Rodless magnetic cylinders series P1Z

Ø 16, 20 and 32 mm

Catalogue : PDE2522TCUK-po
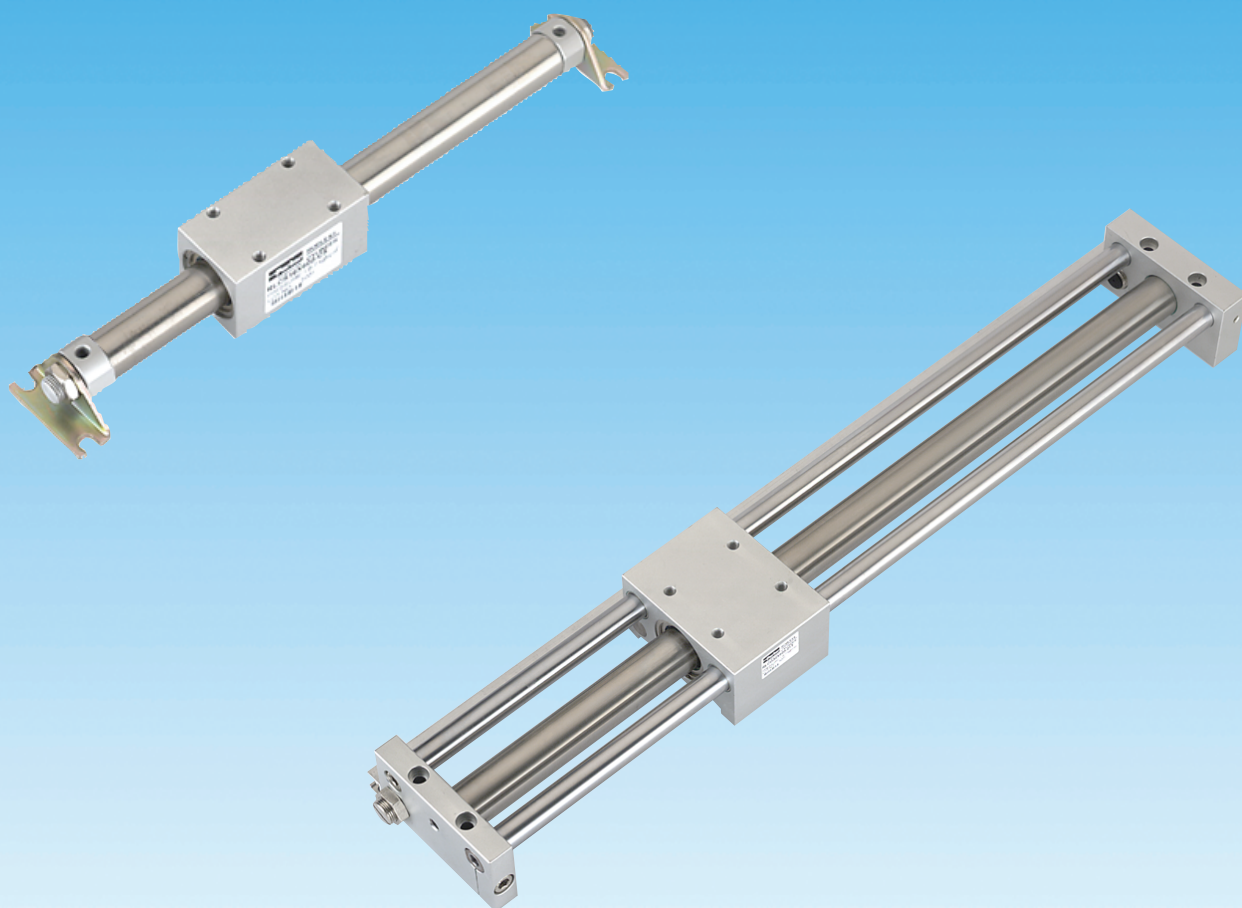
Content   Page

Basic version

Guided version

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.

Important

Please ensure that rodless cylinders are not used in environment with steel chips which may stop the carriage/piston displacement.

Note
Air quality is essential for maximum cylinder service life (see ISO 8573)

Note
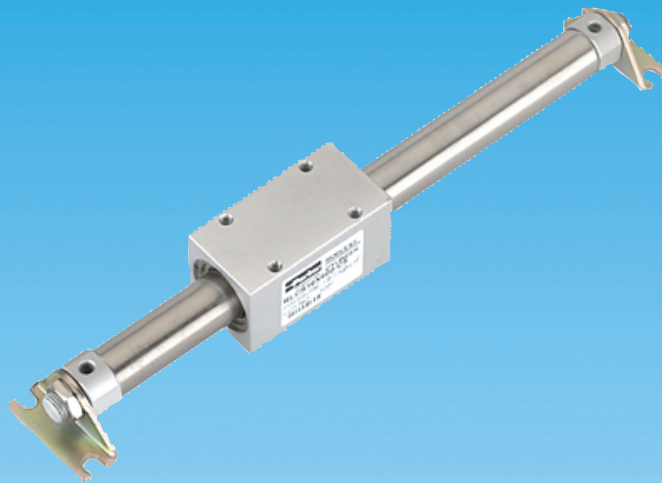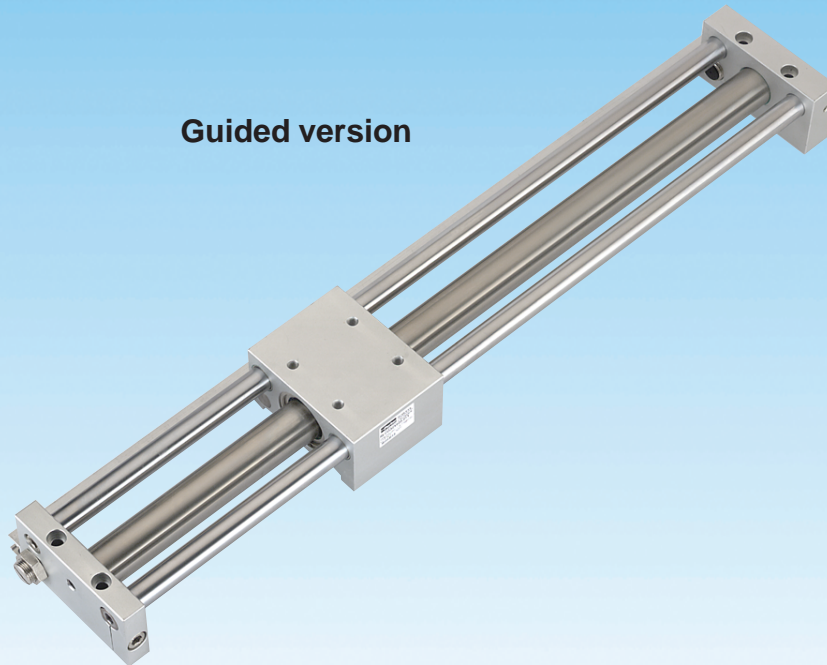**All technical data in this catalogue are typical data only.**

WARNING

Basic version

Guided version

Basic version

Endplate

Hard anodized
alumiinium carriage

Air supply ports

Non magnetic stainless
steel tube
(cylinder body)

Mounting holes to fix load onto
the carriage

Mobile piston

External magnets
(built-in the carriage)

Internal magnets
(on the piston)

360°

360°
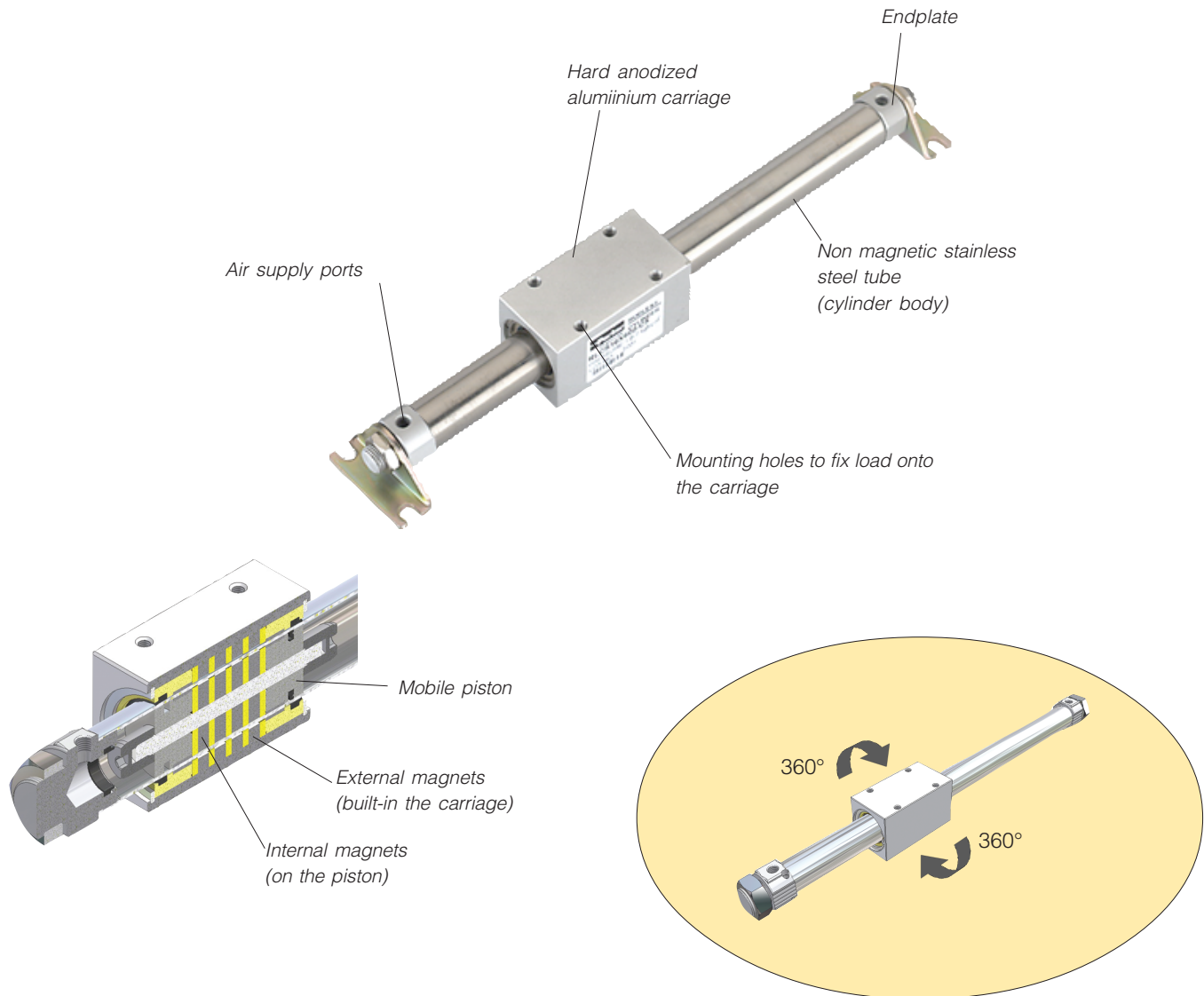
Description

The magnetic rodless cylinder is basically a pneumatic
rodless cylinder featuring a mobile piston fitted with
annular magnets.
The mobile carriage is also equipped with magnets to
provide magnetic coupling (carriage/piston). The carriage
slide freely along the main tube.

It incorporates the following features :

- end of stroke cushioning
- mounting :
        on endplates
        on the carriage

Cushioning

Ø 16 mm : non adjustable rubber bumpers
Ø 20 and 32 mm : adjustable pneumatic cushioning

Attachement

On cylinder endplates, on mobile carriage.

Mounting

The mobile carriage is free to rotate 360° around the
cylinder axis. This feature facilitates the adaptation of
cylinder to various mounting arrangements.

The load should be guided by an external device.

General features

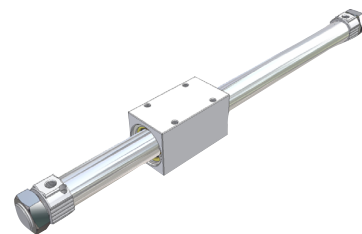**Magnetic Rodless cylinder, basic version**

They are available in 3 bores with possible stroke lengths from 0 up to 2000 mm.

Non adjustable Rubber bumpers on Ø 16 mm.

Adjustable Pneumatic cushioning on Ø 20 and 32 mm.

The load is fixed onto the mobile carriage by 4 tapped holes.

The cylinder is attached by ends with nuts, flanges or brackets.

Ø	16	20	32
Stroke (mm)	0 to 1000	0 to 1500	0 to 2000
Stroke tolerance (mm) 0 to 1000 mm		0/+1,5	
Stroke tolerance (mm) > 1000 mm		0/+2	
Repeatability (mm)	0,1	0,03	
Temperature (C°)		-10 to 60	
Operation		Dry air lubricated or unlubricated	
Port size	M5	G1/8	G1/8
Magnetic coupling force (N)	157	236	703
Min. Max. speed (m/s)		0,1 to 0,4	
Min. operating pressure (bar)		1,8	
Max. operating pressure (bar)		7	
Cushioning stroke (mm)	—	17	15
Weight (kg)			
Stroke 0 mm	0,28	0,46	1,35
Extra./ mm	0,00043	0,00082	0,0014

Technical data

Function	Description
Carriage actuating	By magnetic coupling
Carriage guiding	Exterior on tube by 2 bushes
End of stroke stops	In cylinder endplates
Cushioning	Rubber bumpers for Ø 16 mm, pneumatic for Ø 20 & 32 mm
Position sensing along the stroke	Not forcasted
Pneumatic connection	In tapped holes, on each cylinder endplate
Lubrication	See conditions of use below
Cylinder mounting	By nuts, flanges or brackets
Load attachment on mobile carriage	By 4 tapped holes
Material :	
Body :	Stainless steel tube
Carriage :	Colourless anodized aluminium alloy (6060)
Front and Rear Endplates :	Colourless anodized aluminium alloy (6060)
Cylinder seals :	Nitrile

Conditions of use

If extra lubrication is given, this must always be continued.

Working medium, air quality

Working medium   Dry, filtered compressed air to ISO 8573-1 class 3. 4. 3. or better
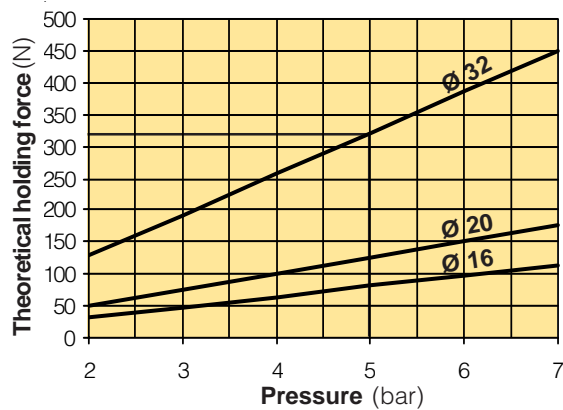
Recommended air quality for cylinders

For best possible service life and trouble-free operation, ISO 8573-1. quality class 3.4.3 should be used. This means 5 μm filter (standard filter), dew point +3 °C for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m³, which is what a standard compressor with a standard filter gives.

ISO 8573-1 qualtity classes

Quality class	maxi. Pollution		Water	Oil
	prticules size (μm)	max. concentration (mg/m³)	max. pressure dew point (°C)	max. concentration (mg/m³)
1	0,1	0,1	-70	0,01
2	1	1	-40	0,1
3	5	5	-20	1,0
4	15	8	+3	5,0
5	40	10	+7	25
6	-	-	+10	-

Pressure in the cylinder / Pneumatic holding force

Example :

Pressure : 5 bar

F_{mp} = 322 N for Ø 32 mm cylinder
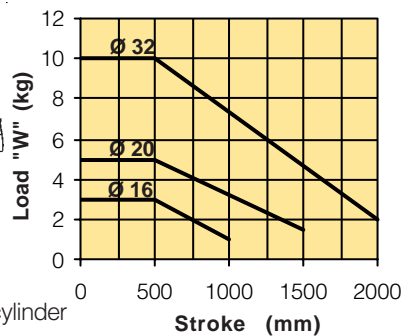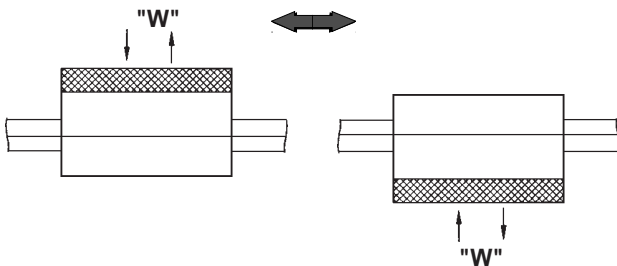
when the magnetic coupling force is 703 N

(constant value whatever the cylinder pressure used).

The maxi load to move should be lower to 322 N.

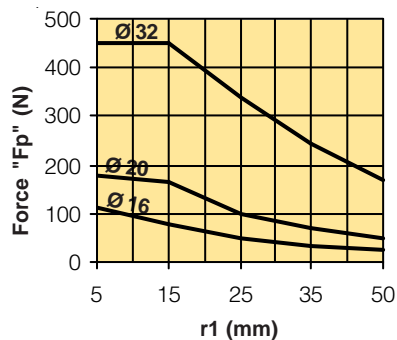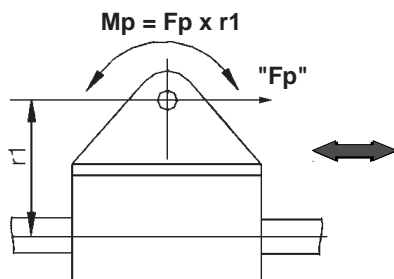⚠ Calculate the kinetic energy due to the load moved

Load diagrams

Permissible radial loads, horizontal mounting

⚠ The load must be guided by a device from outside the cylinder

Ø	W maxi (kg)
16	3
20	5
32	10

Permissible axial loads, horizontal mounting

$$Mp = Fp \times r1$$

⚠ The load must be guided by a device from outside the cylinder

Ø	Max. Moment Mp (Nm)	Max. Fp* (N)
16	1,2	112
20	2,5	175
32	8,5	450

* at 7 bar

Permissible axial loads, vertical mounting
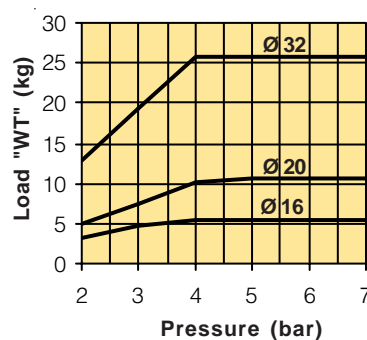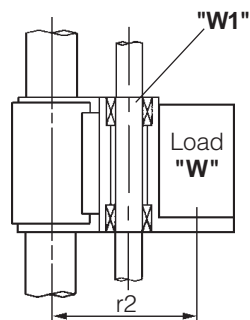
W = Load guided by external device
W1 = Direct mounting onto the cylinder

Ø	Max. load lWT* (kg)	Max. r2 (mm)
16	5	122
20	10	142
32	24	174

* at 6,5 bar

WT = Load weight + guiding device weight + friction effort

Dimensions

** = Air supply Ports

S = Stroke

x = Deep

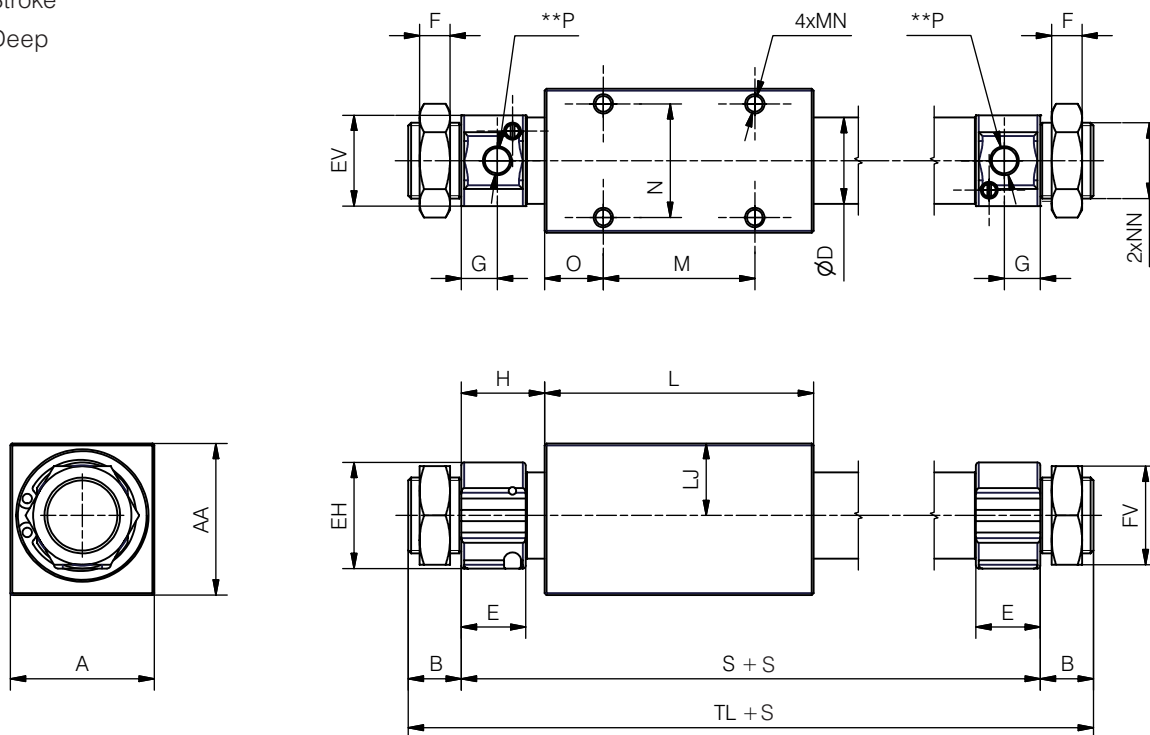| Ø	A	AA	B	ØD	E	Ø EH	Ø EV	F	FV	G	H	L	LJ	M	N	O
16	32	34	10	18	11	18	18	4	14	5,5	15,5	61	16	34	25	13,5
20	38	40	14	22,8	17	28	24	8	26	9,5	22	71	19	40	30	15,5
32	60	60	16	35	17	40	36	8	32	9,5	23	87	30	50	40	18,5

Ø	P	MN	NN	S	TL
16	M5 x 0,8	M4 x 0,7 **x** 6	M10 x 1 **x** 6	92	112
20	G 1/8	M5 x 0,8 **x** 8	M20 x 1,5 **x** 7	115	143
32	G 1/8	M6 x 1 **x** 10	M26 x 1,5 **x** 7	133	165

Mountings

Flanges

Only on Ø 16 mm
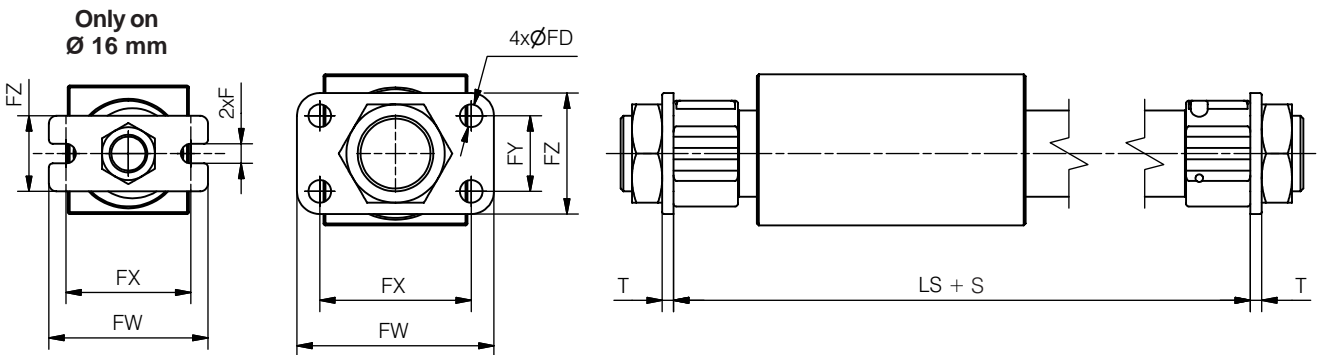
Ø	F	ØFD	FW	FX	FY	FZ	T	LS	Order code
16	5,2	-	42	33	-	20	2,3	92	**PDC15-FH***
20	-	6	52	40	20	32	3	115	**PK1A20-FH***
32	-	7	80	64	28	44	5	133	**PK1A25-FH***

Brackets

Only on Ø 16 mm
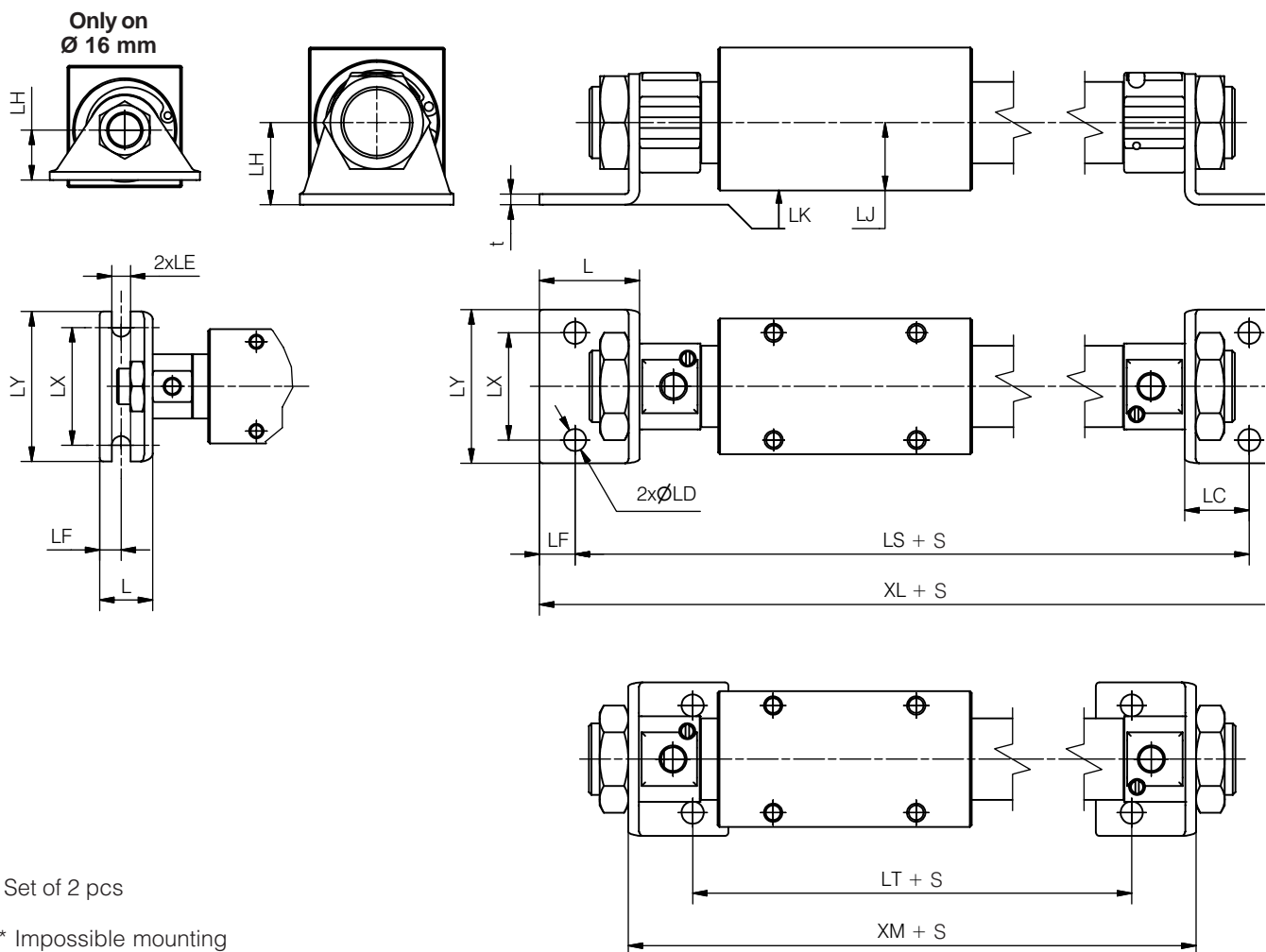
* Set of 2 pcs

** Impossible mounting

Ø	t	L	LC	ØLD	LE	LF	LH	LJ	LK	LX	LY	LS	LT	XL	XM	Order code
16	2,3	14,8	8,8	-	5,2	6	14	16	-2	33	42	109,6	79	121,6	96,6	**PDC15-LB***
20	3	28	18	6,2	-	10	23	19	4	30	43	151	85	171	121	**PK1A20-LB***
32	3	35	23	7	-	12	30	30	0	46	62	179	**	203	**	**PK1A25-LB***

Standard cylinder (15 positions)	Options (16 positions)

P1Z M 0 1 6 S N N 0 5 0 0 B   F

	Bore
16	Ø 16 mm
20	Ø 20 mm
32	Ø 32 mm

	Cushioning
N	None (Ø 16)
A	Pneumatic (Ø 20 & 32)

	Strokes
0200	200 mm
1000	1000 mm

	Mounting kit*
F	Brackets
L	Flanges

	Options*
B	None
W	With options
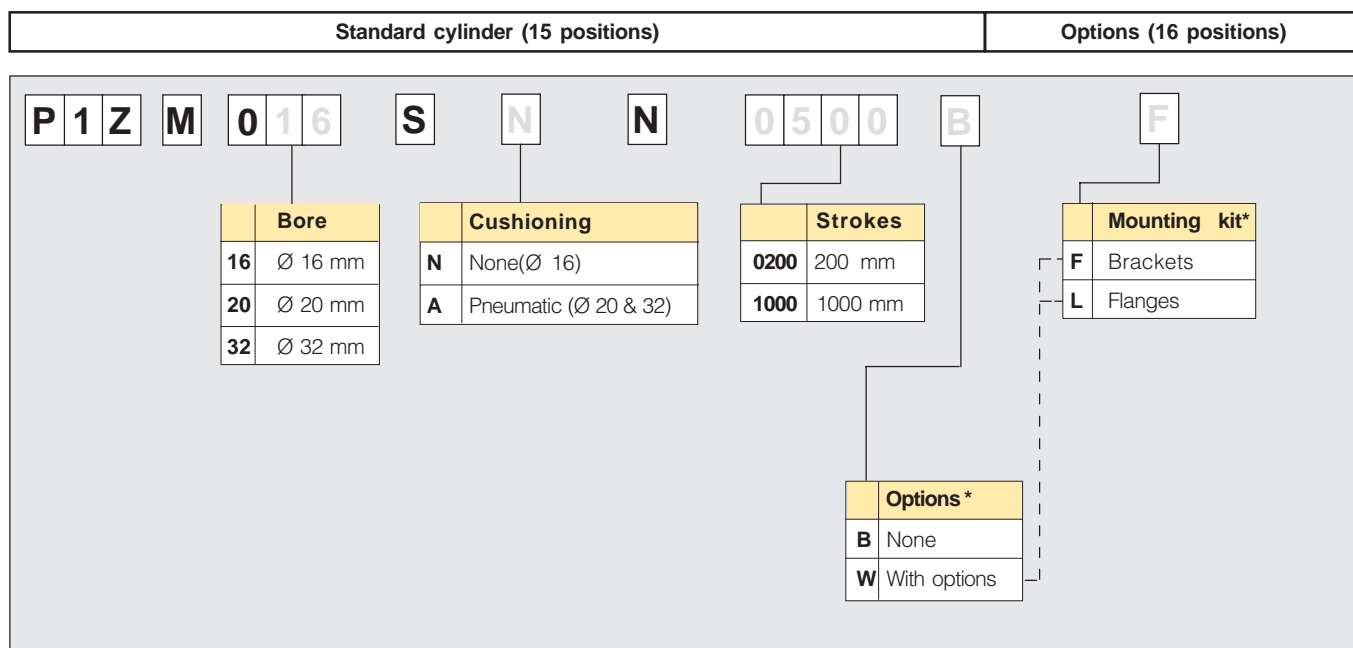
* Cylinders are supplied with mounting nuts fitted on each end plate.

Ø	Stroke (mm)
16	0 to 1000
20	0 to 1500
32	0 to 2000

Order code examples :

- **P1ZM016SNN0100B**   Ø 16 mm stroke 100 mm cylinder supplied with mounting nut on each end plate

- **P1ZM020SAN1000WF**   Ø 20 mm stroke 1 m with mounting bracket on each end plate

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Guided version

Endplate

Rail for mounting sensors
laterally
(on one side only)

Mounting holes
(chamferred and
tapped)

Chrome plated steel
Guiding rods

Adjustable Rubber bumpers
(Optional : hydraulic shock
absorbers)

Non magnetic stainless steel
(body cylinder)

Anodized aluminium
mobile carriage

Holes to fix load onto the
carriage

Ports on one side only
on one of the endplate

Guiding bushes

Internal magnets
(on the piston)

Mobile piston

External magnets
(built-in the carriage)

Description

The magnetic rodless cylinder is basically a rodless cylinder featuring a mobile piston with annular magnets.
The mobile carriage is also equipped with magnets to give magnetic coupling (carriage/piston). The carriage slides along the main tube and is guided by twin guide rods

It incorporates the following features :

- guiding
- end of stroke cushioning
- detection
- mounting

Guidance

The guided version consists of a carriage fitted with 4 plain bearings, guided on 2 rods.
This design provides high regidity, accurate guidance and smooth movement of the carriage and thus the load.

Cushioning

Each endplate is fitted with a rubber bumper or auto-compensating hydraulic shock absorber absorbing impacts and controlling deceleration at the end of stroke.

Cylinder porting

Cylinder air supply is located on one end only to facilitate cylinder installation and avoid long tube lengths for long strokes.

Mounting

Mounting kits offer possible mounting arrangement to fit 3D® modular units onto the mobile carriage.

Options

The following options are available to enhance the Magnetic Rodless cylinder functions :

• *External Rubber bumpers :* when low operating or light loads and short strokes.

• *External hydraulic shock absorbers :* recommended for arduous applications.

• *Rail and magneto-inductive sensors :* provide data at the beginning, during and at the end of stroke.
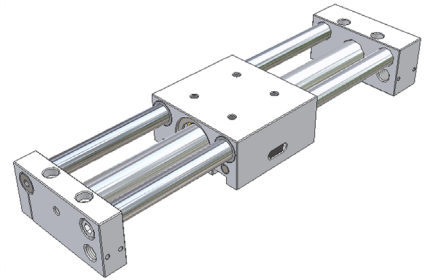
Parker

Range

Magnetic Rodless Cylinder, guided version

Available in 3 diameters with possible strokes from 0 to 1500 mm.

Pneumatic air supply on one side only.

4 tapped holes permit to attach load onto the mobile carriage.

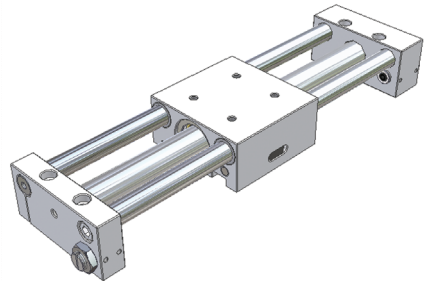Mounting at the ends provided by 4 tapped and chamferred holes.

Options

External adjustable Rubber bumpers

The can be fitted on cylinder endplates and provide cushioning and adjustment at the end of stroke.

Used when light loads and short strokes.

External hydraulic shock absorbers

Self-compensating hydraulic shock absorbers can be used instead of rubber bumpers for a greater cushioning at the end of stroke.

They are virtually recommended for arduous applications.
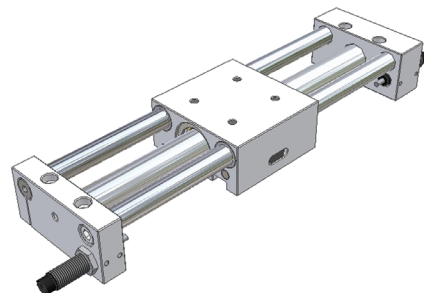
Magneto-inductive Sensors:

A guiding rail fitted on one side only of the cylinder provides mounting and position adjustment of sensors.

Mounting on same side as the end of stroke stops.
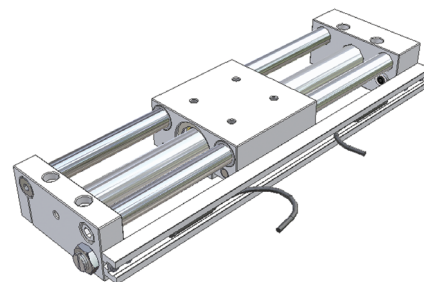
General features

Ø	16	20	32
Stroke (mm)	0 to 750	0 to 1000	0 to 1500
Stroke tolerance (mm) 0 à 1000 mm		0/+1,5	
Stroke tolerance (mm) > 1000 mm		0/+2	
Repeatability (mm)		0,03	
Temperature (C°)		0 to 60	
Operating		Dry air lubricated or unlubricated	
Port connection	M5	G1/8	G1/8
Max. force of magnetic coupling (N)	157	236	703
Min. Max. speed (m/s)		0,1 to 0,4	
Min. operating pressure (bar)		2	
Max. operating pressure (bar)		7	
Weight (kg)			
Stroke 0 mm	0,9	1,52	3,63
Extra/mm	0,002	0,003	0,0053

Technical data

Function	Description
Carriage actuation	By magnetic coupling
Carriage guiding	On 2 chrome plated steel guiding rods
End of stroke stops	Built-in endplates
Cushioning	With adjustable rubber bumpers or hydraulic shock absorbers
Sensing along stroke	Magnet fitted onto the mobile carriage and rail fixed on endplates
Pneumatic connection	On one side only, in tapped holes
Lubrication	See conditions of use page 5
Cylinder fixing	By fixing holes in endplates
Fixing load on mobile carriage	By 4 tapped holes
Material :	
Body :	Stainless steel
Plates and carriage :	Colourless anodized aluminium alloy (6060)
Front and Rear endplates :	Colourless anodized aluminium alloy (6060)
Guiding rods :	Chrome plated steel
Guiding rings :	PTFE
Cylinder seals :	Nitrile

Options

Function	Description
Detection	Sensors mounting in T-slot
	Magnetic switches (reed) or 3-wires magneto-inductive sensors with direct indication on the detector
External rubber bumpers	Supplied pre-fitted in endplates
Hydraulic shock absorbers	Self-compensating shock absorbers supplied pre-fitted in endplates
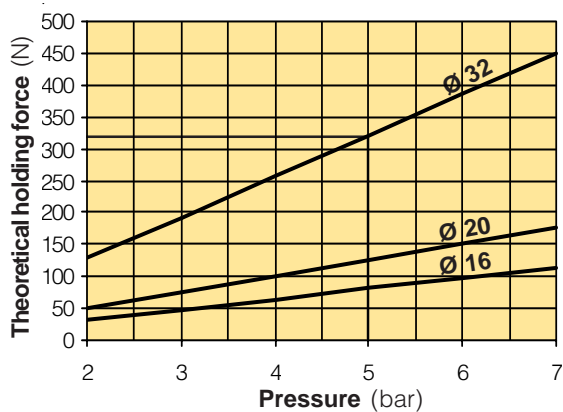
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Pressure in the cylinder / Pneumatic holding force

Example :

Pressure : 5 bar

F_{mp} = 322 N for Ø 32 mm cylinder
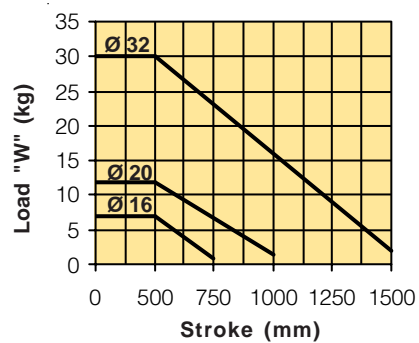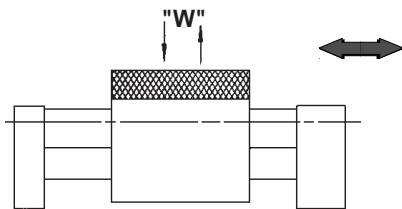
when the magnetic coupling force is 703 N

(constant value whatever the pressure in the cylinder is).

The maxi load to move should be lower to 322 N.

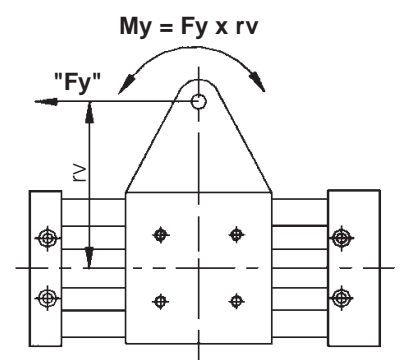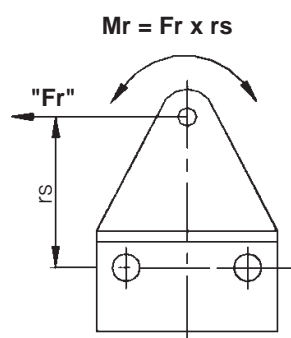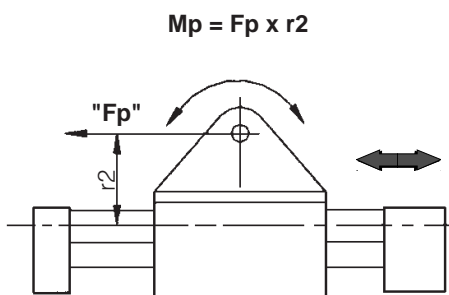⚠ Calculate the kinetic energy due to the load moved

Loads diagram

Permissible radial loads, horizontal mounting

Ø	Max. W (kg)
16	7
20	12
32	30

Permissible axial loads, horizontal mounting

Mp = Fp x r2

Mr = Fr x rs

My = Fy x rv

Ø	Max. moment Mp (Nm)	Max. moment Mr (Nm)	Max. moment My (Nm)	Max. r2 (mm)	Max. rs (mm)	Max. rv (mm)
16	2,4	0,5	2,4	130	100	100
20	5	1	5	150	132	132
32	15	3	15	182	192	192

04.02

Loads diagram

Permissible axial loads, vertical mounting

Ø	Max. Load WT* (kg)	Max. r2 (mm)
16	5	122
20	10	142
32	24	174

* at 6,5 bar
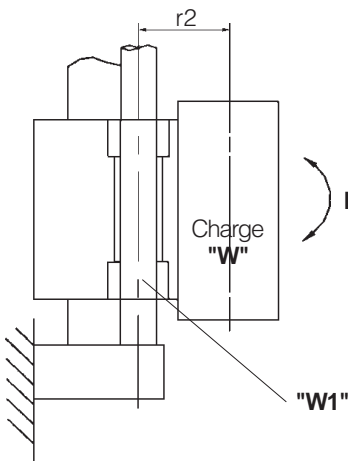
W = Load guided by external device
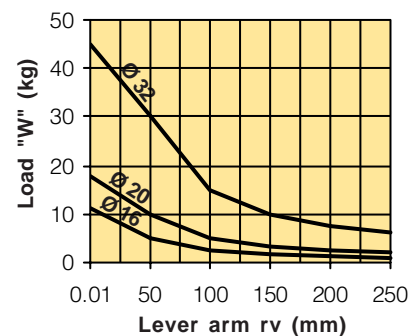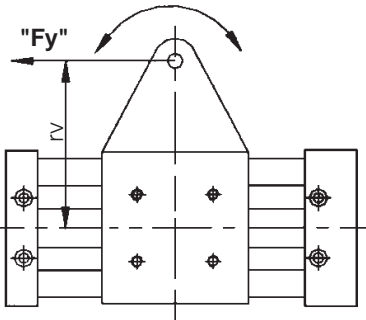
Mp = Fp x r2   W1 = mounting direct onto cylinder

WT = Load weight + guiding device weight + friction effort
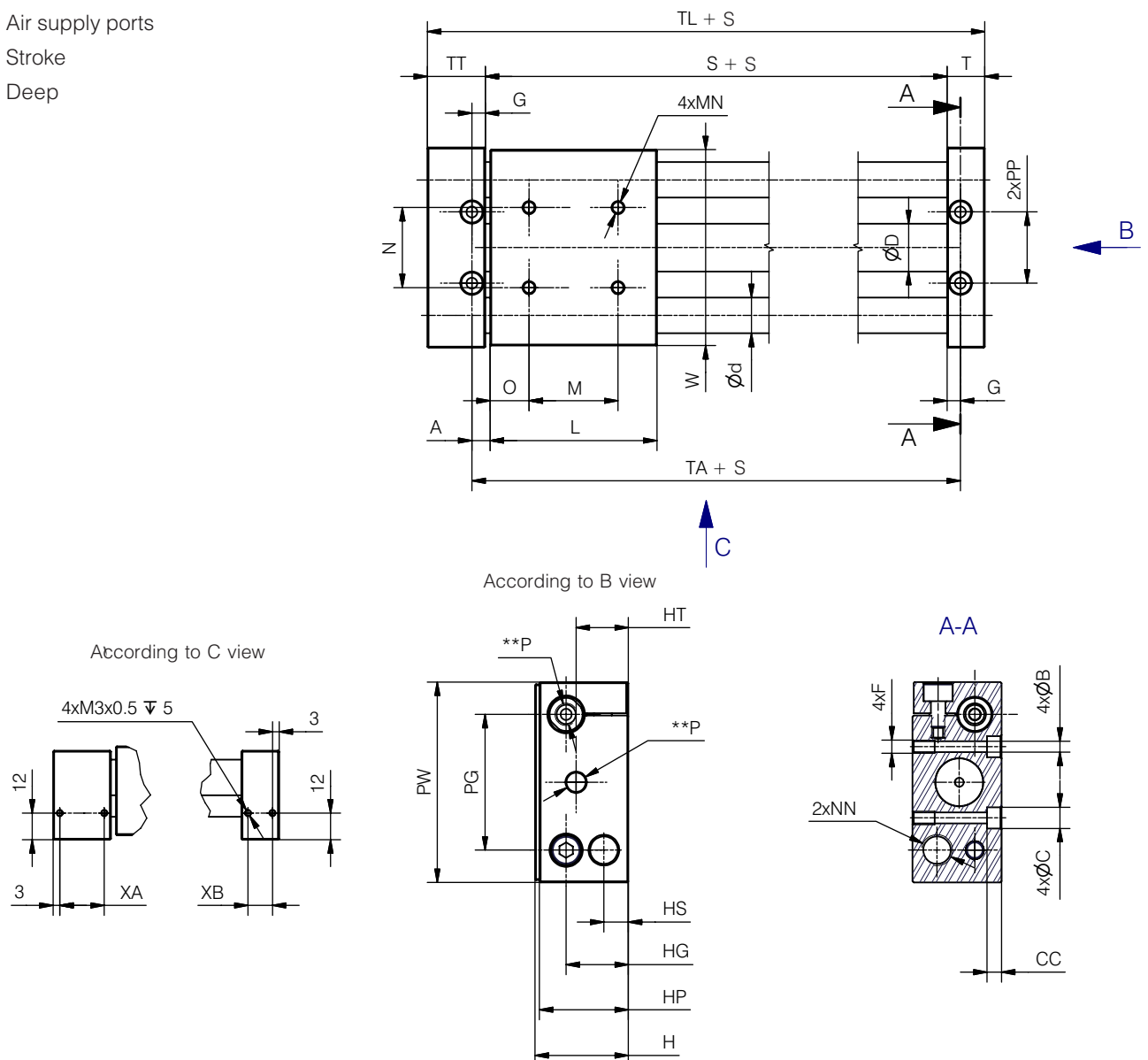
Mr = Fr x rs

My = Fy x rv

Dimensions

** = Air supply ports

S = Stroke

x = Deep

According to B view

According to C view

4xM3x0.5 �井 5

A-A
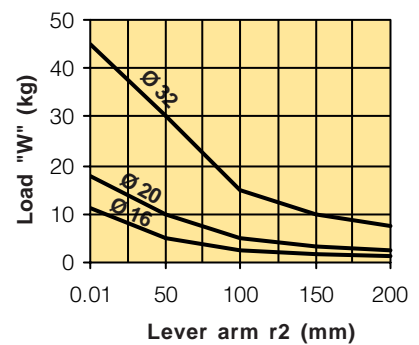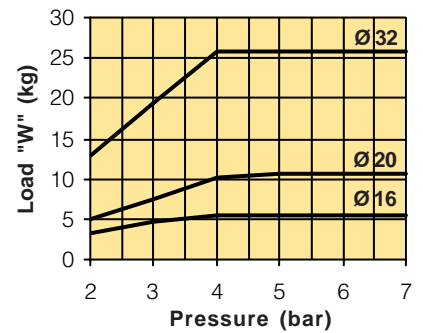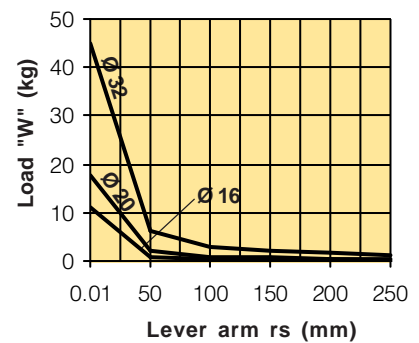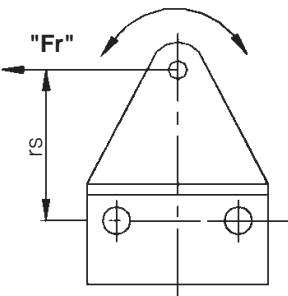
Ø	A	ØB	ØC	CC	ØD	Ød	F	G	H	HP	HG	HS	HT	L	M	N	MN
16	8	4,3	8	4,5	17,4	12	M5x0,8 **x** 10	6	34	33,5	25	12	21,5	65	34	30	M5 x 0,8 **x**8
20	8	5,5	9,5	6,5	21,4	16	M6x1 **x**10	6	42	40	28	12	23,5	75	40	36	M6 x 1 **x** 10
32	13,5	8,7	14	8	33,6	20	M10x1,5 **x** 15	10	66	64	46	20	41	91	60	50	M8 x 1,25 **x** 12

Ø	NN	O	P	PG	PW	PP	T	TT	S	TA	TL	W	XA	XB
16	M10 x 1 **x**6	15.5	M5 x 0,8	50	70	27	14	23	69	81	106	68	17	8
20	M14 x1,5 **x** 7	17.5	G1/8	61	90	32	17	26	79	91	122	88	20	11
32	M20 x 1,5 **x** 7	15.5	G1/8	86	122	50	20	28	97	117	145	118	22	14

04.02

Option External adjustable rubber bumpers

Dimensions
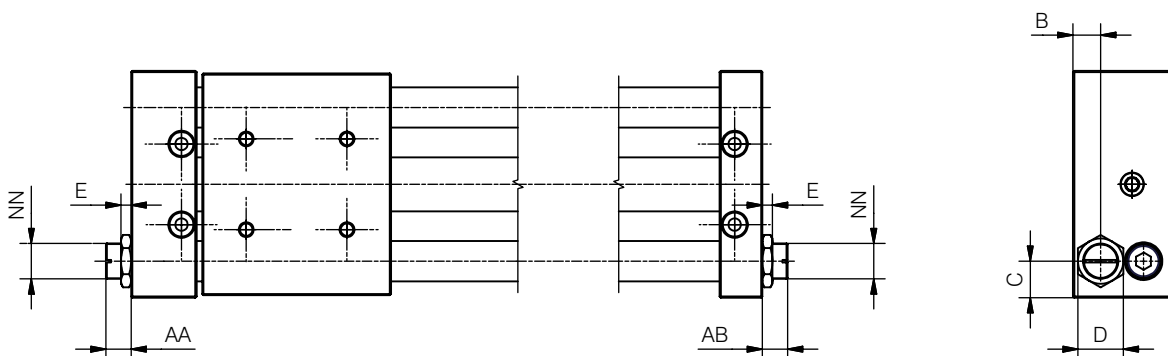
Ø	AA	AB	B	C	D	E	NN
16	7,5	6,5	12	10	14	4	M10 X 1
20	10	10	11	14,5	18	4	M14 X1,5
32	11	12	20	18	26	8	M20 X 1,5

Option External hydraulic shock absorbers

Loads / Speeds diagram

The opposite diagram points the P1Z cylinders maxi capacities.

If the cross-section point between speed and load is under the curves,

it is imperative to fit hydraulic shock absorbers to prevent cylinders

damage.
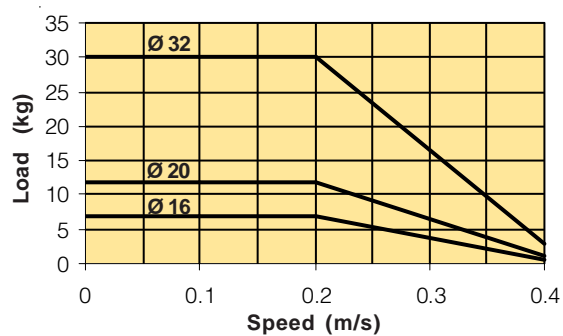
Example :

Say a Ø 32 mm cylinder with a 0,3 m/s speed and 25 kg load

Choose hydraulic shock absorbers option

Say a Ø 20mm cylinder with 0,2 m/s speed and 10 kg load

Choose rubber bumpers option

Option External hydraulic shock absorbers

Dimensions
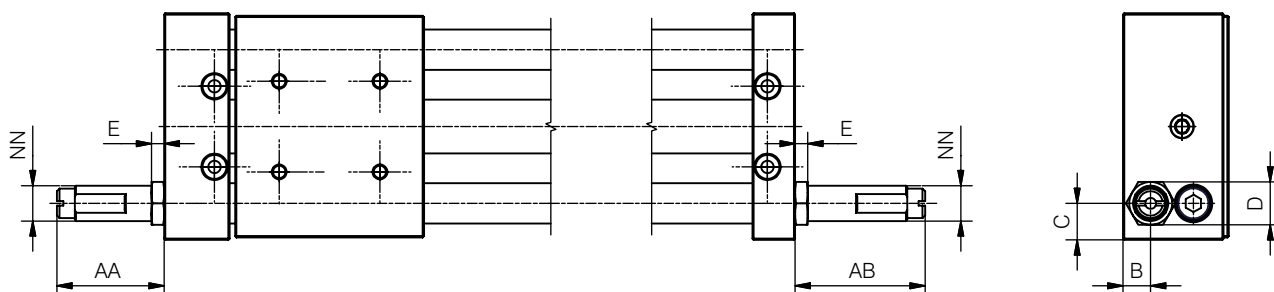
Ø	AA	AB	B	C	D	E	NN
16	18	27	12	10	13	3	M10 X 1
20	50	59	11	14,5	17	5	M14 X1,5
32	56	66	20	18	24	6	M20 X 1,5

Option Rail

Dimensions
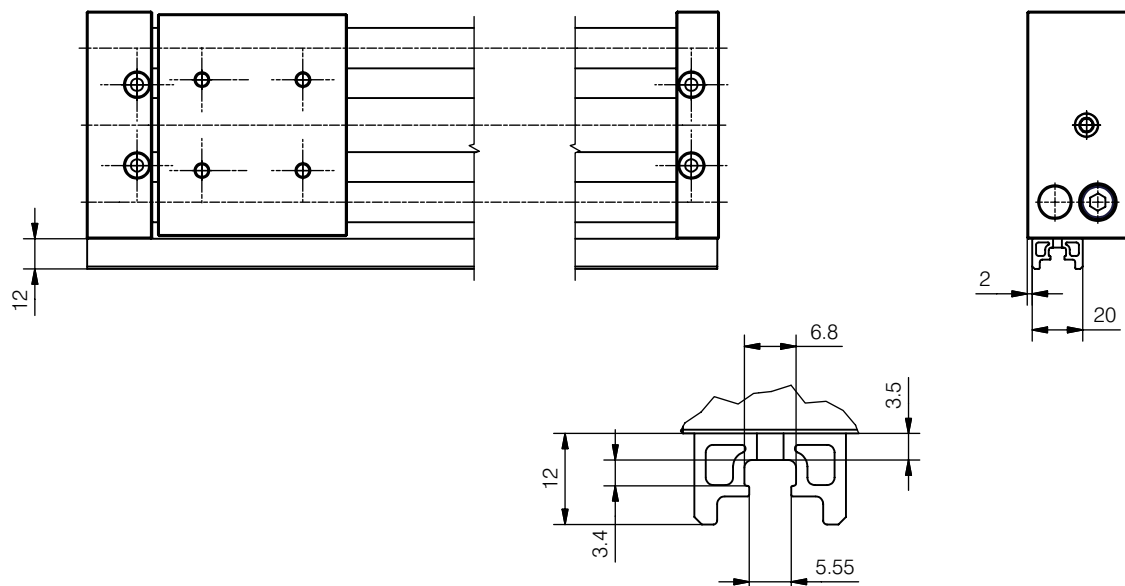
Valid for the 3 diameters

Detection

Reed switches and Sensors mounting is possible on one cylinder side only.
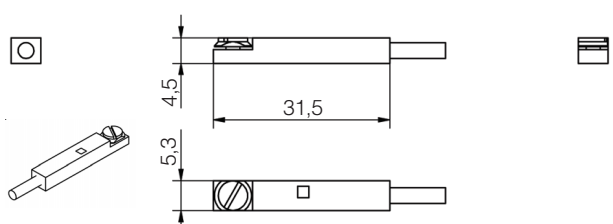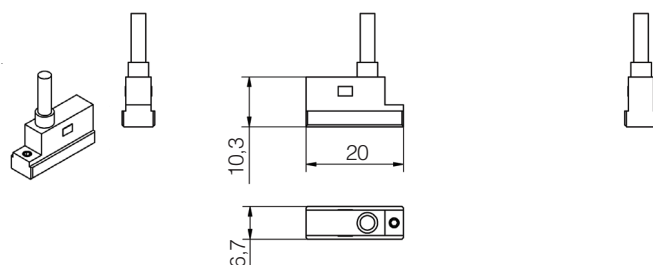
External aluminium profile integrates 1 T-slot.
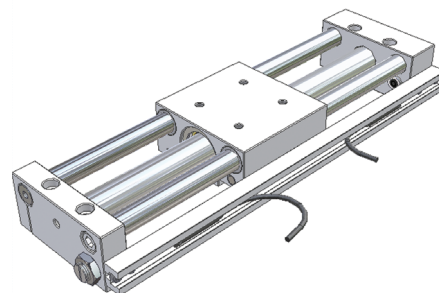
Dimensions (mm)
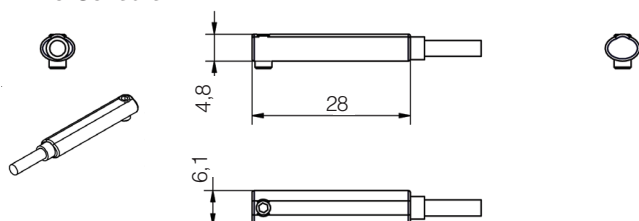
In-line Sensors

Switches or Sensors with connection at 90°

In-line Reed switches

Technical data

Magnetic switches (Reed)

Output function	Cable length (m)	Connection	Max. current (mA)	Voltage range (VCA/CC)	Mass (kg)	Protection number	Operating temperature (°C)	Order code
NO	0,3	at 90° with connector	100	10-120	0,005	IP 67	-25 to +75	**P8S-SRTHX**
NO	0,3	Straight with connector	100	10-120	0,005	IP 67	-25 to +75	**P8S-GSSHX**
NO	3,0	at 90° without connector	100	10-120	0,030	IP 67	-25 to + 75	**P8S-SRELX**
NO	3,0	Straight without connector	100	10-120	0,030	IP 67	-25 to +75	**P8S-GSFLX**

Magneto-inductive Sensors (PNP-NPN)   1 or 10 m cable upon request

Output function	Cable length (m)	Connection	Max. current (mA)	Voltage range (CC)	Mass (kg)	Protection number	Operating temperature (°C)	Order code
PNP, NO	0,3	at 90° with connector	150	10-30	0,005	IP 67	-25 to +75	**P8S-SPTHXD**
PNP, NO	0,3	Straight with connector	150	10-30	0,005	IP 67	-25 to +75	**P8S-GPSHX**
PNP, NO	3,0	at 90° without connector	150	10-30	0,030	IP 67	-25 to +75	**P8S-SPELXD**
PNP, NO	3,0	Straight without connector	150	10-30	0,030	IP 67	-25 to +75	**P8S-GPFLX**
NPN, NO	0,3	at 90° with connector	150	10-30	0,005	IP 67	-25 to +75	**P8S-SNTHX**
NPN, NO	0,3	Straight with connector	150	10-30	0,005	IP 67	-25 to +75	**P8S-GNSHX**
NPN, NO	3,0	Straight without connector	150	10-30	0,030	IP 67	-25 to +75	**P8S-GNFLX**

Standard version (15 positions)	Options (18 positions)

| P | 1 | Z | M | 0 | 1 | 6 | T | N | N | 0 | 5 | 0 | 0 | B | N | M | L |

Bore

16	Ø 16 mm
20	Ø 20 mm
32	Ø 32 mm

Cushioning

N	No stops**
C	Rubber bumpers
H	Hydraul. shock absorber

Strokes

0200	200 mm
1000	1000 mm

Cyl. Port type

B	BSP Ø 20 and 32
M	Metric (Ø 16)

Options

B	None
W	With options

End of stroke sensing

Reed	PNP	Sensors type (Qty : 2)
		In-line cable
L		With rail, no sensor
V	S	0,3 m **with** connector
R	C	3 m **without** connector

** Choose an external cushioning in case of very slow operating.

Ø	Strokes (mm)
16	0 to 750
20	0 to 1000
32	0 to 1500

Order code examples :

- **P1ZM016TCN0100B** cylinder bore 16 mm stroke 100 mm supplied with rubber bumpers without rail

- **P1ZM020THN1000WNBL** cylinder bore 20 mm stroke 1 m with hydraulic shock absorbers and rail for sensors
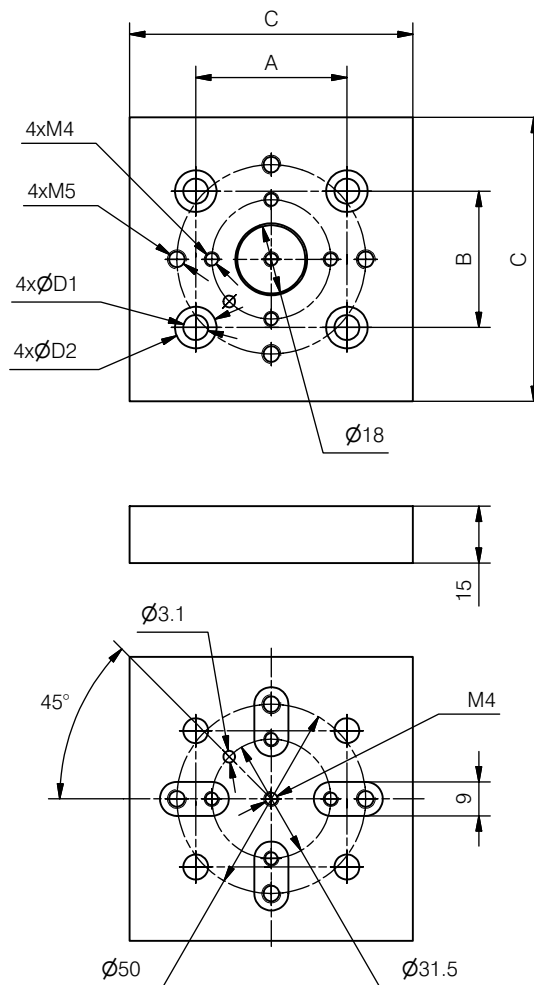
04.02

Interface with 3D® Modular range
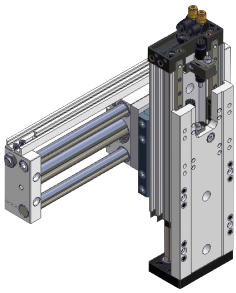
It is possible to have P1Z cylinder mounting arranged with modular units from 3D® Automation product range.

An interface is fitted between the mobile carriage and the mounting kit of the carried unit.

Possible 90° rotation of mounting kit

This plate can only be fitted on the guided version.

Carrier or carried mounting.

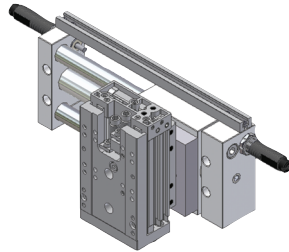| Ø	A	B	C	D1	D2	Order code
16	34	30	65	6.6	11x 6	**P5K-ZFB327**
20	40	36	75	5.5	10 x 7	**P5K-ZHB328**
32	60	50	90	9	15 x 9	**P5K-ZKB329**

Interface is supplied with :

      - mounting screws

      - centring sleeve

      - pin

Mounting arrangements
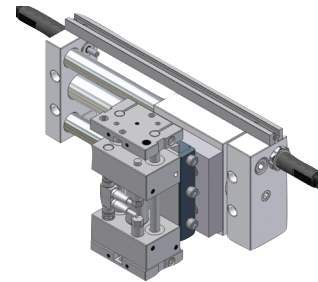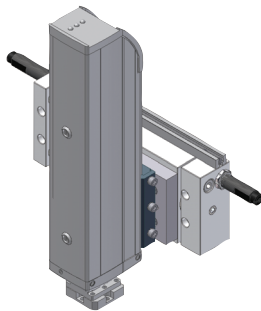
Precision Slide Tables mounting

Without flanges

With flanges
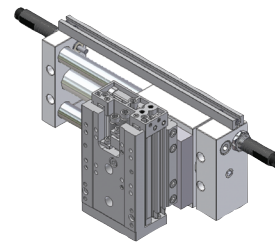
Fitted onto								
Ø	S12	S16	S20	S25	S12	S16	S20	S25
16	P5K-SDB204	●	●	●	P5K-SDD182	●	●	●
20	●	P5K-SFB205	●	●	●	P5K-SFD183	●	●
32	●	●	P5K-SHB206	P5K-SJB207	●	●	P5K-SHD184	P5K-SJD185

Linear or Short Strokes Units mounting

Fitted onto					
Ø	S1	S2	S3	SSU Ø 16	SSU Ø 25
16	P5K-L1D015	●	●	P5K-S1D121	●
20	●	P5K-L2D016	●	●	P5K-S2D122
32	●	●	P5K-L3D017	●	●

● Other mounting arrangements please consult factory

⚠ Check that loads and torques on the cylinder carriage do not overstep values mentioned in the previous pages..

Mounting and order examples :

- Choose the P5K-..... interface for mounting on a Ø 16 mm cylinder

- Choose the P5K-SDB204 mounting kit for mounting a size 12 Precision Slide Table with flanges onto a Ø 16 mm cylinder
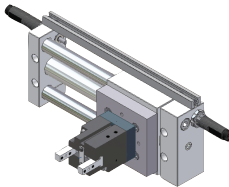
Mounting arrangements

Wrist Rotates mounting
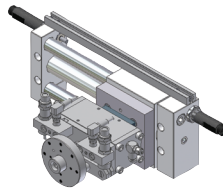
fitted onto Ø	WR2	WR3	WR4
16	P5K-W2F012	●	●
20	●	P5K-W3F013	●
32	●	●	P5K-W4F014

config. 1 Gripper mounting

fitted onto Ø	1	2	3	4	5	3H2
16	P5K-G1B000	P5K-G2B002	●	●	●	●
20	●	P5K-G2 B002	P5K-G3B004	●	●	P5K-G2B048
32	●	●	●	P5K-G4B006	P5K-G5B008	●

config. 2 Gripper mounting
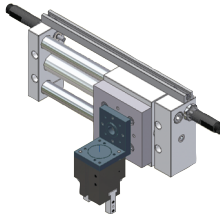
fitted onto Ø	1	2	3	4	5	3H2
16	P5K-G1F001	P5K-G2F003	●	●	●	●
20	●	P5K-G2F003	P5K-G3F005	●	●	P5K-G2F011
32	●	●	●	P5K-G4F007	P5K-G5F009	●

⚠ Check that loads and torques on the cylinder carriage do not overstep values mentioned in the previous pages.

Mounting and order example :

- Select the P5K-..... interface plate for mounting on a Ø 16 mm cylinder

- Select the P5K-G2B002 interface plate for mounting a size 2 conf. 1 Gripper on a Ø 16 mm cylinder

● Other mounting arrangements please consult factory

Spare parts

End of stroke rubber bumpers *(2 pieces)*

Ø	Order code
16	**9129609AS**
20	**9129610AS**
32	**9129611AS**

End of stroke hydraulic shock absorber *(1 piece)*

Ø	Order code
16	**MC 25 MH-NB-2358**
20	**MC 150 MH-B**
32	**SC 300 M-3 NB**

Flow controllers *(1 piece)*

Ø	Order code
16	**PTFL 8 PB4 M5**
20	**PTFL 4 PB6-1/8**
32	**PTFL 4 PB6-1/8**

Repair kits

Ø	Basic version	Guided version
16	**P1ZM016SNN-R**	**P1ZM016GNN-R**
20	**P1ZM020SNN-R**	**P1ZM020GNN-R**
32	**P1ZM032SNN-R**	**P1ZM032GNN-R**