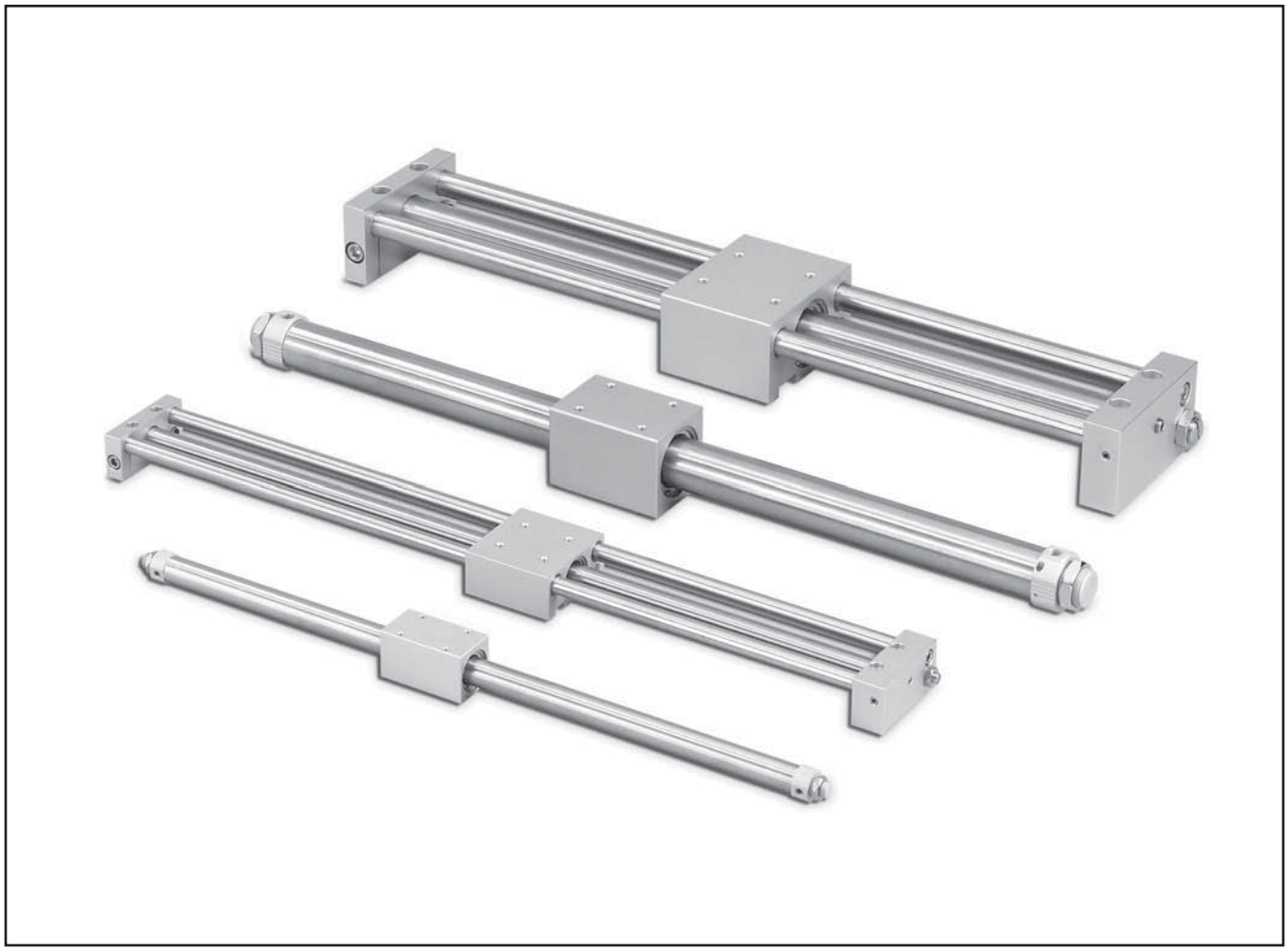
P1Z Series

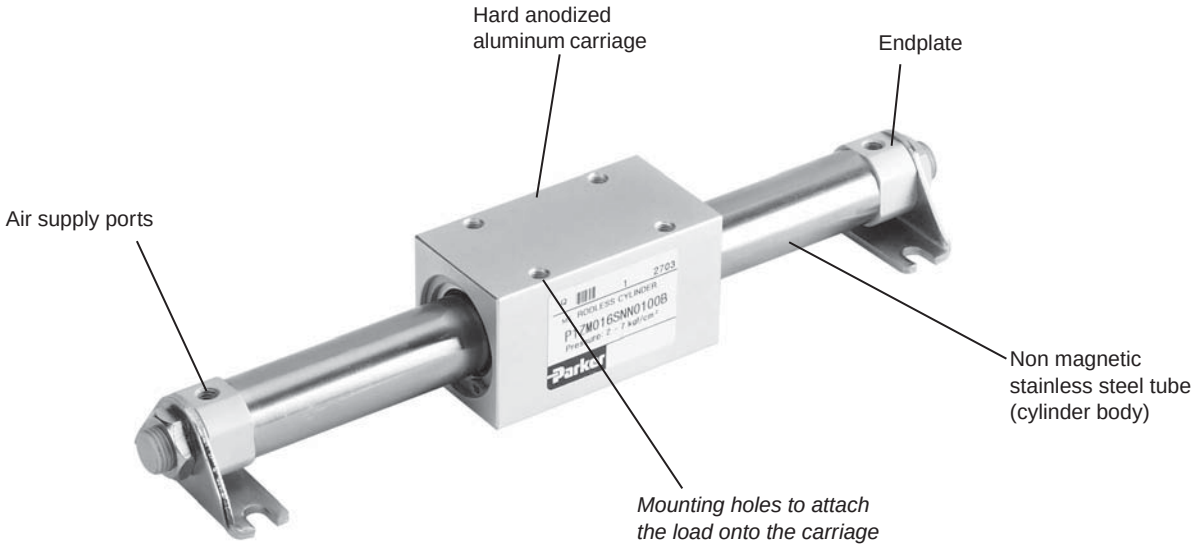
Magnetically Coupled Rodless Air Cylinders

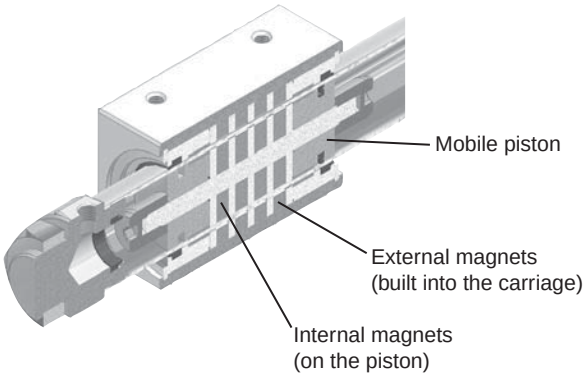


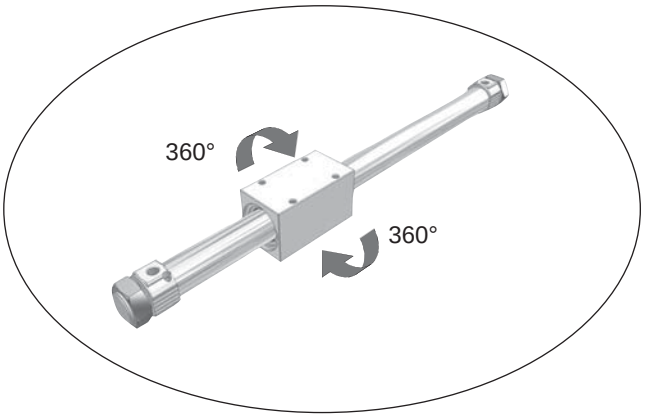
Contents

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

Basic Version







G

Description

The magnetic rodless cylinder is a pneumatic cylinder featuring a mobile piston fitted with annular magnets.

The mobile carriage is also equipped with magnets to provide magnetic coupling between the piston and carriage.

It incorporates the following features:

- end of stroke cushioning/bumpers
- mounting:
  - threaded endcaps
  - optional foot mount
  - optional flange mount

Cushioning

Ø 16 mm: non-adjustable bumper or adjustable pneumatic cushioning

Ø 20 and 32 mm: adjustable pneumatic cushioning

Mounting

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

The load must be guided by an external device.

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

C347

Standard cylinder (15 positions)	Options (16 positions)

P 1 Z M 0 1 6 S N N 0 5 0 0 B F M N

Bore

016	Ø 16 mm
020	Ø 20 mm
032	Ø 32 mm

Cushioning

N	None (Ø 16 only)
A	Adjustable Cushions

Strokes

0200	200 mm
1000	1000 mm

Mounting Kit*

F	Footmount
L	Flanges
N	None (std.)

Options *

B†	None
W	With options

†Standard when "B" option is used.

Ports

M†	Metric (Ø16 only)
B†	BSPP (Ø20 & 32)
R	BSPT (Ø20 & 32)
N	NPTF (Ø20 & 32)

*** Cylinders are supplied with mounting nuts fitted on each endplate.**

Ø	**Stroke** (mm)	(in)
16	0 to 1000	0 to 39.4
20	0 to 1500	0 to 59.1
32	0 to 2000	0 to 78.7

Order code examples:

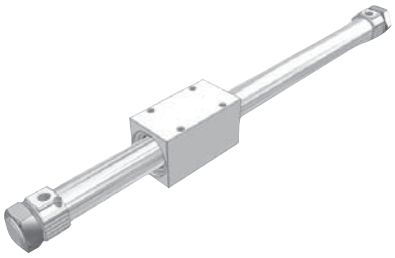
- **P1ZM016SNN0100B** Ø 16 mm bore 100 mm stroke cylinder supplied with mounting nut on each endplate
- **P1ZM020SAN1000WFBN** Ø 20 mm bore 1 m stroke cylinder with foot mount on each endplate

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

General Features

Magnetic Rodless cylinder, basic version

Available in 3 bores with stroke lengths up to 2000 mm.
Adjustable air cushioning is available on all cylinders.
The load is fixed onto the mobile carriage by 4 tapped holes.
The cylinder is attached by the ends with jam nuts, flanges or foot mounts.



Specifications for P1Z Series Magnetically Coupled Rodless

Operating Medium	Compressed Air		
Maximum Pressure - Bar (PSI)	7 (100)		
Minimum Pressure - Bar (PSI)	2 (29)		
Bore Size mm (inch nominal)	16 (5/8)	20 (3/4)	32 (1 1/4)
Port Size	M5 BSPP, 10-32 NPT	1/8 BSPP, 1/8 NPT	1/8 BSPP, 1/8 NPT
Ambient Temperature °F (°C)	15 to 140°F (-10 to 160°C)		
Maximum Stroke mm (inch)	1000 (39.4)	1500 (59.1)	2000 (78.7)
Stroke Tolerance mm	+1.5/-0	<=1000 +1.5/-0; >1000 +2/-0	
Piston Speed m/s (inch/sec)	0.1 to 0.4 (4 to 15.75)		
Max. Coupling Force N (Lbs)	157 (35)	236 (53)	703 (158)
Cushion	Air Cushion Standard		
Lubrication	Not Required (If you choose to lubricate your system, continuing lubrication will be required.)		

G

Technical Data

Bore Size		Weights			
		Weight at Zero Stroke		Weight per 25mm of Stroke	
mm	inch	kg	lbs	kg	lbs
16	5/8	0.28	0.62	0.01	0.02
20	3/4	0.46	1.01	0.02	0.05
32	1-1/4	1.35	2.98	0.04	0.08

Conditions of Use

If external lubrication is added, 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

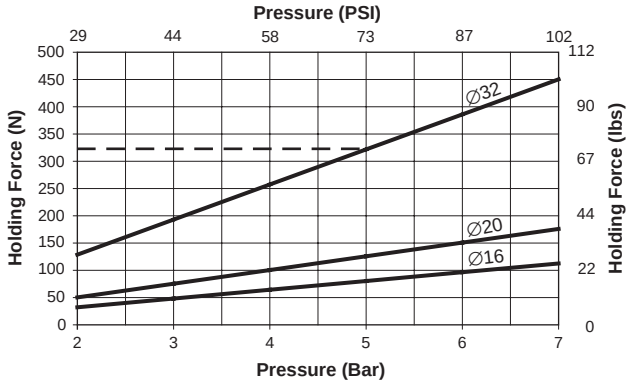
For best possible service life and trouble-free operation, ISO 8573-1. quality class 3.4.3 should be used. This means 5 µm filter (standard filter), dew point +3°C for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m³, which is what a standard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

ISO 8573-1 Quality Classes

Quality Class	Max. Pollution		Water	Oil
	particules 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	–

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

Pressure in the Cylinder / Pneumatic Holding Force



Example:

Pressure: 5 bar

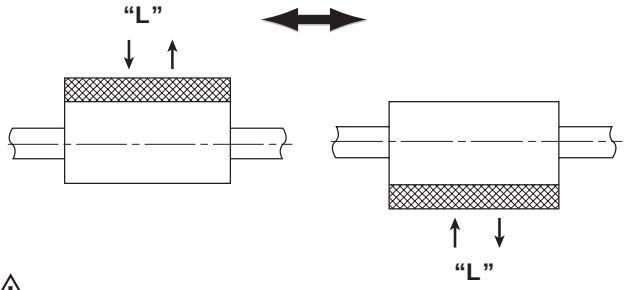
F_{max} = 322 N for Ø 32 mm cylinder

⚠ Calculate the kinetic energy due to the load moved

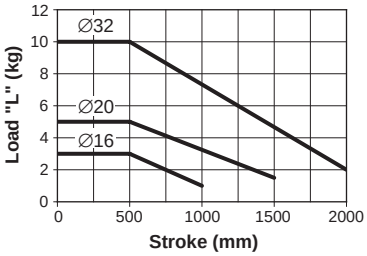
Acceleration or deceleration should not exceed the magnetic coupling force of cylinder

Load Diagrams

Permissible radial loads, horizontal mounting

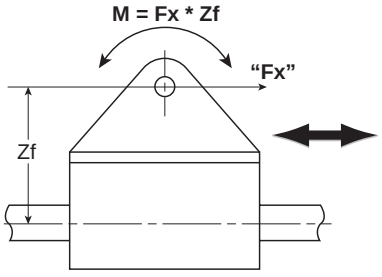


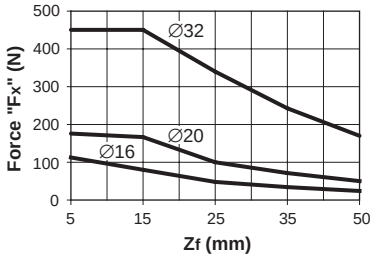
⚠ The load must be guided by a device from outside the cylinder



Ø	L Max. (kg)	(lbs.)
16	3	6.6
20	5	11.0
32	10	22.0

Permissible axial loads, horizontal mounting



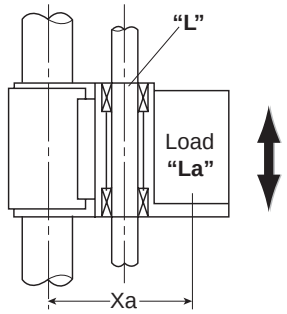


Ø	Max. Moment M (Nm)	(in-lbs.)	Max. Fx* (N)	(lbs.)
16	1.2	11	112	25
20	2.5	22	175	39
32	8.5	75	450	101

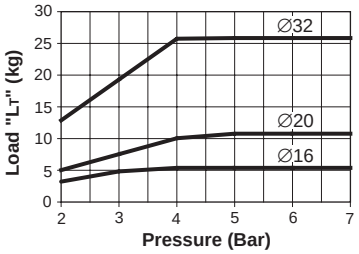
***** at 7 bar

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

Permissible axial loads, vertical mounting



* If force due friction is unknown, use 0.1 × (L + La).



Ø	Max. load T (kg)	(lbs.)	Max. XA (mm)	(in.)
16	5	11	122	4.8
20	10	22	142	5.6
32	24	53	174	6.8

***** at 6.5 bar

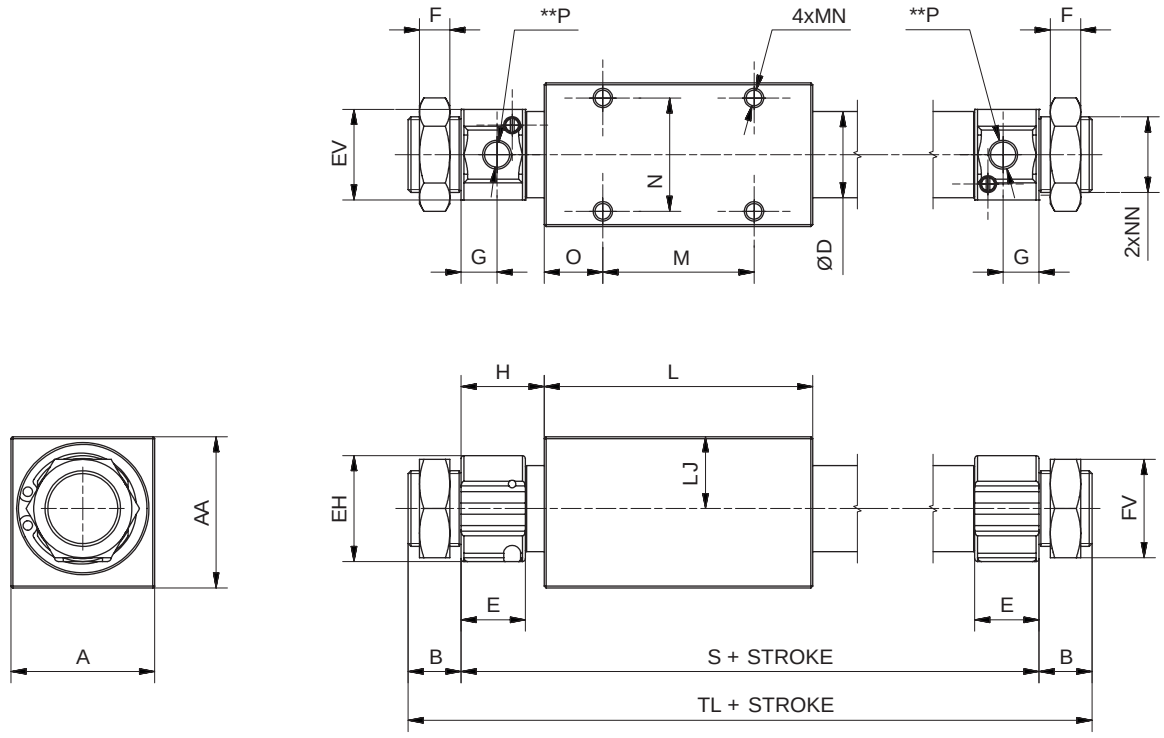
L = Load guided by external device
La = Direct mounting onto the cylinder
Ff = Force due to friction*

L_T = Load weight + guiding device weight + force due to friction

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

Dimensions

****** = Air supply Ports

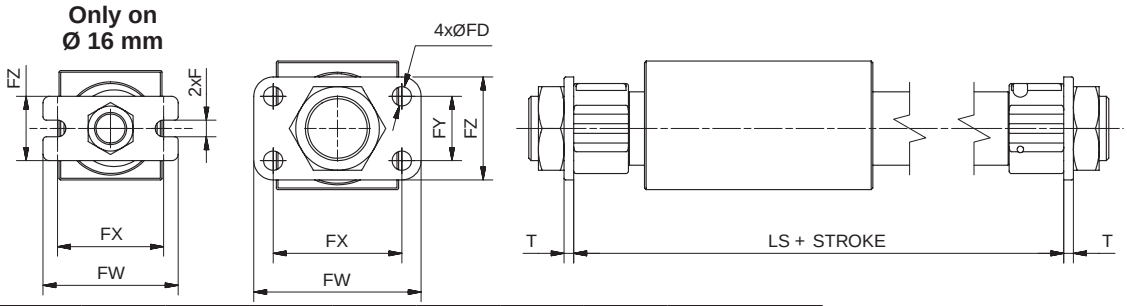


Ø	A	AA	B	ØD	E	Ø EH	Ø EV	F	FV	G	H	L	LJ	M	N	O
16	32 (1.26)	34 (1.34)	10 (0.39)	18 (0.71)	11 (0.43)	18 (0.71)	18 (0.71)	4 (0.16)	14 (0.55)	5.5 (0.22)	15.5 (0.61)	61 (2.40)	16 (0.63)	34 (1.34)	25 (0.98)	13.5 (0.53)
20	38 (1.50)	40 (1.57)	14 (0.55)	22.8 (0.90)	17 (0.67)	28 (1.10)	24 (0.94)	8 (0.31)	26 (1.02)	9.5 (0.37)	22 (0.87)	71 (2.80)	19 (0.75)	40 (1.57)	30 (1.18)	15.5 (0.61)
32	60 (2.36)	60 (2.36)	16 (0.63)	35 (1.38)	17 (0.67)	40 (1.57)	36 (1.42)	8 (0.31)	32 (1.26)	9.5 (0.37)	23 (0.91)	87 (3.43)	30 (1.18)	50 (1.97)	40 (1.57)	18.5 (0.73)

Ø	P	MN	NN	S	TL
16	M5 x 0.8 (10-32)	M4 x 0.7 x 6	M10 x 1 x 6	92 (3.62)	112 (4.41)
20	G 1/8 (1/8)	M5 x 0.8 x 8	M20 x 1.5 x 7	115 (4.53)	143 (5.63)
32	G 1/8 (1/8)	M6 x 1 x 10	M26 x 1.5 x 7	133 (5.24)	165 (6.50)

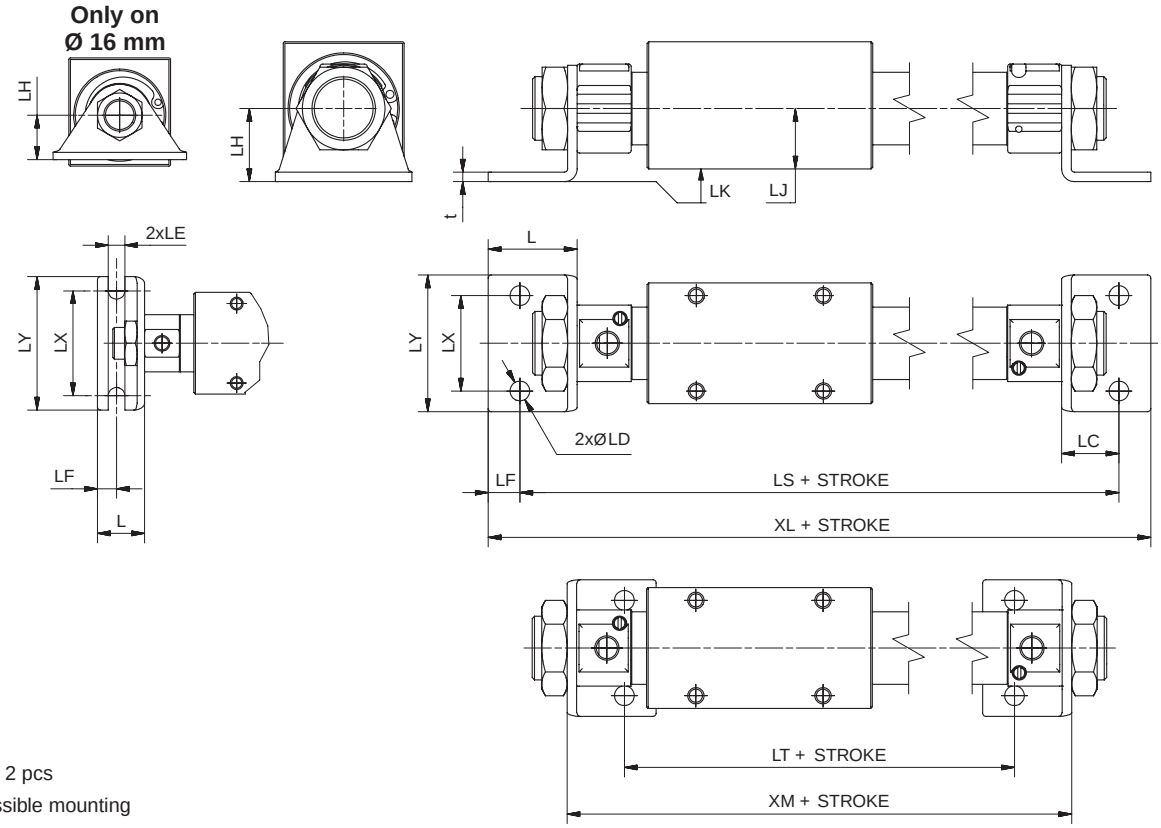
Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

Mountings
Flanges



Ø	F	ØFD	FW	FX	FY	FZ	T	LS	Order Code
16	5.2 (0.20)	–	42 (1.65)	33 (1.30)	–	20 (0.79)	2.3 (0.09)	92 (3.62)	**PDC15-FH**
20	–	6 (0.24)	52 (2.05)	40 (1.57)	20 (0.78)	32 (1.26)	3 (0.12)	115 (4.53)	**PK1A20-FH**
32	–	7 (0.28)	80 (3.15)	64 (2.52)	28 (1.10)	44 (1.73)	5 (0.20)	133 (5.24)	**PK1A25-FH**

Brackets



* Set of 2 pcs

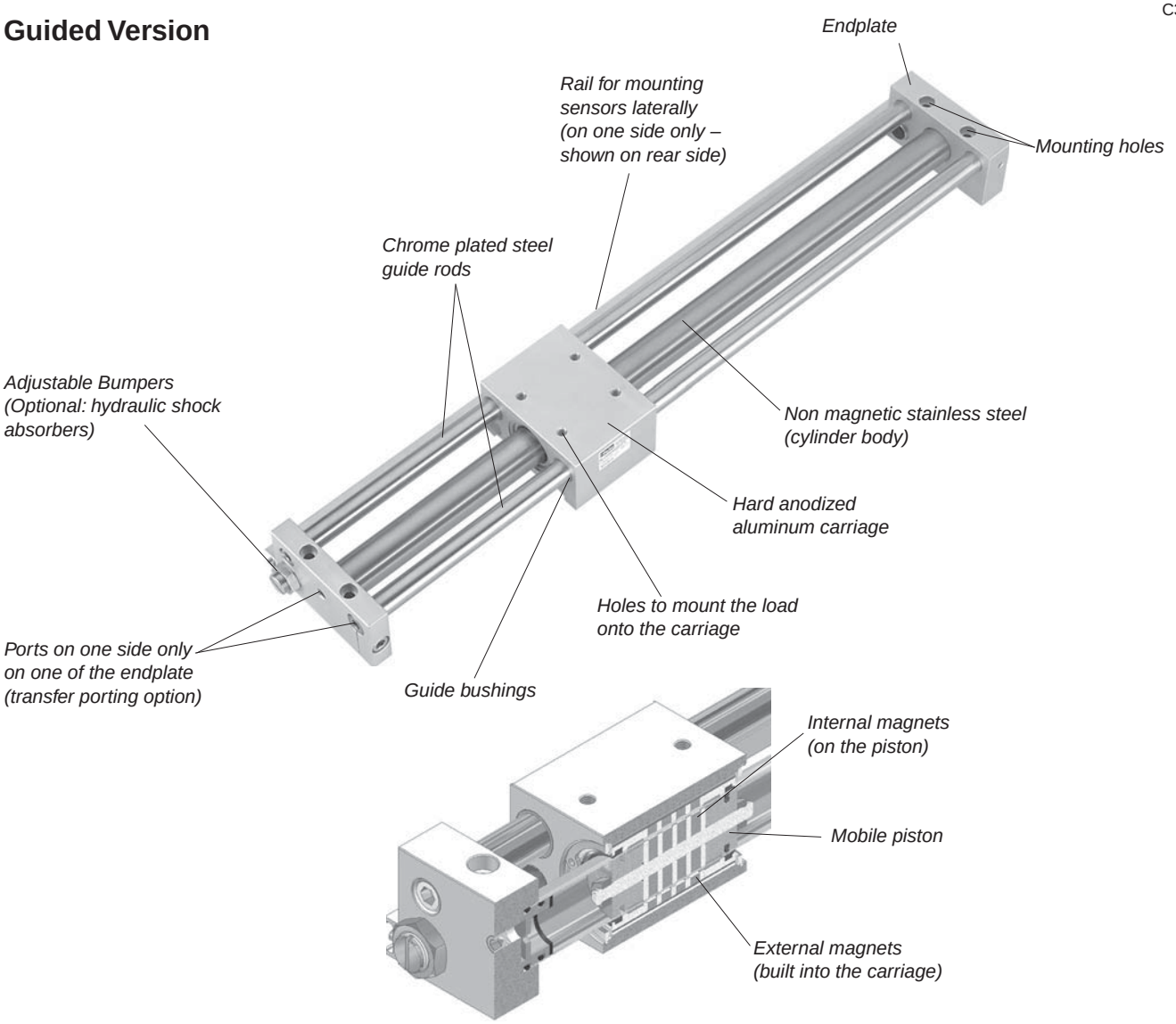
** Impossible mounting

Ø	t	L	LC	ØLD	LE	LF	LH	LJ	LK	LX	LY	LS	LT	XL	XM	Order Code
16	2.3 (0.09)	14.8 (0.58)	8.8 (0.35)	–	5.2 (0.20)	6 (0.24)	14 (0.55)	16 (0.63)	-2 (-0.08)	33 (1.30)	42 (1.65)	109.6 (4.32)	79 (3.11)	121.6 (4.79)	96.6 (3.80)	**PDC15-LB***
20	3 (0.12)	28 (1.10)	18 (0.71)	6.2 (0.24)	–	10 (0.39)	23 (0.91)	19 (0.75)	4 (0.16)	30 (1.18)	43 (1.69)	151 (5.94)	85 (3.35)	171 (6.73)	121 (4.76)	**PK1A20-LB***
32	3 (0.12)	35 (1.38)	23 (0.91)	7 (0.28)	–	12 (0.47)	30 (1.18)	30 (1.18)	0 (0)	46 (1.81)	62 (2.44)	179 (7.05)	**	203 (7.99)	**	**PK1A25-LB***

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

C347

Guided Version



G

Description

The magnetic rodless cylinder is a pneumatic cylinder featuring a mobile piston with annular magnets.

The mobile carriage is also equipped with magnets to give magnetic coupling between the piston and carriage. The carriage slides along the main tube and is guided by two guide rods.

It incorporates the following features:

- Built-in guide rods
- Adjustable end-of-stroke bumpers
- Optional magnetic piston sensing
- Optional transfer porting

Guidance

The guided version consists of a carriage fitted with 4 plain bearings, guided on 2 rods.

This design provides high rigidity, accurate guidance and smooth movement of the carriage.

End of Stroke

Each endplate can be fitted with an adjustable bumper or self-compensating shock absorbers.

Optional transfer porting

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

Options

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

- ***External bumpers:*** when low operating pressure, light loads and short strokes.
- ***External hydraulic shock absorbers:*** recommended for arduous applications.
- ***Reed and solid state sensors:*** provide sensing at an adjustable position along the entire stroke of the cylinder.

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

C347

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

016	Ø 16 mm
020	Ø 20 mm
032	Ø 32 mm

Function

G	Guided
T	Guided with transfer porting

Cushioning

N	No stops**
C	Adjustable stop
H	Hydraul. shock absorber

Strokes

0200	200 mm
1000	1000 mm

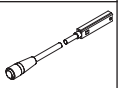
Options

B†	None
W	With options

Cyl. Port type

M†	Metric (Ø 16 only)
B†	BSP (Ø 20 and 32)
R	BSPT (Ø 20 and 32)
N	NPTF (Ø 20 and 32)

End of stroke sensing

NPN	PNP	Reed	Sensors type (Qty: 2)
	L		With rail, no sensor
D	**K**	**S**	0.3 m **with** 8mm connector 
A	**H**	**C**	3 m flying leads 
F	**U**	**B**	10 m flying leads
G	**W**	**E**	0.3 m **with** M12 connector
	N† **(std.)**		No sensor rail
	P		Proximity sensor in end caps

†Standard when "B" option is used.

****** Do not exceed coupling force on deceleration.

Ø	**Maximum Strokes** (mm)	(in.)
16	0 to 750	0 to 29.5
20	0 to 1000	0 to 39.4
32	0 to 1500	0 to 59.1

Order code examples:

- **P1ZM016GCN0100B** 16 mm bore, 100 mm stroke cylinder supplied with adjustable stop
- **P1ZM020GHN1000WNBL** 20 mm bore, 1 m stroke cylinder supplied with hydraulic shock absorbers and rail for sensors

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

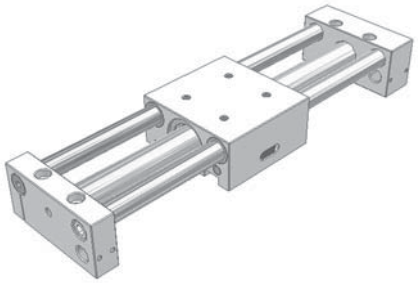
Range

Magnetic Rodless Cylinder, guided version

Available in 3 diameters with possible strokes up to 1500 mm (59 in).

4 tapped mounting holes on the carriage.

Endcap mounting provided by 4 tapped and counterbored holes.



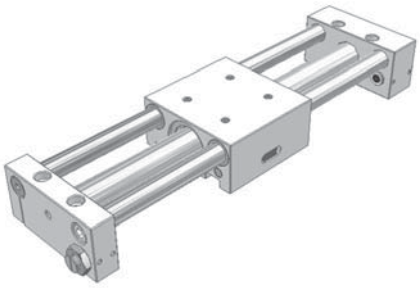
Options

External adjustable bumpers

Can be fitted on cylinder endcaps and provide noise reduction and adjustment at the end of stroke.

Used when light loads and short strokes.

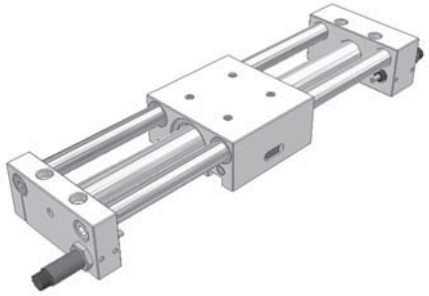
Pneumatic air supply on one side only (transfer porting option).



External hydraulic shock absorbers

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

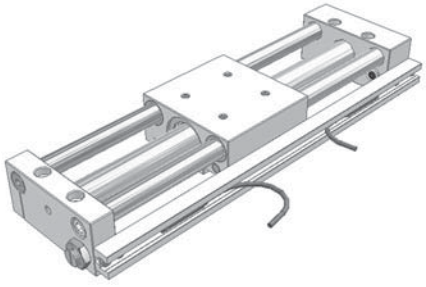
They are recommended for arduous applications.



Reed or Solid State Sensors:

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

The rail is located on same side as the end of stroke stops.



Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

General Features

Specifications for P1Z Series Magnetically Coupled Rodless

Operating Medium	Compressed Air		
Maximum Pressure Bar (PSI)	7 (100)		
Minimum Pressure Bar (IPS)	2 (29)		
Bore Size mm (inch nominal)	16 (5/8)	20 (3/4)	32 (1 1/4)
Port Size	M5 BSPP, 10-32 NPT	1/8 BSPP, 1/8 NPT	1/8 BSPP, 1/8 NPT
Ambient Temperature °F (°C)	15 to 140°F (-10 to 160°C)		
Maximum Stroke mm (inch)	750 (29.5)	1000 (39.4)	1500 (59.1)
Stroke Tolerance mm	+1.5/-0	<=1000 +1.5/-0; >1000 +2/-0	
Piston Speed m/s (inch/sec)	0.1 to 0.4 (4 to 15.75)		
Max. Coupling Force N (Lbs)	157 (35)	236 (53)	703 (158)
Cushion	Air Cushion Standard		
Lubrication	Not Required (If you choose to lubricate your system, continuing lubrication will be required.)		

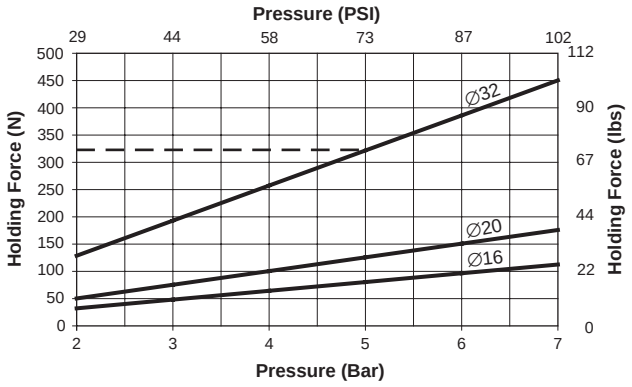
Bore Size		Weights			
		Weight at Zero Stroke		Weight per 25mm of Stroke	
mm	inch	kg	lbs	kg	lbs
16	5/8	0.9	1.98	0.05	0.11
20	3/4	1.52	3.35	0.08	0.17
32	1-1/4	3.63	8.00	0.13	0.29

Options

Function	Description
Detection	Sensors mounting in T-slot
	Reed or solid state sensors (PNP or NPN)
External rubber bumpers	Supplied pre-fitted in endplates if chosen
Hydraulic shock absorbers	Self-compensating shock absorbers supplied pre-fitted in endplates if chosen

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

Pressure in the Cylinder / Pneumatic Holding Force



Example:

Pressure: 5 bar (73 PSI)

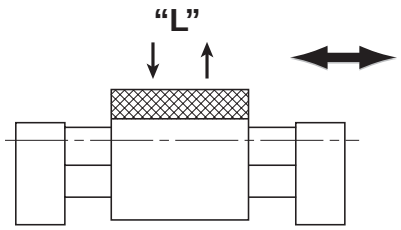
F_{max} = 322 N (72 lbs.) for Ø 32 mm cylinder

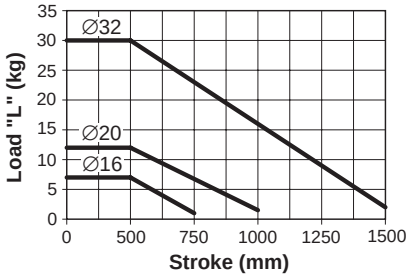
⚠ Calculate the kinetic energy due to the load moved.

Acceleration or deceleration should not exceed the magnetic coupling force of cylinder.

Load Diagrams

Permissible radial loads, horizontal mounting

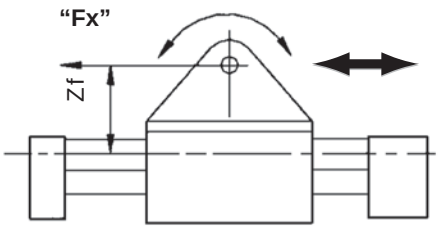




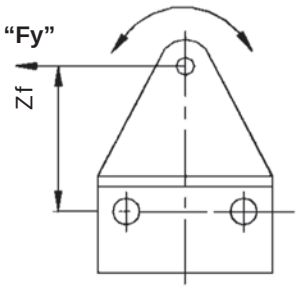
Ø	Max. L (kg)	(lbs.)
16	7	15
20	12	26
32	30	66

Permissible axial loads, horizontal mounting

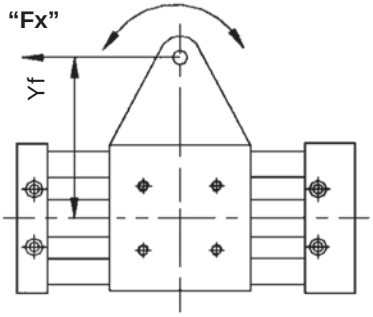
M = Fx * Zf



Ms = Fy * Zf



Mv = Fx * Yf



Ø	Max. moment M (Nm)	(in-lbs.)	Max. moment Ms (Nm)	(in-lbs.)	Max. moment Mv (Nm)	(in-lbs.)
16	2.4	21	0.5	4.4	2.4	21
20	5	44	1	8.9	5	44
32	15	133	3	26.6	15	133

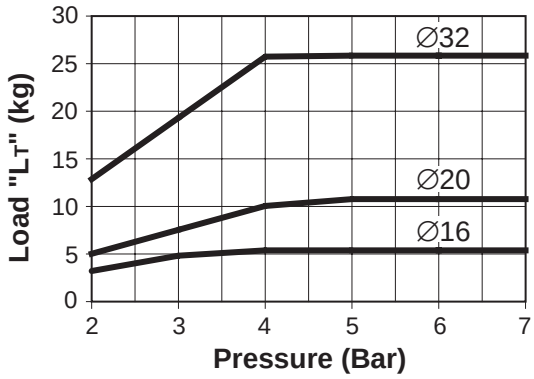
Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

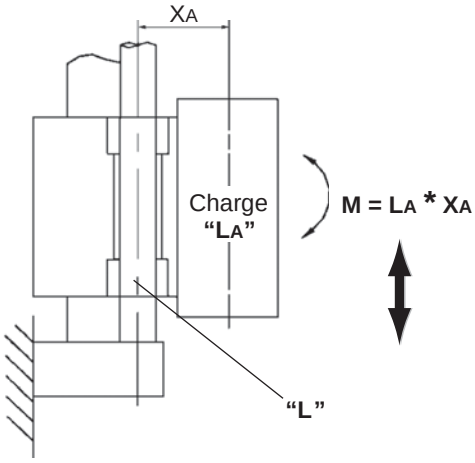
Loads Diagram

Permissible axial loads, vertical mounting

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

***** at 6.5 bar





L = Load guided by external device

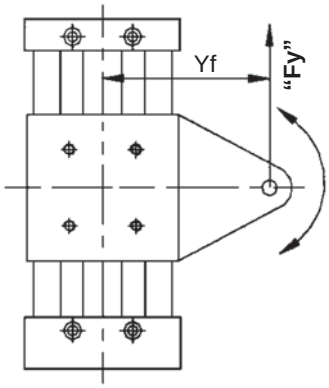
L_A = Mounting direct onto cylinder

L_T = Load weight + guiding device weight + force due to friction

Ff* = Force due to friction

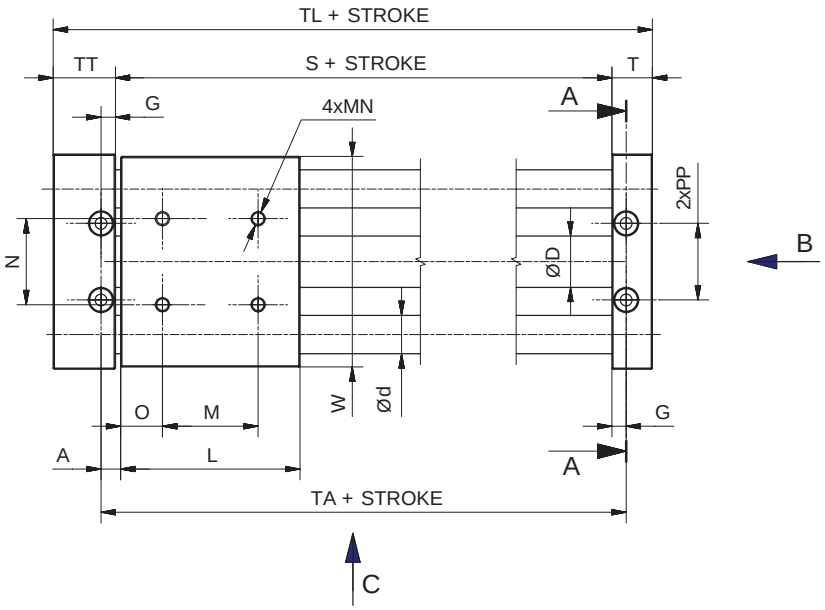
*If force due to friction is unknown, use 0.1 * (L + L_A)

Mv = Fy * Yf

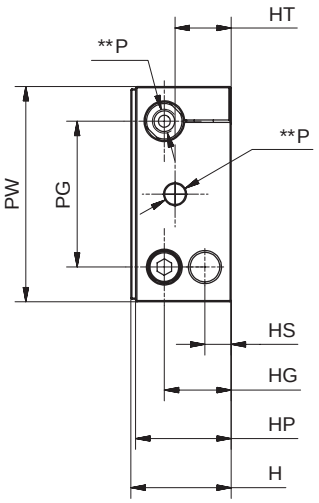


Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

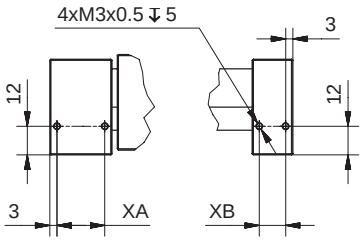
Dimensions



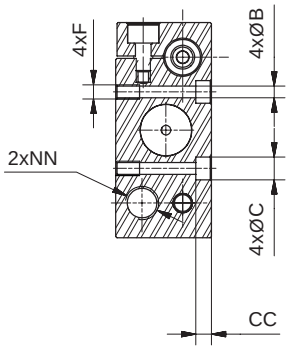
According to B view



According to C view



A-A



** = Air supply ports

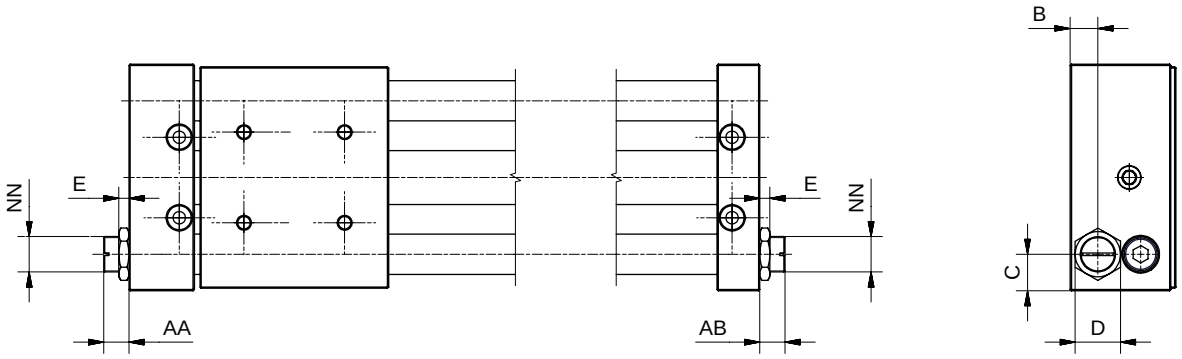
Ø	A	ØB	ØC	CC	ØD	Ød	F	G	H	HP	HG	HS	HT	L	M	N	MN
16	8 (.31)	4.3 (.17)	8 (.31)	4.5 (.18)	17.4 (.69)	12 (.47)	M5x0.8 x 10	6 (.24)	34 (1.34)	33.5 (1.32)	25 (0.98)	12 (.47)	21.5 (0.85)	65 (2.56)	34 (1.34)	30 (1.18)	M5 x 0.8 x 8
20	8 (.31)	5.5 (.22)	9.5 (.37)	6.5 (.26)	21.4 (.84)	16 (.63)	M6x1 x 10	6 (.24)	42 (1.65)	40 (1.57)	28 (1.10)	12 (.47)	23.5 (.93)	75 (2.95)	40 (1.57)	36 (1.42)	M6 x 1 x 10
32	13.5 (.53)	8.7 (.34)	14 (.55)	8 (.31)	33.6 (1.32)	20 (.79)	M10x1.5 x 15	10 (.39)	66 (2.60)	64 (2.52)	46 (1.81)	20 (.79)	41 (1.61)	91 (3.58)	60 (2.36)	50 (1.97)	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 (0.61)	M5 x 0.8	50 (1.97)	70 (2.76)	27 (1.06)	14 (0.55)	23 (0.91)	69 (2.76)	81 (3.19)	106 (4.17)	68 (2.68)	17 (0.67)	8 (0.31)
20	M14 x1.5 x 7	17.5 (0.69)	G1/8	61 (2.40)	90 (3.54)	32 (1.26)	17 (0.67)	26 (1.02)	79 (3.11)	91 (3.58)	122 (4.80)	88 (3.46)	20 (0.79)	11 (0.43
32	M20 x 1.5 x 7	15.5 (0.61)	G1/8	86 (3.39)	122 (4.80)	50 (1.97)	20 (0.79)	28 (1.10)	97 (3.82)	117 (4.61)	145 (5.71)	118 (4.65)	22 (0.87)	14 (0.55)

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

Optional External Adjustable Bumpers

Dimensions



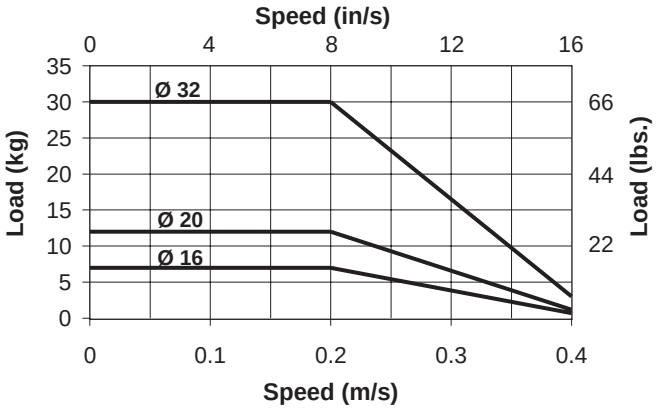
Ø	AA	AB	B	C	D	E	NN
16	7.5 (0.30)	6.5 (0.26)	12 (0.47)	10 (0.39)	14 (0.55)	4 (0.16)	M10 x 1
20	10 (0.39)	10 (0.39)	11 (0.43)	14.5 (0.57)	18 (0.71)	4 (0.16)	M14 x 1.5
32	11 (0.43)	12 (0.47)	20 (0.79)	18 (0.71)	26 (1.02)	8 (0.31)	M20 x 1.5

External Hydraulic Shock Absorbers

Loads / Speeds diagram

The diagram to the right exhibits the P1Z cylinders maximum capacities with an adjustable bumper.

If the intersection exhibits between speed and load is above the curves, it is imperative to use hydraulic shock absorbers to prevent cylinder damage.



Example:

Ø 32 mm cylinder with a 0.3 m/s speed and 25 kg load

Choose the hydraulic shock absorber option

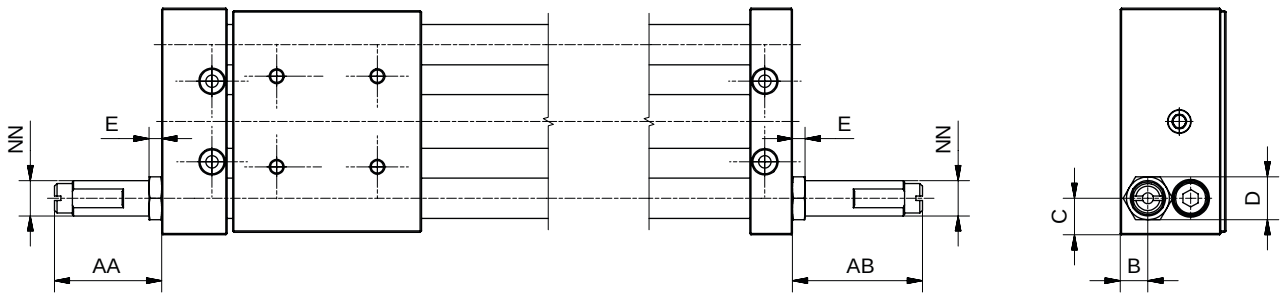
Ø 20mm cylinder with 0.2 m/s speed and 10 kg load

Choose the adjustable bumpers option

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

Optional External Hydraulic Shock Absorbers

Dimensions

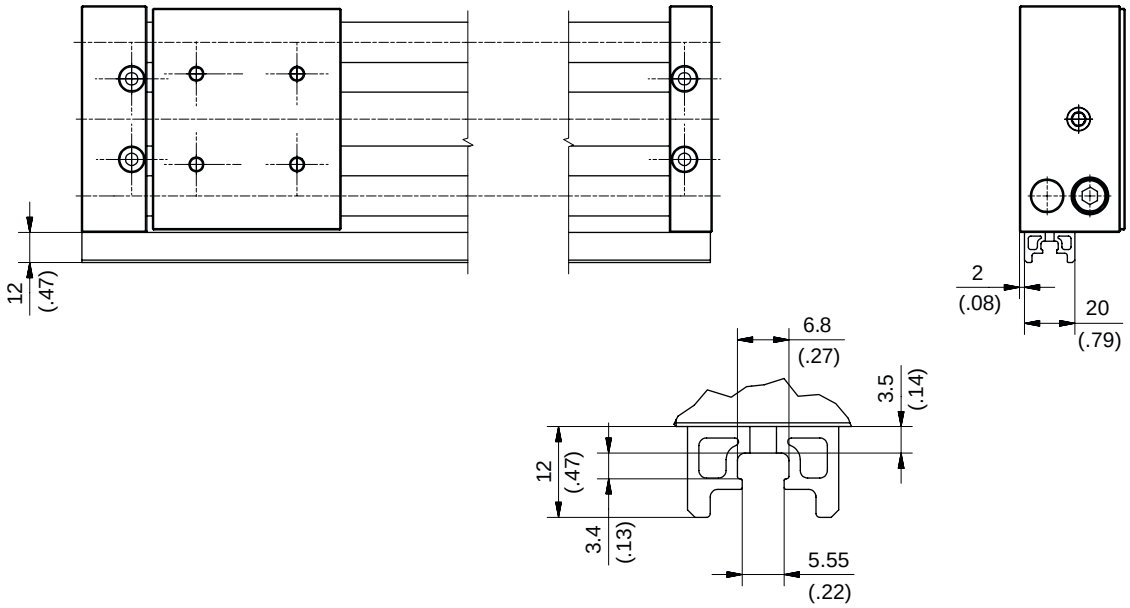


Ø	AA	AB	B	C	D	E	NN
16	18 (0.71)	27 (1.06)	12 (0.47)	10 (0.39)	13 (0.51)	3 (0.12)	M10 x 1
20	50 (1.97)	59 (2.32)	11 (0.43)	14.5 (0.57)	17 (0.67)	5 (0.20)	M14 x 1.5
32	56 (2.20)	66 (2.60)	20 (0.79)	18 (0.71)	24 (0.94)	6 (0.24)	M20 x 1.5

G

Optional Sensor Rail

Dimensions

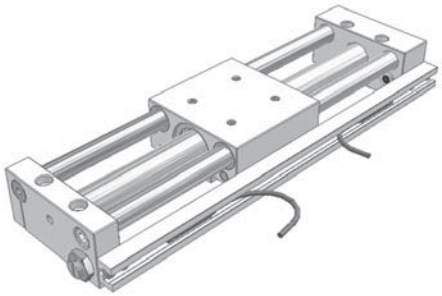


Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

Detection

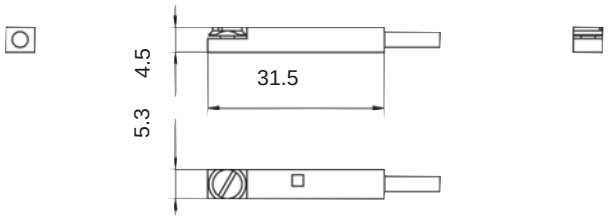
Reed or Solid State Sensor mounting is possible on one cylinder side only.

External aluminum profile integrates 1 T-slot for sensor mounting.

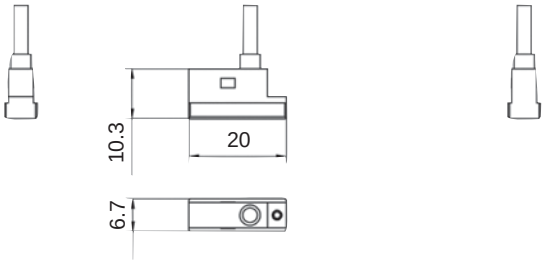


Dimensions (mm)

Drop-in Global Sensor



Sensors with connection at 90°



Technical Data (see Electronic Sensors Section)

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless

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	**MC25MH-NB**
20	**MC150MH**
32	**SC300M-3 NB**

G

Flow Controls *(1 piece)*

Ø	Order Code		
	BSP Ports	**NPT Ports**	**Metric Ports**
16	**–**	**–**	**0876300300**
20	**PTFL4PB6-1/8**	**0876300400**	**–**
32	**PTFL4PB6-1/8**	**0876300400**	**–**

Repair Kits

Ø	Basic Version	Guided Version
16 (Cushioned)	**P1ZM016SAN-R**	**–**
16 (Non-cushioned)	**P1ZM016SNN-R**	**P1ZM016GNN-R**
20	**P1ZM020SAN-R**	**P1ZM020GNN-R**
32	**P1ZM032SAN-R**	**P1ZM032GNN-R**

Parker Hannifin Corporation
Parker-Origa
Glendale Heights, Illinois
www.parker.com/pneu/rodless