

RODLESS CYLINDER

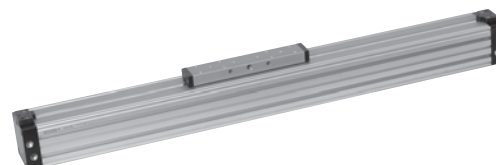
Series A404

Cat No A404 - 01 - 01 - B

RODLESS CYLINDER - Ø18, 25, 32, 40, 50 mm

Features

- ☐ High strength aluminium extrusion
- ☐ With magnetic piston for position sensing
- ☐ Adjustable cushioning at both ends
- ☐ Piston Ø18, 25, 32, 40, 50 mm
- ☐ Air connection can be given in any one of the three sides
- ☐ Inlet & outlet air connection at one end possible
- ☐ Can be installed in any position



Application

This long stroke space saving actuator is widely used for cutting application in Textile, Plastic & Paper, for wiping in pad printing / sorting machines, Door opening / closing etc...

Technical Specifications

Bore dia	(mm)	18	25	32	40	50
Cushion length	(mm)	11.5	14	18	30	
Standard strokes *	(mm)	10 to 2900				
Medium		Compressed air - Filtered & Non-lubricated				
Working pressure		2 to 8 bar				
Ambient temperature		-10° to +60° C				
Medium temperature		+5° to +50° C				
Magnetic sensor		AM42 (Magnetic sensor details, refer Janatics Pneumatic Actuators catalogue page No. 1a.2.1)				
Maximum speed @		2 m/s				
Materials of construction		Aluminium, Nitrile, Stainless steel, Acetal, Polyurethane, Brass, PVC, MoS2 Filled Nylon, En8				

* - For longer stroke cylinders, contact **JANATICS H.O.**

@ - Recommended to use with cushioning only.
Refer speed vs load graph (Page no. 5)

Output force in N (1N = 0.1 kgf)

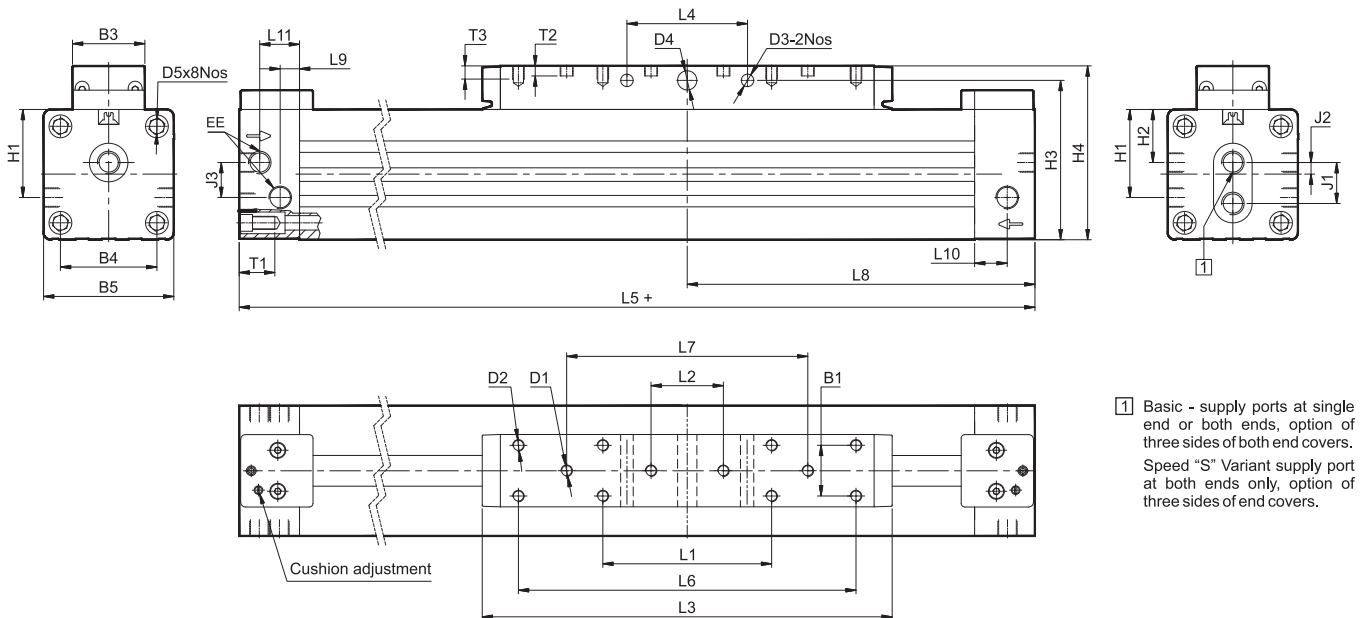
Bore dia (mm)	Working pressure in bar						
	2	3	4	5	6	7	8
18	51	76	102	127	153	178	204
25	98	147	196	245	294	343	393
32	161	241	322	402	482	563	643
40	251	377	502	628	754	879	1005
50	392	589	785	981	1177	1374	1570

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Basic cylinder - Ø18, 25, 32, 40, 50 mm



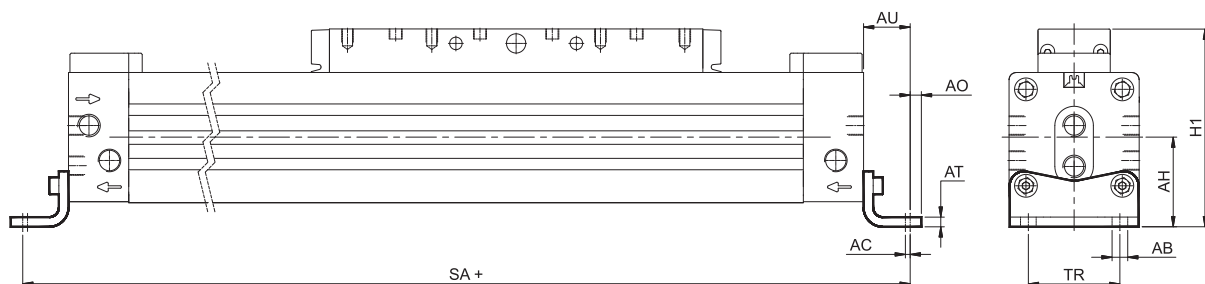
+ = plus stroke length

Bore dia (mm)	B1	B3	B4	B5	D1	D2	D3	D4	D5	EE	H1	H2	H3	H4
Ø18	13	21	SQ25	SQ34	M5x0.8 - 2Nos	M4x0.7 - 4Nos	Ø5.2+0.2	Ø6 H7	M4x0.7 - 8Nos	M5	23	14.5	44	50
Ø25	16	25	SQ32.5	SQ45	M8x1.25 - 2Nos	M4x0.7 - 4Nos	Ø5.2+0.2	Ø8 H10	M5 x 0.8 - 8Nos	G1/8	29.4	17	57	63
Ø32	16	30	SQ40	SQ54	M5x0.8 - 12Nos	M5x0.8 - 12Nos	Ø5.2+0.2	Ø8 H7	M6x1 - 8Nos	G1/8	36.5	22	66	72
Ø40	25	37	SQ49	SQ64	M6x1 - 12Nos	M6x1 - 12Nos	Ø6.5+0.1	Ø10 H10	M6x1 - 8Nos	G1/4	43.5	25	78	86
Ø50	30	45	SQ72	SQ90	M8x1.25 - 12Nos	M8x1.25 - 12Nos	Ø8.5+0.1	Ø12 H10	M8x1.25 - 8Nos	G1/4	62	33.5	106	115

Bore dia (mm)	J1	J2	J3	L1	L2	L3	L4	L5+	Stroke Tol	L6	L7	L8	L9	L10	L11	T1	T2	T3
Ø18	11.1	4.1	8.5	45	NA	92	30	152	+4 -1	NA	60	76	5.5	5.5	13	13	5	8
Ø25	16.7	4.4	11.5	NA	NA	120	30	200		75	50	100	7.5	7.5	17	14.5	8	8
Ø32	17	7.5	14.4	70	30	170	50	250		140	100	125	7	13.5	15.5	14.5	8	8
Ø40	22	4	18.5	85	40	210	70	300		165	130	150	11.5	15	18	17.5	10	10
Ø50	31.8	11.5	28.5	100	50	255	80	350		200	150	175	14	15	18.5	19	12.5	12.5

Mountings for Rodless Cylinder Series A404

Foot bracket



+ = plus stroke length

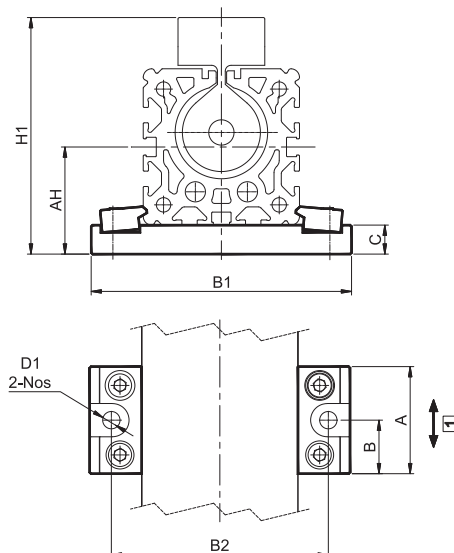
Bore dia (mm)	AB	AC	AH	AO	AT	AU	SA	TR	H1	Ordering No
Ø18	5.5	1	24	5.8	3	12.2	176.5	24	57	ML5018
Ø25	5.5	2	29.5	6	3	13	226	32.5	70	ML5025
Ø32	6.5	2	37	7	4	17	284	38	82	ML5032
Ø40	6.5	2	46	8.5	5	17.5	335	45	100	ML5040
Ø50	9	3	61	11	6	25	400	65	131	ML5050

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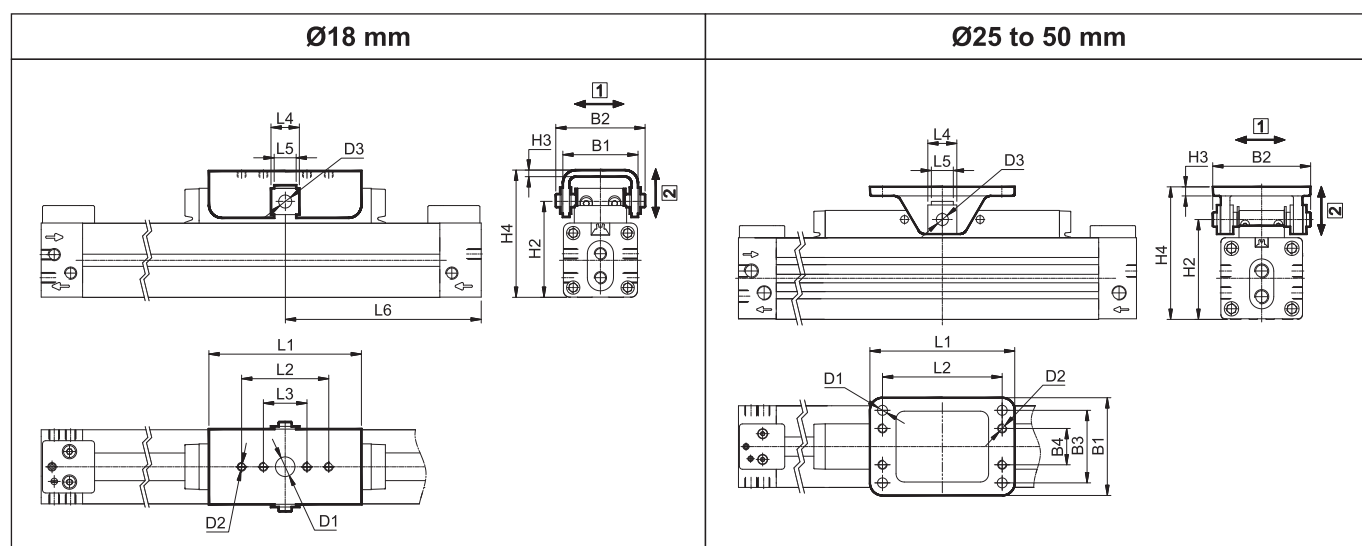
Center support



1 Position of the central support along the profile barrel is freely selectable

Bore dia (mm)	AH	B1	B2	H1	ØD1	A	B	C	Ordering No
Ø18	24	64	54	57	5.5	30	15	7	MW5018
Ø25	29.5	75	65	70	5.5	30	15	7	MW5025
Ø32	37	90	75	82	6.6	37	18.5	10	MW5032
Ø40	46	108	90	100	11	45	22.5	14	MW5040
Ø50	61	134	116	131	11	52	26	16	MW5050

Moment Compensator



Bore dia (mm)	Max. offset between linear drive and external guide		B1	B2	B3	B4	ØD1	D2	ØD3	H2	H3	H4	L1	L2	L3	L4	L5	L6	Ordering No
	1	2																	
Ø18	±2	±1.2	34.5	41	-	-	9-4Nos	M4X0.7-4Nos	6	44	3	58	70	40	20	13	10.1	76	MZ5018
Ø25	±2	±2	54	54	40	20	5.5-4Nos	M5X0.8-4Nos	8	57	5	75	80	66	-	16	12.1	100	MZ5025
Ø32	±2	±2	54	59	40	20	5.5-4Nos	M5X0.8-4Nos	8	66	5	84	80	66	-	16	12.1	125	MZ5032
Ø40	±2	±2	62	65	44	24	6.5-4Nos	M6x1-4Nos	10	78	6	100	90	76	-	18	14.1	150	MZ5040
Ø50	±2	±2	75	80	51	23	9-4Nos	M8x1.25-4Nos	12	106	8	130	122	102	-	22	16.1	175	MZ5050

Basic dimensions refer basic fitment drawing

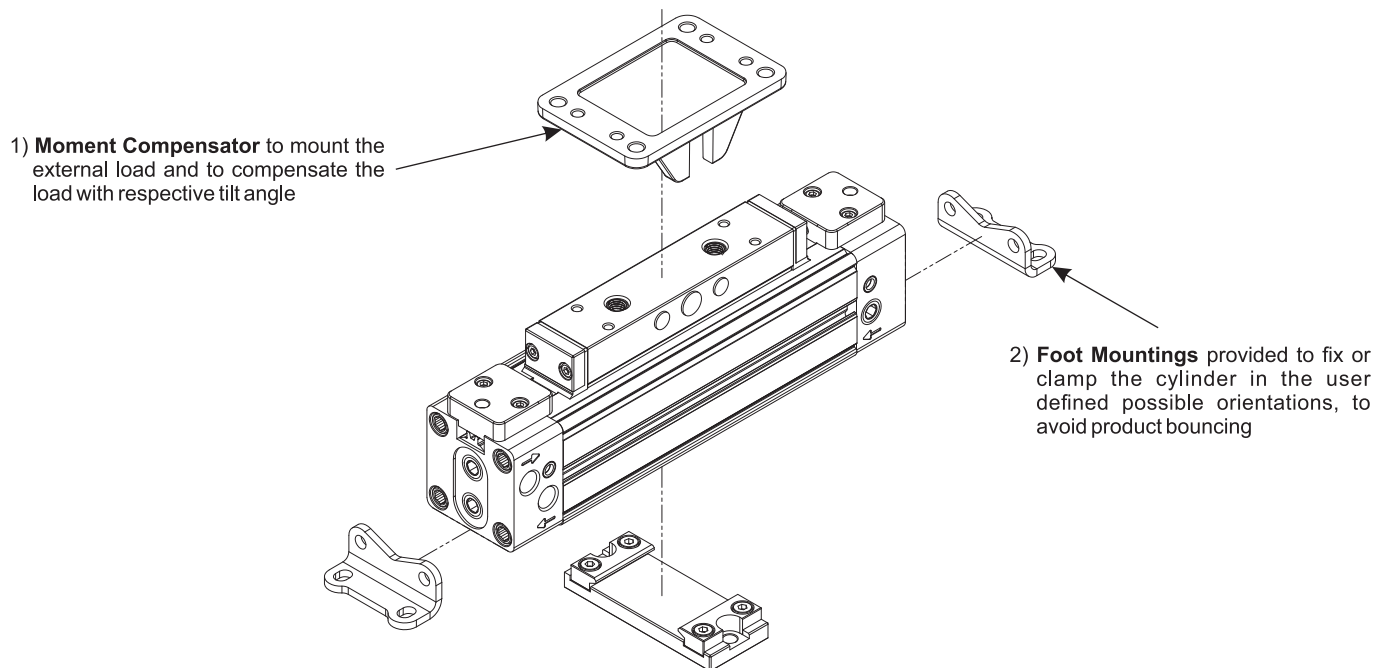
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Rodless Cylinder (Basic & Speed) - Mountings & Fitment

A404 Rodless - Basic Cylinder Series Mounting / Accessories

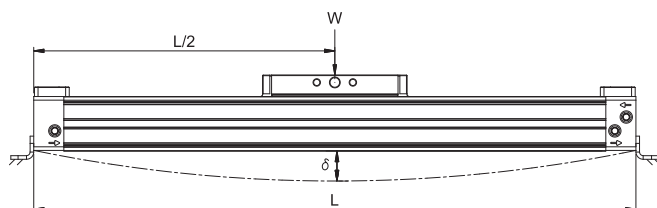


**** Note:**

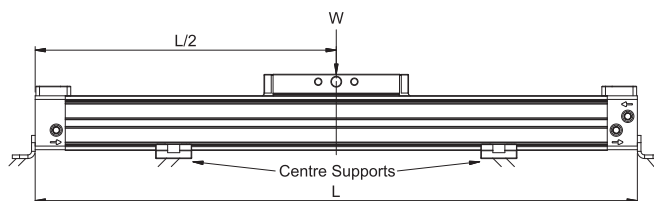
All the subassembly parts / fasteners required for mountings will be supplied along with them.

Distance between center supports

Center supports are the mountings, which is mounted at either the base or sides of the cylinder slots, in order to prevent the deflection / bending moment caused by the cylinder, when an external load (W) is applied on it. It is not only dependent on the load but also based on stroke length.



Deflection / Bending Moment occurs due to external loading, if there is no center support for longer strokes



No Deflection / Bending Moment occurs due to external loading, if there is center support for longer strokes

The number of center supports that has to be equally mounted on basis of stroke length for the load applied is tabulated below:

Stroke Length (m)	No. of Centre Supports required
<1	Not required due to negligible bending
From 1 up to 2	1 No for equal interval as per overall length (or) 2 No's for overall length with equal division
From 2 up to 3	2 No's for equal interval as per overall length (or) 3 No's for overall length with equal division

**** Note:**

During operation, all the accessories have to be rigidly clamped.

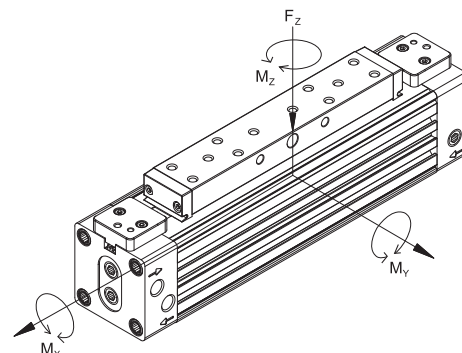
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Permissible Forces and Torques for Horizontal Mounting

Piston Ø mm	18	25	32	40	50
Fz max (N)	120	300	480	800	1200
Mx max (Nm)	0.5	1	2	4	6
My max (Nm)	5	15	35	50	100
Mz max (Nm)	1	3	4.5	8	15



Loads & Moments

The loads & moments are calculated based on the speed rating of $v \leq 0.5$ m/s. The cylinder when operated at maximum design load has to be operated with 0.5 m/s or lower, with **cushioning effectiveness and Flow Control Valves**. If required with greater speeds, then the load rating has to be decreased with respect to relative speeds (or) use **external dampening units** (such as shock absorbers, stops etc.), preferably at the center of gravity of mass.

The load when placed eccentrically with respect to maximum design load & maximum bending moment or if more than the external indicated forces, it shall satisfy the equation of load to moment ratio (Guide load condition) as given below:

$$(0.4 * \frac{F_z}{F_z \text{ max}}) + (\frac{M_x}{M_x \text{ max}}) + (\frac{M_{ys}}{M_{ys} \text{ max}}) + (\frac{M_{yd}}{M_{yd} \text{ max}}) + (0.2 * \frac{M_z}{M_z \text{ max}}) \leq 1$$

Key Notation:

F_x F_y F_z : Externally applied Load (N)

M_x : Moment about roll-axis (N-m) at static condition in x-axis

M_{ys} : Moment about pitch-axis (N-m) at static condition in y-axis

M_{yd} : Moment about pitch-axis (N-m) at dynamic condition in y-axis

M_z : Moment about yaw-axis (N-m) at dynamic condition in z-axis

k : Dampening factor from impact load (constant)

F_o : Impact load generated due to collision speed (N)

d_x : Offset distance from yoke center plane with respect to x-axis (m)

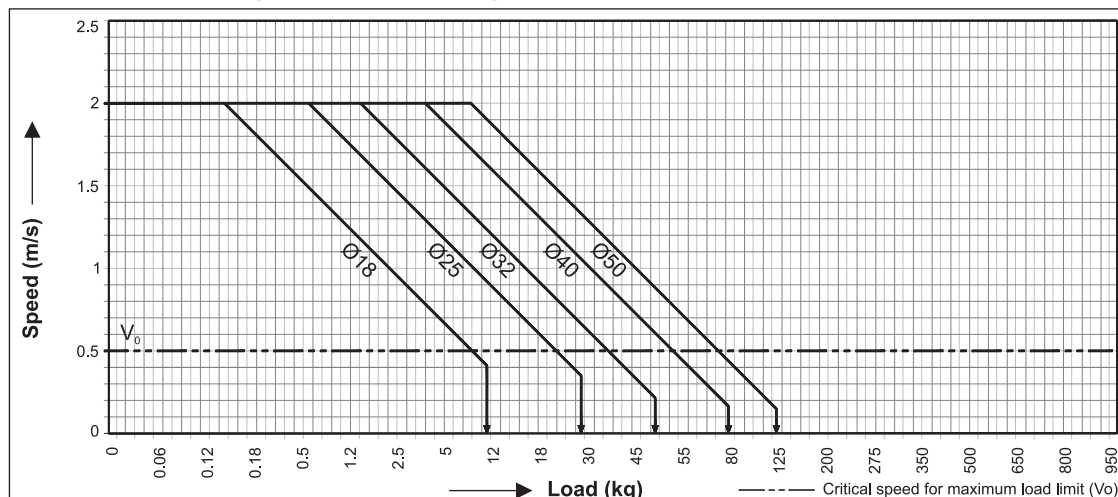
d_y : Offset distance from yoke center plane with respect to y-axis (m)

d_z : Offset distance from yoke top mounting face with respect to z-axis (m)

α : Dampening coefficient (For air cushion & shocks, $\alpha=0.01$)

**** Note** : All permissible static & dynamic loads with coefficient of friction is taken into consideration

Horizontal Mounting - Load vs Speed graph

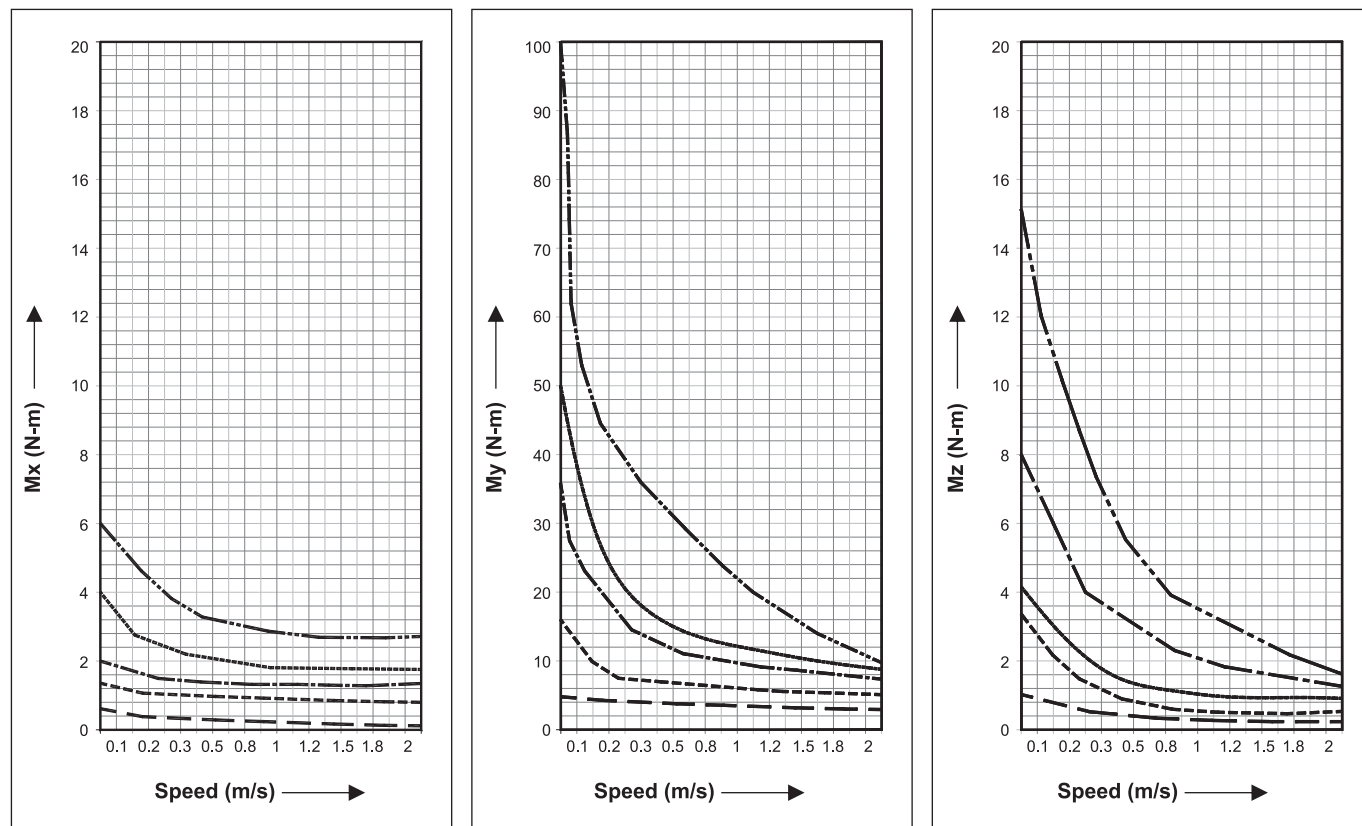


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Permissible Moments for A404 with respect to above load vs speed plot



Permissible Forces and Torques for other mounting

The moment for the cylinder remains same, but apart from horizontal mounting, all other mounting carries floating load with gravitational pull in space.

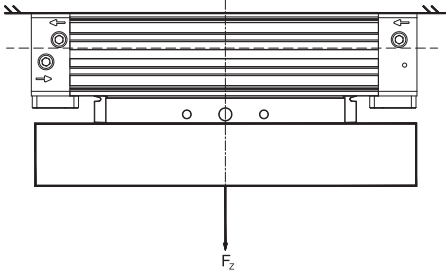
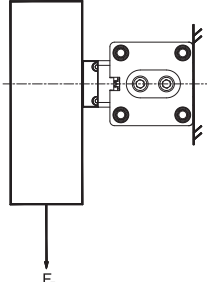
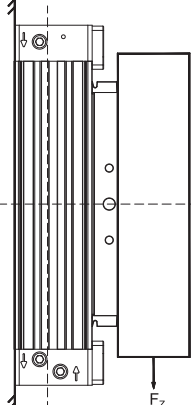
Due to this, the magnitude is considered to be lower than the highest magnitude in horizontal mounting.

Mounting Orientation	Maximum permissible load for A404 Rodless Basic Series (Fz) (N)				
	Ø18	Ø25	Ø32	Ø40	Ø50
Ceiling	25	60	95	160	240
Side-Wall	30	65	105	175	265
Vertical	50	120	190	320	480

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Ceiling Mounting	Side-Wall Mounting	Vertical Mounting
		

**** Note:** Since the magnitude is lower, it doesn't mean that the speed shall be increased due to lower magnitude, due to gravitational effect, the cylinder experiences momentum gain and the speed must remain as specified in graph.

Free-Body diagram for weight transfer with consideration of all permissible forces

1) Horizontal Mounting:

a) Static Condition:

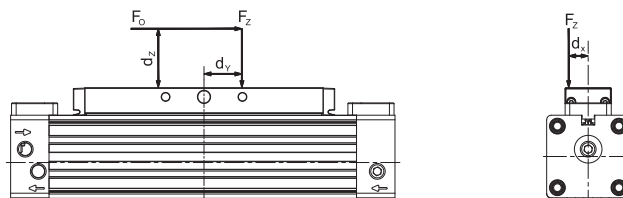
$$M_x = F_z * d_x$$

$$M_y = F_z * d_y$$

b) Dynamic Condition:

$$M_{y_d} = k * F_o * d_y$$

$$M_z = k * F_o * d_z$$



'F_o' is the impact load generated due to collision speed & kinetic energy due to applied mass. This states that at the time of impact, the **collision speed will tend to produce an effect of about 1.4 to 1.6 times the actual speed** at which the cylinder is operated, also taking **dampenability** into consideration. (Assume k=0.6)

Collision Speed (V_o) = x * Actual Set Speed (V_a) where, x=1.4,...,1.6 & **F_o = V_o * F_z * α**

2) Ceiling Mounting:

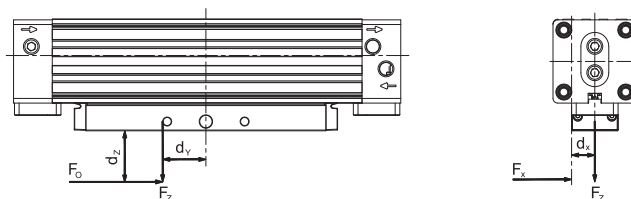
a) Static Condition:

$$M_y = F_z * d_y$$

b) Dynamic Condition:

$$M_x = k * F_o * d_x$$

$$M_z = k * F_o * d_z$$



'F_o' is the impact load generated due to collision speed & kinetic energy due to applied mass. This states that at the time of impact, the **collision speed will tend to produce an effect of about 1.4 to 1.6 times the actual speed** at which the cylinder is operated, also taking **dampenability** into consideration.

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3) Side-Wall Mounting:

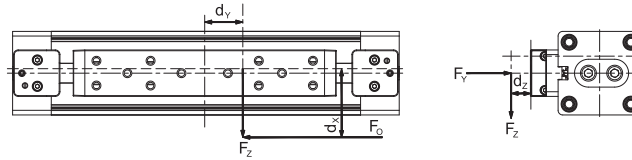
a) Static Condition:

$$M_x = F_z * d_x$$

b) Dynamic Condition:

$$M_{y_d} = k * F_y * d_y$$

$$M_z = k * F_o * d_z$$



'F_o' is the impact load generated due to collision speed & kinetic energy due to applied mass. This states that at the time of impact, the **collision speed will tend to produce an effect of about 1.4 to 1.6 times the actual speed** at which the cylinder is operated, also taking **dampenableity** into consideration.

4) Vertical Mounting:

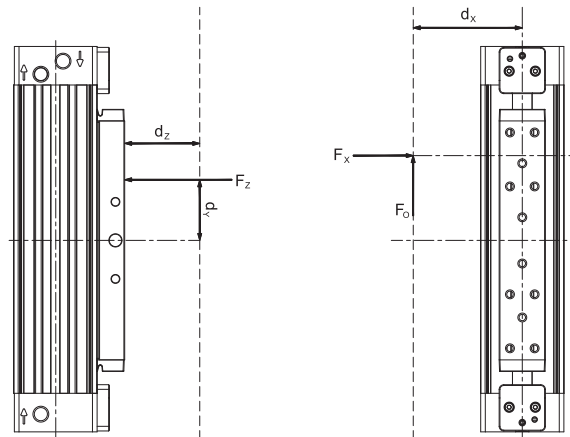
a) Static Condition:

$$M_{y_s} = F_z * d_y$$

b) Dynamic Condition:

$$M_x = k * F_x * d_x$$

$$M_z = k * F_o * d_z$$



'F_o' is the impact load generated due to collision speed & kinetic energy due to applied mass. This states that at the time of impact, the **collision speed will tend to produce an effect of about 1.4 to 1.6 times the actual speed** at which the cylinder is operated, also taking **dampenableity** into consideration.

** Note:

The maximum loading at vertical mounting is taken as 40 to 45% of the total magnitude @ horizontal orientation.

For static design maximum moments, refer to the specification table whereas for dynamic moment, refer to the speed vs moment graph, with respect to which the moment is generated for the design load.

Some of the key considerations / precautions while operating the cylinder:

1) Environmental Operations:

- Ensure that the cylinder operated in an environment shall be neat & clean. The surrounding environment shall be free from dust as it may contaminate the seals present inside the cylinder if gone through fine porous gaps. The seals shall not be subjected to water. Use air gun or dry clothes for cleaning the cylinder.
- Avoid placing the cylinders in a region where the temperature is higher or lower than the maximum & minimum recommended temperature due to the permanent set that may occur with the seals present inside the cylinder and thereby causing leakage.

2) Cushion Adjustments:

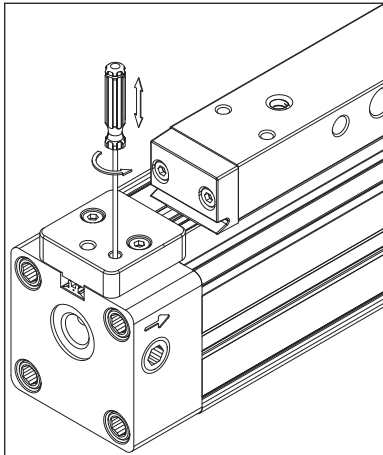
- The cushioning provided must be mandatorily adjusted when the cylinder is operated at high loads, with relatively low speeds in order to avoid seal failure. No overloading has to be provided to the cylinder because overloading the cylinder & functioning will cause seal failure as it is designed for withstanding the recommended design load & speed only.
- Use suitable screw driver for needle adjustments. Do not operate the cylinder at cushion free condition.

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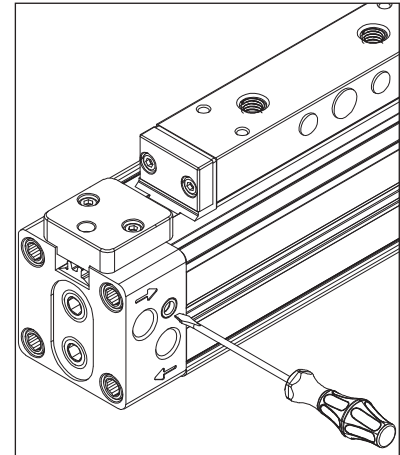
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Ø18, 32, 40, 50 mm



Screw driver must slide inside the end plate diametric hole of end plate while adjusting needle. The needle head will be affected due to slippage or tool damage if wrong size screw driver is used.

Ø25 mm



3) Pipe routing:

- The piping provided shall be rust resistant and the air supply provided to the system shall have its pipe routing clean.

4) Quality of compressed air:

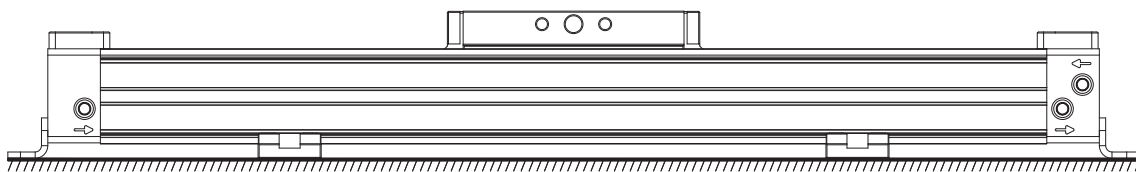
- Use clean & fresh air by using filter. Always ensure that air through the filter from the compressor is regularly filtered in order to avoid contamination and dust particles.

5) Product Maintenance from damages:

- Do not damage or mishandle the product because, if any such exist to the cylinder, then it may affect the cylinder performance & avoiding electrical welding contacts or any hazardous contacts closer to the cylinder is safe, which will result in cylinder destruction if not done.

6) Clamping of cylinder:

- The cylinder when operated at working pressure level (with or without external loads), ensure that the cylinder is rigidly clamped or both the end covers is fixed with end stops, concerning product & user safety. Do not overhang the cylinder. Do not fix the yoke & operate cylinder.



How to order

A404	040	1000	S	W		
Bore Ø (mm)		Stroke (mm)	Supply Ports		Mountings	
018 - Ø18		10 to 2900mm	Nil - basic		Nil - Basic	
025 - Ø25			S - Supply port at both ends (Speed Model)		L - Foot Mounting	
032 - Ø32					W - Center Support	
040 - Ø40					Z - Moment Compensator	
050 - Ø50						

Ordering Example:

Ordering no. for Rodless cylinder with Ø40 bore, 1000mm stroke, Speed model with Center support :
A4040401000SW