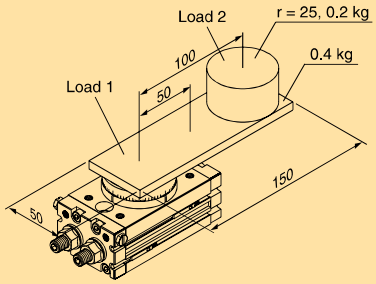


B-B

Pos	Part	Material
1	Body	Aluminium alloy
2	Cover	Aluminium alloy
3	End cover	Aluminium alloy
4	Piston	Stainless steel
5	Pinion	SCM
6	Bearing retainer	Aluminium alloy
7	Table	Aluminium alloy
8	Seal nut	Stainless steel
9	Shock absorber	Stainless steel
10	Cushion pad	NBR
11	Plate	Aluminium alloy
12	Packing	NBR
13	Gasket	NBR

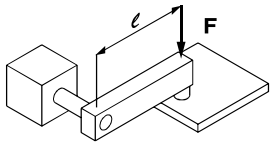
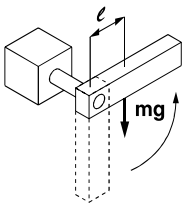
Pos	Part	Material
14	Fixed	Copper
15	Ball bearing	Bearing steel
16	Ball bearing	Bearing steel
17	Snap ring	Spring steel
18	Screw	SCM
19	Screw	SCM
20	Magnet	Magnet material
21	Wear ring	PTFE
22	Piston packing	NBR
23	O-ring	NBR
24	O-ring	NBR
25	O-ring	NBR

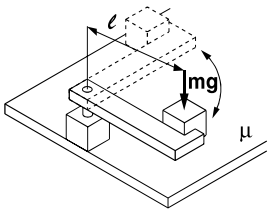
Model selection

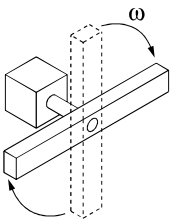
Selection Procedure	Remarks	Selection Example
1 Operating conditions Operating conditions are as follows: • Provisionally selected model • Operating pressure: MPa • Mounting position • Load type Static load: N.m Resistance load: N.m Inertial load: N.m • Load dimensions: m • Load mass: kg • Rotation time: s • Rotation angle: rad	• See page 49 for load type. • The unit of the rotation angle is Radiants. 180° = π rad 90° = π /2rad	 Provisionally selected model: P5RS-016 Operating pressure: 3 bar Mounting position: Vertical, Type of load: Inertial load Rotation time: 6s Rotation angle: π rad (180°)
2 Calculating of moment of inertia Calculate the moment of inertia of the load. ⇨ P.55	• If the moment of inertia of the laod is made up of multiple components, calculate the moment of inertia of each component and add them together.	Load 1 moment of inertia: I_1 $I_1 = 0.4 \times \frac{0.15^2 + 0.05^2}{12} + 0.4 \times 0.05^2 = 0.001833$ Load 2 moment of inertia: I_2 $I_2 = 0.2 \times \frac{0.025^2}{2} + 0.2 \times 0.1^2 = 0.002063$ Total moment of inertia: I $I = I_1 = I_2 = 0.003896$ [kg m^2]
3 Calculating of necessary torque Calculate necessary torque corresponding to the load type and ensure it is within effective torque range. • Static load (Ts) Necessary torque T = Ts • Resistance load (Tf) Necessary torque T = Tf x (3 to 5) • Inertial load (Ta) Necessary torque T = Ta x 10 ⇨ P.54	• When calculating the inertial load, if the rotation time exceeds 2s per 90°, inertial load is calculated with rotation time 2s per 90°. • Even for resistance load, when the load is rotated, necessary torque calculated from inertial load shall be added. Necessary torque T = Tf x (3 to 5) + Ta x 10	Inertial load: Ta $Ta = I\omega$ $\omega = \frac{2\Theta}{t^2}$ [rad/s2] Necessary torque: T T = Ta x 10 $= 0.003896 \times \frac{2 \times \pi}{4^2} \times 10 = 0.015$ [N.m] (t is calculated with 2s per 90) 0.109 N.m < Effective torque OK
4 Checking rotation time Confirm that it is within the adjustable range of rotation time. ⇨ P.49	• Converted to the time per 90° for comparison. (For example, 6s/180° is converted to 3s/90°).	$1.0 \leq t \leq 5$ t = 3s/90° OK
5 Calculation of kinetic energy Confirm that the load's kinetic energy is within the allowable value. Confirm it with the graph of the moment of inertia and the rotation time. ⇨ P.49	• If the rotation time exceeds 2s per 90°, kinetic energy is calculated with rotation time of 2s per 90°. • If the allowable value is exceeded, an external cushioning mechanism, such as an absorber, needs to be installed.	$E = \frac{1}{2} I \omega^2$ $\omega = \frac{2\Theta}{t}$ Kinetic energy $E = \frac{1}{2} \times 0.003896 \times \left(\frac{2 \times \pi}{4^2}\right)^2 = 0.0048$ [J] (t is calculated with 2s per 90°). 0.0048 [J] < Allowable energy OK
6 Checking allowable force Check if the load applied to the product is within the allowable range. ⇨ P.49	• If the allowable value is exceeded, an external bearing needs to be installed.	M = 0.4 x 9.8 x 0.05 + 0.2 x 9.8 x 0.1 = 0.392 (N.m) 0.392 [N.m} < Allowable moment load OK

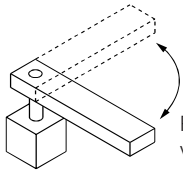
Load type

Necessary torque calculation method depends on the load type, Refer to the table below.

<table>
<tr><th colspan="3">Load type</th></tr>
<tr><th>Static load: Ts</th><th>Resistance load: Tf</th><th>Inertial load: Ta</th></tr>
<tr><td>Only pressing force is necessary
(e.g. for clamping)</td><td>Weight or friction force is applied to rotating direction.</td><td>Rotate the load with inertia.</td></tr>
<tr><td> 
</td><td>Gravity is applied
 

Friction force is applied</td><td>Centre of rotation and centre of gravity of the load are concentric.
 

Rotation shaft is vertical (up and down).</td></tr>
<tr><td>Ts = F l

Ts : Static load (N.m)
F : Clamping force (N)
l : Distance from the rotation centre to the clamping position (m)</td><td>Gravity is applied in rotation direction

Tf = m g l

Friction force is applied in rotating direction.

Tf = μ m g l

Tf : Resistance load (N.m)
m : Load mass (kg)
g : Gravitational acceleration 9.8 (m/s^2)
l : Distance from the rotation centre to the point of application of the weight or friction force (m)
μ : Friction coefficient</td><td>Ta = $\mathbf{I}\,\omega = \mathbf{I}\,\frac{2\Theta}{t^2}$

Ta : Inertial load (N.m)
$\mathbf{I}$: Moment of inertia (kg m^2)
ω : Angular acceeration (rad/s^2)
Θ : Rotation angle (rad)
t : Rotation time (s)

For low speed rotary, if the rotation time exceeds 2s per 90°, inertial load is calculated with rotation time of 2s per 90°.</td></tr>
<tr><td>Necessary torque: T = Ts</td><td>Necessary torque: T = Tf x (3 to 5) Note)</td><td>Necessary torque: T = Ta x 10 Note)</td></tr>
</table>

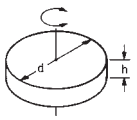
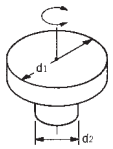
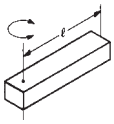
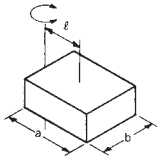
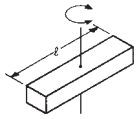
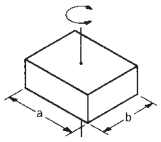
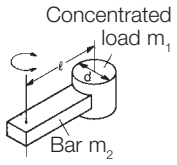
* Resistance load: Gravity or friction force is applied to rotating direction.
  EX, 1) Rotation shaft is horizontal (lateral) and the rotation centre and the centre of gravity of the load are not concentric.
  Ex, 2) Load moves by sliding on the floor.

Note 1) The total of resistance load and inertial load is the necessary torque, T = Tf x (3 to 5) + Ta x 10
Note 2) To adjust the speed, margin is necessary for Tf and Ta.

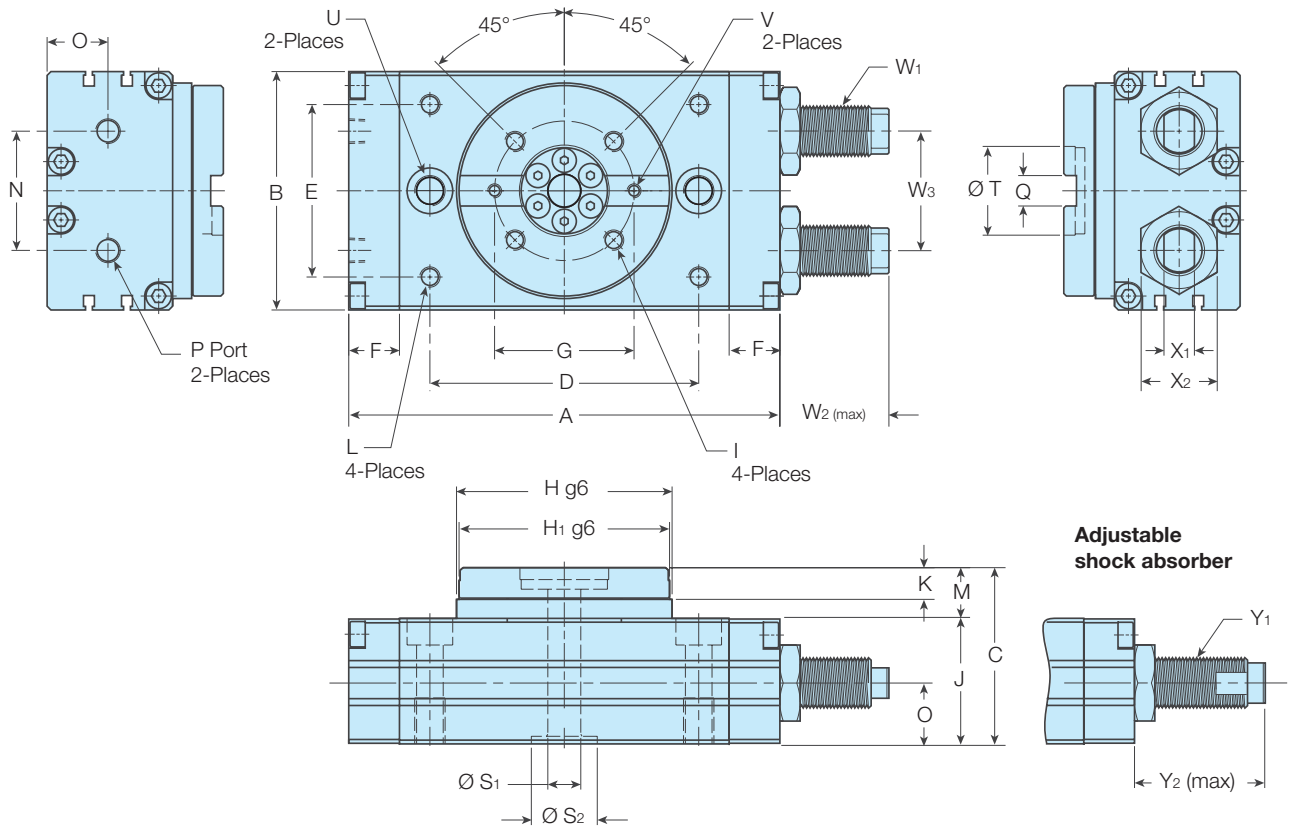
* Not resistance load: Nor weight nor friction forces are applied in rotating direction.
  Ex, 1) Rotation shaft is vertical (up and down)
  Ex, 2) Rotation shaft is horizontal (lateral) and rotation centre and the centre of gravity of the load are not concentric.

Note) Necessary torque is inertial load only. T = Ta x 10

Calculating the moment of inertia

Shape	Sketch	Requirement	Inertia moment I (kgcm²)	Radius of gyration	Remarks
Disc		Diameter d (cm) Mass m (kg)	$I = m \cdot \frac{d^2}{8}$	$\frac{d^2}{8}$	
Stepped disc		Diameter d_1 (cm) d_2 (cm) Mass portion d_1 m_1 (kg) portion d_2 m_2 (kg)	$I = m_1 \cdot \frac{d_1^2}{8} + m_2 \cdot \frac{d_2^2}{8}$	–	When portion d_2 is much smaller than portion d_1, value of d_2 is negligible.
Bar (with rotating center at the end)		Bar length l (cm) Mass m (kg)	$I = m \cdot \frac{l^2}{3}$	$\frac{l^2}{3}$	If the ratio of the bar width : length is over 0.3, use formula for rectangle.
Rectangular parallelepiped		Side length a (cm) b (cm) Distance between the center of gravity and rotation l (cm) Mass m (kg)	$I = m\left(l^2 + \frac{a^2+b^2}{12}\right)$	$l^2 + \frac{a^2+b^2}{12}$	
Bar (with rotating center at the center)		Bar length l (cm) Mass m (kg)	$I = m \cdot \frac{l^2}{12}$	$\frac{l^2}{12}$	If the ratio of the bar width : length is over 0.3, use formula for rectangle.
Rectangular parallelepiped		Side length a (cm) b (cm) Mass m (kg)	$I = m \cdot \frac{a^2+b^2}{12}$	$\frac{a^2+b^2}{12}$	
Concentrated load		Shape of concentrated load Disc Diameter of disc d (cm) Arm length l (cm) Mass of concentrated load m_1 (kg) Mass of arm m_2 (kg)	$I = m_1 \cdot l^2 + m_1 \cdot K_1^2 + m_2 \cdot \frac{l^2}{12}$ Case of disc $K_1^2 = \frac{d^2}{8}$	K_1^2: Select from above this column	If m_2 is much smaller than m_1, assume m_2 to be 0 for calculation.

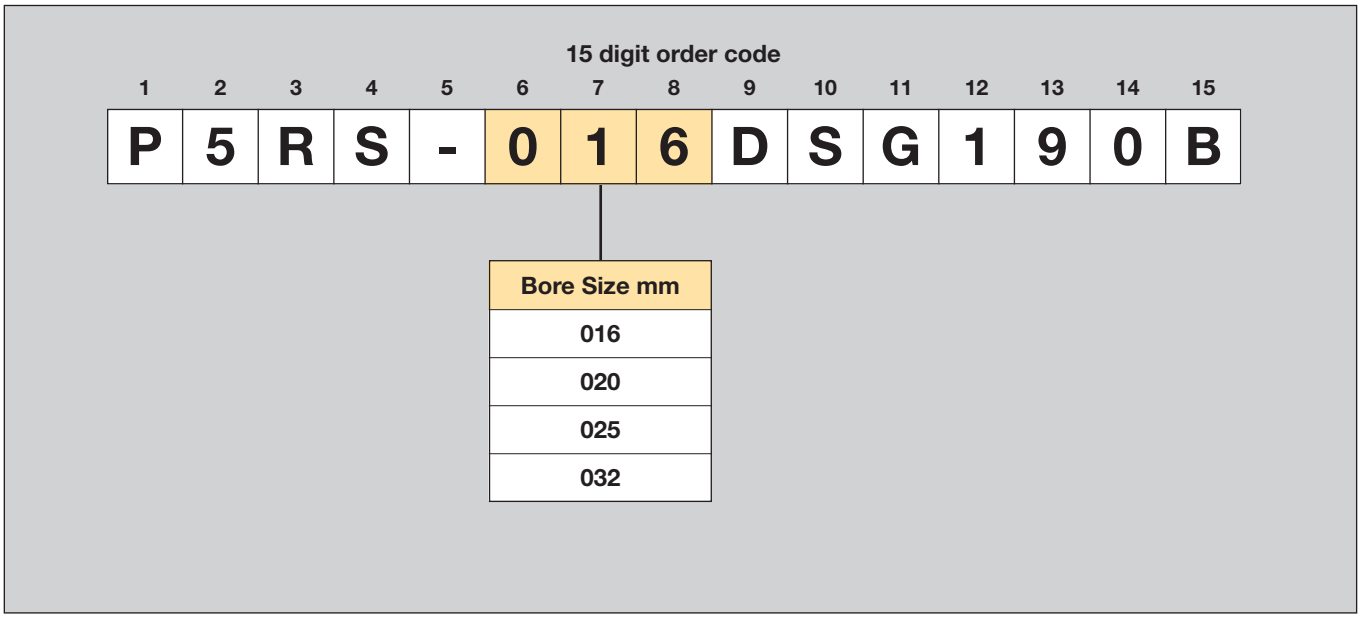
Dimensions (mm)



Bore mm	A	B	C	D	E	F	G	H	H1	I	J	K	L	M	N	O	P BSPP	Q
16	108	58	47	62	38	15	38	50	48	M5 x 7 Dp, P.C.D38	33	8	M5 x 8 Dp	14	26	15.5	G 1/8	8 $^{+0.03}_{-0}$ x 3.3 Dp
20	128	68	55	78	47	15	46	62.5	60	M6 x 7 Dp, P.C.D46	38	10	M6 x 8 Dp	17	27	18.5	G 1/8	10 $^{+0.03}_{-0}$ x 3.5 Dp
25	135.5	77	58.5	84	55	15.5	48	67	65	M6 x 9 Dp, P.C.D48	41.5	10	M6 x 8 Dp	17	37	20	G 1/8	12 $^{+0.03}_{-0}$ x 4 Dp
32	170	94	69.5	106	68	20	55	85	83	M8 x 10 Dp, P.C.D55	49.5	12.5	M8 x 8.5 Dp	20	47	24	G 1/8	12 $^{+0.03}_{-0}$ x 5 Dp

Bore mm	S1	S2	T	U	V	W1	W2	W3	X1	X2	Y1	Y2
16	6	17 (H7) x 2.5 Dp	24 (H7) x 3 Dp	2-Ø 6.8 thru, Ø11 x 6.5 Dp, M8 x 12 Dp (Sink)	M3 x 4 Dp	M10 x 1,0	27	26	7	17	N/A	N/A
20	10	22 (H7) x 2.5 Dp	32 (H7) x 3 Dp	2-Ø 8.6 thru, Ø14 x 8.5 Dp, M10 x 15 Dp (Sink)	M4 x 6 Dp	M12 x 1,0	23	32	8	19	N/A	N/A
25	13	22 (H7) x 3 Dp	32 (H7) x 3.7 Dp	2-Ø 8.6 thru, Ø14 x 8.5 Dp, M10 x 15 Dp (Sink)	M4 x 5 Dp	M14 x 1,5	36	37	8	22	MC150M	52
32	13	26 (H7) x 3 Dp	35 (H7) x 4.7 Dp	2-Ø 10.5 thru, Ø18 x 10.5 Dp, M12 x 18 Dp (Sink)	M5 x 5 Dp	M20 x 1.5	43	47	12	30	MC225M	62

Order Key Code



Note : All rotary actuators are supplied magnetic for optional sensing

Ordering Information: P5RS

Decsription	Ports (BSPP)	Rotation	Torque (Nm at 5 bar)	Weight (kg)	**Order code**
Rotary table, stroke adjusters	1/8	190 degrees	1.21	0.7	**P5RS-016DSG190B**
Rotary table, stroke adjusters	1/8	190 degrees	2.51	1.16	**P5RS-020DSG190B**
Rotary table, stroke adjusters	1/8	190 degrees	4.91	1.57	**P5RS-025DSG190B**
Rotary table, stroke adjusters	1/8	190 degrees	9.86	3.07	**P5RS-032DSG190B**

Note: Above units are supplied with rubber buffer stroke adjustment bolts.

Optional Shock Absorbers

Bore mm	Rotary Actuator	**Order code**
16	P5RS-016DSG190B	**N/A**
20	P5RS-020DSG190B	**N/A**
25	P5RS-025DSG190B	**MC150M**
32	P5RS-032DSG190B	**MC225M**

Reed sensors

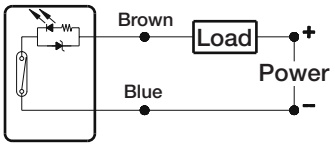
Reed type sensors are based on proven reed switch technology and provide reliable function in many applications.
Simple installation and the available AC voltage range are advantages for this range of sensors.

Technical data

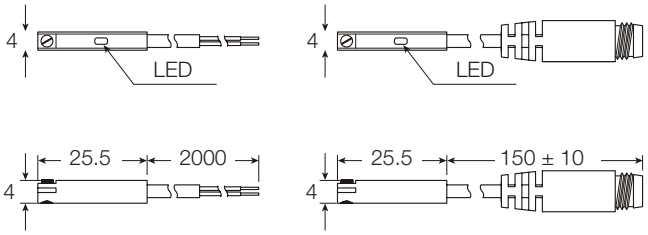
Design	Reed element
Installation	Mounts within cylinder switch groove
Outputs	Normally open
Voltage range	5-120 V DC/AC
Voltage drop	3.5 V max
Switching current	100 mA max
Switch rating	10 W max
Encapsulation	IP67 (NEMA 6)
Temperature range	–10°C to +70°C
Indication	LED Red
Cable	Polyurethane

Schematic

Reed type

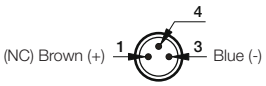


Dimensions

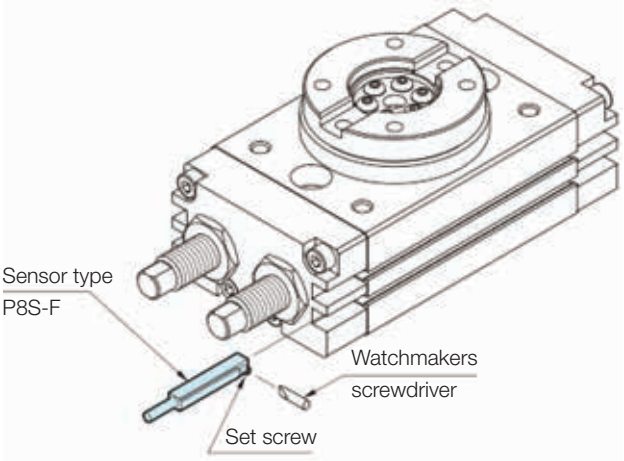


M8 Quick Connector

2 wire QD wiring



Installation of Sensor



Reed Sensors

Size	Description	Order code
Flush Mount Style		
Reed Type, normally open	0.15 m PUR cable and M8 screw male connector	**P8S-FRSUS**
Reed Type, normally open	2 m PUR cable without connector	**P8S-FRFXS**

Connecting cables with one connector

The cables have an integral snap-in female connector.

Type of cable	Cable/connector	Weight kg	Order code
Cables for sensors, complete with one female connector			
Cable, Flex PVC	3 m, 8 mm Snap-in connector	0.07	**9126344341**
Cable, Flex PVC	10 m, 8 mm Snap-in connector	0.21	**9126344342**
Cable, Super Flex PVC	3 m, 8 mm Snap-in connector	0.07	**9126344343**
Cable, Super Flex PVC	10 m, 8 mm Snap-in connector	0.21	**9126344344**
Cable, Polyurethane	3 m, 8 mm Snap-in connector	0.01	**9126344345**
Cable, Polyurethane	10 m, 8 mm Snap-in connector	0.20	**9126344346**

Male connectors for connecting cables

Cable connectors for producing your own connecting cables.
The connectors can be quickly attached to the cable without special tools.
Only the outer sheath of the cable is removed. The connectors are available for M8 and M12 screw connectors and meet protection class IP 65.

Connector	Weight kg	Order code
M8 screw connector	0,017	**P8SCS0803J**
M12 screw connector	0,022	**P8SCS1204J**

Ready to use connecting cables with connectors at each end

As accessories the system comprises a large number of different cables in order to meet all requirements that may arise and to make the installation simple, fast and reliable.

Cables with moulded 8 mm snap-in round contacts in both ends.
The cables are available in two types, one with a straight male and female connectors respectively, and one with a straight 3-pole male connector in one end and an angled 3-pole female connector in the other end.

Technical data

Contacts

Moulded 8 mm snap-in male/female contacts.

Enclosure	IP67

Cable

Conductor	3x0,25 mm^2 (32x0,10 mm^2)
Sheath	PVC/PUR
Colour	Black

Installation and Maintenance

Disconnect air and electrical supplies before attempting repair or maintenance.
See ISO 4414-1982 for safety requirements covering the installation and use of pneumatic equipment.

To prevent sudden movement of the unit during start up, to prevent sudden damage and possible movement, controlled introduction of air supply pressure by use of a soft start valve is recommended.

Selection

❶ **Do not apply a load over the operating limit range.**

Select the model considering max. allowable load and allowable moment. When actuator is used outside of operating limits, eccentric loads on guide will be in excess this causing vibration on guide and inaccuracy and shortens life

❷ **Do not apply excessive forces and impacts.**

This will cause problems and possible failure.

Mounting

The rotary unit can be fastened to a static or a moving part. When on a moving part, you must pay attention to the forces created by inertia over the unit and its load.

Do not exceed the maximum loading and operating speed limitation, it will affect the life cycle of the product

This product can only be actuated via air pressure, operation air pressure range 1~9 bar. Hydraulic actuation is not applicable.

No magnetic items should be placed nearby, it will affect the sensors operating function.

Do not apply this product as a shock absorbing device

Do not reprocess this product. It will affect the product intensity and durability to drop.

Do not rotate the cylinder to the end of the stroke when fixing (assembling) the transmission parts, it could cause the life expectancy of the the gear shaft to drop.

Stabilize the cylinder body when assembling the transmission parts. The screw depth of the transmission parts should not exceed the thickness of flange. Please refer to the chart below.

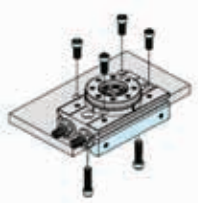
Environment temperature: -5 °C~60 °C

Variety of Installation options for space saving

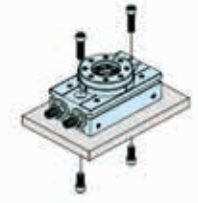
Offers maximum space saving installation by taking advantage of the compact body, space saving wiring and piping.

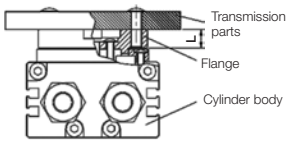
Free mount

Top mounting



Bottom mounting





Model	Screw length (L) on transmission
P5RS-016	7
P5RS-020	9.5
P5RS-020	9.5
P5RS-025	11.5

Shock Absorbers

1. Disassembly of the shock absorber is strictly prohibited. Disassembly of the shock absorber will cause failure and leakage.
2. Do not cause any damage to the surface of the shock absorber piston rod. It would lower the products durability and ability to retract and stretch.
3. The shock absorber is considered a consumable item. Therefore it is crucial to replace the shock absorber when absorbency performance drops.

Do not disassemble the shock absorber

Piston rod (Do not damage the surface)

Environment

❶ **Do not use in atmosphere where the actuator contacts directly the liquid such as cutting oil.**

Conditions where the rotary actuator is exposed directly to cutting oil, coolant and oil mist can lead to vibration, increase of moving part resistance, air leakage, etc.

❷ **Do not use in atmosphere where the rotary actuator contacts directly the material such as powder dust, dust, spatter etc.**

❸ **Do not use in direct sun light.**

❹ **Do not use in environment where there is heat source.**

Use a cover when there is a heat source around the rotary actuator, or if temperature of product increases and exceeds operating temperature range by emissive heat.

❺ **Do not subject it to excessive vibration and/or impact.**

This results in damage and/or malfunction.

Contact Parker if the actuator is used in the above conditions.

Specifying air quality (purity) in accordance with ISO8573-1:2010, the international standard for Compressed Air Quality

ISO8573-1 is the primary document used from the ISO8573 series as it is this document which specifies the amount of contamination allowed in each cubic metre of compressed air.

ISO8573-1 lists the main contaminants as Solid Particulate, Water and Oil. The purity levels for each contaminant are shown separately in tabular form, however for ease of use, this document combines all three contaminants into one easy to use table.

ISO8573-1:2010 CLASS	Solid Particulate				Water		Oil
	Maximum number of particles per m^3			Mass Concentration mg/m^3	Vapour Pressure Dewpoint	Liquid g/m^3	Total Oil (aerosol liquid and vapour)
	0,1 - 0,5 micron	0,5 - 1 micron	1 - 5 micron				mg/m^3
0	As specified by the equipment user or supplier and more stringent than Class 1						
1	≤ 20 000	≤ 400	≤ 10	-	≤ -70 °C	-	0,01
2	≤ 400 000	≤ 6 000	≤ 100	-	≤ -40 °C	-	0,1
3	-	≤ 90 000	≤ 1 000	-	≤ -20 °C	-	1
4	-	-	≤ 10 000	-	≤ +3 °C	-	5
5	-	-	≤ 100 000	-	≤ +7 °C	-	-
6	-	-	-	≤ 5	≤ +10 °C	-	-
7	-	-	-	5 - 10	-	≤ 0,5	-
8	-	-	-	-	-	0,5 - 5	-
9	-	-	-	-	-	5 - 10	-
X	-	-	-	> 10	-	> 10	> 10

Specifying air purity in accordance with ISO8573-1:2010

When specifying the purity of air required, the standard must always be referenced, followed by the purity class selected for each contaminant (a different purity class can be selected for each contamination if required).

An example of how to write an air quality specification is shown below:

ISO 8573-1:2010 Class 1.2.1

ISO 8573-1:2010 refers to the standard document and its revision, the three digits refer to the purity classifications selected for solid particulate, water and total oil. Selecting an air purity class of 1.2.1 would specify the following air quality when operating at the standard's reference conditions :

Class 1 - Particulate

In each cubic metre of compressed air, the particulate count should not exceed 20,000 particles in the 0.1 - 0.5 micron size range, 400 particles in the 0.5 - 1 micron size range and 10 particles in the 1 - 5 micron size range.

Class 2 - Water

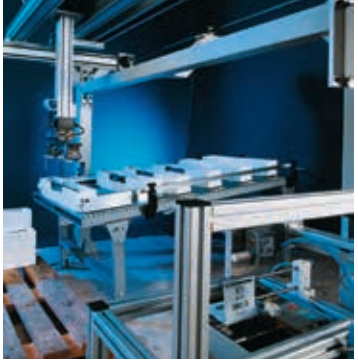
A pressure dewpoint (PDP) of -40°C or better is required and no liquid water is allowed.

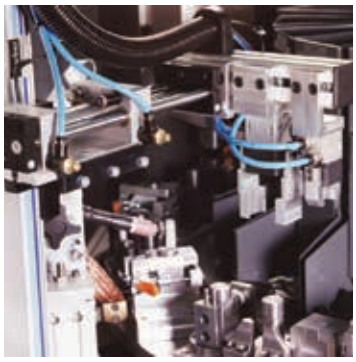
Class 1 - Oil

In each cubic metre of compressed air, not more than 0.01mg of oil is allowed. This is a total level for liquid oil, oil aerosol and oil vapour.

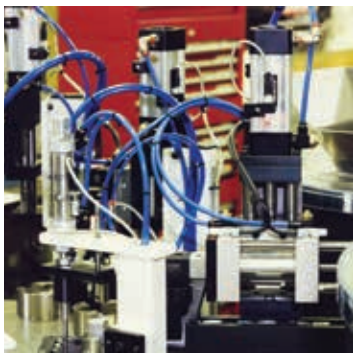
ISO8573-1:2010 Class zero

- **Class 0 does not mean zero contamination.**
- **Class 0 requires the user and the equipment manufacturer to agree contamination levels as part of a written specification.**
- **The agreed contamination levels for a Class 0 specification should be within the measurement capabilities of the test equipment and test methods shown in ISO8573 Pt 2 to Pt 9.**
- **The agreed Class 0 specification must be written on all documentation to be in accordance with the standard.**
- **Stating Class 0 without the agreed specification is meaningless and not in accordance with the standard.**
- **A number of compressor manufacturers claim that the delivered air from their oil-free compressors is in compliance with Class 0.**
- **If the compressor was tested in clean room conditions, the contamination detected at the outlet will be minimal. Should the same compressor now be installed in typical urban environment, the level of contamination will be dependent upon what is drawn into the compressor intake, rendering the Class 0 claim invalid.**
- **A compressor delivering air to Class 0 will still require purification equipment in both the compressor room and at the point of use for the Class 0 purity to be maintained at the application.**
- **Air for critical applications such as breathing, medical, food, etc typically only requires air quality to Class 2.2.1 or Class 2.1.1.**
- **Purification of air to meet a Class 0 specification is only cost effective if carried out at the point of use.**



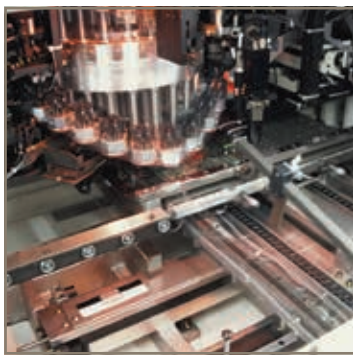


aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



Slide Tables
P5SS Series

Sizes 6, 8, 12, 16, 20 and 25 mm



Parker

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Contents page

Important
Before attempting any external or internal work on the cylinder or any connected components, make sure the cylinder is vented and disconnect the air supply in order to ensure isolation of the air supply.

Note
All technical data in this catalogue are typical data only.
Air quality is essential for maximum cylinder service life (see ISO 8573).

P5SS - Slide Tables

The Slide Table P5SS is a pneumatic actuator, operated by two cylinders mounted in parallel for moving loads fitted on its mobile carriage or on its front plate quickly and accurately. Optional end of stroke adjusters offer precise adjustment even when the slide table is pressurised.

- High precision
- Bores Ø6, 8, 12,16, 20 and 25mm
- Combination of dual bore cylinder and linear rail
- Magnetic piston standard
- Rubber bumper standard
- Optional stroke adjusters available
- Optional shock absorbers available

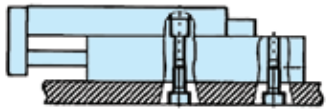
General technical data

Size	6	8	12	16	20	25
Stroke (mm)	See chart per size and stroke					
Max stroke (mm)	50	75	100	125	125	150
Stroke length tolerance (mm)	0 / +1					
Ø Piston bore (mm)	2 x 6	2 x 8	2 x 12	2 x 16	2 x 20	2 x 25
Ø Air port size (mm)	M3	M5			G1/8	
Speed (mm/s)	50 to 500					
Force OUT (N)*	29	51	113	201	314	491
Force IN (N)*	21	38	85	151	236	378
Sensing	Magnet in					
Max kinetic energy (mJ) elastic bumpers	18	27	55	110	160	240
Max kinetic energy (mJ) hydraulic shocks	-	45	110	220	320	480
Max allowable static load (kg) on the carriage	0.6	1	2	4	6	9
Max allowable static load (kg) on the front plate	0.36	0.6	1.2	2.4	3.6	5.4
Max allowable static moments (Nm)	See chart per size and stroke					
End stroke threads size	M5 x 0.8	M8 x 1.0	M8 x 1.0	M10 x 1.0	M14 x 1.5	M14 x 1.5
Weight (g) without elastic bumpers	See chart per size and stroke					
Additional weight (g) elastic bumpers OUT	10	15	30	50	100	150
Additional weight (g) elastic bumpers IN	5	9	10	30	70	125
Weight (g) without hydraulic shocks	See chart per size and stroke					
Additional weight (g) hydraulic shocks OUT	-	35	50	80	170	215
Additional weight (g) hydraulic shocks IN	-	45	60	105	205	300
Max. temperature (C°)	-10° to +60°					
Air pressure (bar)	1,5 to 7					
Type of drive	Twin piston in parallel					
Operation	Dry air, lubricated or unlubricated					

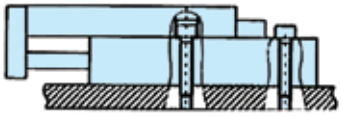
* At 5 bar

Flexible Installation

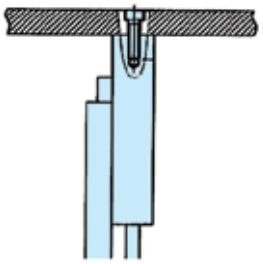
Horizontal mounting (Body tapped)



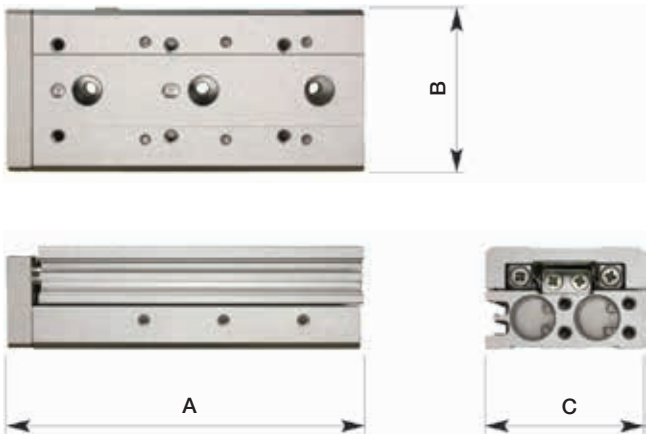
Horizontal mounting (Through hole)



Vertical mounting (Body tapped)



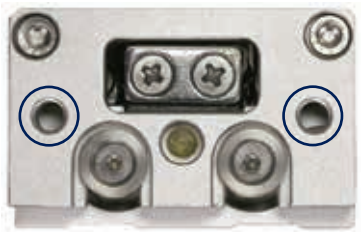
Installation Sizes



Model	A with stroke (mm)									B (mm)	C (mm)
	10	20	30	40	50	75	100	125	150		
P5SS-006	48	58	68	90	106	-	-	-	-	32	20
P5SS-008	56	61	72	90	108	158	-	-	-	40	24
P5SS-012	80	80	80	92	112	158	212	-	-	50	32
P5SS-016	87	87	87	87	112	162	210	260	-	62	40
P5SS-020	97	97	97	107	122	161	214	268	320	76	50
P5SS-025	108	108	108	118	131	172	213	271	311	92	62

Dimensions shown are inclusive of stroke length
Dimensions shown are for basic unit only and do not include optional stroke adjusters

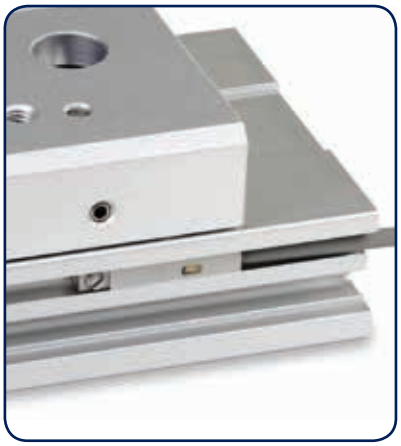
Tapped tool plate



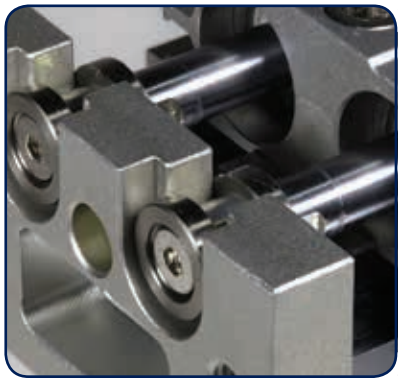
Optional Adjustment Bolts

Optional Shock Absorbers

Integrated protected sensor grooves



Twin cylinder - Increased thrust to profile ratio



Weight (g)

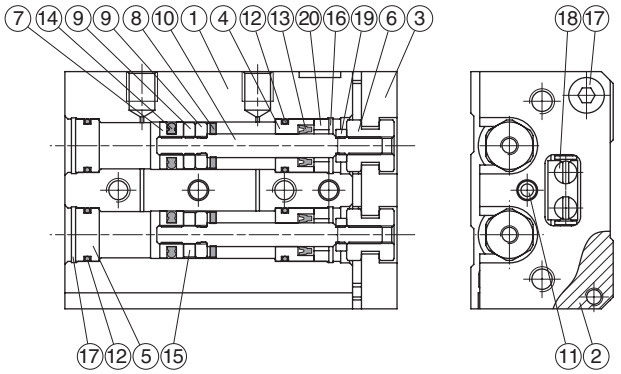
Stroke (mm)	Bore (mm)					
	Ø6	Ø8	Ø12	Ø16	Ø20	Ø25
10	78	137	335	536	1001	1573
20	98	148	339	546	1012	1587
30	111	171	343	552	1020	1605
40	147	216	393	630	1098	1735
50	172	255	482	723	1254	1930
75	-	367	684	1030	1690	2553
100	-	-	910	1341	2214	3180
125	-	-	-	1646	2729	4082
150	-	-	-	-	3310	4420

Operating and environmental data

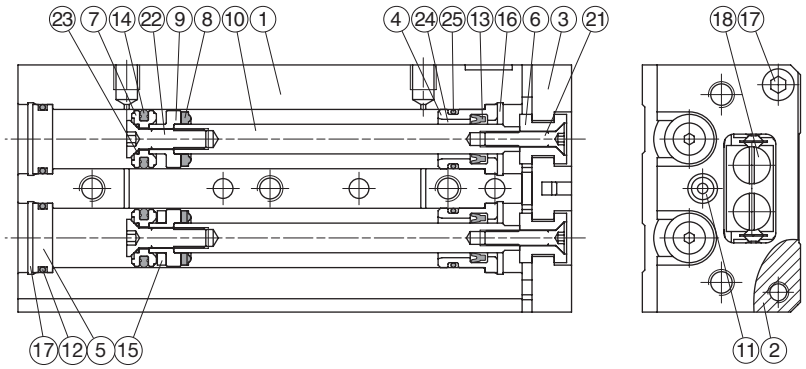
Operating medium	For best possible service life and trouble-free operation dry, filtered compressed air to ISO 8573-1:2010 quality class 3.4.3 should be used. This specifies a dew point of +3°C for indoor operation (a lower dew point should be selected for outdoor operation) and is in line with the air quality from most standard compressors with a standard filter.
Operating pressure	1.5 bar to 7 bar
Ambient temperature	-5 °C to +60 °C
Pre-lubricated	Further lubrication is normally not necessary. If additional lubrication is introduced it must be continued.
Corrosion resistance	Resistance to corrosion and chemicals.

Material specification

Ø 6, Ø 8



Ø 12 thru Ø 25

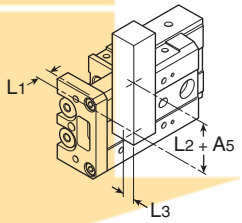


Pos	Part	6	8	12 to 25
1	Body	Aluminum alloy		
2	Table	Aluminum alloy		
3	Plate	Aluminum alloy		
4	Rod cover	Aluminum alloy		
5	Head cover	Aluminum alloy		
6	Floating connector	Stainless steel		
7	Piston	Stainless steel		Aluminum alloy
8	Cushion pad	NBR		
9	Spacer ring	Aluminum alloy	Stainless steel	Aluminum alloy
10	Piston rod	Stainless steel		
11	End cushion	PU		
12	Cover ring	NBR		
13	Rod packing	NBR		

Pos	Part	6	8	12 to 25
14	Piston packing	NBR		
15	Magnet ring	Magnet material		
16	Snap ring	Spring steel	Stainless steel	
17	Bolt	Stainless steel		
18	Slide way	Bearing steel		
19	Nut	Copper	–	
20	Rod cover washer	Stainless steel	–	
21	Floating connector bolt	Stainless steel	–	
22	Piston screw	–		Stainless steel
23	Piston gasket	–		NBR
24	Rod bush	Copper		
25	Cover ring	NBR		

Selection Flow Chart

Operating conditions	Formula and charts	Selection example
List out the operating conditions according to mounting position and shape of the workpiece	Model used	Cylinder: P5SS-6-10
	Cushion style	Cushion: Cushion pad
	Workpiece install position	Workpiece table mounting
	Mounting position	Mounting: Lateral mounting
	Average speed Va (mm/s)	Average speed: Va = 150mm/s
	Allowable load W (kg) *(Figure 1)*	Load: W = 0.3kg
	Overhang Ln (mm) *(Figure 2)*	L_1 = 4mm
		L_2 = 4mm
		L_3 = 4mm



Kinetic energy

Calculate kinetic energy E(J) of work	$E = 1/2 \bullet W (V/1000)^2$	$E = 1/2 \bullet 0.3 (210/1000)^2 = 0.0066$
	Collision speed $V = 1.4 \bullet Va$	Collision speed $V = 1.4 \bullet 150 = 210$
Calculate allowable kinetic energy Ea(J)	$Ea = K \bullet Emax$	$Ea = 1 \bullet 0.015 = 0.015$
	Workpiece mounting coefficient K: *Figure 3*	Possible to use by $E = 0.0066 \leq Ea = 0.015$
Make sure that kinetic energy of work is less / lower than allowable kinetic energy.	Max. allowable kinetic energy Emax: *Table 1*	
	Kinetic energy (E) ≤ Allowable kinetic energy (Ea)	

Load rate

Load rate of work

Calculate static work Wa(kg)	$Wa = K \bullet \beta \bullet Wmax$	$Wa = 1 \times 1 \times 0. = 0.66$
	Workpiece mounting coefficient K: *Figure 3*	$K = 1$
	Allowable load coefficient β: *Figure 4*	$\beta = 1$
	Maximum allowable moment Wmax: *Table 2*	$Wmax = 0.6$
Calculate load rate α_1 of static work	$\alpha_1 = W/Wa$	$\alpha_1 = 03/0.6 = 0.5$

Load rate of static moment		**Yawing**	**Rolling**
Calculate static moment M(Nm).	$M = W \times 9.8 (Ln + An)/1000$	Calculate My	Calculate Mr
	Correction value for moment center distance An: *Table 3*	$My = W \times 9.8 (L_1 + A_3)/1000 = 0.3 \times 9.8 (4 +13)/1000 = 0.05$	$Mr = W \times 9.8 (L_3 + A_2)/1000 = 0.3 \times 9.8 (5 + 6)/1000 = 0.033$
Calculate allowable static moment Ma(Nm).	$Ma = K \bullet \gamma \bullet Mmax$	$A_3 = 13$	$A_2 = 6$
	Workpiece mounting coefficient K: *Figure 3*	$May = 1 \times 1 \times 0.7 = 0.7$	Mar = 0.7 (Same value as Ma)
	Allowable moment coefficient γ : *Figure 5*	$Mymax = 0.7$	
	Max. allowable moment Mmax: *Table 4*	$K = 1$	
Calculate load rate α_2 of static moment	$\alpha_2 = M/Ma$	$\gamma = 1$	
		$\alpha_2 = 0.05/0.7 = 0.072$	$\alpha'_2 = 0.033/0.7 = 0.047$

Load rate of kinetic moment		**Pitching**	**Yawing**
Calculate kinetic moment Me(Nm).	$Me = 1/3 \bullet We \bullet 9.8 (Ln + An)/1000$	Calculate Mep	Calculate Mey
	Collision equivalence load $We = \delta \bullet W \bullet V$	$Mep = 1/3 \times 2.52 \times 9.8 \times (5 + 6)/1000 = 0.09$	$Mey = 1/3 \times 2.52 \times 9.8 \times (4 + 16)/1000 = 0.165$
	δ: Cushion coefficient with cushion pad (Standard) = 4/100 with shock absorber = 1/100	$We = 4/100 \times 0.3 \times 210 = 2.52$	We = 2.52
Calculate allowable kinetic moment Mea(Nm).	Correction value for moment center distance An: *Table 3*	A2 = 6	A4 = 16
	$Mea = K \gamma Mmax$	$Meap = 1 \times 0.97 \times 0.7 = 0.679$	Meay = 0.679 (Same value as Meap)
	Workpiece mounting coefficient t K: *Figure 3*	$K = 1$	
	Allowable moment coefficient γ: *Figure 5*	$\gamma = 0.97$	
	Max. allowable moment Mmax: *Table 4*	Mpmax = 0.	
Calculate load rate α_3 of kinetic moment.	$\alpha_3 = Me/Mea$	$\alpha_3 = 0.09/0.679 = 0.13$	$\alpha'_3 = 0.165/0.679 = 0.243$

Sum of load rate		
When sum of load rate does not exceed 1, it is possible to use.	$\sum\alpha_n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$	$\sum\alpha_n = \alpha_1 + \alpha_2 + \alpha'_2 + \alpha_3 + \alpha'_3 \leq 1$ $= 0.5 + 0.072 + 0.047 + 0.133 + 0.243 = 0.995 \leq 1$ And it is possible to use.

Table 1: Maximum allowable kinetic energy: Emax (J)

Allowable kinetic energy		
Cushion pad	Shock absorber	Model
0.018	—	**P5SS-006**
0.027	0.045	**P5SS-008**
0.55	0.110	**P5SS-012**
0.10	0.220	**P5SS-016**
0.60	0.320	**P5SS-020**
0.40	0.460	**P5SS-025**

Table 2: Maximum allowable static load: Wmax (kg)

Max. allowable kinetic energy	Model
0.6	**P5SS-006**
1	**P5SS-008**
2	**P5SS-012**
4	**P5SS-016**
6	**P5SS-020**
9	**P5SS-025**

Table 3: Correction value for moment center distance: An (mm) (Refer to Figure 2)

A_1	A_2	A_3	A_4	A_5	Model
11	6	13	16	16	**P5SS-006**
11	8	13	20	20	**P5SS-008**
24	9.5	26	25	25	**P5SS-012**
27	10.5	30	31	31	**P5SS-016**
34	15.5	36	38	38	**P5SS-020**
42	20.5	44	46	46	**P5SS-025**

Figure 3: Workpiece mounting coefficient: K

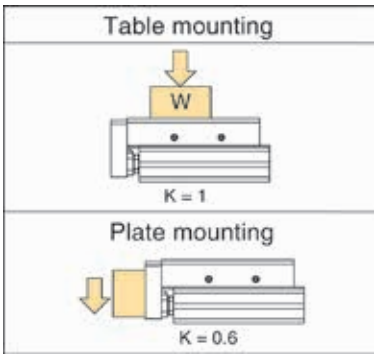


Figure 1: Allowable load: W (kg)

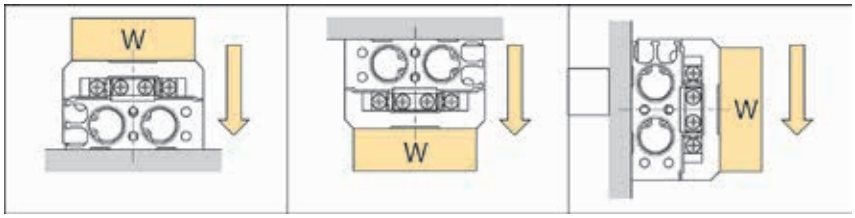


Figure 2: Overhang: Ln (mm) Correction value for moment center distance: An (mm)

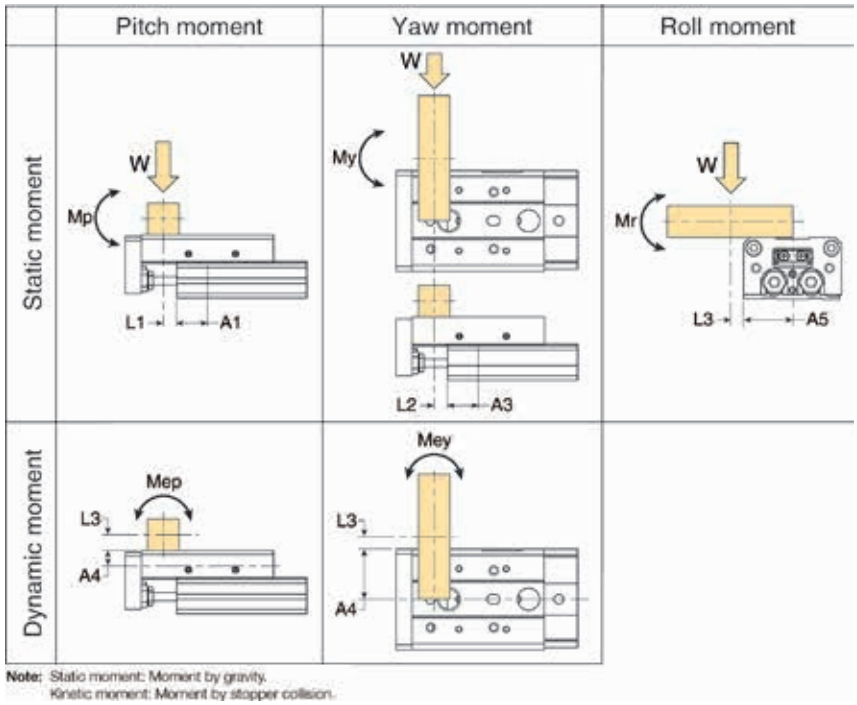


Figure 4: Allowable static load coefficient: β

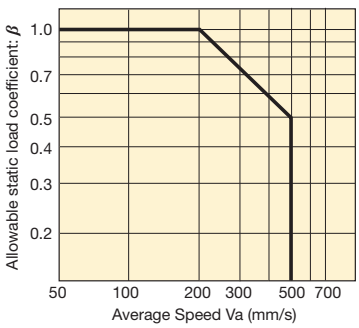
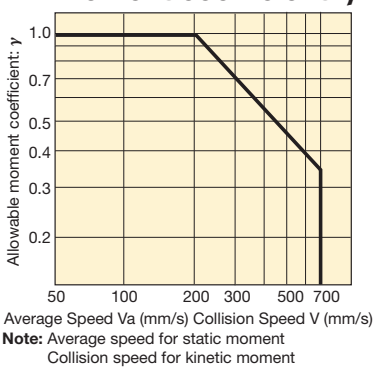


Figure 5: Allowable moment coefficient: γ



Note: Average speed for static moment
Collision speed for kinetic moment

Table 4: Maximum allowable moment: Mmax (Nm)

Stroke (mm)									
10	20	30	40	50	75	100	125	150	Model
0.7	1.0	1.1	1.1	1.1	—	—	—	—	**P5SS-006**
2.0	2.0	2.6	3.5	3.9	3.9	—	—	—	**P5SS-008**
3.9	3.9	3.9	5.5	6.8	9.6	9.6	—	—	**P5SS-012**
9.8	9.8	9.8	9.8	12.0	21.0	30.0	30.0	—	**P5SS-016**
16.4	16.4	16.4	16.4	24.2	31.4	45.5	45.5	45.5	**P5SS-020**
26.5	26.5	26.5	26.5	37.8	49.8	62.2	62.2	62.2	**P5SS-025**

Table deflection

Table deflection by pitch moment

Table pitch deflection due to static pitch moment applied at arrow for fully extended stroke of slide table.

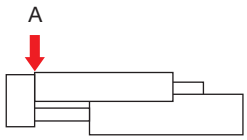


Table deflection by raw moment

Table yaw deflection due to static yaw moment applied at arrow for fully extended stroke of slide table.

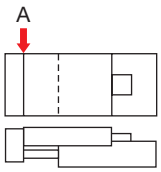
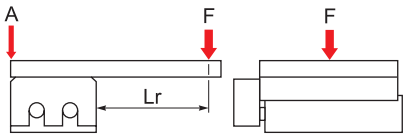
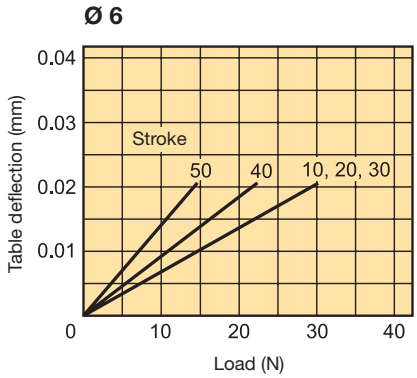
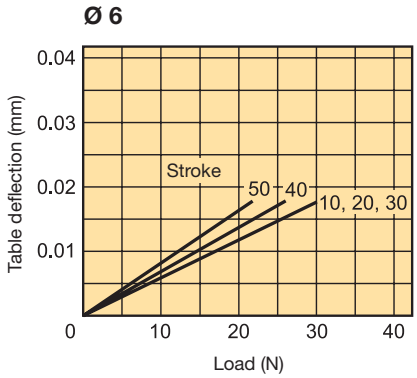


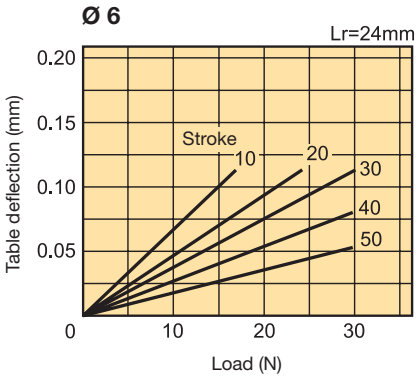
Table deflection by roll moment

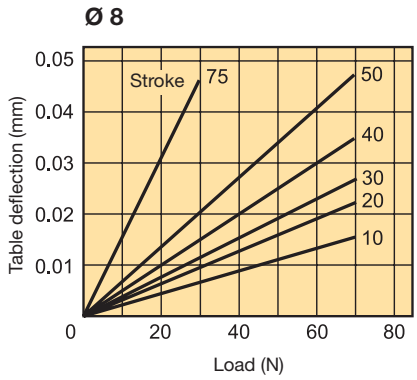
Table roll deflection arrow A due to static roll moment applied at arrow F when Lr = (see table) and table retracted.

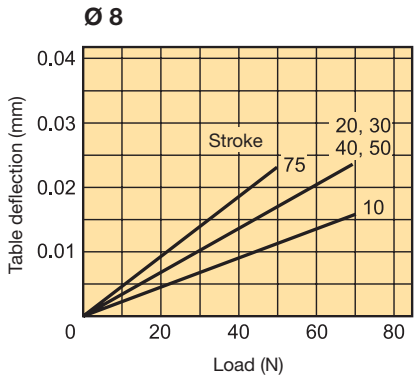


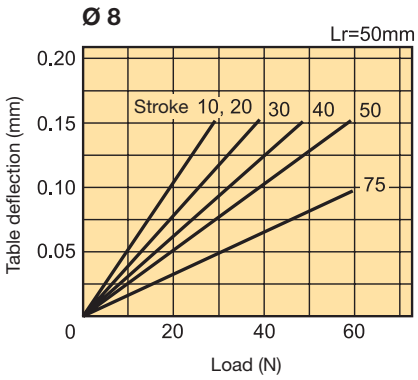


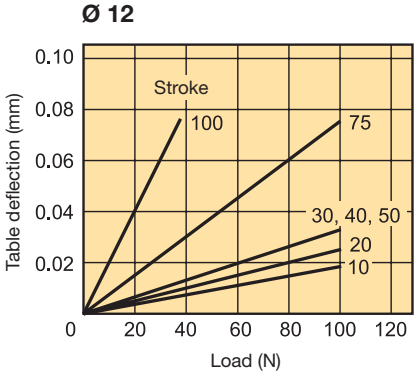


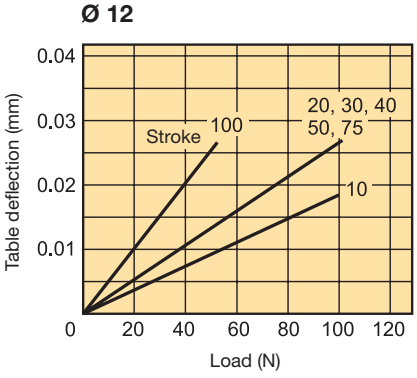












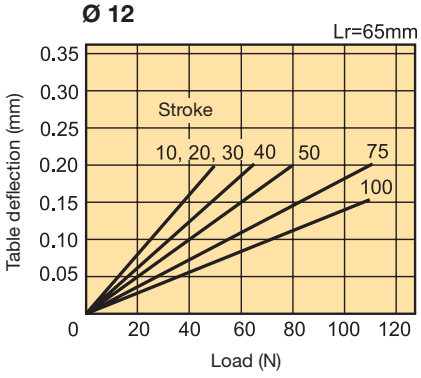


Table deflection

Table deflection by pitch moment

Table pitch deflection due to static pitch moment applied at arrow for fully extended stroke of slide table.

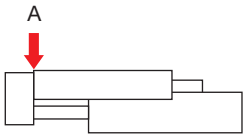


Table deflection by raw moment

Table yaw deflection due to static yaw moment applied at arrow for fully extended stroke of slide table.

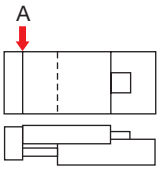
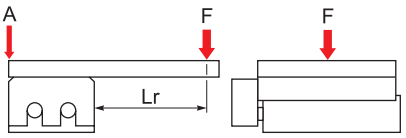
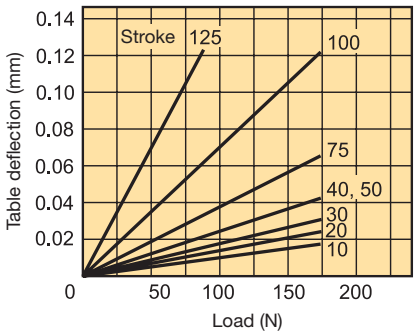


Table deflection by roll moment

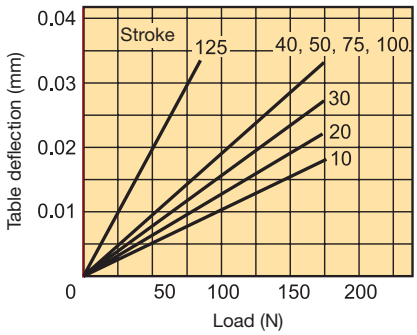
Table roll deflection arrow A due to static roll moment applied at arrow F when Lr = (see table) and table retracted.



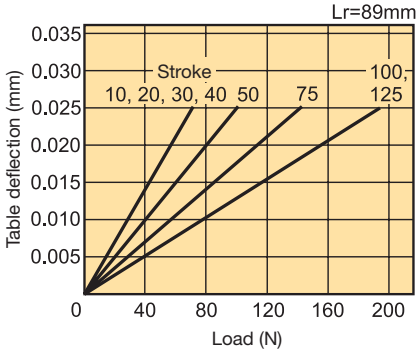
Ø 16



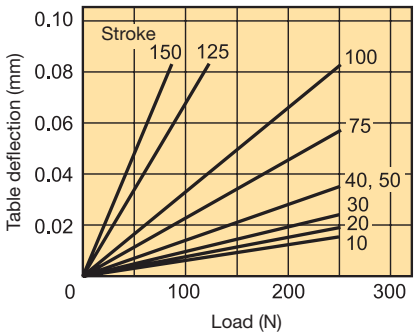
Ø 16



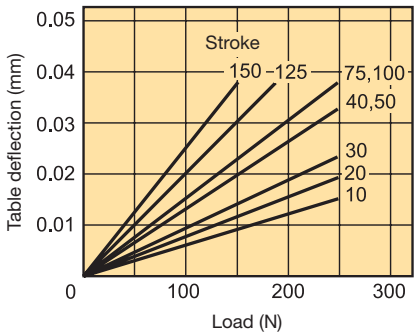
Ø 16



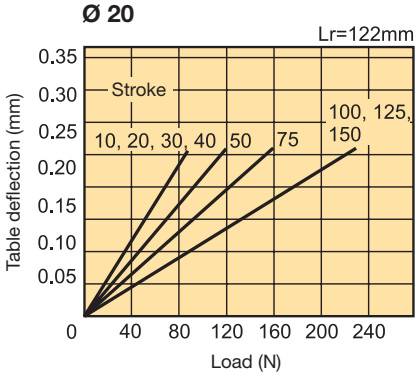
Ø 20



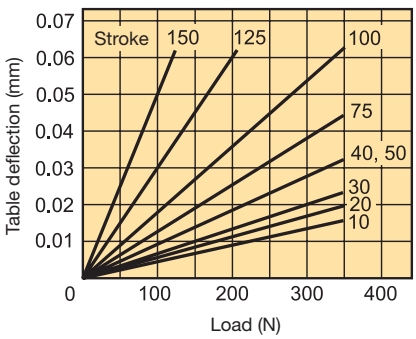
Ø 20



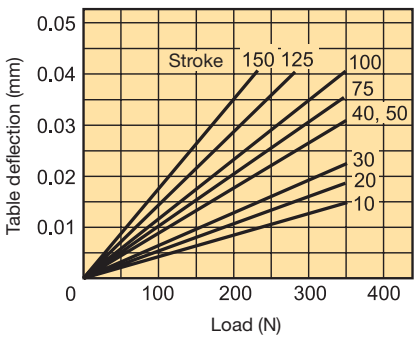
Ø 20



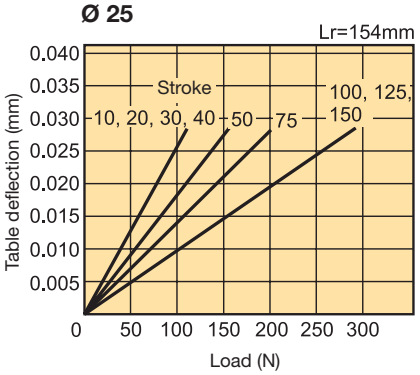
Ø 25



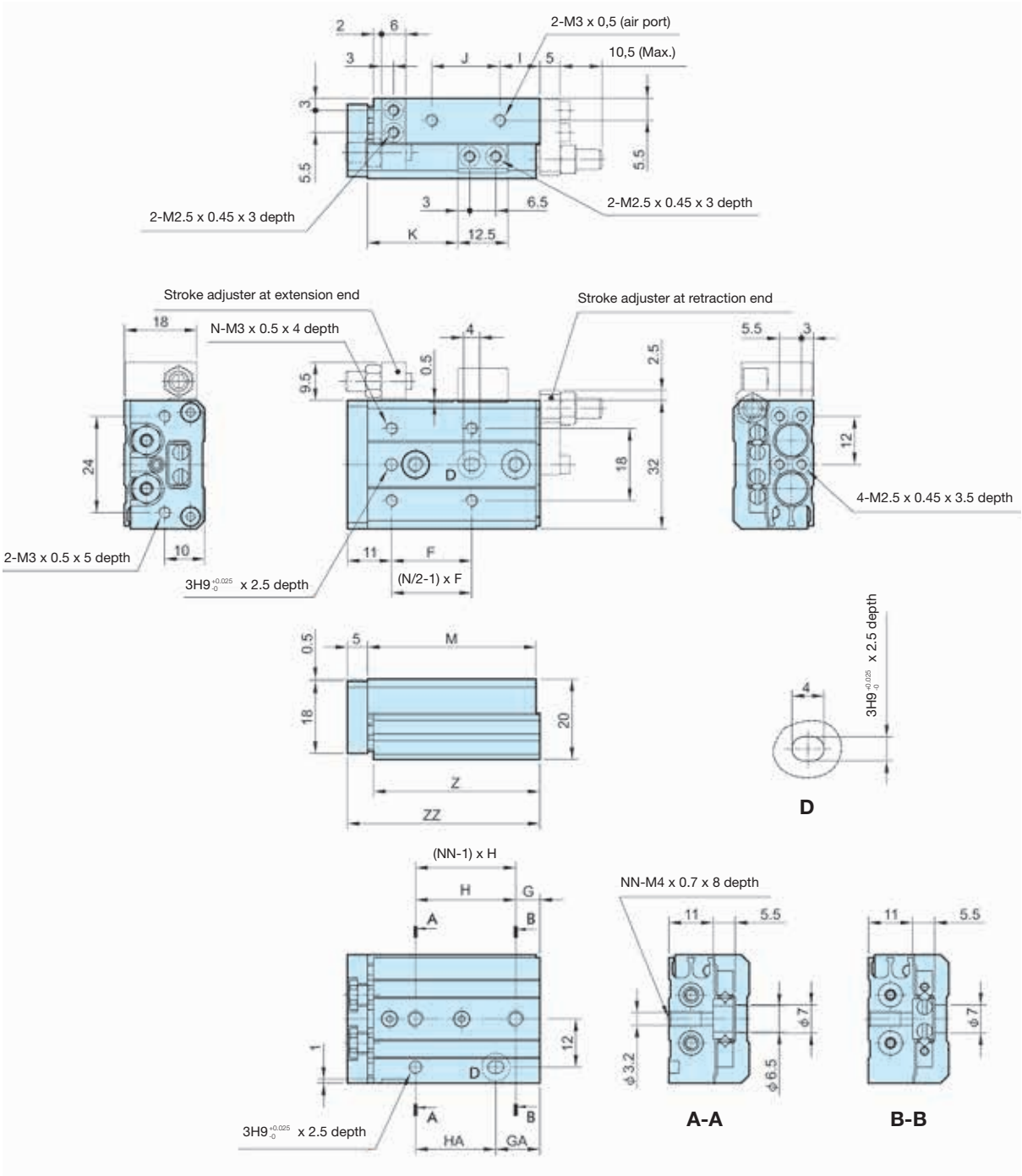
Ø 25



Ø 25

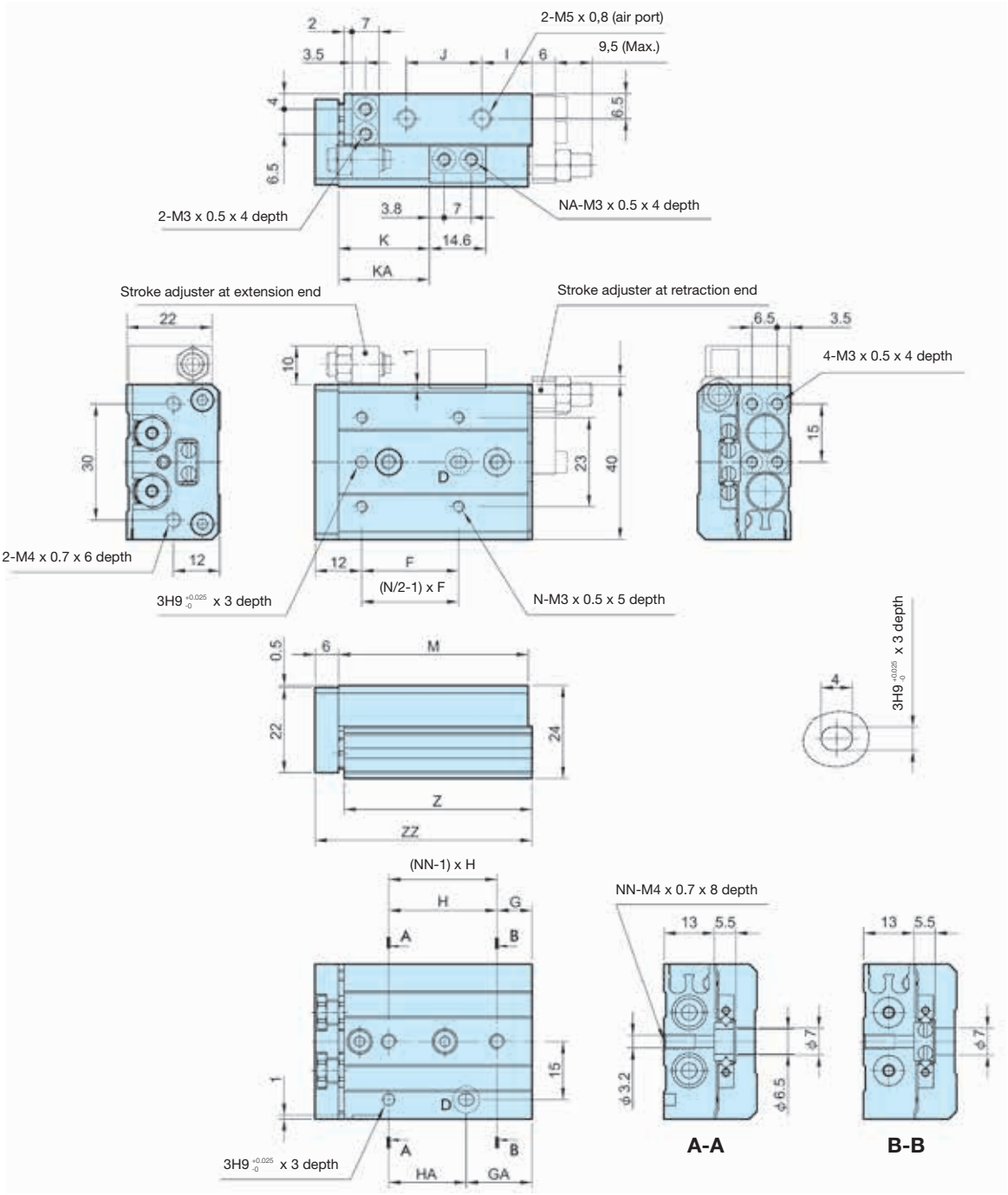


Slide Table Ø6 - Dimensions (mm)



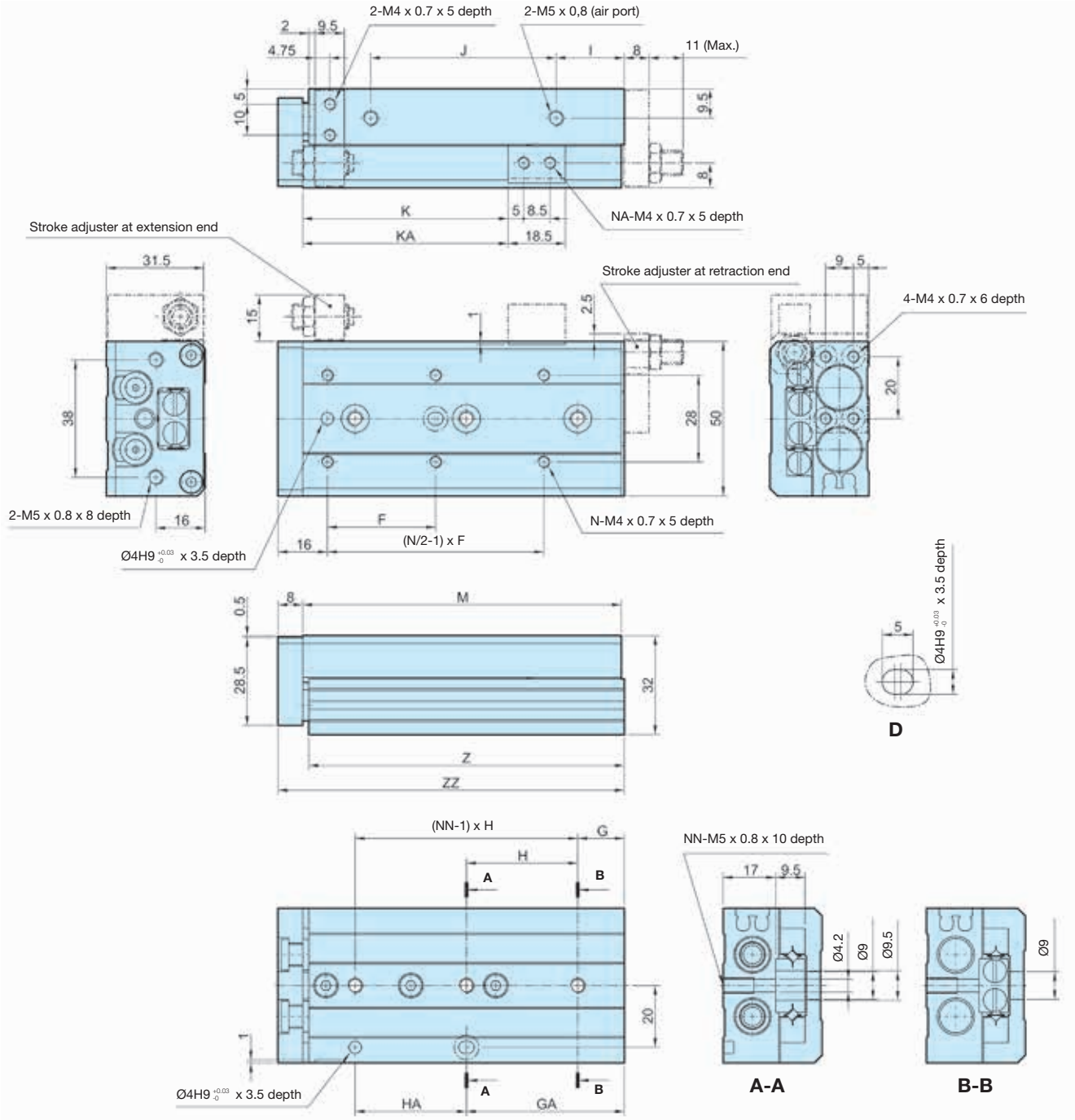
Stroke	F	G	GA	H	HA	I	J	K	M	N	NN	Z	ZZ
10	20	6	11	25	20	10	17	22,5	42	4	2	41,5	48
20	30	6	21	35	20	10	27	32,5	52	4	2	51,5	58
30	20	11	31	20	20	7	40	42,5	62	6	3	61,5	68
40	28	13	43	30	30	19	50	52,5	84	6	3	83,5	90
50	38	17	41	24	48	25	60	62,5	100	6	4	99,5	106

Slide Table Ø8 - Dimensions (mm)



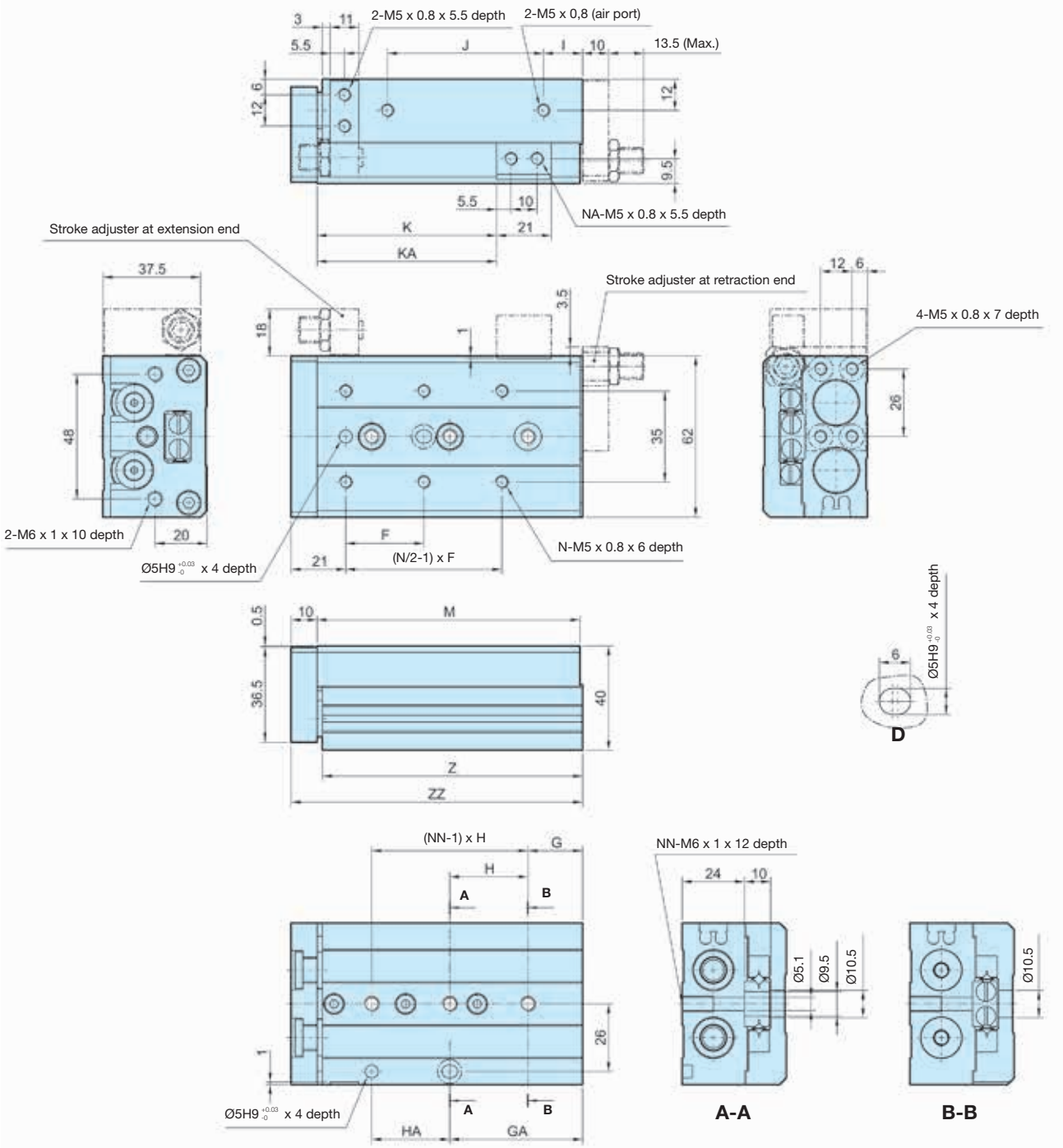
Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	25	9	17	28	20	13	19,5	23,5	-	49	4	2	2	48,5	56
20	25	12	12	30	30	8,5	29	33,5	-	54	4	2	2	53,5	61
30	40	13	33	20	20	9,5	39	43,5	-	65	4	2	3	64,5	72
40	50	15	43	28	28	10,5	56	53,5	-	83	4	2	3	82,5	90
50	38	20	43	23	46	24,5	60	63,5	82,5	101	6	4	4	100,5	108
75	50	27	83	28	56	38,5	96	88,5	132,5	151	6	4	5	150,5	158

Slide Table Ø12 - Dimensions (mm)



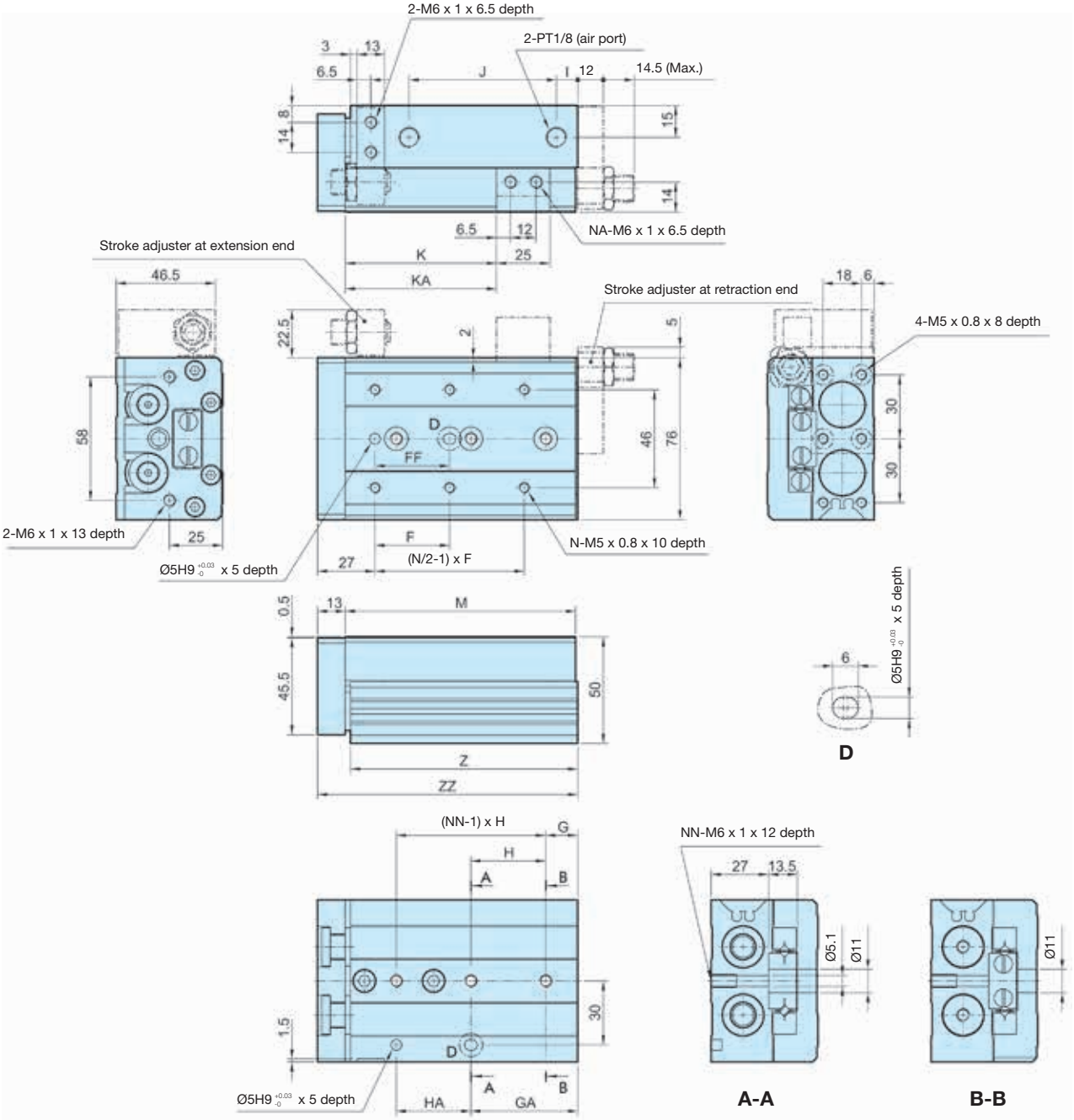
Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	35	15	15	40	40	10	40	26,5	-	71	4	2	2	70	80
20	35	15	15	40	40	10	40	36,5	-	71	4	2	2	70	80
30	35	15	15	40	40	10	40	46,5	-	71	4	2	2	70	80
40	50	17	42	25	25	10	52	56,5	-	83	4	2	3	82	92
50	35	15	51	36	36	22	60	66,5	-	103	6	2	3	102	112
75	55	25	61	36	72	43	85	91,5	125,5	149	6	4	4	148	158
100	65	35	111	38	76	52	130	116,5	179,5	203	6	4	5	202	212

Slide Table Ø16 - Dimensions (mm)



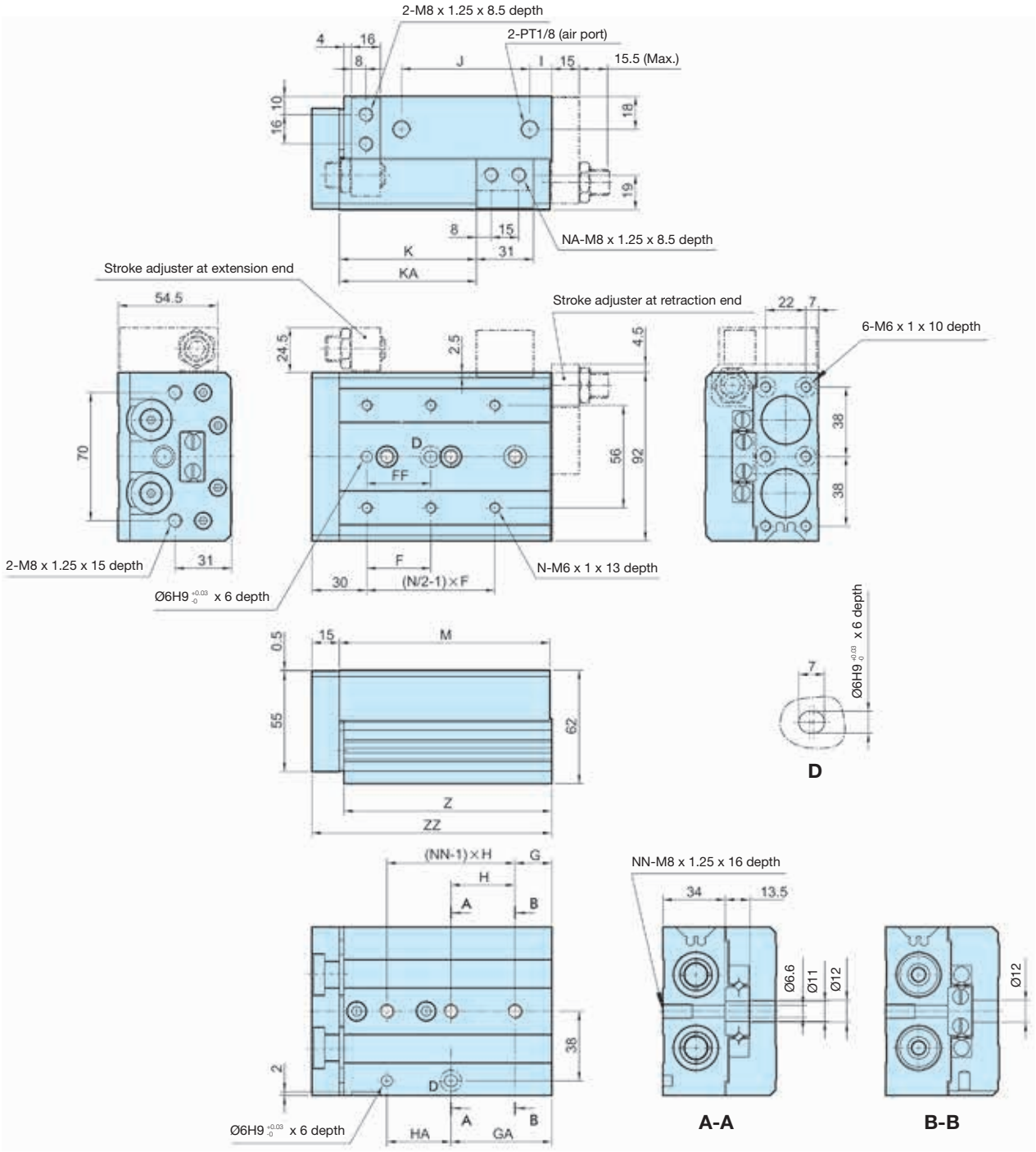
Stroke	F	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	35	16	16	40	40	10	40	29	-	76	4	2	2	75	87
20	35	16	16	40	40	10	40	39	-	76	4	2	2	75	87
30	35	16	16	40	40	10	40	49	-	76	4	2	2	75	87
40	40	16	16	50	50	10	50	59	-	86	4	2	2	85	97
50	30	21	51	30	30	15	60	69	-	101	6	2	3	100	112
75	55	26	61	35	70	40	85	94	125	151	6	4	4	150	162
100	65	39	109	35	70	55	118	119	173	199	6	4	5	198	210
125	70	19	159	35	70	68	155	144	223	249	8	4	7	248	260

Slide Table Ø20 - Dimensions (mm)



Stroke	F	FF	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	50	40	15	25	45	35	10	44	31	-	83	4	2	2	81,5	97
20	50	40	15	25	45	35	10	44	41	-	83	4	2	2	81,5	97
30	50	40	15	25	45	35	10	44	51	-	83	4	2	2	81,5	97
40	60	50	15	35	55	35	10	54	61	-	93	4	2	2	91,5	107
50	35	35	15	50	35	35	10	69	71	-	108	6	2	3	106,5	122
75	60	60	19	54	35	70	10	108	96	-	147	6	2	4	145,5	161
100	70	70	37	107	35	70	58	113	121	169	200	6	4	5	198,5	214
125	70	70	41	155	38	76	70	155	146	223	254	8	4	6	252,5	268
150	80	80	19	195	44	88	87	190	171	275	306	8	4	7	304,5	320

Slide Table Ø25 - Dimensions (mm)



Stroke	F	FF	G	GA	H	HA	I	J	K	KA	M	N	NA	NN	Z	ZZ
10	50	40	22	22	45	45	12	47	35	-	92	4	2	2	90,5	108
20	50	40	22	22	45	45	12	47	45	-	92	4	2	2	90,5	108
30	50	40	22	22	45	45	12	47	55	-	92	4	2	2	90,5	108
40	60	50	22	22	55	55	12	57	65	-	102	4	2	2	100,5	118
50	35	35	20	55	35	35	12	70	75	-	115	6	2	3	113,5	131
75	60	60	26	61	35	70	33	90	100	-	156	6	2	4	154,5	172
100	70	70	32	102	35	70	50	114	125	162	197	6	4	5	195,5	213
125	75	75	40	154	38	76	67	155	150	218	255	8	4	6	253,5	271
150	80	80	30	190	40	80	82	180	175	258	295	8	4	7	293,5	311

Order Key Code

15 digit order code

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
P	5	S	S	-	0	0	6	D	S	G	0	1	0	B

Bore Size mm
006
008
012
016
020
025

Stroke (mm) e.g. 010 = 10mm
Only standard stroke lengths are available. See table below

For non standard strokes see Stroke Adjusters

Note : All slides are supplied magnetic for optional sensing

Standard strokes

Order code XXX = stroke	Cylinder bore (mm)	● = Standard stroke (mm) 10	20	30	40	50	75	100	125	150
P5SS-006DSGXXXB	6	●	●	●	●	●				
P5SS-008DSGXXXB	8	●	●	●	●	●	●			
P5SS-012DSGXXXB	12	●	●	●	●	●	●	●		
P5SS-016DSGXXXB	16	●	●	●	●	●	●	●	●	
P5SS-020DSGXXXB	20	●	●	●	●	●	●	●	●	●
P5SS-025DSGXXXB	25	●	●	●	●	●	●	●	●	●

Note: Only strokes listed above are available.
For optional stroke adjusters see next page.

Ordering Information: P5SS

Ø6mm bore

Stroke (mm)	Order code
10	**P5SS-006DSG010B**
20	**P5SS-006DSG020B**
30	**P5SS-006DSG030B**
40	**P5SS-006DSG040B**
50	**P5SS-006DSG050B**

Ø8mm bore

Stroke (mm)	Order code
10	**P5SS-008DSG010B**
20	**P5SS-008DSG020B**
30	**P5SS-008DSG030B**
40	**P5SS-008DSG040B**
50	**P5SS-008DSG050B**
75	**P5SS-008DSG075B**

Ø12mm bore

Stroke (mm)	Order code
10	**P5SS-012DSG010B**
20	**P5SS-012DSG020B**
30	**P5SS-012DSG030B**
40	**P5SS-012DSG040B**
50	**P5SS-012DSG050B**
75	**P5SS-012DSG075B**
100	**P5SS-012DSG100B**

Ø16mm bore

Stroke (mm)	Order code
10	**P5SS-016DSG010B**
20	**P5SS-016DSG020B**
30	**P5SS-016DSG030B**
40	**P5SS-016DSG040B**
50	**P5SS-016DSG050B**
75	**P5SS-016DSG075B**
100	**P5SS-016DSG100B**
125	**P5SS-016DSG125B**

Ø20mm bore

Stroke (mm)	Order code
10	**P5SS-020DSG010B**
20	**P5SS-020DSG020B**
30	**P5SS-020DSG030B**
40	**P5SS-020DSG040B**
50	**P5SS-020DSG050B**
75	**P5SS-020DSG075B**
100	**P5SS-020DSG100B**
125	**P5SS-020DSG125B**
150	**P5SS-020DSG150B**

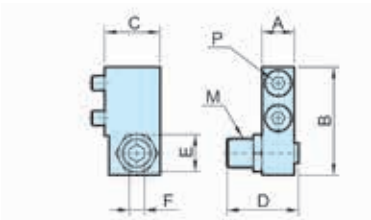
Ø25mm bore

Stroke (mm)	Order code
10	**P5SS-025DSG010B**
20	**P5SS-025DSG020B**
30	**P5SS-025DSG030B**
40	**P5SS-025DSG040B**
50	**P5SS-025DSG050B**
75	**P5SS-025DSG075B**
100	**P5SS-025DSG100B**
125	**P5SS-025DSG125B**
150	**P5SS-025DSG150B**

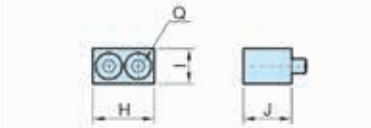
Accessories Ø 6 - Ø 25

Stroke adjuster at extension end:

Mounted to body



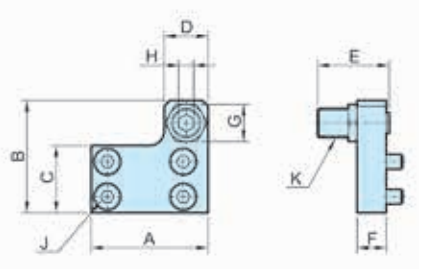
Mounted to table



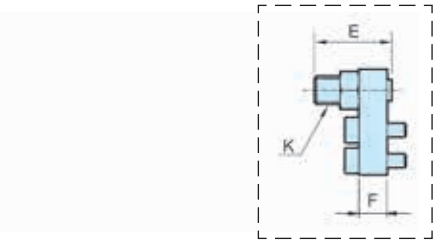
Bore mm	Order code	Adjustable stroke range (mm)	Mounted to body								Mounted to table			
			A	B	C	D	E	F	M	P*	H	I	J	Q*
6	**P5SS-006-EA-05**	5	6	17,8	10,5	16,5	7	2,5	M5 x 0.8	M2.5x10	12,5	6	8,5	M2.5 x 8
	P5SS-006-EA-15	15				26,5								
8	**P5SS-008-EA-05**	5	7	21,5	11	16,5	8	3	M6 x 1	M3 x 10	14,6	7	10	M3 x 10
	P5SS-008-EA-15	15				26,5								
	P5SS-008-EA-25	25				36,5								
12	**P5SS-012-EA-05**	5	9,5	31	16	20	11	4	M8 x 1	M4 x 16	18,5	10	13	M4 x 12
	P5SS-012-EA-15	15				30								
	P5SS-012-EA-25	25				40								
16	**P5SS-016-EA-05**	5	11	37	19	24,5	14	5	M10 x 1	M5 x 16	21	12	16,5	M5 x 16
	P5SS-016-EA-15	15				34,5								
	P5SS-016-EA-25	25				44,5								
20	**P5SS-020-EA-05**	5	13	45,5	24	27,5	17	6	M12 x 1.25	M6 x 20	25	13	21	M6 x 20
	P5SS-020-EA-15	15				37,5								
	P5SS-020-EA-25	25				47,5								
25	**P5SS-025-EA-05**	5	16	53,5	26,5	32,5	19	6	M14 x 1.5	M8 x 25	31	17	25,5	M8 x 25
	P5SS-025-EA-15	15				42,5								
	P5SS-025-EA-25	25				52,5								

* Size of hexagon socket head cap screws

Stroke adjuster at retraction end:



P5SS-006
P5SS-008



Bore mm	Order code	Adjustable stroke range (mm)	A	B	C	D	E	F	G	H	J*	K
6	**P5SS-006-RA-05**	5	21	19	10,5	8	16,5	5	7	2,5	M2.5 x 8	M5 x 0.8
	P5SS-006-RA-15	15					26,5					
8	**P5SS-008-RA-05**	5	25	22,5	12,5	9	16,5	6	8	3	M3 x 10	M6 x 1
	P5SS-008-RA-15	15					26,5					
	P5SS-008-RA-25	25					36,5					
12	**P5SS-012-RA-05**	5	32	31	18,5	13	20	8	12	4	M4 x 8	M8 x 1
	P5SS-012-RA-15	15					30					
	P5SS-012-RA-25	25					40					
16	**P5SS-016-RA-05**	5	40	38,5	23	15	24,5	10	14	5	M5 x 10	M10 x 1
	P5SS-016-RA-15	15					34,5					
	P5SS-016-RA-25	25					44,5					
20	**P5SS-020-RA-05**	5	50	48	29	21	27,5	12	17	6	M5 x 12	M12 x 1.25
	P5SS-020-RA-15	15					37,5					
	P5SS-020-RA-25	25					47,5					
25	**P5SS-025-RA-05**	5	60	58	35	23	32,5	15	19	6	M6 x 16	M14 x 1.5
	P5SS-025-RA-15	15					42,5					
	P5SS-025-RA-25	25					52,5					

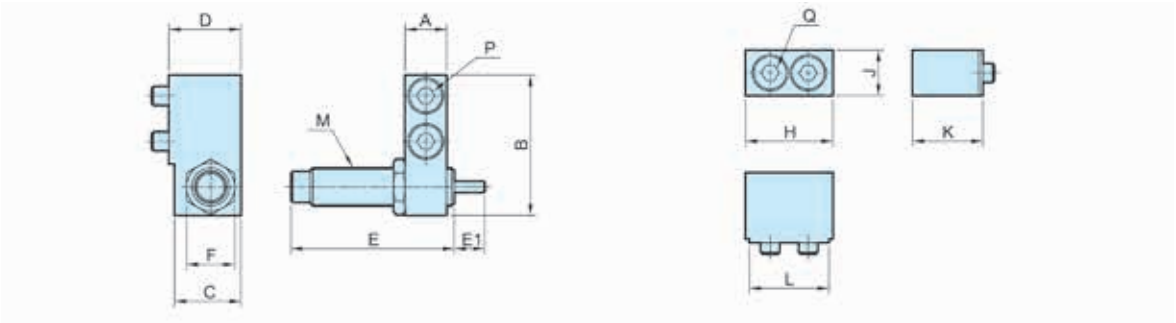
* Size of hexagon socket head cap screws

Accessories Ø 8 - Ø 25

Shock absorber at extension end:

Mounted to body

Mounted to table



Bore mm	Order code	Mounted to body									Mounted to table				
		A	B	C	D	E	E1	F	M	P*	H	J	K	L	Q*
8	**P5SS-008-ESK**	7	23	14	15,5	40,6	6	11	M8 x 1	M3 x 16	16,6	7	15,5	14,6	M3 x 16
12	**P5SS-012-ESK**	9,5	31	14,5	16	40,6	6	11	M8 x 1	M4 x 16	20,5	10	15	18,5	M4 x 12
16	**P5SS-016-ESK**	11	37	17,5	19	47	7	12,7	M10 x 1	M5 x 16	23	12	18,5	21	M5 x 16
20	**P5SS-020-ESK**	13	45,5	23,5	26	67	12	19	M14 x 1.5	M6 x 25	27	13	25,5	25	M6 x 25
25	**P5SS-025-ESK**	16	53,5	23,5	26,5	67	12	19	M14 x 1.5	M8 x 25	33	17	25,5	31	M8 x 25

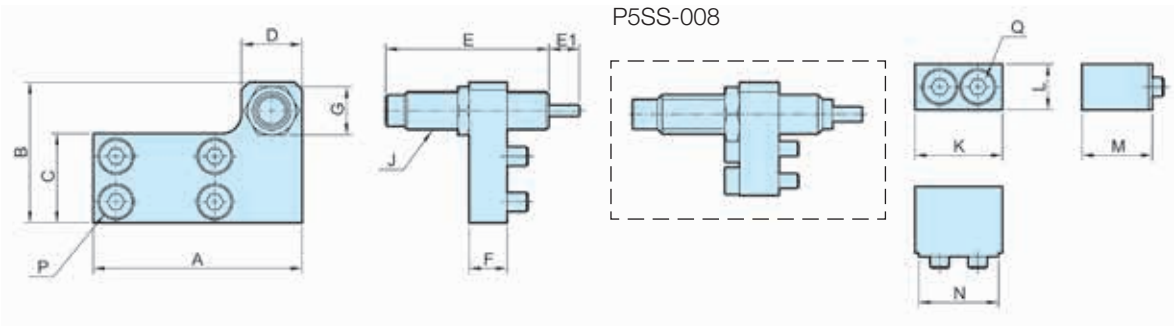
* Size of hexagon socket head cap screws

Shock absorber at retraction end:

Mounted to body

Mounted to table

P5SS-008



Bore mm	Order code	Mounted to body										Mounted to table				
		A	B	C	D	E	E1	F	G	J	P*	K	L	M	N	Q*
8	**P5SS-008-RSK**	38	23	12,5	14	40,6	6	8	12	M8 x 1	M3 x 12	16,6	7	15,5	14,6	M3 x 16
12	**P5SS-012-RSK**	45	31	18	14	40,6	6	8	11	M8 x 1	M4 x 8	20,5	10	15	18,5	M4 x 12
16	**P5SS-016-RSK**	55	37	23,5	16	47	7	10	12,7	M10 x 1	M5 x 10	23	12	18,5	21	M5 x 16
20	**P5SS-020-RSK**	70	47	29	23	67	12	12	19	M14 x 1.5	M5 x 12	27	13	25,5	25	M6 x 25
25	**P5SS-025-RSK**	80	54	35	23	67	12	12	19	M14 x 1.5	M6 x 16	33	17	25,5	31	M8 x 25

* Size of hexagon socket head cap screws

Stroke Adjustment Bolts

Bore	Description	Order code
6	5mm Adjustment bolt	**P5SS-006-SA-05**
	15mm Adjustment bolt	**P5SS-006-SA-15**
8	5mm Adjustment bolt	**P5SS-008-SA-05**
	15mm Adjustment bolt	**P5SS-008-SA-15**
	25mm Adjustment bolt	**P5SS-008-SA-25**
12	5mm Adjustment bolt	**P5SS-012-SA-05**
	15mm Adjustment bolt	**P5SS-012-SA-15**
	25mm Adjustment bolt	**P5SS-012-SA-25**
16	5mm Adjustment bolt	**P5SS-016-SA-05**
	15mm Adjustment bolt	**P5SS-016-SA-15**
	25mm Adjustment bolt	**P5SS-016-SA-25**
20	5mm Adjustment bolt	**P5SS-020-SA-05**
	15mm Adjustment bolt	**P5SS-020-SA-15**
	25mm Adjustment bolt	**P5SS-020-SA-25**
25	5mm Adjustment bolt	**P5SS-025-SA-05**
	15mm Adjustment bolt	**P5SS-025-SA-15**
	25mm Adjustment bolt	**P5SS-025-SA-25**

Optional Shock Absorbers

Bore	Rotary Actuator	Order code
6	P5SS-006MSGXXXB	Not applicable
8	P5SS-008MSGXXXB	**MC10EUML**
12	P5SS-012MSGXXXB	**MC10EUML**
16	P5SS-016MSGXXXB	**MC25EUM-NB**
20	P5SS-020MSGXXXB	**MC150M**
25	P5SS-025MSGXXXB	**MC150M**

P8S Sensors Series

The P8S family of sensors provides a broad range of reed and solid state sensor types with flying lead or M8 options available. Mounting on all slides is within the integrated sensor grooves allowing for compact installation.

Electronic sensors

The electronic sensors utilise “Solid State” technology, providing operation with no moving parts. These switches are available in NPN and PNP type, both provide built in short circuit and transient protection as standard. The solid state operation allows for high switching on off frequency, ideal for applications where long service life is required.

Technical data

Design	GMR (Giant Magnetic Resistance) magneto-resistive function
Installation	Mounts within cylinder switch groove
Outputs	PNP or NPN normally open
Voltage range	5-30 V DC
Voltage drop	1.5 V max.
Switching current	50 mA max.
Switch rating	1.5 W max.
Leakage current	0.01 mA max.
Internal consumption	10 mA max (NPN) 12 mA max (PNP)
On/off switching frequency	1000 Hz max
Encapsulation	IP 67 (NEMA 6)
Temperature range	–10 °C to +70 °C
Indication	LED Red (NPN) LED Green (PNP)
Cable	Polyurethane

Reed sensors

Reed type sensors are based on proven reed switch technology and provide reliable function in many applications.
Simple installation and the available AC voltage range are advantages for this range of sensors.

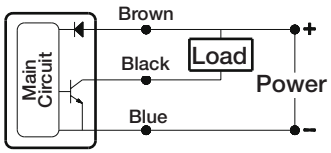
Technical data

Design	Reed element
Installation	Mounts within cylinder switch groove
Outputs	Normally open
Voltage range	5-120 V DC/AC
Voltage drop	2.5 V max.
Switching current	100 mA max.
Switch rating	10 W max.
Encapsulation	IP 67 (NEMA 6)
Temperature range	–10 °C to +70 °C
Indication	LED Red (NPN)
Cable	Polyurethane

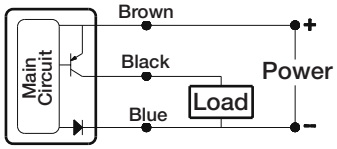
Electronic sensors

Schematic

NPN type



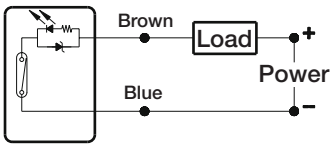
PNP type



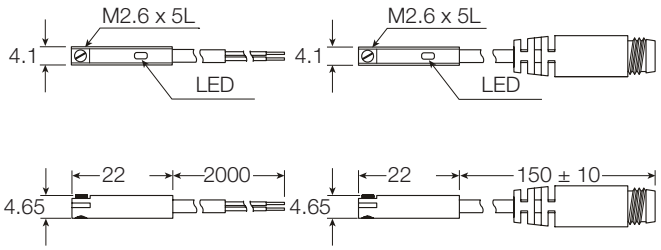
Reed sensors

Schematic

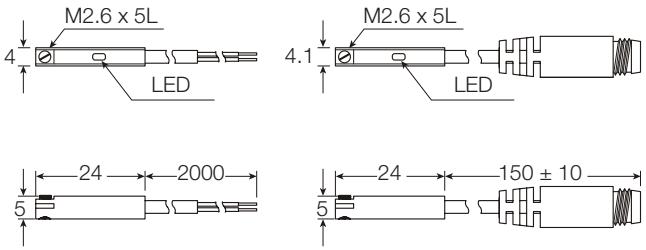
Reed type



Dimensions

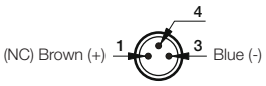


Dimensions

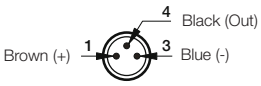


M8 Quick Connector

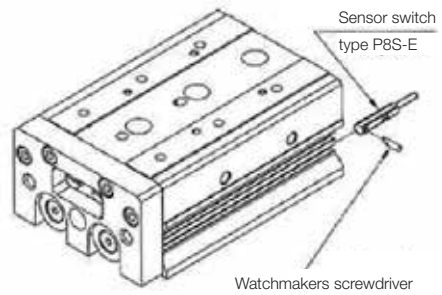
2 wire



3 wire



Installation of Sensor



Electronic and Reed Sensors

Size	Description	Order code
Flush Mount Style		
PNP Type, normally open	0.165 m cable and M8 screw male connector	**P8S-EPSUS**
PNP Type, normally open	2 m PUR cable without connector	**P8S-EPFXS**
NPN Type, normally open	0.165 m cable and M8 screw male connector	**P8S-ENSUS**
NPN Type, normally open	2 m PUR cable without connector	**P8S-ENFXS**
Reed Type, normally open	0.15 m cable and M8 screw male connector	**P8S-ERSUS**
Reed Type, normally open	2 m PUR cable without connector	**P8S-ERFXS**

Connecting cables with one connector

The cables have an integral snap-in female connector.

Type of cable	Cable/connector	Weight kg	Order code
Cables for sensors, complete with one female connector			
Cable, Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344341**
Cable, Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344342**
Cable, Super Flex PVC	3 m, 8 mm Snap-in connector	0,07	**9126344343**
Cable, Super Flex PVC	10 m, 8 mm Snap-in connector	0,21	**9126344344**
Cable, Polyurethane	3 m, 8 mm Snap-in connector	0,01	**9126344345**
Cable, Polyurethane	10 m, 8 mm Snap-in connector	0,20	**9126344346**

Male connectors for connecting cables

Cable connectors for producing your own connecting cables. The connectors can be quickly attached to the cable without special tools. Only the outer sheath of the cable is removed. The connectors are available for M8 and M12 screw connectors and meet protection class IP 65.

Connector	Weight kg	Order code
M8 screw connector	0,017	**P8SCS0803J**
M12 screw connector	0,022	**P8SCS1204J**

Ready to use connecting cables with connectors at each end

As accessories the system comprises a large number of different cables in order to meet all requirements that may arise and to make the installation simple, fast and reliable.

Cables with moulded 8 mm snap-in round contacts in both ends.

The cables are available in two types, one with a straight male and female connectors respectively, and one with a straight 3-pole male connector in one end and an angled 3-pole female connector in the other end.

Technical data

Contacts

Moulded 8 mm snap-in male/female contacts.

Enclosure	IP67

Cable

Conductor	3x0,25 mm^2 (32x0,10 mm^2)
Sheath	PVC/PUR
Colour	Black

Installation and Maintenance

Disconnect air and electrical supplies before attempting repair or maintenance.
See ISO 4414-1982 for safety requirements covering the installation and use of pneumatic equipment.

Selection

1 Do not apply a load over the operating limit range.

Select the model considering max. allowable load and allowable moment. When actuator is used outside of operating limits, eccentric loads on guide will be in excess this causing vibration on guide and inaccuracy and shortens life

2 If intermediate stops by external stopper is done, avoid ejection.

If ejection occurs, it may cause damage. In case the slide table is stopped at intermediate positions by an external stopper then forwarded to the front, return the slide table to the back for just a moment to retract the stopper, then supply pressure to the opposite port to operate slide table.

3 Do not apply excessive forces and impacts.

This will cause problems and possible failure.

Mounting

1 Do not scratch and dent mounting side of body, table and end plate.

The damage will result in a decrease in parallelism, vibration of guide and an increase in moving part resistance.

2 Do not scratch and dent forward side of rail and guide.

This can cause vibration and increases moving part resistance.

3 Do not apply excessive power and load when work is mounted.

Vibration on guide and moving part resistance will result when power over the allowable moment is applied.

4 Flatness of mounting surface should be less than 0.02mm.

Insufficient flatness of workpiece or base to which the Slide Table is mounted can cause generation of play at guide section or increase sliding resistance.

5 Select the proper connection with the load which has external support and/ or guide mechanism on the outside and align it properly..

6 Avoid contact with the slide table during operation.

Adjuster options create additional pinch points which can cause injury to the operator when table is moving. Preventative measures, e.g. installation of a cover should be taken to avoid such accidents.

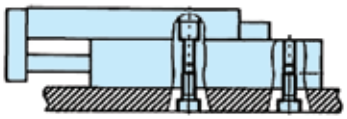
7 Keep away from objects which are influenced by magnets.

A magnet is built in the guide block for use with sensors, therefore do not use magnetic disk, magnetic card or magnetic tape, else data will be eliminated.

8 When mounting a slide table, use appropriate length of screws and do not exceed the maximum tightening torque.

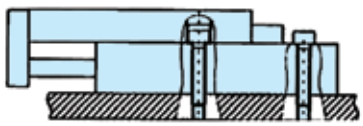
Tightening the screw beyond the designated value may result in a malfunction. Tightening insufficiently may result in position sliding or falling off of the slide table

Horizontal mounting (Body tapped)



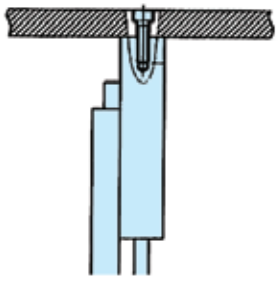
Order code	Bolt	Max.torque (Nm)	Max.screw-in depth (L mm)
P5SS-006	M4 x 0.7	2.1	8
P5SS-008	M4 x 0.8	2.1	8
P5SS-012	M5 x 0.8	4.4	10
P5SS-016	M6 x 1	7.4	12
P5SS-020	M6 x 1	7.4	12
P5SS-025	M8 x 1.25	18	16

Horizontal mounting (Through hole)



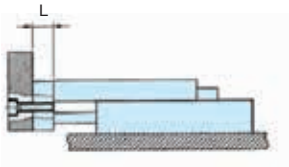
Order code	Bolt	Max.torque (Nm)	Max.screw-in depth (L mm)
P5SS-006	M3 x 0.5	1.2	11
P5SS-008	M3 x 0.5	1.2	13
P5SS-012	M4 x 0.7	2.8	17
P5SS-016	M5 x 0.8	5.7	24
P5SS-020	M5 x 0.8	5.7	27
P5SS-025	M6 x 1	10	34

Vertical mounting (Body tapped)



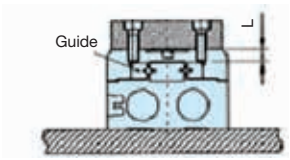
Order code	Bolt	Max.torque (Nm)	Max.screw-in depth (L mm)
P5SS-006	M2.5 x 0.45	0.5	3.5
P5SS-008	M3 x 0.5	0.9	4
P5SS-012	M4 x 0.7	2.1	6
P5SS-016	M5 x 0.8	4.4	7
P5SS-020	M5 x 0.8	4.4	8
P5SS-025	M6 x 1	7.4	10

Tool plate mounting



Order code	Bolt	Max.torque (Nm)	Max.screw-in depth (L mm)
P5SS-006	M3 x 0.5	0.9	5
P5SS-008	M4 x 0.8	2.1	6
P5SS-012	M5 x 0.8	4.4	8
P5SS-016	M6 x 1	7.4	10
P5SS-020	M6 x 1	7.4	13
P5SS-025	M8 x 1.25	18	15

Top face mounting



When attaching work piece to guide use a bolt that is at least 0.5mm shorter than the maximum thread depth. Longer bolts can cause malfunction due to contact with the guide bearings.

❶ **The positioning hole on the table and the positioning hole at the bottom of the body do not have the same center.**

Use these holes during reinstallation after the table has been removed for the maintenance of an identical product.

Precautions for adjuster option

Stroke adjuster

❶ **Never replace the original adjuster bolts.**

Impact energy causes play, damage etc.

❷ **Refer to the below table for lock nut tightening torque.**

If the lock nut is not tightened sufficiently, this leads to low positioning accuracy.

Order code	Tightening torque (Nm)
P5SS-006	3
P5SS-008	5
P5SS-012	12.5
P5SS-016	25
P5SS-020	43
P5SS-025	69

❸ **When stroke adjuster is adjusted, do not hit the table with the wrench.**

This can cause excessive play.

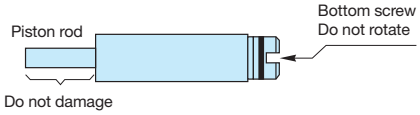
With shock absorber

❶ **Do not rotate the screw set on the bottom of shock absorber.**

This is not the screw for adjusting. If this screw is rotated, it may cause oil leakage.

❷ **Do not scratch the exposed portion of the piston rod.**

Decrease in life or malfunction may result.



❸ **Shock absorber is considered a consumable component. When energy absorption is decreased replace it.**

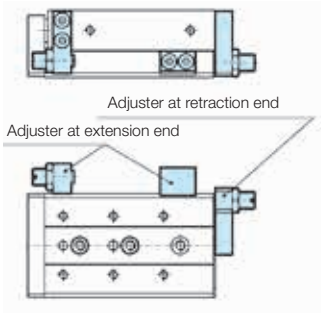
Order code	Item number of shock absorber
P5SS-006	Not applicable
P5SS-008	MC10EUMC
P5SS-012	MC10EUMC
P5SS-016	MC25EUM-NB
P5SS-020	MC150M
P5SS-025	MC150M

❹ **Refer to the below table for lock nut tightening torque.**

If the lock nut is not tightened sufficiently, this leads to low positioning accuracy.

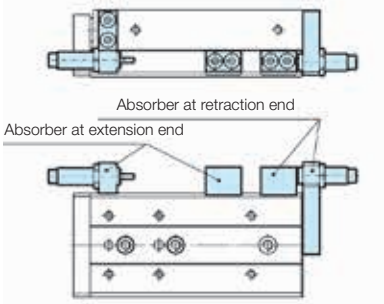
Order code	Tightening torque (Nm)
P5SS-008	1.67
P5SS-012	1.67
P5SS-016	3.14
P5SS-020	10.8
P5SS-025	10.8

Stroke Adjuster with adjustable bolt



Adjustable stroke range: 0-5mm
EA: Adjuster at extension end
RA: Adjuster at retraction end

Stroke Adjuster with shock absorber



Enables adjustment of stroke.
Absorbs the collision at stroke end and stops smoothly
ESK: Absorber at extension end
RSK: Absorber at retraction end

Precautions for adjuster (optional item) :

Stroke adjuster

❶ **Do not replace the special designed bolt with any other bolts.**

It could loosen or get damaged by the impact force.

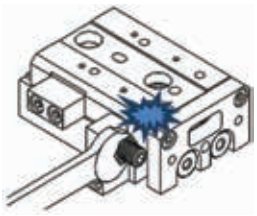
❷ **Please tighten the fixing nut according to the tightness torque chart below.**

Failure to tighten the fixing screw will affect the precision.

❸ **When adjusting the stroke adjuster, be careful the wrench should not make contact with the slide.**

May cause damage or sway the slide

Adjuster torque



Order code	Tightening torque (Nm)
P5SS-006	3
P5SS-008	5
P5SS-012	12.5
P5SS-016	25
P5SS-020	43
P5SS-025	69

Order code	Adjuster at both ends					
	Adjuster at extension end (EA)				Adjuster at retraction end (RA)	
	Body mounting part		Table mounting part		Body mounting part	
	Thread size	Torque (Nm)	Thread size	Torque (Nm)	Thread size	Torque (Nm)
P5SS-006	M2.5 x 10	0.5	M2.5 x 10	0.5	M2.5 x 10	0.5
P5SS-008	M3 x 10	0.9	M3 x 10	0.9	M3 x 10	0.9
P5SS-012	M4 x 16	2.1	M4 x 16	2.1	M4 x 16	2.1
P5SS-016	M5 x 16	4.5	M5 x 16	4.5	M5 x 16	4.5
P5SS-020	M6 x 20	7.5	M6 x 20	7.5	M6 x 20	4.5
P5SS-025	M8 x 25	18	M8 x 25	18	M8 x 25	7.5

Environment

❶ **Do not use in atmosphere where the actuator contacts directly the liquid such as cutting oil.**

Conditions where the cylinder piston rod and guide shafts are exposed directly to cutting oil, coolant and oil mist lead to vibration, increase of moving part resistance, air leakage, etc.

❷ **Do not use in atmosphere where the actuator contacts directly the material such as powder dust, dust, spatter etc.**

❸ **Do not use in direct sun light.**

❹ **Do not use in environment where there is heat source.**

Use a cover when there is a heat source around the actuator, or if temperature of product increases and exceeds operating temperature range by emissive heat.

❺ **Do not subject it to excessive vibration and/or impact.**

This results in damage and/or malfunction.

Specifying air quality (purity) in accordance with ISO8573-1:2010, the international standard for Compressed Air Quality

ISO8573-1 is the primary document used from the ISO8573 series as it is this document which specifies the amount of contamination allowed in each cubic metre of compressed air.

ISO8573-1 lists the main contaminants as Solid Particulate, Water and Oil. The purity levels for each contaminant are shown separately in tabular form, however for ease of use, this document combines all three contaminants into one easy to use table.

ISO8573-1:2010 CLASS	Solid Particulate				Water		Oil
	Maximum number of particles per m^3			Mass Concentration mg/m^3	Vapour Pressure Dewpoint	Liquid g/m^3	Total Oil (aerosol liquid and vapour)
	0,1 - 0,5 micron	0,5 - 1 micron	1 - 5 micron				mg/m^3
0	As specified by the equipment user or supplier and more stringent than Class 1						
1	≤ 20 000	≤ 400	≤ 10	-	≤ -70 °C	-	0,01
2	≤ 400 000	≤ 6 000	≤ 100	-	≤ -40 °C	-	0,1
3	-	≤ 90 000	≤ 1 000	-	≤ -20 °C	-	1
4	-	-	≤ 10 000	-	≤ +3 °C	-	5
5	-	-	≤ 100 000	-	≤ +7 °C	-	-
6	-	-	-	≤ 5	≤ +10 °C	-	-
7	-	-	-	5 - 10	-	≤ 0,5	-
8	-	-	-	-	-	0,5 - 5	-
9	-	-	-	-	-	5 - 10	-
X	-	-	-	> 10	-	> 10	> 10

Specifying air purity in accordance with ISO8573-1:2010

When specifying the purity of air required, the standard must always be referenced, followed by the purity class selected for each contaminant (a different purity class can be selected for each contamination if required).

An example of how to write an air quality specification is shown below:

ISO 8573-1:2010 Class 1.2.1

ISO 8573-1:2010 refers to the standard document and its revision, the three digits refer to the purity classifications selected for solid particulate, water and total oil. Selecting an air purity class of 1.2.1 would specify the following air quality when operating at the standard's reference conditions :

Class 1 - Particulate

In each cubic metre of compressed air, the particulate count should not exceed 20,000 particles in the 0.1 - 0.5 micron size range, 400 particles in the 0.5 - 1 micron size range and 10 particles in the 1 - 5 micron size range.

Class 2 - Water

A pressure dewpoint (PDP) of -40°C or better is required and no liquid water is allowed.

Class 1 - Oil

In each cubic metre of compressed air, not more than 0.01mg of oil is allowed. This is a total level for liquid oil, oil aerosol and oil vapour.

ISO8573-1:2010 Class zero

- **Class 0 does not mean zero contamination.**
- **Class 0 requires the user and the equipment manufacturer to agree contamination levels as part of a written specification.**
- **The agreed contamination levels for a Class 0 specification should be within the measurement capabilities of the test equipment and test methods shown in ISO8573 Pt 2 to Pt 9.**
- **The agreed Class 0 specification must be written on all documentation to be in accordance with the standard.**
- **Stating Class 0 without the agreed specification is meaningless and not in accordance with the standard.**
- **A number of compressor manufacturers claim that the delivered air from their oil-free compressors is in compliance with Class 0.**
- **If the compressor was tested in clean room conditions, the contamination detected at the outlet will be minimal. Should the same compressor now be installed in typical urban environment, the level of contamination will be dependent upon what is drawn into the compressor intake, rendering the Class 0 claim invalid.**
- **A compressor delivering air to Class 0 will still require purification equipment in both the compressor room and at the point of use for the Class 0 purity to be maintained at the application.**
- **Air for critical applications such as breathing, medical, food, etc typically only requires air quality to Class 2.2.1 or Class 2.1.1.**
- **Purification of air to meet a Class 0 specification is only cost effective if carried out at the point of use.**

Compact Cylinders - P5T

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- Stainless steel guide rods
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- Flexible porting as standard
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- Available with hydraulic Industrial shock absorbers
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RDV Series

AZ Series

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- Adjustable cushioning
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Rodless Cylinders - OSP-P

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- High loads and moments
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