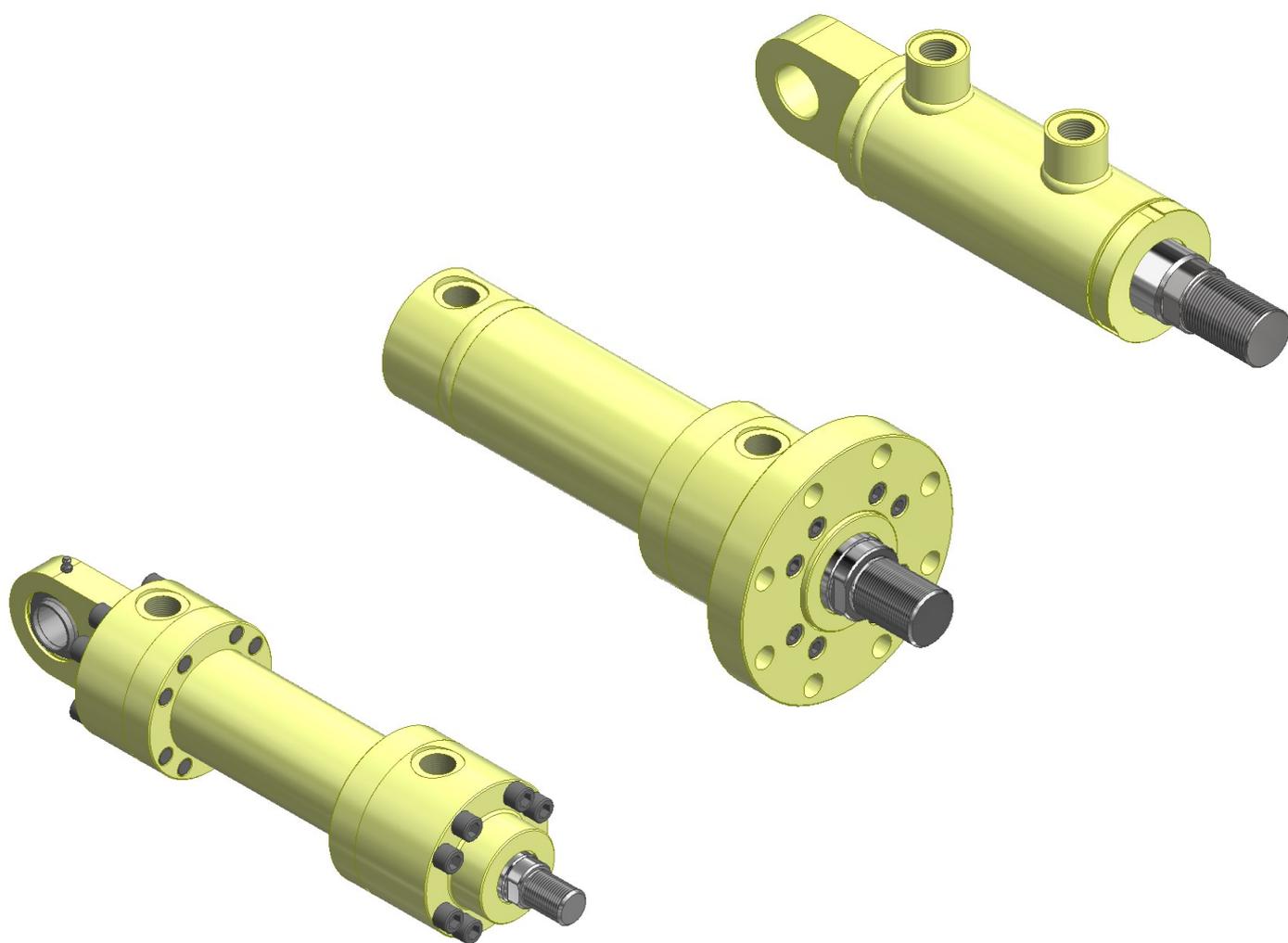


# HYDRAULIC CYLINDERS CATALOGUE



## An Introduction:

### About The Company :

RAX Hydraulics (P) Ltd. is an ISO 9001:2015 certified company. The Fluid Power Division (FPD) is engaged in design and manufacturing of hydraulic cylinders, mill duty pneumatic cylinders, hydraulic power packs and other hydraulic aggregates.

RAX is lead by an innovative & enthusiastic team with decades of combined experience. RAX products are manufactured at its two fully equipped modern manufacturing facilities located in Jamshedpur.

### About This Catalogue :

This Product Catalogue covers the entire range of hydraulic cylinders manufactured by RAX.

Series R1 to R5 is based on ISO standards and is interchangeable among manufactures.

Series RWB is designed for rigorous mill duty application and comes in welded and bolted design.

Series RW is compact designed for cost effective general purpose application and comes in threaded welded design.

The catalogue also covers accessories for the hydraulic cylinders. Each section covers detailed aspects of design, engineering and mounting.

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OR, Scan the QR code below:

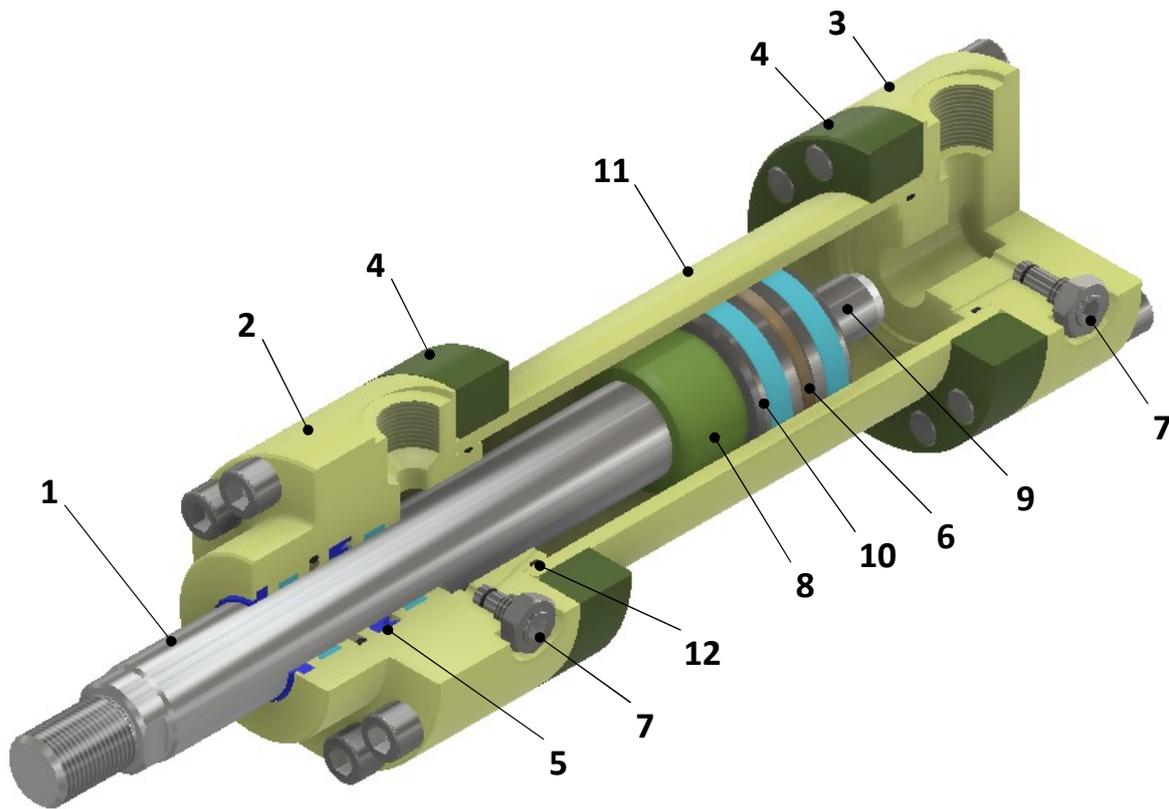


Alternatively, write to us on [info@rax.co.in](mailto:info@rax.co.in)  
Call us on +91- 92346 84417; +91- 95252 13070

## RAX Hydraulic Cylinder Series - An Overview

Series Name	Construction Type	Relevant ISO Series	Pressure Rating [bar]		Strokes [mm]	Available Bore Sizes [mm]	Page No.
			Nominal	Maximum			
Series R1	Round Heads With Counter Flanges	ISO 6020-1	160	250	Up to 5000	40 - 200	03-12
Series R2	Square Heads With Tie Rods	ISO 6020-2	160	250		25 - 200	13-26
Series R3	Square Heads With Counter Flanges	ISO 6020-2	160	250		63 - 200	27-36
Series R4	Big Bore Sizes	ISO 6020-3	160	250		250 - 400	37-44
Series R5	Round Heads With Counter Flanges [High Pressure]	ISO 6022	250	320		50 - 320	45-53
Series RWB	Welded & Bolted	Non-ISO	160	250	Up to 2000	50 - 250	54-62
Series RW	Threaded & Welded	Non-ISO	160	240	50 - 1000	40 - 100	63-70

## Design Features :



### 1 - Piston Rod

The piston rod is manufactured from C45 round bar or other high tensile carbon alloy steel. It is further ground and hard chrome plated to a thickness of minimum 0.020 mm and hardness 850-1150 (HV). The diameter tolerance is f7 and surface roughness (Ra)  $\leq$  0.25  $\mu$ m. To further improve surface properties and enhance sealing life, induction hardened rods can be selected as an option.

### 2 & 3 - Front and Rear Head

The cylinder front and rear head are machined from steel and placed into the cylinder barrel internal diameter for superior strength and accurate alignment. To ensure leak-free performance, both the front and rear head are sealed by 'O' rings which, in turn, are protected by anti-extrusion rings called 'back-up' rings, usually made of PTFE.

### 4 - Retainer Flange

The front and the rear head are bolted to heavy steel flanges, which are retained by threads at each end of the cylinder body. The final assembly is fatigue-free at its maximum rated pressure.

### 5 & 6 - Rod and Piston Seals

The rod sealing consists of a wiper to prevent ingress of contaminants and the sealing is provided by a set of a U cup seal in PU and a step seal in PTFE for efficient retention of pressurized fluid. The piston seal is glyd ring in PTFE/NBR. A variety of seal options are available. Please refer to relevant sections inside the catalogue. Seals can be customized to suit specific needs of customers. Please get in touch with RAX customer service.

### 7, 8 & 9 - Cushioning

Cushioning is recommended for applications where the piston makes a full stroke with speed over than 0.05 m/s & It is necessary to reduce undesirable noise and mechanical shocks.

In case of high masses and/or very high operating speeds it is recommended to back them off to optimize the cushioning effect. The adjustment screws are provided at the both heads to prevent expulsion.

The stroke-end cushioning are hydraulic dampers specifically designed to dissipate the energy of the mass connected to the cylinder rod, by progressively increasing the pressure in the cushioning chamber and thus reducing the rod speed before the cylinder's mechanical stroke-end.

The Front end cushion is a sleeve, while the rear end cushion is an integral part of the piston rod.

### 10 - 'O' Ring Seals

To ensure leak-free performance, 'O' ring seals are of radial construction, avoiding the problems of 'nibbling' and early failure associated with face-type seals.

### 11 - Barrel

The cylinder's housings are made in "cold drawn and stressed steel" or "Hot rolled steel"; the internal surfaces are honed to a high surface finish to minimize friction and enhance seal life, roughness Ra  $\leq$  0.25  $\mu$ m.



## Hydraulic Cylinders Type R1 - Round heads with counter flanges

Conforms to ISO 6020-1: Nominal pressure of 160 bar and max 250 bar

Series R1 hydraulic cylinders are designed for heavy mill duty application and conforms to ISO 6020-1. It is completely interchangeable among manufacturers. It allows manufacturers of hydraulic equipments flexibility in the design of cylinders while it does not restrict technical development; however, it does provide basic guidelines.

### Standard Specifications :

- Heavy duty construction
- Double Acting Design
- Bore Sizes: **40** mm to **200** mm
- Rod Sizes: **22** mm to **140** mm
- Strokes up to **5000** mm
- **Two** rod diameters per bore
- **Two** seals options
- **Air Bleed** at both ends
- **Male & Female** rod end threads
- **Eight** standard mounting styles
- **Adjustable** or **Fixed** cushioning
- **Oversized & SAE Flange** oil port options

### Ordering Instructions :

R1 D - 050 / 028 / 0500 - 0 K 0 S 0 - B1X1 - 1

#### Cylinder Series:

R1 [ISO 6020-1]

#### Mounting Style: see section 1

	REF. ISO
A - Front Round Flange	MF3
B - Rear Round Flange	MF4
D - Fixed Eye	MP3
E - Foot	MS2
L - Intermediate Trunnion	MT4*
N - Front Rectangular Flange	MF1
P - Rear Rectangular Flange	MF2
S - Fixed Eye with Spherical Bearing	MP5

**Bore Size:** From  $\varnothing 40$  - 200 mm, see section 13

**Rod Size:** From  $\varnothing 22$  - 140 mm, see section 13

**Stroke:** Up to 5000 mm, see section 6

**Rod End:** see section 13

- 1 - Male Thread
- 2 - Female Thread

**Oil Port Positions:** see section 4

- B1;B2;B3 & B4 - Front Head Oil Port at Location 1;2;3 & 4
- X1;X2;X3 & X4 - Rear Head Oil Port at Location 1;2;3 & 4

**Oil Port options:** see section 2 & 3

- 0 - Standard
- 1 - Front & Rear Oversized Oil Ports
- D - Front Oversized Oil Port
- Y - Rear Oversized Oil Port
- M - Front & Rear SAE Flange Oil Port

#### Sealing System:

- S - Standard [NBR + PTFE + PU] [-20°C to 85°C]
- V - Viton, For High Temp. [FKM + PTFE] [-20°C to 120°C]

**Spacer:** see section 7

- 0 - None; 2 - 50 mm; 4 - 100 mm; 6 - 150 mm; 8 - 200 mm

**Rod Treatment:** see section 8

- K - Ground & hard chrome plated
- T - Induction hardened, Ground & hard chrome plated

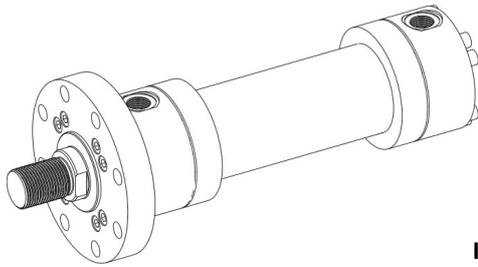
**Cushioning:** see section 5

- 0 - None
- Slow Adjustable**
- 1 - Rear end
- 2 - Front end
- 3 - Both ends
- Slow Fixed**
- 7 - Rear end
- 8 - Front end
- 9 - Both ends

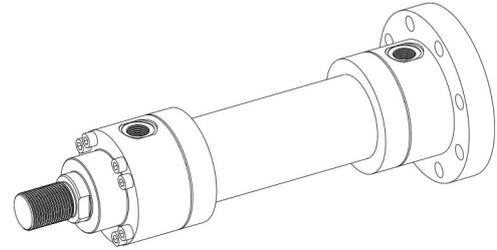
\*NOTE: For style L [MT4], XV Dimension must be indicated in the order code, see section 9

**1 Mounting Style :**

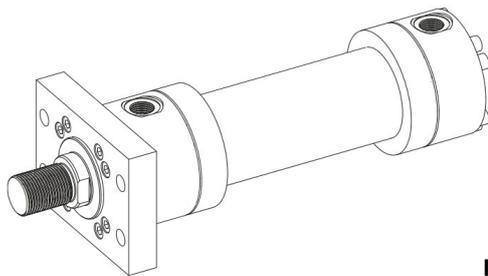
- 8 different standard styles of mounting as shown below
- Browse through subsequent pages for technical details and mounting dimensions
- Piston Rod End dimensions are given separately in section [13](#)



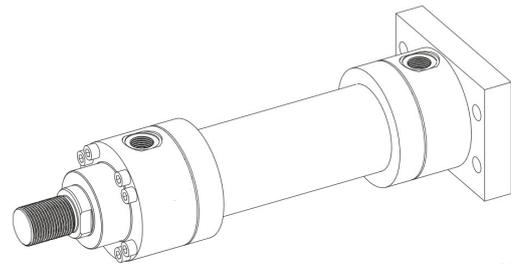
**ISO MF3**  
**Style A [Front Round Flange]**



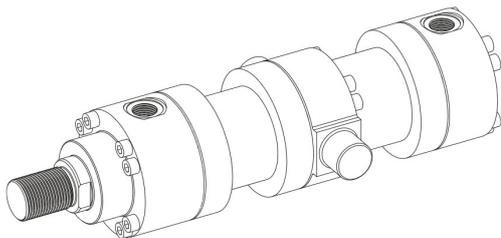
**ISO MF4**  
**Style B [Rear Round Flange]**



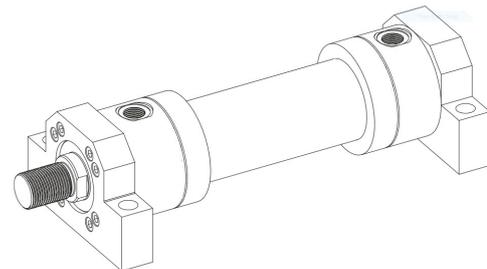
**ISO MF1**  
**Style N [Front Rectangular Flange]**



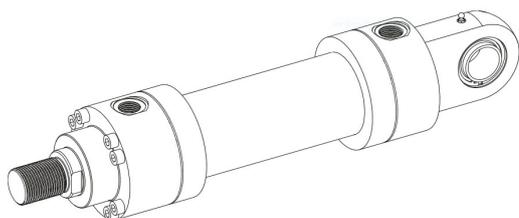
**ISO MF2**  
**Style P [Rear Rectangular Flange]**



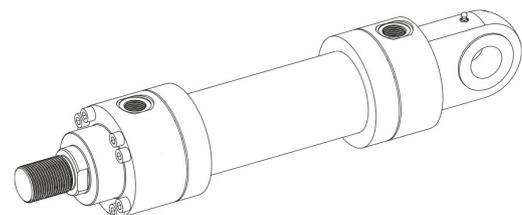
**ISO MT4**  
**Style L [Intermediate Trunnion]**



**ISO MS2**  
**Style E [Foot Mounting]**



**ISO MP5**  
**Style S [Rear Fixed Eye with Spherical Bearing]**



**ISO MP3**  
**Style D [Rear Fixed Eye]**

**2 Size Of Oil Ports & Round Head Dimension [mm]:**

Bore $\varnothing$		40	50	63	80	100	125	160	200
Standard Oil Ports	D <sub>min</sub>	29	29	36	36	42	42	52	52
	EE (BSPP)	G ½	G ½	G ¾	G ¾	G 1	G 1	G 1 ¼	G 1 ¼
Oversized Oil Ports	D1 <sub>min</sub>	36	36	42	42	52	52	58	58
	EE1 (BSPP)	G ¾	G ¾	G 1	G 1	G 1 ¼	G 1 ¼	G 1 ½	G 1 ½

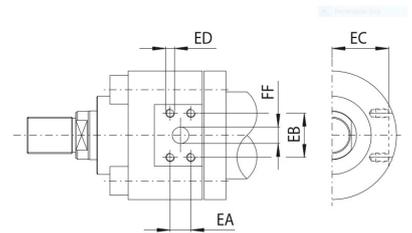
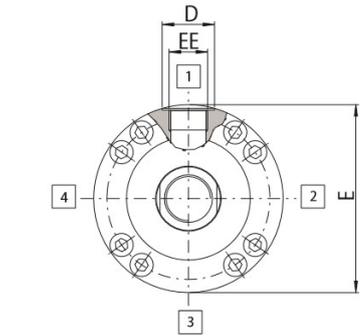
- Oil ports EE are threaded according to GAS standard with counter bore dimension D.
- When oversized oil ports are selected dimensions D and EE are respectively modified into D1 and EE1.

Bore $\varnothing$		40	50	63	80	100	125	160	200
Front & Rear Head $\varnothing$	E <sub>max</sub>	78	95	116	130	158	192	238	285

- If not otherwise specified, E is the value of the front and rear round heads dimension for all the mounting styles.

**3 SAE 3000 Flange Oil Port Dimensions (ISO 6162-1) [mm]:**

Bore $\varnothing$	DN	EC	EA $\pm 0.25$	EB $\pm 0.25$	ED 6g	FF 0/-1.5
63	13	50	17.5	38.1	M8 X 1.25	13
80		58				
100	19	71	22.3	47.6	M10 X 1.5	19
125		89				
160	25	113	26.2	52.4	M10 X 1.5	25
200		137				



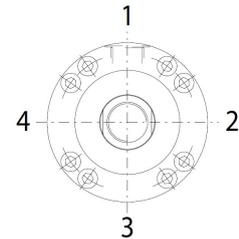
SAE 3000 flange not available for bores 40 and 50

**4 Position of Oil Ports:**

- FRONT HEAD: B\* = oil port position;
- REAR HEAD: X\* = oil port position;
- \*Selected position (1, 2, 3 or 4)

The oil ports and cushioning adjustments positions are available, respectively on sides 1 and 3 for all styles except E (see the figure at side): the style E has the cushioning adjustments on side 2.

Unless otherwise specified by customer, the standard oil port position remains as shown in figure at side, i.e. B1 & X1.



**5 Cushioning:**

Cushioning is recommended for applications where:

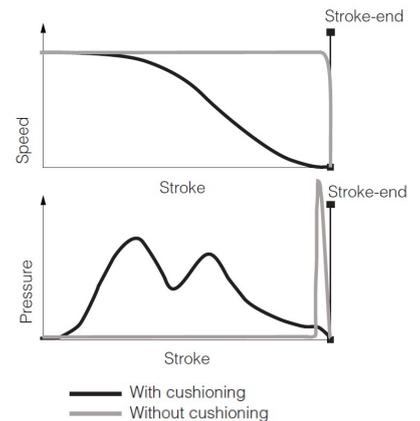
- The piston makes a full stroke with speed over than 0.05 m/s;
- It is necessary to reduce undesirable noise and mechanical shocks;
- Vertical application with heavy loads.

The stroke-end cushioning are hydraulic dampers specifically designed to dissipate the energy of the mass connected to the cylinder rod, by progressively increasing the pressure in the cushioning chamber and thus reducing the rod speed before the cylinder's mechanical stroke-end (see the graphics at side). The regulating screws are supplied fully screwed in (max cushioning effect).

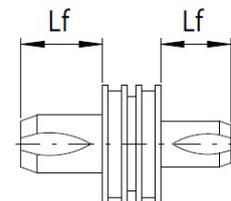
In case of high masses and/or very high operating speeds it is recommended to back them off to optimize the cushioning effect. The adjustment screw has a special design to prevent unlocking and expulsion. The cushioning effect is highly ensured even in case of variation of the fluid viscosity.

**Cushioning Length:**

Lf is the total cushioning length. When the stroke-end cushioning are used as safety devices, to mechanically preserve the cylinder and the system, it is advisable to select the cylinder's stroke longer than the operating one by an amount equal to the cushioning length Lf; in this way the cushioning effect does not influence the movement during the operating stroke.



Bore $\varnothing$		40		50		63		80		100		125		160		200	
Rod $\varnothing$		22	28	28	36	36	45	45	56	56	70	70	90	90	110	110	140
Cushioning Length [mm]	Lf Front	25	25	29	29	29	29	27	27	26	26	27	27	34	34	34	49
	Lf Rear	30		30		32		32		32		41		56		56	



**6 Stroke Selection:**

Stroke has to be selected a few mm longer than the working stroke, to prevent to use the cylinder heads as mechanical stroke-end.

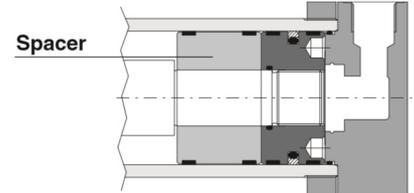
Maximum stroke: 5000 mm

Stroke tolerances:

- 0 +2 mm for strokes up to 1250 mm
- 0 +5 mm for strokes from 1250 to 3150 mm
- 0 +8 mm for strokes over 3150 mm

**7 Spacer:**

For strokes longer than 1000 mm, proper spacers have to be introduced in the cylinder's construction to increase the rod and piston guide and to protect them from overloads and premature wear. Spacers can be omitted for cylinders working in traction mode. The introduction of spacers increases the overall cylinder's dimensions: spacers' length has to be added to all stroke dependent dimensions.



Stroke [mm]	1001 to 1500	1501 to 2000	2001 to 2500	2501 to 5000
<b>Spacer Code</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>8</b>
<b>Length [mm]</b>	50	100	150	200

**8 Rod Features & options:**

The rods materials have high strength - EN8D / C45 & the rod surface is chrome plated: diameter tolerances f7, roughness Ra ≤ 0.25 µm.

Rod hardness can be improved selecting the option **T** :

**K** = Ground and hard chrome plated (for rods from 22 to 110mm)

**T** = Induction surface hardening, ground & hard chrome plated

- 56-60 HRC (613-697 HV) hardness

**9 Note [Trunnion Mounting]:**

**XV** - For cylinders with mounting style **L** the stroke must always exceed the minimum values reported in the table. The requested XV value must be included between **XV min** and **XV max** and it must be always indicated, with dimension in millimetres, together with the cylinder code. See the following example:

R1 L - 50 / 28 / 0500 - 0 K 0 S 0 - B1X1 - 1

**XV = 200**

**10 Cylinder's Housing Features:**

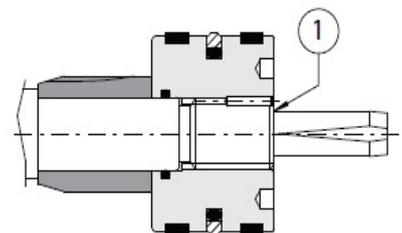
The cylinder's housings are made in "cold drawn and stressed steel"; the internal surfaces are lapped: diameter tolerance H8, roughness Ra ≤ 0.25 µm.

**11 Fluid Requirements:**

Cylinders and servo cylinders are suitable for operation with mineral oils with or without additives (**HH, HL, HLP, HLP-D, HM, HV**), fire resistant fluids (**HFA** oil in water emulsion, 90-95% water and 5-10% oil; **HFB** water in oil emulsion, 40% water; **HFC** water glycol, max 45% water) and synthetic fluids (**HFD-U** organic esters, **HFD-R** phosphate esters). The fluid must have a viscosity within 15 and 100 mm<sup>2</sup>/s, a temperature within 0 and 70°C and fluid contamination class ISO 20/18/15 according to ISO 4406 NAS1638 class 9.

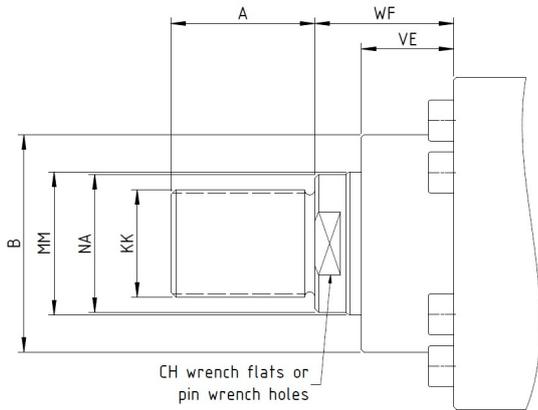
**12 Rod - Piston Coupling:**

The rod and piston are mechanically coupled by a threaded connection in which the thread on the rod is at least equal to the external thread KK. The piston is screwed to the rod by a pre-fixed tightening torque in order to improve the fatigue resistance. The Grub screw **1** avoids the piston unscrewing.

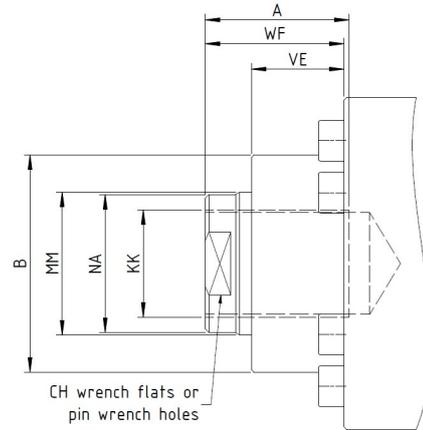


**13 Piston Rod End Data :**

**Rod End [Male] Code 1**



**Rod End [Female] Code 2**



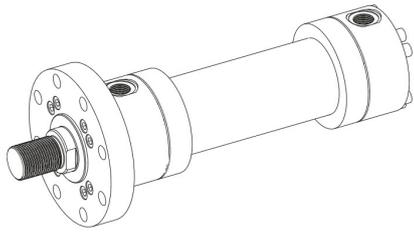
**Rod End Dimensions :**

Bore Ø	Rod/MM Ø	A	B f8	KK 6g Code 1	KF 6H Code 2	CH	NA	VE max	WF
40	22	22	60	M16 X 1.5	M16 X 1.5	18	21	19	32
	28	28		M20 X 1.5	M20 X 1.5	22	26		
50	28	28	70	M20 X 1.5	M20 X 1.5	22	26	24	38
	36	36		M27 X 2	M27 X 2	30	34		
63	36	36	85	M27 X 2	M27 X 2	30	34	29	45
	45	45		M33 X 2	M33 X 2	39	43		
80	45	45	106	M33 X 2	M33 X 2	39	43	36	54
	56	56		M42 X 2	M42 X 2	48	54		
100	56	56	132	M42 X 2	M42 X 2	48	54	37	57
	70	63		M48 X 2	M48 X 2	62	68		
125	70	63	160	M48 X 2	M48 X 2	62	68	37	60
	90	85		M64 X 3	M64 X 3	80	88		
160	90	85	200	M64 X 3	M64 X 3	80	88	41	66
	110	95		M80 X 3	M80 X 3	100	108		
200	110	95	250	M80 X 3	M80 X 3	100	108	45	75
	140	112		M100 X 3	M100 X 3	128	138		

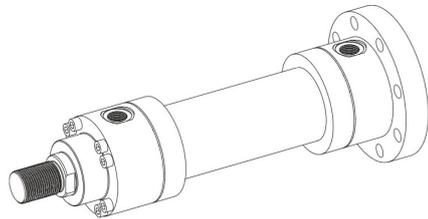
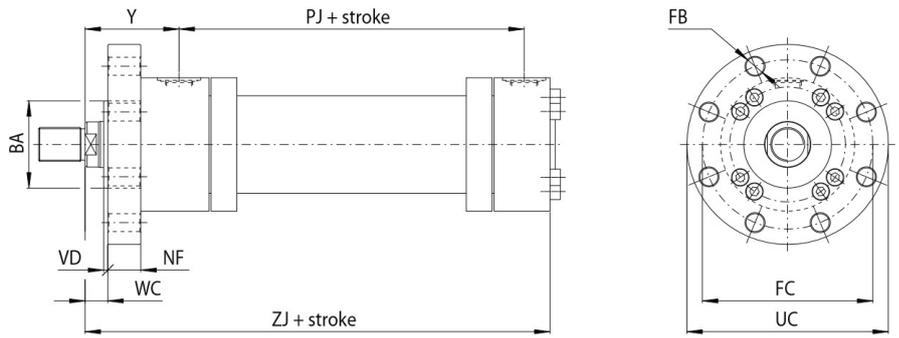
All dimensions are in mm .

**NOTE:** Tolerances: max for male thread; min for female thread.

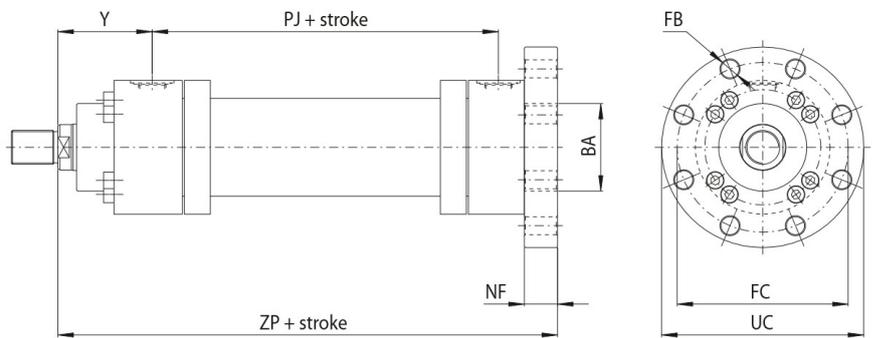
14 Round Flange Mountings :



**Style A**  
**ISO MF3**  
Front Round Flange



**Style B**  
**ISO MF4**  
Rear Round Flange



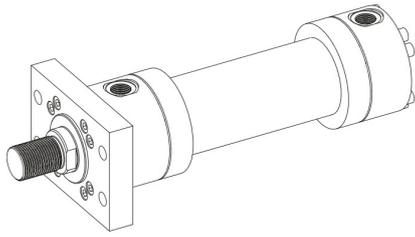
Installation Dimensions - MF3 & MF4

Bore Ø	Rod Ø	BA H8	FC js13	FB H13	NF js13	UC max	VD min	WC	Y	+ Stroke		
										PJ	ZJ	ZP
40	22 28	50	106	9	16	125	3	16	71	97	190	206
50	28 36	60	126	11	20	148	4	18	72	111	205	225
63	36 45	70	145	13.5	25	170	4	20	82	117	224	249
80	45 56	85	165	17.5	32	195	4	22	91	134	250	282
100	56 70	106	200	22	32	238	5	25	108	162	300	332
125	70 90	132	235	22	32	272	5	28	121	174	325	357
160	90 110	160	280	22	36	316	5	30	143	191	370	406
200	110 140	200	340	26	40	385	5	35	190	224	450	490

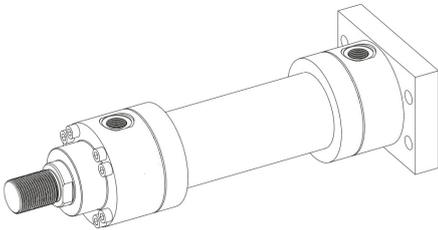
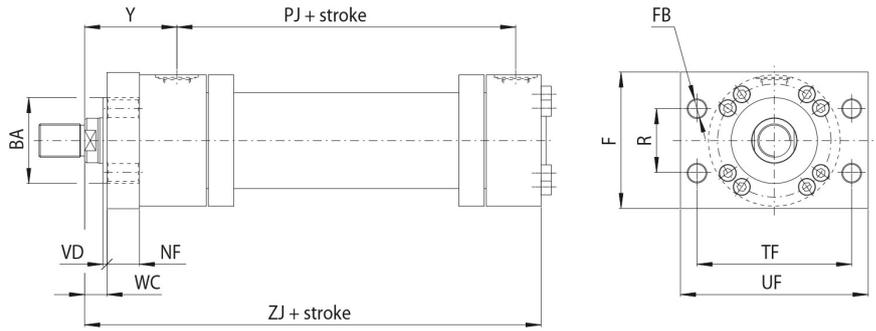
All dimensions are in mm .

**NOTE:** For Rod End Dimensions refer to the section [13](#)

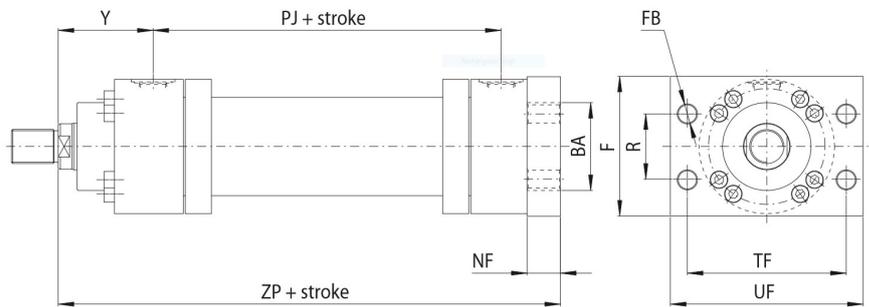
15 Rectangular Flange Mountings :



**Style N**  
ISO MF1  
Front Rectangular Flange



**Style P**  
ISO MF2  
Rear Rectangular Flange



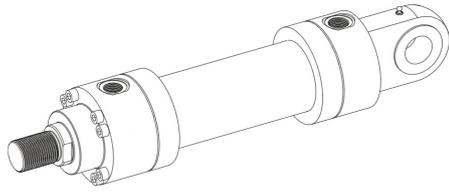
Installation Dimensions - MF1 & MF2

Bore Ø	Rod Ø	BA H8	F max	FB H13	NF js13	R js13	TF js13	UF max	VD	WC	Y	+Stroke		
												PJ	ZJ	ZP
40	22 28	50	80	9	16	40.6	98	115	3	16	71	97	190	206
50	28 36	60	100	11	20	48.2	116.4	140	4	18	72	111	205	225
63	36 45	70	120	13.5	25	55.5	134	160	4	20	82	117	224	249
80	45 56	85	135	17.5	32	63.1	152.5	185	4	22	91	134	250	282
100	56 70	106	160	22	32	76.5	184.8	225	5	25	108	162	300	332
125	70 90	132	195	22	32	90.2	217.1	255	5	28	121	174	325	357

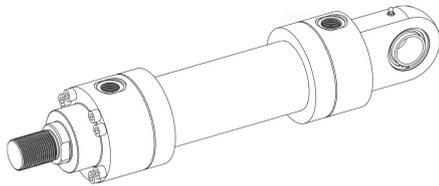
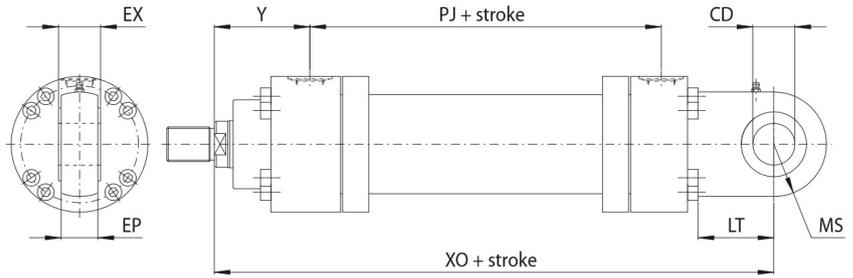
All dimensions are in mm .

**NOTE:** For Rod End Dimensions refer to the section [13](#)

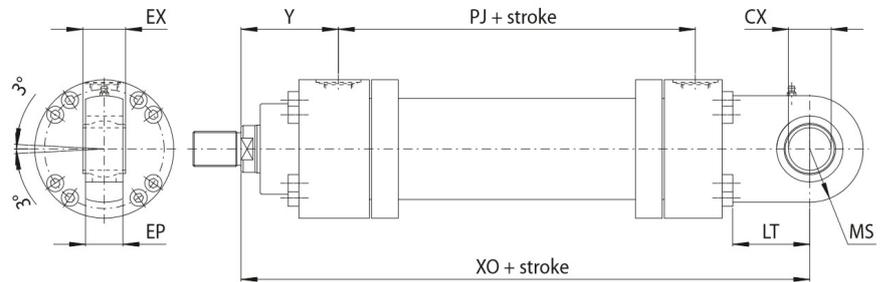
16 Pivot Mountings :



**Style D**  
**ISO MP3**  
Rear Fixed Eye



**Style S**  
**ISO MP5**  
Rear Fixed Eye with Spherical Bearing



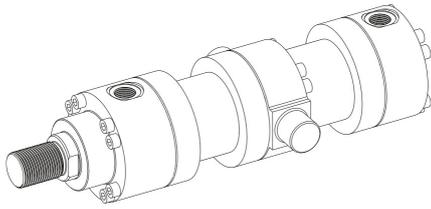
Installation Dimensions - MP3 & MP5

Bore Ø	Rod Ø	CX H7	CD H9	EX h12	EP	LT min	MS max	Y	+Stroke	
									PJ	XO
40	22 28	20	20	20	18	25	25	71	97	231
50	28 36	25	25	25	22	32	32	72	111	257
63	36 45	32	32	32	27	40	40	82	117	289
80	45 56	40	40	40	35	50	50	91	134	332
100	56 70	50	50	50	40	63	63	108	162	395
125	70 90	63	63	63	52	71	71	121	174	428
160	90 110	80	80	80	66	90	90	143	191	505
200	110 140	100	100	100	84	112	112	190	224	615

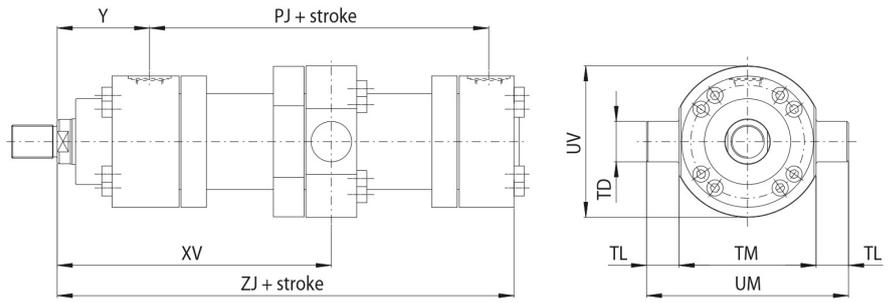
All dimensions are in mm .

**NOTE:** For Rod End Dimensions refer to the section [13](#)

17 Trunnion Mounting :



Style L  
ISO MT4  
Intermediate Trunnion



Installation Dimensions - MT4

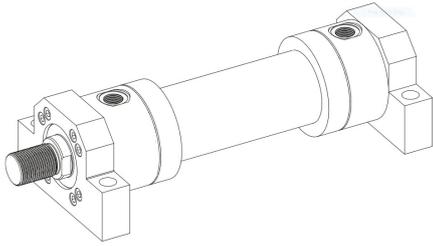
Bore ∅	Rod ∅	TD f8	TL js13	TM h12	UM	UV	Y	Min. Stroke	XV min	+ Stroke		
										XV max	PJ	ZJ
40	22 28	20	16	90	122	90	71	55	155	100	97	190
50	28 36	25	20	105	145	108	72	55	160	105	111	205
63	36 45	32	25	120	170	124	82	85	190	105	117	224
80	45 56	40	32	135	199	150	91	90	215	125	134	250
100	56 70	50	40	160	240	180	108	110	255	145	162	300
125	70 90	63	50	195	295	219	121	135	290	155	174	325
160	90 110	80	63	240	366	280	143	170	340	170	191	370
200	110 140	100	80	295	455	333	190	190	420	230	224	450

All dimensions are in mm .

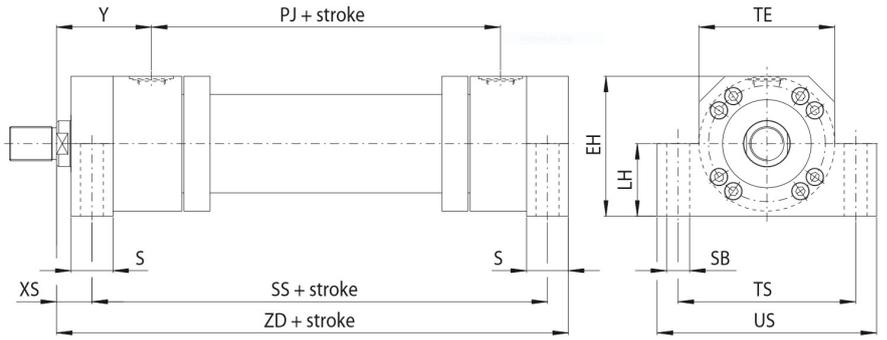
NOTE:

- XV dimension must be indicated in the order code, see section 9
- For Rod End Dimensions refer to the section 13

**18 Foot Mounting :**



**Style E**  
**ISO MS2**  
Foot Mounting



**Installation Dimensions - MS2**

Bore Ø	Rod Ø	EH max	LH h10	S js13	SB H13	TE js13	TS js13	US max	XS	Y	+Stroke		
											PJ	SS	ZD
40	22 28	82	43	25	11	78	100	120	19.5	71	97	183	190
50	28 36	100	52	32	14	95	120	145	22	72	111	199	205
63	36 45	120	62	32	18	116	150	180	29	82	117	211	224
80	45 56	135	70	40	22	130	170	210	34	91	134	236	250
100	56 70	161	82	50	26	158	205	250	32	108	162	293	300
125	70 90	196	100	56	33	192	245	300	32	121	174	321	325
160	90 110	238	119	60	33	238	295	350	36	143	191	364	370
200	110 140	288	145	72	39	285	350	415	39	190	224	447	450

All dimensions are in mm .

**NOTE:** For Rod End Dimensions refer to the section [13](#)



## Hydraulic Cylinders Type R2 - Square heads with tie rods

Conforms to ISO 6020-2: Nominal pressure of 160 bar and max 250 bar

Series R2 hydraulic cylinders are designed for heavy mill duty application and conforms to ISO 6020-2. It is completely interchangeable among manufacturers. It allows manufacturers of hydraulic equipments flexibility in the design of cylinders while it does not restrict technical development; however, it does provide basic guidelines.

### Standard Specifications :

- Heavy duty construction
- Double Acting Design
- Bore Sizes: **40 mm to 200 mm**
- Rod Sizes: **18 mm to 140 mm**
- Strokes up to **5000 mm**
- **Three** rod diameters per bore
- **Two** seals options
- **Air Bleed** at both ends
- **Male & Female** rod end threads
- **Twelve** standard mounting styles
- **Adjustable** or **Fixed** cushioning
- **Oversized** oil port options

### Ordering Instructions :

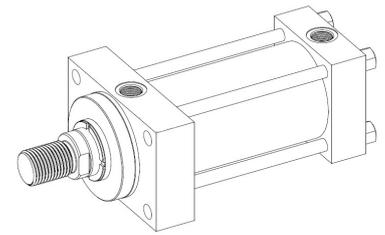
<b>Cylinder Series:</b> R2 [ISO 6020-2]	<b>Mounting Style:</b> see section <a href="#">1</a>	<b>Bore Size:</b> From $\varnothing$ 40 - 200 mm, see section <a href="#">13</a>	<b>Rod Size:</b> From $\varnothing$ 18 - 140 mm, see section <a href="#">13</a>	<b>Second Rod Size (for double rod):</b> From $\varnothing$ 12 - 140 mm [skip if single rod], see section <a href="#">13</a>	<b>Stroke:</b> Up to 5000 mm, see section <a href="#">5</a>	<b>Sealing System:</b> S - Standard [NBR + PTFE + PU] [-20° C to 85° C] V - Viton, For High Temp. [FKM + PTFE] [-20° C to 120° C]	<b>Spacer:</b> see section <a href="#">6</a> 0 - None; 2 - 50 mm; 4 - 100 mm; 6 - 150 mm; 8 - 200 mm	<b>Rod Treatment:</b> see section <a href="#">7</a> K - Ground & hard chrome plated T - Induction hardened, Ground & hard chrome plated	<b>Cushioning:</b> see section <a href="#">4</a>	<b>Oil Port Positions:</b> see section <a href="#">3</a> B1;B2;B3 & B4 - Front Head Oil Port at Location 1;2;3 & 4 X1;X2;X3 & X4 - Rear Head Oil Port at Location 1;2;3 & 4	<b>Oil Port options:</b> see section <a href="#">2</a> 0 - Standard 1 - Front & Rear Oversized Oil Ports D - Front Oversized Oil Port Y - Rear Oversized Oil Port	<b>Rod End:</b> see section <a href="#">13</a> 1 - Male Thread 2 - Female Thread
--	--	--	---	--	---	---	---	---	--	---	---	--

\*NOTE: 1) F or style L [MT4], XV Dimension must be indicated in the order code, see section [8](#)

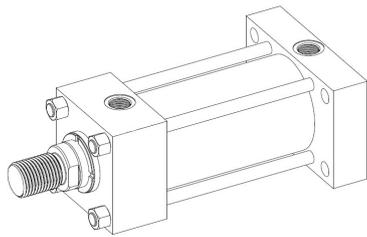
2) Double Rod not available for styles- C, D, H, P & S

**1 Mounting Style :**

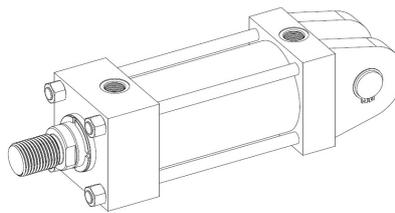
- 12 different standard styles of mounting as shown below
- Browse through subsequent pages for technical details and mounting dimensions
- Piston Rod End dimensions are given separately in section [13](#)



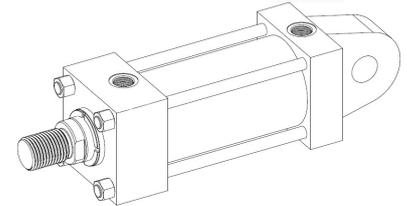
**ISO ME5**  
**Style N [Front Rectangular Flange]**



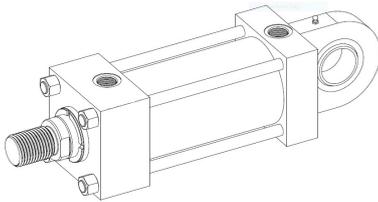
**ISO ME6**  
**Style P [Rear Rectangular Flange]**



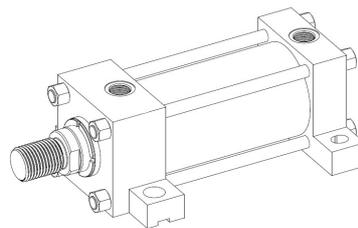
**ISO MP1**  
**Style C [Fixed Clevis]**



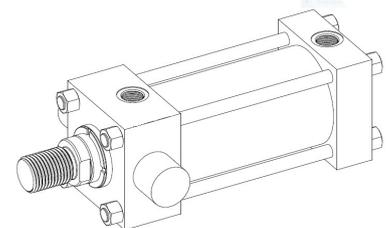
**ISO MP3**  
**Style D [Fixed Eye]**



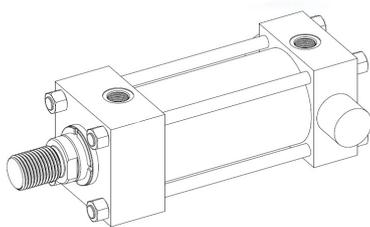
**ISO MP5**  
**Style S [Fixed Eye with Spherical Bearing]**



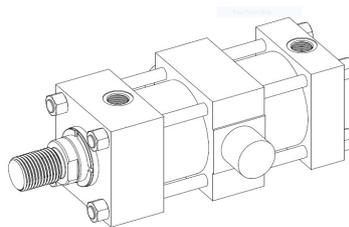
**ISO MF2**  
**Style E [Foot Mounting]**



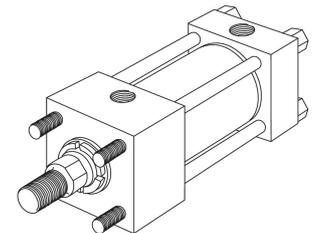
**ISO MT1**  
**Style G [Front Trunnion]**



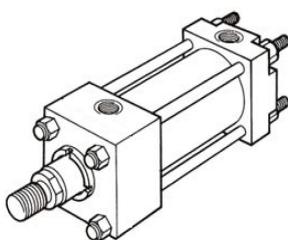
**ISO MT2**  
**Style H [Rear Trunnion]**



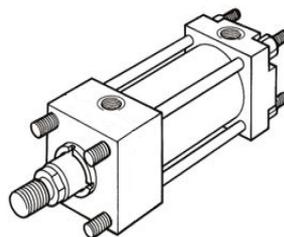
**ISO MT4**  
**Style L [Intermediate Trunnion]**



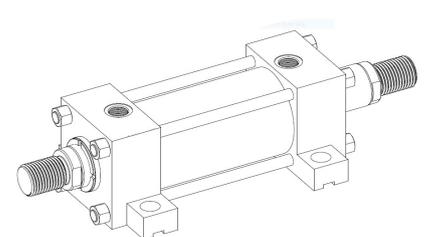
**ISO MX3**  
**Style Y [Front End Tie Rods Extended]**



**ISO MX2**  
**Style V [Rear End Tie Rods Extended]**



**ISO MX1**  
**Style W [Both End Tie Rods Extended]**



**Non - ISO**  
**Style E [Foot Mounting for Double Rod]**

**2 Size Of Oil Ports & Square Head Dimension [mm]:**

Bore Ø		40	50	63	80	100	125	160	200
Standard Oil Ports	D <sub>min</sub>	25	29	29	36	36	42	42	52
	EE (BSPP)	G ¾	G ½	G ½	G ¾	G ¾	G 1	G 1	G 1 ½
Oversized Oil Ports	D1 <sub>min</sub>	29	36	36	42	42	52	52	58
	EE1 (BSPP)	G ½	G ¾	G ¾	G 1	G 1	G 1 ½	G 1 ½	G 1 ½

- Oil ports EE are threaded according to GAS standard with counter bore dimension D.
- When oversized oil ports are selected dimensions D and EE are respectively modified into D1 and EE1.

Bore Ø	40	50	63	80	100	125	160	200
E	63 ±1.5	75 ±1.5	90 ±1.5	115 ±1.5	130 ±2	155 ±2	205 ±2	245 ±2
M	1500	1800	2300	3000	3500	3500	3500	3500

- If not otherwise specified, E is the value of the front and rear square heads dimension for all the mounting styles.
- For strokes longer than M, one or more intermediate tie rods supports 1 are fitted on the cylinder housing to maintain the radial tension on the tie rods, thus keeping them rigidly fixed to the cylinder housing. The support has the same overall dimensions of the square heads.

• SAE 3000 flanges are available on request. Contact our Technical office.

**3 Position of Oil Ports:**

- FRONT HEAD: B\* = oil port position;
- REAR HEAD: X\* = oil port position;
- \*Selected position (1, 2, 3 or 4)

The oil ports and cushioning adjustments positions are available, respectively on sides 1 and 3 for all styles except E (see the figure at side): the style E has the cushioning adjustments on side 2.

Unless otherwise specified by customer, the standard oil port position remains as shown in figure at side, i.e. B1 & X1.

**4 Cushioning:**

Cushioning is recommended for applications where:

- The piston makes a full stroke with speed over than 0.05 m/s;
- It is necessary to reduce undesirable noise and mechanical shocks;
- Vertical application with heavy loads.

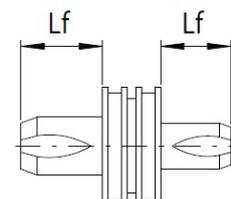
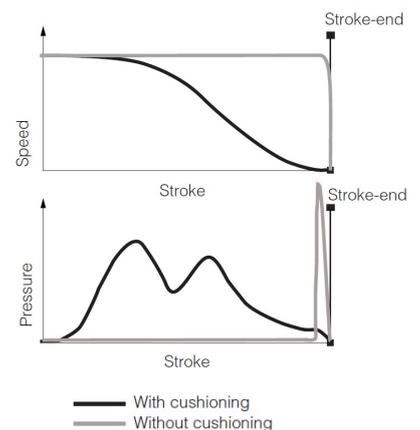
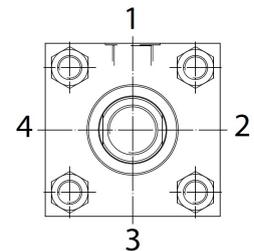
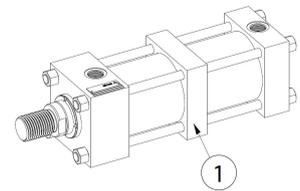
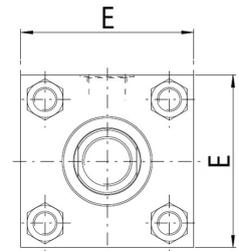
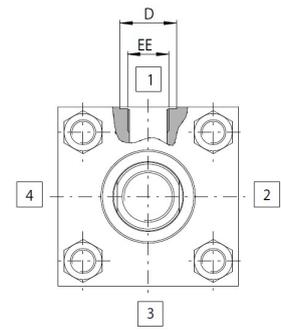
The stroke-end cushioning are hydraulic dampers specifically designed to dissipate the energy of the mass connected to the cylinder rod, by progressively increasing the pressure in the cushioning chamber and thus reducing the rod speed before the cylinder's mechanical stroke-end (see the graphics at side). The regulating screws are supplied fully screwed in (max cushioning effect).

In case of high masses and/or very high operating speeds it is recommended to back them off to optimize the cushioning effect. The adjustment screw has a special design to prevent unlocking and expulsion. The cushioning effect is highly ensured even in case of variation of the fluid viscosity.

**Cushioning Length:**

Lf is the total cushioning length. When the stroke-end cushioning are used as safety devices, to mechanically preserve the cylinder and the system, it is advisable to select the cylinder's stroke longer than the operating one by an amount equal to the cushioning length Lf; in this way the cushioning effect does not influence the movement during the operating stroke.

Bore Ø		40		50		63		80		100		125		160		200	
Rod Ø		18	22	22	28	28	36	36	45	45	56	56	70	70	90	90	110
Cushioning Length [mm]	Lf Front	26	25	28	27	28	27	27	29	35	27	28	25	34	34	49	34
	Lf Rear	27		28		30		32		32		32		41		56	



**5 Stroke Selection:**

Stroke has to be selected a few mm longer than the working stroke, to prevent to use the cylinder heads as mechanical stroke-end.

Standard strokes to ISO 4393;

**25, 50, 80, 100, 125, 160, 200, 250, 320, 400, 500, 630, 800, 1000, 1250**

Maximum stroke: 5000 mm

Stroke tolerances:

- 0 +2 mm for strokes up to 1250 mm
- 0 +5 mm for strokes from 1250 to 3150 mm
- 0 +8 mm for strokes over 3150 mm

**6 Spacer:**

For strokes longer than 1000 mm, proper spacers have to be introduced in the cylinder's construction to increase the rod and piston guide and to protect them from overloads and premature wear. Spacers can be omitted for cylinders working in traction mode. The introduction of spacers increases the overall cylinder's dimensions: spacers' length has to be added to all stroke dependent dimensions.

Stroke [mm]	1001 to 1500	1501 to 2000	2001 to 2500	2501 to 5000
<b>Spacer Code</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>8</b>
<b>Length [mm]</b>	50	100	150	200

**7 Rod Features & options:**

The rods materials have high strength - EN8D / C45 & the rod surface is chrome plated: diameter tolerances f7, roughness Ra ≤ 0.25 µm.

Rod hardness can be improved selecting the options T :

**K** = Ground and hard chrome plated (for rods from 22 to 110mm)

**T** = Induction surface hardening, ground & hard chrome plated

- 56-60 HRC (613-697 HV) hardness.

**8 Note [Trunnion Mounting]:**

**XV** - For cylinders with mounting style **L** the stroke must always exceed the minimum values reported in the table. The requested XV value must be included between **XV min** and **XV max** and it must be always indicated, with dimension in millimetres, together with the cylinder code. See the following example:

R2 L - 50 / 22 / 0500 - 0 K 0 S 0 - B1X1 - 1

**XV = 200**

**9 Cylinder's Housing Features:**

The cylinder's housings are made in "cold drawn and stressed steel" & "Hot rolled steel"; the internal surfaces are lapped: diameter tolerance H8, roughness Ra ≤ 0.25 µm.

**10 Fluid Requirements:**

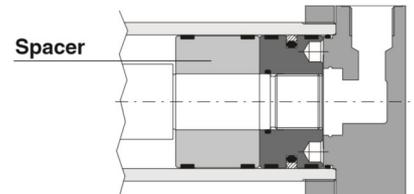
Cylinders and servo cylinders are suitable for operation with mineral oils with or without additives (**HH, HL, HLP, HLP-D, HM, HV**), fire resistant fluids (**HFA** oil in water emulsion, 90-95% water and 5-10% oil; **HFB** water in oil emulsion, 40% water; **HFC** water glycol, max 45% water) and synthetic fluids (**HFD-U** organic esters, **HFD-R** phosphate esters). The fluid must have a viscosity within 15 and 100 mm<sup>2</sup>/s, a temperature within 0 and 70°C and fluid contamination class ISO 20/18/15 according to ISO 4406 NAS1638 class 9.

**11 Rod - Piston Coupling:**

The rod and piston are mechanically coupled by a threaded connection in which the thread on the rod is at least equal to the external thread KK. The piston is screwed to the rod by a pre-fixed tightening torque in order to improve the fatigue resistance. The Grub screw **1** avoids the piston unscrewing.

**12 Double Rod:**

Double rod cylinders ensure the same pushing and pulling areas, thus the same speeds and forces. Rod2 is screwed into the male thread of Rod1(see figure at side), consequently the Rod2 is weaker than the other and it is strongly recommended to use this one only to compensate the areas; the stronger rod is identified by the number '1' stamped on its end. For double rod cylinders, rod end dimensions indicated in section-13 are valid for both the rods.

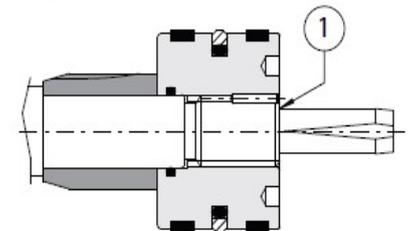


**\* Tie Rod Features:**

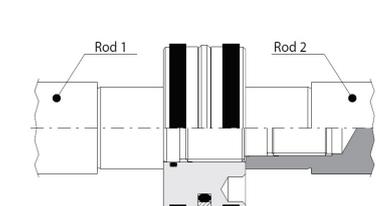
The cylinder's tie rods are made in "normalized automatic steel"; end-threads are rolled to improve the fatigue working life. They are screwed to the heads or mounted by means of nuts with a prefixed tightening torque MT, see table below:

Bore Ø	40	50	63	80
MT [Nm]	20	70	70	160
Wrench	13	19	19	24
Bore Ø	100	125	160	200
MT [Nm]	160	460	820	1160
Wrench	24	32	41	46

Single Rod

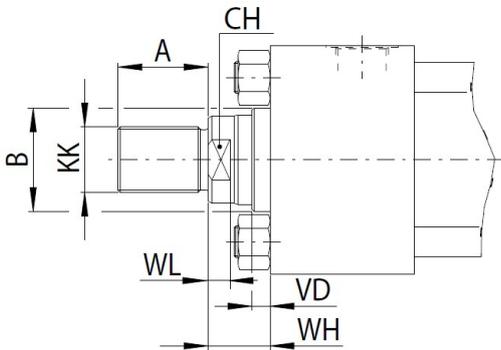


Double Rod

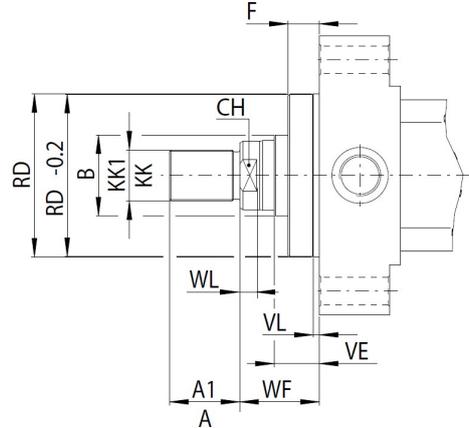


**13 Piston Rod End Data :**

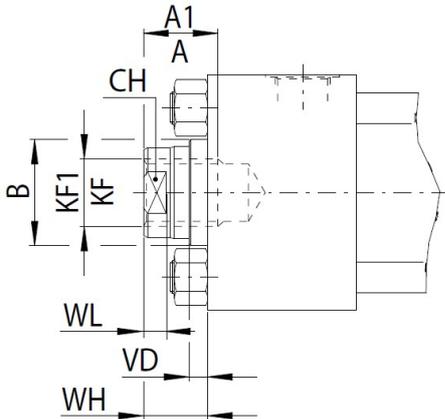
**Rod End [Male] Code 1**  
For all styles except N



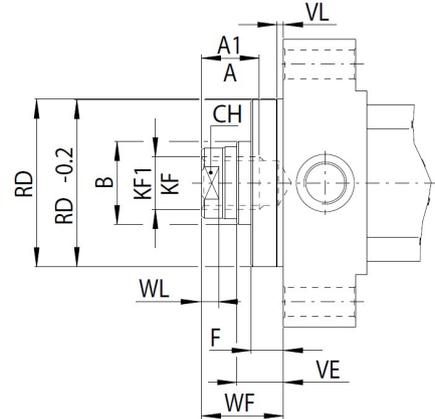
**Rod End [Male] Code 3**  
For style N



**Rod End [Female] Code 2**  
For all styles except N



**Rod End [Female] Code 4**  
For style N



**Rod End Dimensions :**

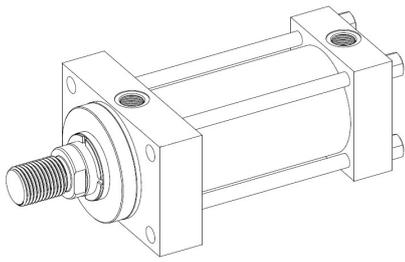
Bore ∅	Rod ∅	Male Thread		Female Thread		A (KK or KF)	A1 (KK1 or KF1)	B f9	CH H14	F max	RD f8	VD	VE max	VL min	WF ±2	WH ±2	WL min
		KK 6g Code 1,3	KK1 6g Code 3	KF 6H Code 2,4	KF1 6H Code 2,4												
40	18	M14 X 1.5	NA	M12 X 1.25	NA	18	NA	30	15	10	62	6	16	3	35	25	5
	22	M16 X 1.5	M14 X 1.5	M16 X 1.5	NA	22	18	34	19	10	62	12	22	3	35	25	5
	28	M20 X 1.5	M14 X 1.5	M20 X 1.5	M12 X 1.25	28	18	42	22	10	62	12	22	3	35	25	7
50	22	M16 X 1.5	NA	M16 X 1.5	NA	22	NA	34	19	16	74	9	25	4	41	25	5
	28	M20 X 1.5	M16 X 1.5	M20 X 1.5	NA	28	22	42	22	16	74	9	25	4	41	25	7
	36	M27 X 2	M16 X 1.5	M27 X 2	M16 X 1.5	36	22	50	30	16	74	9	25	4	41	25	8
63	28	M20 X 1.5	NA	M20 X 1.5	NA	28	NA	42	22	16	75	13	29	4	48	32	7
	36	M27 X 2	M20 X 1.5	M27 X 2	NA	36	28	50	30	16	88	13	29	4	48	32	8
	45	M33 X 2	M20 X 1.5	M33 X 2	M20 X 1.5	45	28	60	39	16	88	13	29	4	48	32	10
80	36	M27 X 2	NA	M27 X 2	NA	36	NA	50	30	20	82	9	29	4	51	31	8
	45	M33 X 2	M27 X 2	M33 X 2	NA	45	36	60	39	20	105	9	29	4	51	31	10
	56	M42 X 2	M27 X 2	M42 X 2	M27 X 2	56	36	72	48	20	105	9	29	4	51	31	10
100	45	M33 X 2	NA	M33 X 2	NA	45	NA	60	39	22	92	10	32	5	57	35	10
	56	M42 X 2	M33 X 2	M42 X 2	NA	56	45	72	48	22	125	10	32	5	57	35	10
	70	M48 X 2	M33 X 2	M48 X 2	M33 X 2	63	45	88	62	22	125	10	32	5	57	35	10
125	56	M42 X 2	NA	M42 X 2	NA	56	NA	72	48	22	105	10	32	5	57	35	10
	70	M48 X 2	M42 X 2	M48 X 2	NA	63	56	88	62	22	150	7	29	5	57	35	10
	90	M64 X 3	M42 X 2	M64 X 3	M42 X 2	85	56	108	80	22	150	7	29	5	57	35	15
160	70	M48 X 2	NA	M48 X 2	NA	63	NA	88	62	25	125	7	32	5	57	32	10
	90	M64 X 3	M48 X 2	M64 X 3	NA	85	63	108	80	25	170	7	32	5	57	32	15
	110	M80 X 3	M48 X 2	M80 X 3	M48 X 2	95	63	133	100	25	170	7	32	5	57	32	15
200	90	M64 X 3	NA	M64 X 3	NA	85	NA	108	80	25	150	7	32	5	57	32	15
	110	M80 X 3	M64 X 3	M80 X 3	NA	95	85	133	100	25	210	7	32	5	57	32	15
	140	M100 X 3	M64 X 3	M100 X 3	M64 X 3	112	85	163	128	25	210	7	32	5	57	32	15

All dimensions are in mm .

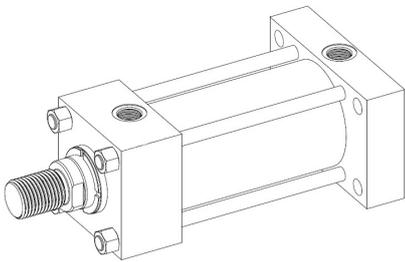
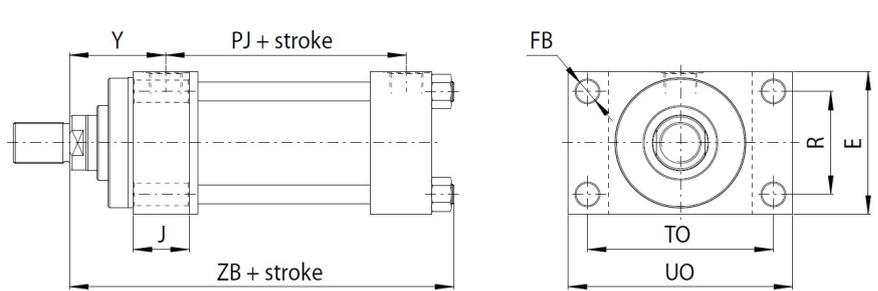
**NOTE:**

- Dimensions A & A1 are according to ISO 4395 short type.
- Tolerances: max for male thread; min for female thread.

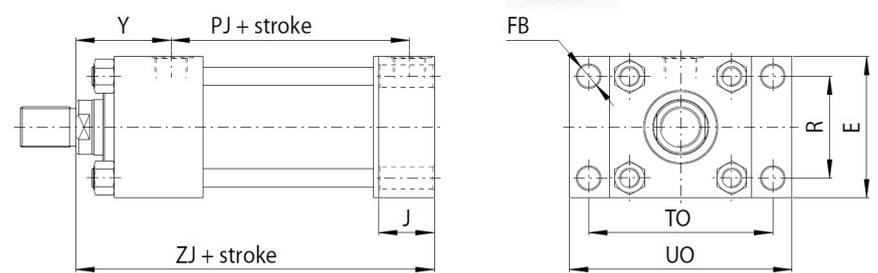
14 Rectangular Flange Mountings :



Style N  
ISO ME5  
Front Rectangular Flange



Style P  
ISO ME6  
Rear Rectangular Flange



Installation Dimensions - ME5 & ME6

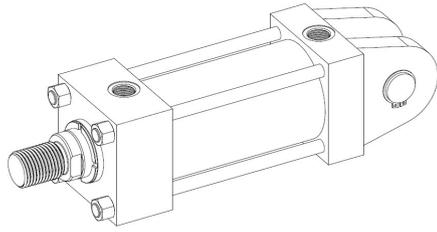
Bore Ø	Rod Ø	E	FB H13	J ref	R js13	TO js13	UO max	Y	Y1	+Stroke			
										PJ	PJ2	ZB max	ZJ
40	18 22 28	63	11	38	41	87	110	62	63	73	73	166	153
50	22 28 36	75	14	38	52	105	130	67	65.5	74	76	176	159
63	28 36 45	90	14	38	65	117	145	71	70	80	80	185	168
80	36 45 56	115	18	45	83	149	180	77	75.5	93	93	212	190
100	45 56 70	130	18	45	97	162	200	82	83	101	99	225	203
125	56 70 90	165	22	58	126	208	250	86	84	117	121	260	232
160	70 90 110	205	26	58	155	253	300	86	79.5	130	143	279	245
200	90 110 140	245	33	76	190	300	360	98	97	165	167	336	299

All dimensions are in mm .

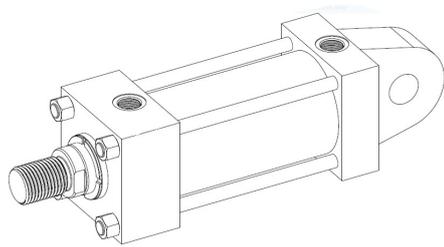
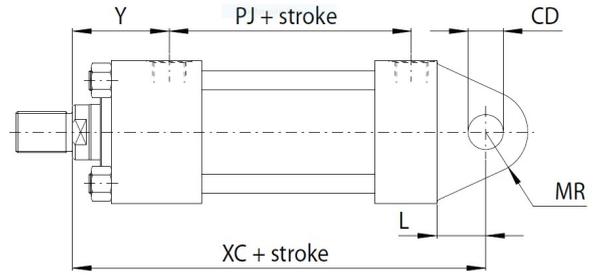
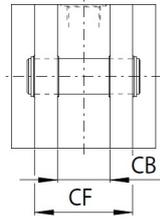
NOTE:

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)

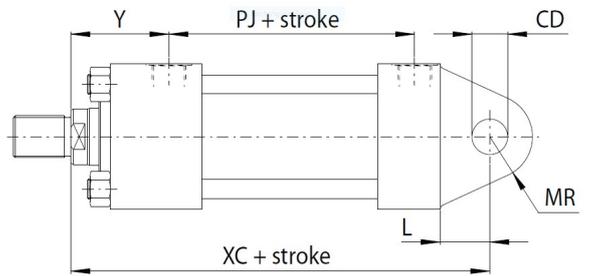
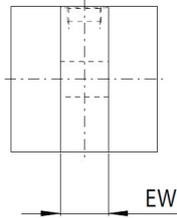
15 Pivot Mountings :



**Style C**  
**ISO MP1**  
Fixed Clevis [supplied with Pivot Pin]



**Style D**  
**ISO MP3**  
Fixed Eye



Installation Dimensions - MP1 & MP3

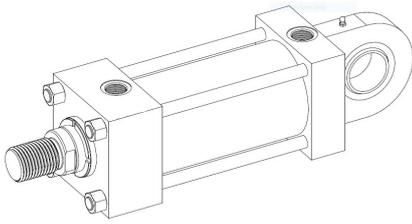
Bore Ø	Rod Ø	CB A13	CD H9	CF max	EW h14	L min	MR max	Y	Y1	+Stroke		
										PJ	PJ2	XC
40	18	20	14	42	20	19	17	62	63	73	73	172
	22											
	28											
50	22	30	20	62	30	32	29	67	65.5	74	76	191
	28											
	36											
63	28	30	20	62	30	32	29	71	70	80	80	200
	36											
	45											
80	36	40	28	83	40	39	34	77	75.5	93	93	229
	45											
	56											
100	45	50	36	103	50	54	50	82	83	101	99	257
	56											
	70											
125	56	60	45	123	60	57	53	86	84	117	121	289
	70											
	90											
160	70	70	56	143	70	63	59	86	79.5	130	143	308
	90											
	110											
200	90	80	70	163	80	82	78	98	97	165	167	381
	110											
	140											

All dimensions are in mm .

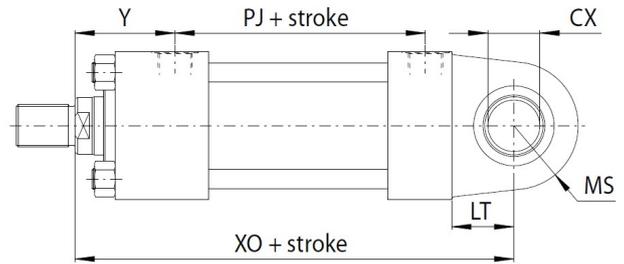
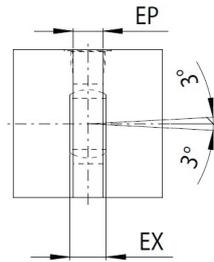
**NOTE:**

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)

**15 Pivot Mountings :**



**Style S**  
**ISO MP5**  
Fixed Eye with Spherical Bearing



**Installation Dimensions - MP5**

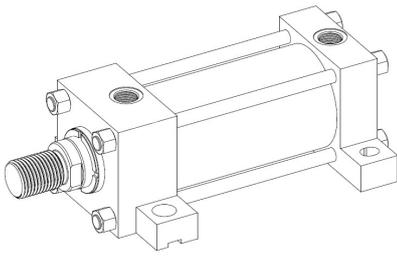
Bore ∅	Rod ∅	CX	EP max	EX	LT min	MS max	Y	Y1	+Stroke		
									PJ	PJ2	XO
40	18	20 <sup>-0.012</sup>	13	16 <sup>-0.12</sup>	25	29	62	63	73	73	178
	22										
	28										
50	22	25 <sup>-0.012</sup>	17	20 <sup>-0.12</sup>	31	33	67	65.5	74	76	190
	28										
	36										
63	28	30 <sup>-0.012</sup>	19	22 <sup>-0.12</sup>	38	40	71	70	80	80	206
	36										
	45										
80	36	40 <sup>-0.012</sup>	23	28 <sup>-0.12</sup>	48	50	77	75.5	93	93	238
	45										
	56										
100	45	50 <sup>-0.012</sup>	30	35 <sup>-0.12</sup>	58	62	82	83	101	99	261
	56										
	70										
125	56	60 <sup>-0.015</sup>	38	44 <sup>-0.15</sup>	72	80	86	84	117	121	304
	70										
	90										
160	70	80 <sup>-0.015</sup>	47	55 <sup>-0.15</sup>	92	100	86	79.5	130	143	337
	90										
	110										
200	90	100 <sup>-0.020</sup>	57	70 <sup>-0.20</sup>	116	120	98	97	165	167	415
	110										
	140										

All dimensions are in mm .

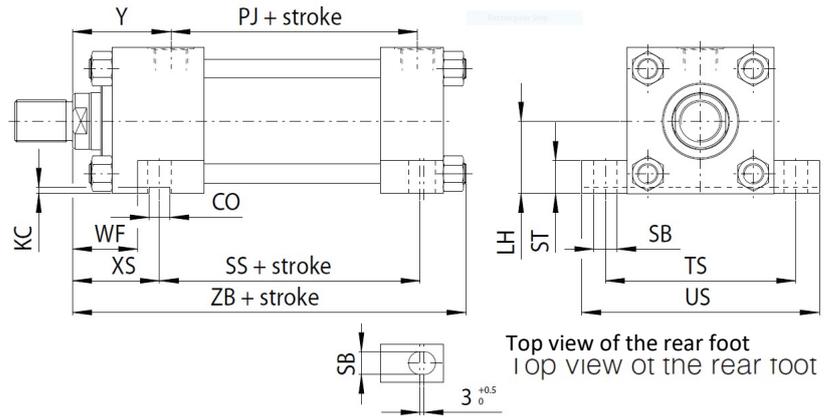
**NOTE:**

- The grease nipple is fitted to cylinders of 50mm bore and above. Smaller bore cylinders have a 2.5mm drilling for lubrication.
- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)

16 Foot Mounting :



Style E  
ISO MS2  
Foot Mounting



Installation Dimensions - MS2

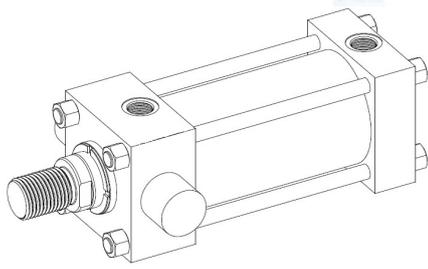
Bore Ø	Rod Ø	CO N9	KC min	LH h10	SB H13	ST js13	TS js13	US max	WF ±2	XS	Y	Y1	+Stroke			
													PJ	PJ2	SS	ZB max
40	18	12	4	31	11	12.5	83	103	35	45	62	63	73	73	97	166
	22															
	28															
50	22	12	4.5	37	14	19	102	127	41	54	67	65.5	74	76	91	176
	28															
	36															
63	28	16	4.5	44	18	26	124	161	48	65	71	70	80	80	85	185
	36															
	45															
80	36	16	5	57	18	26	149	186	51	68	77	75.5	93	93	104	212
	45															
	56															
100	45	16	6	63	26	32	172	216	57	79	82	83	101	99	101	225
	56															
	70															
125	56	20	6	82	26	32	210	254	57	79	86	84	117	121	130	260
	70															
	90															
160	70	30	8	101	33	38	260	318	57	86	86	79.5	130	143	129	279
	90															
	110															
200	90	40	8	122	39	44	311	381	57	92	98	97	165	167	171	336
	110															
	140															

All dimensions are in mm .

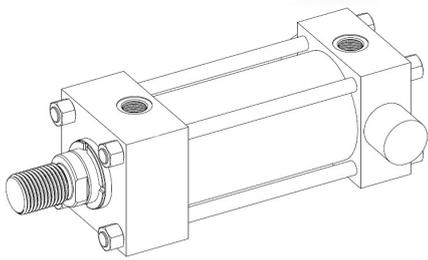
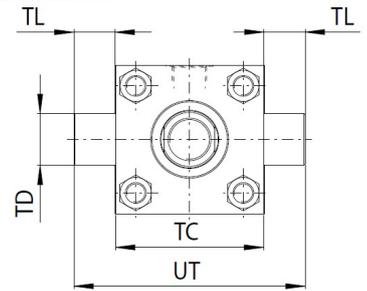
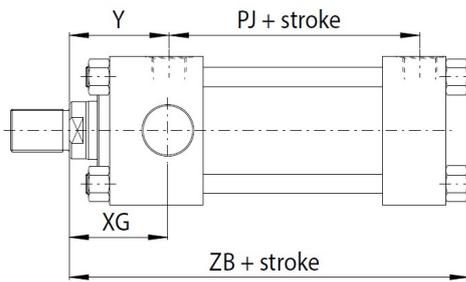
NOTE:

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)

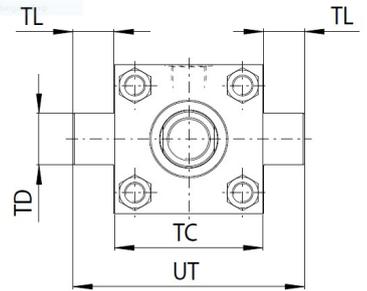
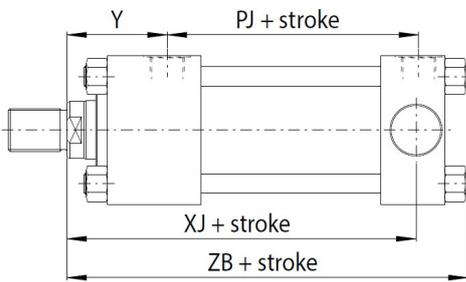
17 Trunnion Mountings :



Style G  
ISO MT1  
Front Trunnion



Style H  
ISO MT2  
Rear Trunnion



Installation Dimensions - MT1 & MT2

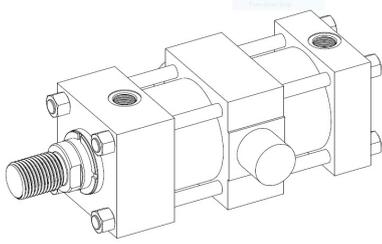
Bore Ø	Rod Ø	TC h14	TD f8	TL js13	UT ref	XG	Y	Y1	+Stroke			
									PJ	PJ2	XJ	ZB max
40	18	63	20	16	95	57	62	63	73	73	134	166
	22											
	28											
50	22	76	25	20	116	64	67	65.5	74	76	140	176
	28											
	36											
63	28	89	32	25	139	70	71	70	80	80	149	185
	36											
	45											
80	36	114	40	32	178	76	77	75.5	93	93	168	212
	45											
	56											
100	45	127	50	40	207	71	82	83	101	99	187	225
	56											
	70											
125	56	165	63	50	265	75	86	84	117	121	209	260
	70											
	90											
160	70	203	80	63	329	75	86	79.5	130	143	230	279
	90											
	110											
200	90	241	100	80	401	85	98	97	165	167	276	336
	110											
	140											

All dimensions are in mm .

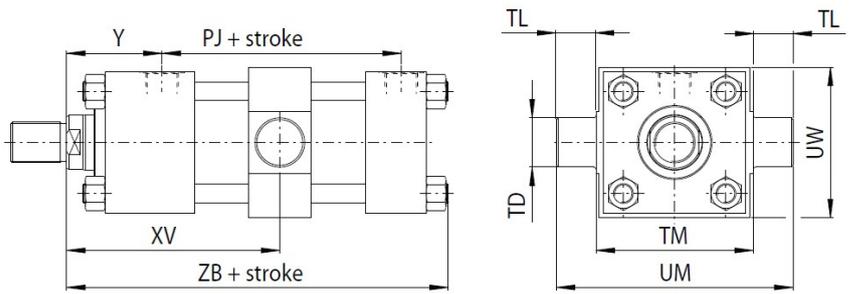
NOTE:

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section 13

17 Trunnion Mountings :



**Style L**  
**ISO MT4**  
Intermediate Trunnion



Installation Dimensions - MT4

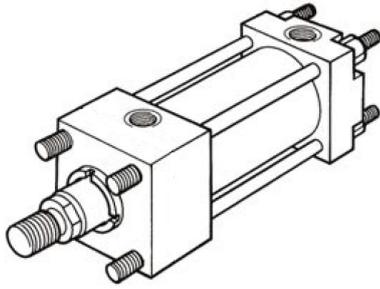
Bore Ø	Rod Ø	TM h14	TD f8	TL js13	UM ref	UW max	Y	Y1	Min. Stroke	XV min	+Stroke			
											XV max	PJ	PJ2	ZB max
40	18	76	20	16	108	70	62	63	5	100	99	73	73	166
	22													
	28													
50	22	89	25	20	129	88	67	65.5	15	109	98	74	76	176
	28													
	36													
63	28	100	32	25	150	98	71	70	20	120	100	80	80	185
	36													
	45													
80	36	127	40	32	191	127	77	75.5	20	129	115	93	93	212
	45													
	56													
100	45	140	50	40	220	141	82	83	35	148	117	101	99	225
	56													
	70													
125	56	178	63	50	278	168	86	84	35	155	134	117	121	260
	70													
	90													
160	70	215	80	63	341	205	86	79.5	35	161	141	130	143	279
	90													
	110													
200	90	279	100	80	439	269	98	97	35	195	166	165	167	336
	110													
	140													

All dimensions are in mm .

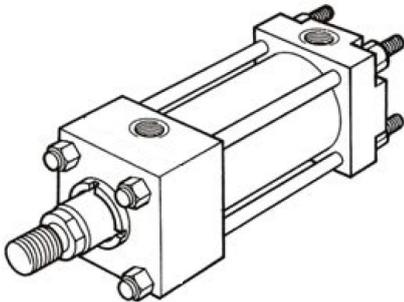
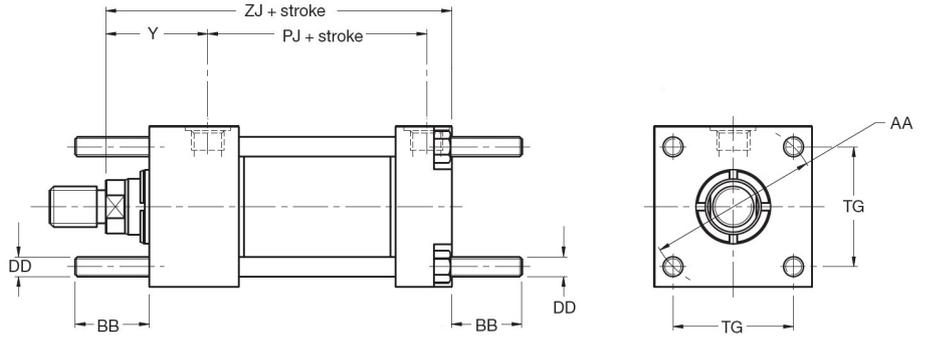
**NOTE:**

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)

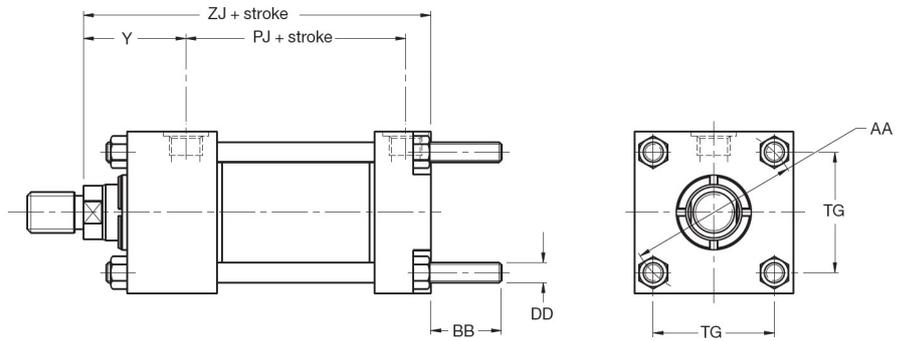
18 Tie Rod Mountings :



**Style W**  
**ISO MX1**  
Both End Tie Rods Extended



**Style V**  
**ISO MX2**  
Rear End Tie Rods Extended



Installation Dimensions - MX1 & MX2

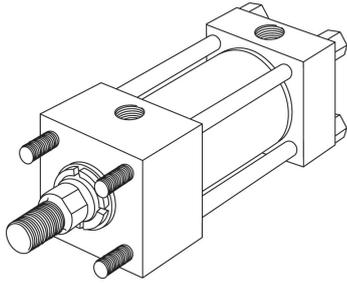
Bore Ø	Rod Ø	AA	BB +3/0	DD 6g	TG js13	Y	Y1	+Stroke		
								PJ	PJ2	ZJ
40	18	59	35	M8 X 1	41.7	62	63	73	73	153
	22									
	28									
50	22	74	46	M12 X 1.25	52.3	67	65.5	74	76	159
	28									
	36									
63	28	91	46	M12 X 1.25	64.3	71	70	80	80	168
	36									
	45									
80	36	117	59	M16 X 1.5	82.7	77	75.5	93	93	190
	45									
	56									
100	45	137	59	M16 X 1.5	96.9	82	83	101	99	203
	56									
	70									
125	56	178	81	M22 X 1.5	125.9	86	84	117	121	232
	70									
	90									
160	70	219	92	M27 X 2	154.9	86	79.5	130	143	245
	90									
	110									
200	90	269	115	M30 X 2	190.2	98	97	165	167	299
	110									
	140									

All dimensions are in mm .

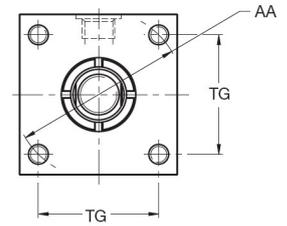
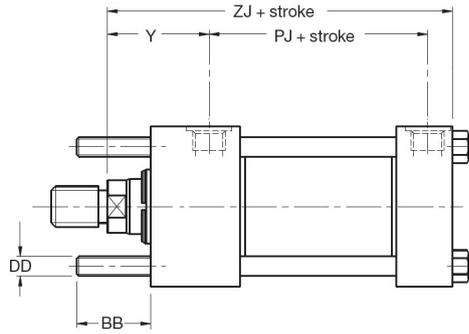
**NOTE:**

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)

**18 Tie Rod Mountings :**



**Style Y**  
**ISO MX3**  
Front End Tie Rods Extended



**Installation Dimensions - MX3**

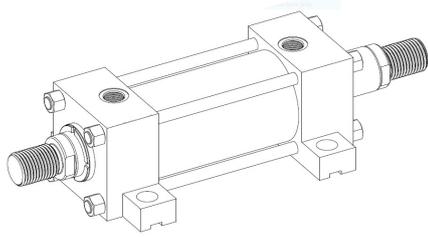
Bore Ø	Rod Ø	AA	BB +3/0	DD 6g	TG js13	Y	Y1	+Stroke		
								PJ	PJ2	ZJ
40	18	59	35	M8 X 1	41.7	62	63	73	73	153
	22									
	28									
50	22	74	46	M12 X 1.25	52.3	67	65.5	74	76	159
	28									
	36									
63	28	91	46	M12 X 1.25	64.3	71	70	80	80	168
	36									
	45									
80	36	117	59	M16 X 1.5	82.7	77	75.5	93	93	190
	45									
	56									
100	45	137	59	M16 X 1.5	96.9	82	83	101	99	203
	56									
	70									
125	56	178	81	M22 X 1.5	125.9	86	84	117	121	232
	70									
	90									
160	70	219	92	M27 X 2	154.9	86	79.5	130	143	245
	90									
	110									
200	90	269	115	M30 X 2	190.2	98	97	165	167	299
	110									
	140									

All dimensions are in mm .

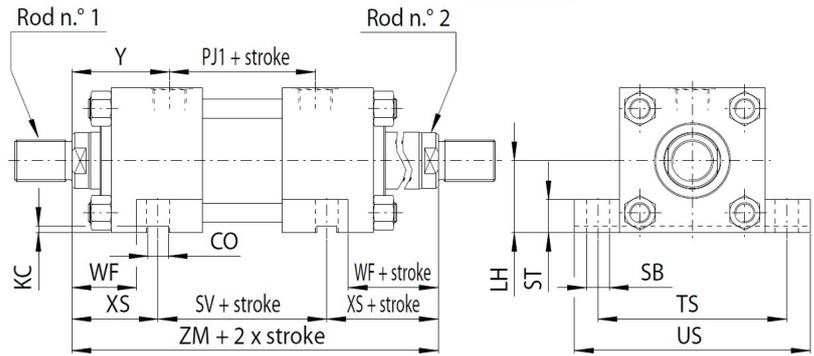
**NOTE:**

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)

19 Double Rod Cylinders :



**Style E**  
**Non - ISO**  
 Foot Mounting  
 Available with Styles W,Y,N,E,G,L



Installation Dimensions -

Bore Ø	Rod Ø	CO N9	KC min	LH h10	SB H13	ST js13	TS js13	US max	Y	+(2xStroke) ZM	+Stroke			
											PJ1	XS	SV	WF
40	18	12	4	31	11	12.5	83	103	62	195	71	45	105	35
	22													
	28													
50	22	12	4.5	37	14	19	102	127	67	207	73	54	99	41
	28													
	36													
63	28	16	4.5	44	18	26	124	161	71	223	81	65	93	48
	36													
	45													
80	36	16	5	57	18	26	149	186	77	246	92	68	110	51
	45													
	56													
100	45	16	6	63	26	32	172	216	82	265	101	79	107	57
	56													
	70													
125	56	20	6	82	26	32	210	254	86	289	117	79	131	57
	70													
	90													
160	70	30	8	101	33	38	260	318	86	302	130	86	130	57
	90													
	110													
200	90	40	8	122	39	44	311	381	98	356	160	92	172	57
	110													
	140													

All dimensions are in mm .

NOTE:

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)



## Hydraulic Cylinders Type R3 - Square heads with counter flanges

Conforms to ISO 6020-2: Nominal pressure of 160 bar and max 250 bar

Series R3 hydraulic cylinders are designed for heavy mill duty application and conforms to ISO 6020-2. It is completely interchangeable among manufacturers. It allows manufacturers of hydraulic equipments flexibility in the design of cylinders while it does not restrict technical development; however, it does provide basic guidelines.

### Standard Specifications :

- Heavy duty construction
- Double Acting Design
- Bore Sizes: **63 mm to 200 mm**
- Rod Sizes: **28 mm to 140 mm**
- Strokes up to **5000 mm**
- **Three** rod diameters per bore
- **Two** seals options
- **Air Bleed** at both ends
- **Male & Female** rod end threads
- **Seven** standard mounting styles
- **Adjustable** or **Fixed** cushioning
- **Oversized** oil port options

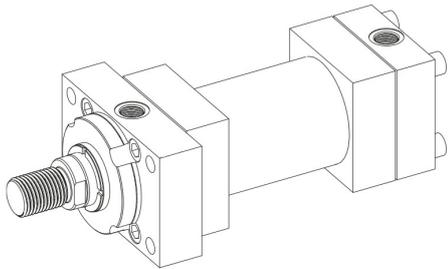
### Ordering Instructions :

<b>Cylinder Series:</b> R3 [ISO 6020-2]	<b>Mounting Style:</b> see section <a href="#">1</a>	<b>Bore Size:</b> From Ø63 - 200 mm, see section <a href="#">13</a>	<b>Rod Size:</b> From Ø28 - 140 mm, see section <a href="#">13</a>	<b>Second Rod Size (for double rod):</b> From Ø28 - 140 mm [skip if single rod], see section <a href="#">13</a>	<b>Stroke:</b> Up to 5000 mm, see section <a href="#">5</a>	<b>Sealing System:</b> S - Standard [NBR + PTFE + PU] [-20° C to 85° C] V - Viton, For High Temp. [FKM + PTFE] [-20° C to 120° C]	<b>Spacer:</b> see section <a href="#">6</a> 0 - None; 2 - 50 mm; 4 - 100 mm; 6 - 150 mm; 8 - 200 mm	<b>Rod Treatment:</b> see section <a href="#">7</a> K - Ground & hard chrome plated T - Induction hardened, Ground & hard chrome plated	<b>Cushioning:</b> see section <a href="#">4</a>	<b>Rod End:</b> see section <a href="#">13</a> 1 - Male Thread 2 - Female Thread	<b>Oil Port Positions:</b> see section <a href="#">3</a> B1;B2;B3 & B4 - Front Head Oil Port at Location 1;2;3 & 4 X1;X2;X3 & X4 - Rear Head Oil Port at Location 1;2;3 & 4	<b>Oil Port options:</b> see section <a href="#">2</a> 0 - Standard 1 - Front & Rear Oversized Oil Ports D - Front Oversized Oil Port Y - Rear Oversized Oil Port
--	--	---	--	---	---	---	---	---	--	--	---	---

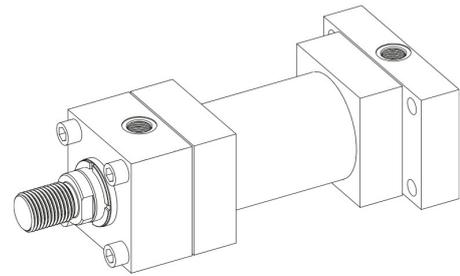
\* Double Rod not available for styles- D, H, P & S

**1 Mounting Style :**

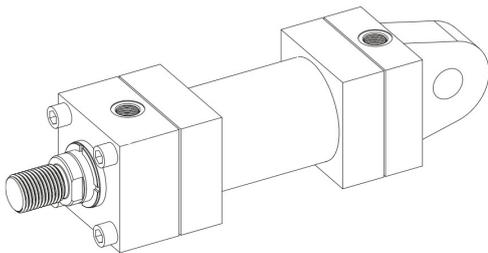
- 7 different standard styles of mounting as shown below
- Browse through subsequent pages for technical details and mounting dimensions
- Piston Rod End dimensions are given separately in section [13](#)



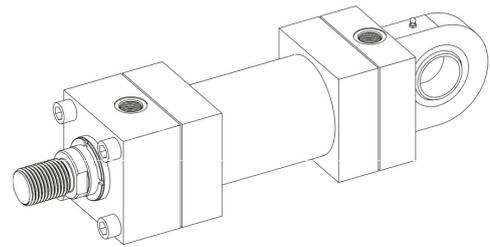
**ISO ME5**  
**Style N [Front Rectangular Flange]**



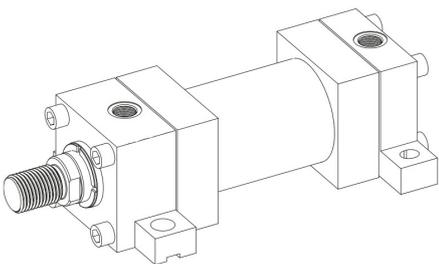
**ISO ME6**  
**Style P [Rear Rectangular Flange]**



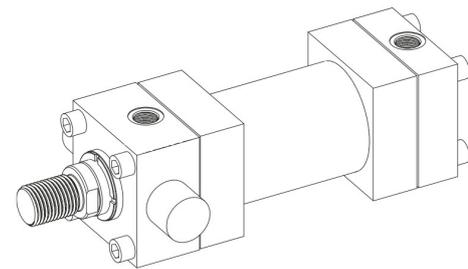
**ISO MP3**  
**Style D [Fixed Eye]**



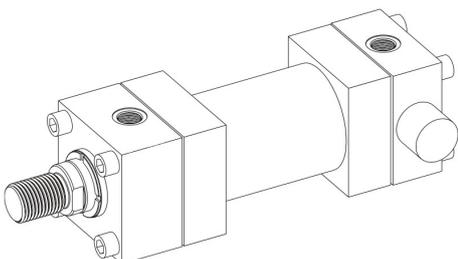
**ISO MF2**  
**Style S [Rear Fixed Eye with Spherical Bearing]**



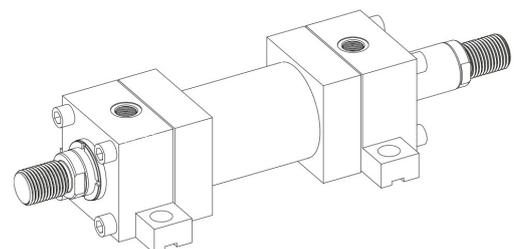
**ISO MS2**  
**Style E [Foot Mounting]**



**ISO MT1**  
**Style G [Front Trunnion]**



**ISO MT2**  
**Style H [Rear Trunnion]**



**Non - ISO**  
**Style E [Foot mounting for Double Rod]**

**2 Size Of Oil Ports & Square Head Dimension [mm]:**

Bore Ø		63	80	100	125	160	200
Standard Oil Ports	D <sub>min</sub>	29	36	36	42	42	52
	EE (BSPP)	G ½	G ¾	G ¾	G 1	G 1	G 1 ¼
Oversized Oil Ports	D1 <sub>min</sub>	36	42	42	52	52	58
	EE1 (BSPP)	G ¾	G 1	G 1	G 1 ¼	G 1 ¼	G 1 ½

- Oil ports EE are threaded according to GAS standard with counter bore dimension D.
- When oversized oil ports are selected dimensions D and EE are respectively modified into D1 and EE1.

Bore Ø	63	80	100	125	160	200
E	90 ±1.5	115 ±1.5	130 ±2	155 ±2	205 ±2	245 ±2

- If not otherwise specified, E is the value of the front and rear square heads dimension for all the mounting styles.

• SAE 3000 flanges are available on request. Contact our Technical office.

**3 Position of Oil Ports:**

- FRONT HEAD: B\* = oil port position;
- REAR HEAD: X\* = oil port position;
- \*Selected position (1, 2, 3 or 4)

The oil ports and cushioning adjustments positions are available, respectively on sides 1 and 3 for all styles except E (see the figure at side): the style E has the cushioning adjustments on side 2.

Unless otherwise specified by customer, the standard oil port position remains as shown in figure at side, i.e. B1 & X1.

**4 Cushioning:**

Cushioning is recommended for applications where:

- The piston makes a full stroke with speed over than 0.05 m/s;
- It is necessary to reduce undesirable noise and mechanical shocks;
- Vertical application with heavy loads.

The stroke-end cushioning are hydraulic dampers specifically designed to dissipate the energy of the mass connected to the cylinder rod, by progressively increasing the pressure in the cushioning chamber and thus reducing the rod speed before the cylinder's mechanical stroke-end (see the graphics at side). The regulating screws are supplied fully screwed in (max cushioning effect).

In case of high masses and/or very high operating speeds it is recommended to back them off to optimize the cushioning effect. The adjustment screw has a special design to prevent unlocking and expulsion. The cushioning effect is highly ensured even in case of variation of the fluid viscosity.

**Cushioning Length:**

Lf is the total cushioning length. When the stroke-end cushioning are used as safety devices, to mechanically preserve the cylinder and the system, it is advisable to select the cylinder's stroke longer than the operating one by an amount equal to the cushioning length Lf; in this way the cushioning effect does not influence the movement during the operating stroke.

Bore Ø		63		80		100		125		160		200	
Rod Ø		28	36 45	36	45 56	45	56 70	56	70 90	70	90 110	90	110 140
Cushioning Length [mm]	Lf Front	28	27	27	29	35	27	28	25	34	34	49	34
	Lf Rear	30		32		32		32		41		56	

**5 Stroke Selection:**

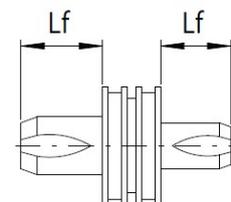
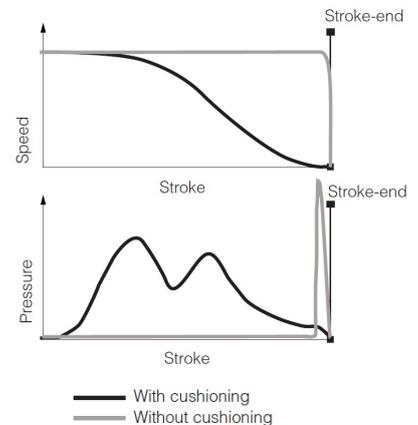
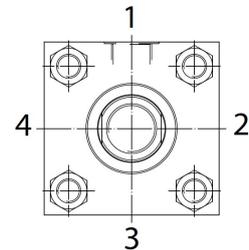
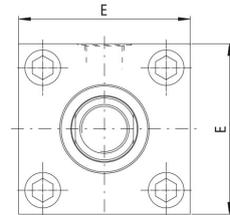
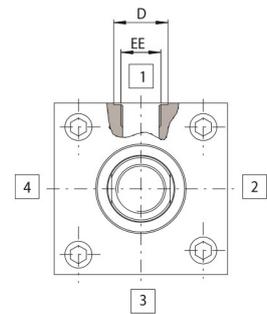
Stroke has to be selected a few mm longer than the working stroke, to prevent to use the cylinder heads as mechanical stroke-end.

Minimum stroke [mm]: see table at side

Maximum stroke: 5000 mm

Stroke tolerances:

- 0 +2 mm for strokes up to 1250 mm
- 0 +5 mm for strokes from 1250 to 3150 mm
- 0 +8 mm for strokes over 3150 mm

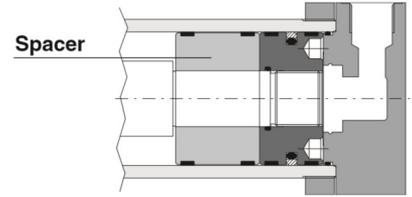


Bore Ø	63	80	100	125	160	200
Min. Stroke [mm]	55	70	70	75	70	85

## 6 Spacer:

For strokes longer than 1000 mm, proper spacers have to be introduced in the cylinder's construction to increase the rod and piston guide and to protect them from overloads and premature wear. Spacers can be omitted for cylinders working in traction mode. The introduction of spacers increases the overall cylinder's dimensions: spacers' length has to be added to all stroke dependent dimensions.

Stroke [mm]	1001 to 1500	1501 to 2000	2001 to 2500	2501 to 5000
Spacer Code	2	4	6	8
Length [mm]	50	100	150	200



## 7 Rod Features & options:

The rods materials have high strength - EN8D / C45 & the rod surface is chrome plated: diameter tolerances f7, roughness Ra ≤ 0.25 μm.

Rod hardness can be improved selecting the options T :

**K** = Ground and hard chrome plated (for rods from 22 to 110mm)

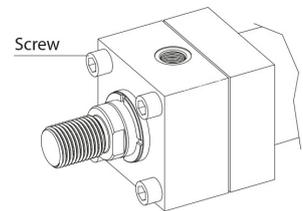
**T** = Induction surface hardening, ground & hard chrome plated

- 56-60 HRC (613-697 HV) hardness.

## 8 Screw Tightening Torque:

Mounting screws must to be a minimum strength of ISO 898/2 grade 12.9.

Bore Ø	63	80	100	125	160	200
MT [Nm]	70	160	160	460	820	1160
Screw	M12	M16	M16	M22	M27	M30



## 9 Cylinder's Housing Features:

The cylinder's housings are made in "cold drawn and stressed steel" & "Hot rolled steel"; the internal surfaces are lapped: diameter tolerance H8, roughness Ra ≤ 0.25 μm.

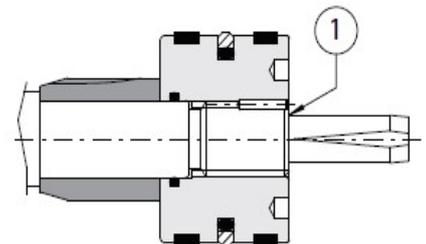
## 10 Fluid Requirements:

Cylinders and servo cylinders are suitable for operation with mineral oils with or without additives (**HH, HL, HLP, HLP-D, HM, HV**), fire resistant fluids (**HFA** oil in water emulsion, 90-95% water and 5-10% oil; **HFB** water in oil emulsion, 40% water; **HFC** water glycol, max 45% water) and synthetic fluids (**HFD-U** organic esters, **HFD-R** phosphate esters). The fluid must have a viscosity within 15 and 100 mm<sup>2</sup>/s, a temperature within 0 and 70°C and fluid contamination class ISO 20/18/15 according to ISO 4406 NAS1638 class 9.

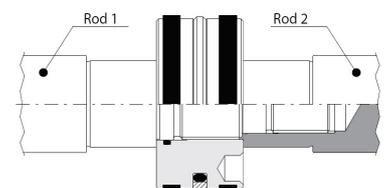
## 11 Rod - Piston Coupling:

The rod and piston are mechanically coupled by a threaded connection in which the thread on the rod is at least equal to the external thread KK. The piston is screwed to the rod by a pre-fixed tightening torque in order to improve the fatigue resistance. The Grub screw **1** avoids the piston unscrewing.

Single Rod



Double Rod

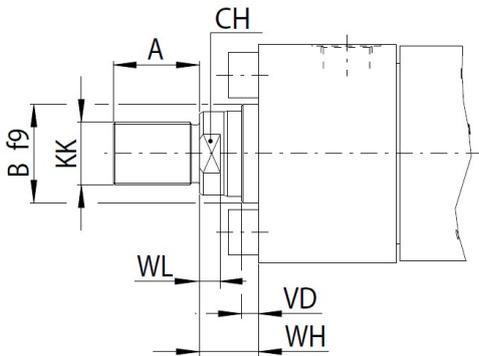


## 12 Double Rod:

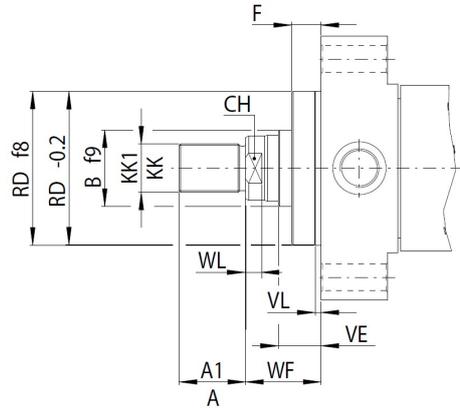
Double rod cylinders ensure the same pushing and pulling areas, thus the same speeds and forces. Rod2 is screwed into the male thread of Rod1 (see figure at side), consequently the Rod2 is weaker than the other and it is strongly recommended to use this one only to compensate the areas; the stronger rod is identified by the number '1' stamped on its end. For double rod cylinders, rod end dimensions indicated in section-13 are valid for both the rods.

**13 Piston Rod End Data :**

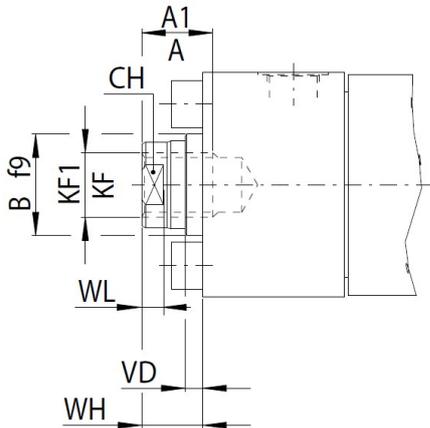
**Rod End [Male] Code 1**  
For all styles except N



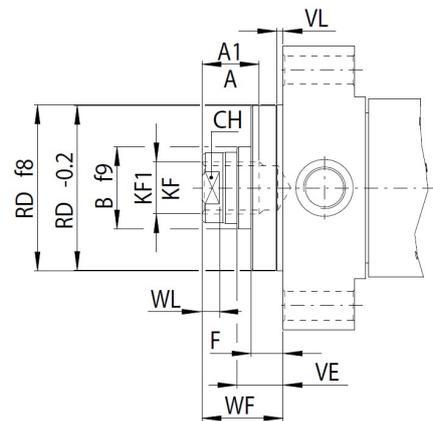
**Rod End [Male] Code 3**  
For style N



**Rod End [Female] Code 2**  
For all styles except N



**Rod End [Female] Code 4**  
For style N



**Rod End Dimensions :**

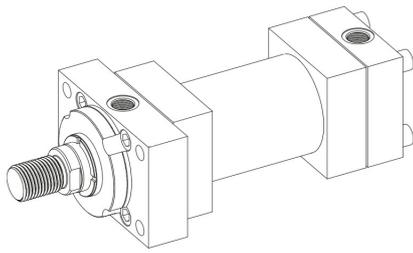
Bore ∅	Rod ∅	Male Thread		Female Thread		A (KK or KF)	A1 (KK1 or KF1)	B f9	CH H14	F max	RD f8	VD	VE max	VL min	WF ±2	WH ±2	WL min
		KK 6g Code 1,3	KK1 6g Code 3	KF 6H Code 2,4	KF1 6H Code 2,4												
63	28	M20 X 1.5	NA	M20 X 1.5	NA	28	NA	42	22	16	75	13	29	4	48	32	7
	36	M27 X 2	M20 X 1.5	M27 X 2	NA	36	28	50	30	16	88	13	29	4	48	32	8
	45	M33 X 2	M20 X 1.5	M33 X 2	M20 X 1.5	45	28	60	39	16	88	13	29	4	48	32	10
80	36	M27 X 2	NA	M27 X 2	NA	36	NA	50	30	20	82	9	29	4	51	31	8
	45	M33 X 2	M27 X 2	M33 X 2	NA	45	36	60	39	20	105	9	29	4	51	31	10
	56	M42 X 2	M27 X 2	M42 X 2	M27 X 2	56	36	72	48	20	105	9	29	4	51	31	10
100	45	M33 X 2	NA	M33 X 2	NA	45	NA	60	39	22	92	10	32	5	57	35	10
	56	M42 X 2	M33 X 2	M42 X 2	NA	56	45	72	48	22	125	10	32	5	57	35	10
	70	M48 X 2	M33 X 2	M48 X 2	M33 X 2	63	45	88	62	22	125	10	32	5	57	35	10
125	56	M42 X 2	NA	M42 X 2	NA	56	NA	72	48	22	105	10	32	5	57	35	10
	70	M48 X 2	M42 X 2	M48 X 2	NA	63	56	88	62	22	150	7	29	5	57	35	10
	90	M64 X 3	M42 X 2	M64 X 3	M42 X 2	85	56	108	80	22	150	7	29	5	57	35	15
160	70	M48 X 2	NA	M48 X 2	NA	63	NA	88	62	25	125	7	32	5	57	32	10
	90	M64 X 3	M48 X 2	M64 X 3	NA	85	63	108	80	25	170	7	32	5	57	32	15
	110	M80 X 3	M48 X 2	M80 X 3	M48 X 2	95	63	133	100	25	170	7	32	5	57	32	15
200	90	M64 X 3	NA	M64 X 3	NA	85	NA	108	80	25	150	7	32	5	57	32	15
	110	M80 X 3	M64 X 3	M80 X 3	NA	95	85	133	100	25	210	7	32	5	57	32	15
	140	M100 X 3	M64 X 3	M100 X 3	M64 X 3	112	85	163	128	25	210	7	32	5	57	32	15

All dimensions are in mm .

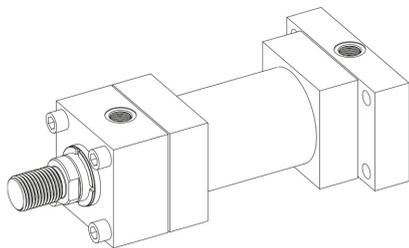
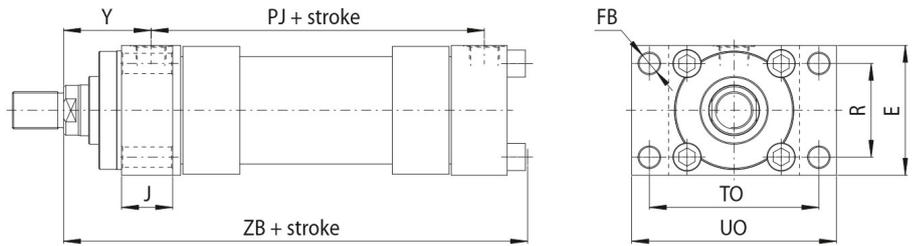
**NOTE:**

- Dimensions A & A1 are according to ISO 4395 short type.
- Tolerances: max for male thread; min for female thread.

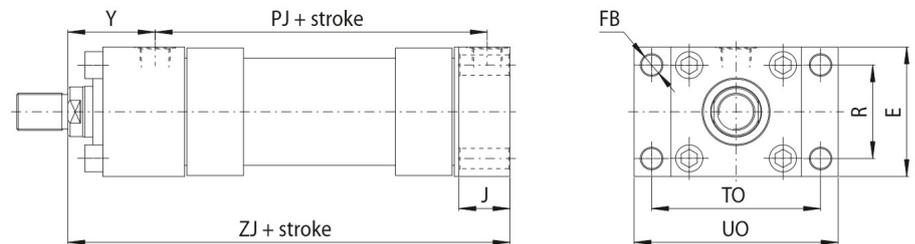
14 Rectangular Flange Mountings :



Style N  
ISO ME5  
Front Rectangular Flange



Style P  
ISO ME6  
Rear Rectangular Flange



Installation Dimensions - ME5 & ME6

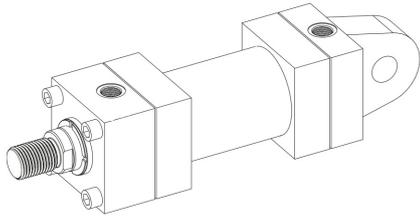
Bore Ø	Rod Ø	E	FB H13	J ref	R js13	TO js13	UO max	Y	Y1	+Stroke			
										PJ	PJ2	ZB max	ZJ
63	28	90	14	38	65	117	145	71	70	80	80	185	168
	36												
	45												
80	36	115	18	45	83	149	180	77	75.5	93	93	212	190
	45												
	56												
100	45	130	18	45	97	162	200	82	83	101	99	225	203
	56												
	70												
125	56	165	22	58	126	208	250	86	84	117	121	260	232
	70												
	90												
160	70	205	26	58	155	253	300	86	79.5	130	143	279	245
	90												
	110												
200	90	245	33	76	190	300	360	98	97	165	167	336	299
	110												
	140												

All dimensions are in mm .

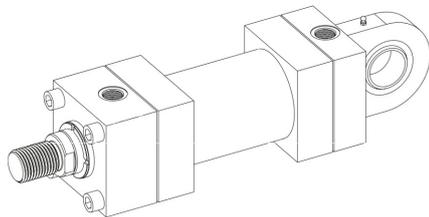
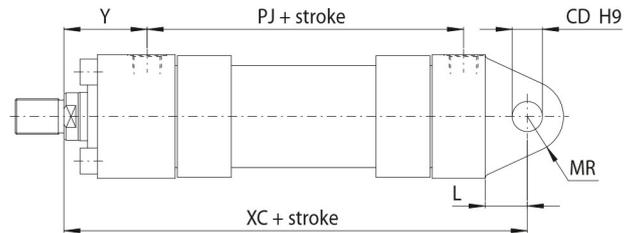
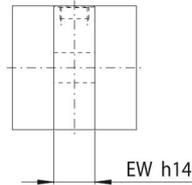
NOTE:

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)

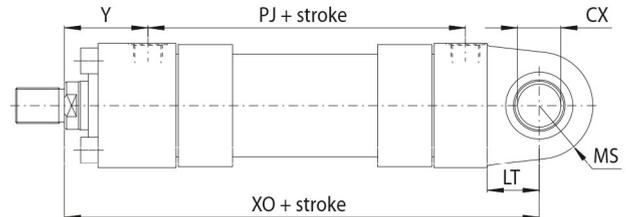
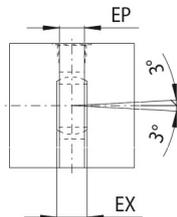
15 Pivot Mountings :



Style D  
ISO MP3  
Fixed Eye



Style S  
ISO MP5  
Fixed Eye with Spherical Bearing



Installation Dimensions - MP3 & MP5

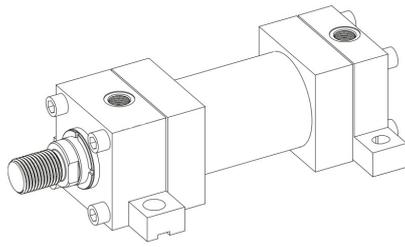
Bore ∅	Rod ∅	CD H9	CX	EP max	EW h14	EX	L min	LT min	MR max	MS max	Y	Y1	+Stroke			
													PJ	PJ2	XO	XC
63	28	20	30 <sup>-0.012</sup>	19	30	22 <sup>-0.12</sup>	32	38	29	40	71	70	80	80	206	200
	36															
	45															
80	36	28	40 <sup>-0.012</sup>	23	40	28 <sup>-0.12</sup>	39	48	34	50	77	75.5	93	93	238	229
	45															
	56															
100	45	36	50 <sup>-0.012</sup>	30	50	35 <sup>-0.12</sup>	54	58	50	62	82	83	101	99	261	257
	56															
	70															
125	56	45	60 <sup>-0.015</sup>	38	60	44 <sup>-0.15</sup>	57	72	53	80	86	84	117	121	304	289
	70															
	90															
160	70	56	80 <sup>-0.015</sup>	47	70	55 <sup>-0.15</sup>	63	92	59	100	86	79.5	130	143	337	308
	90															
	110															
200	90	70	100 <sup>-0.020</sup>	57	80	70 <sup>-0.20</sup>	82	116	78	120	98	97	165	167	415	381
	110															
	140															

All dimensions are in mm .

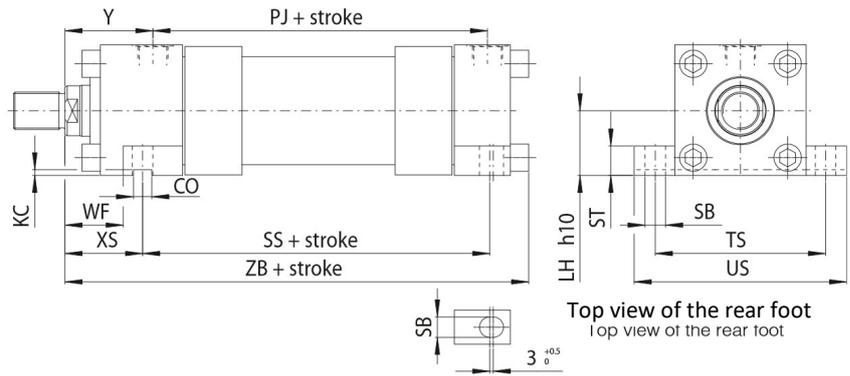
NOTE:

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)

16 Foot Mounting :



Style E  
ISO MS2  
Foot Mounting



Installation Dimensions - MS2

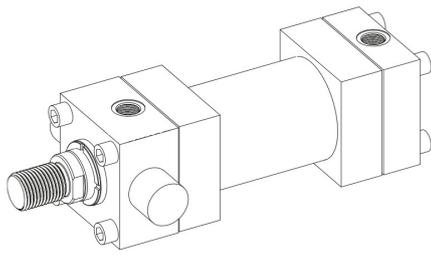
Bore ∅	Rod ∅	CO N9	KC min	LH h10	SB H13	ST js13	TS js13	US max	WF ±2	XS	Y	Y1	+Stroke			
													PJ	PJ2	SS	ZB max
63	28 36 45	16	4.5	44	18	26	124	161	48	65	71	70	80	80	85	185
80	36 45 56	16	5	57	18	26	149	186	51	68	77	75.5	93	93	104	212
100	45 56 70	16	6	63	26	32	172	216	57	79	82	83	101	99	101	225
125	56 70 90	20	6	82	26	32	210	254	57	79	86	84	117	121	130	260
160	70 90 110	30	8	101	33	38	260	318	57	86	86	79.5	130	143	129	279
200	90 110 140	40	8	122	39	44	311	381	57	92	98	97	165	167	171	336

All dimensions are in mm .

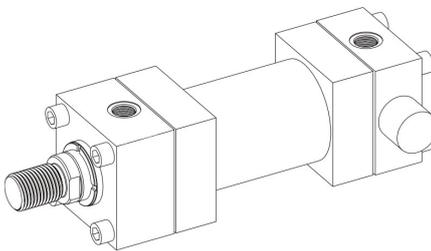
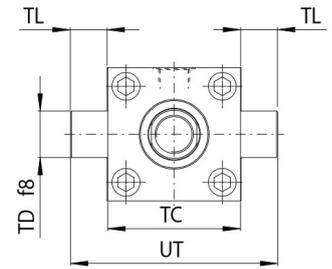
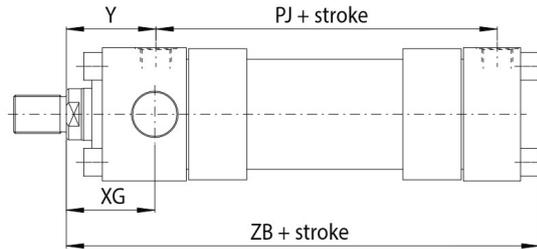
NOTE:

- For oversized oil ports, dimensions PJ & Y are respectively modified to PJ2 & Y1.
- For Rod End Dimensions refer to the section [13](#)

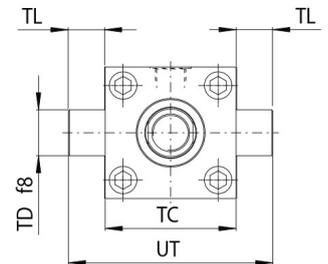
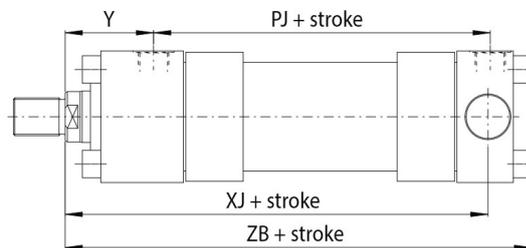
17 Trunnion Mountings :



**Style G**  
**ISO MT1**  
Front Trunnion



**Style H**  
**ISO MT2**  
Rear Trunnion



Installation Dimensions - MT1 & MT2

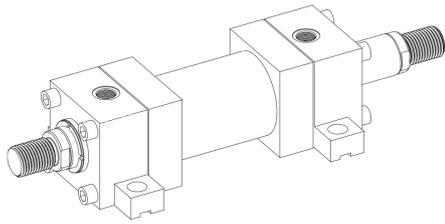
Bore Ø	Rod Ø	TC h14	TD f8	TL js13	UT ref	XG	Y	Y1	+Stroke			
									PJ	PJ2	XJ	ZB max
63	28	89	32	25	139	70	71	70	80	80	149	185
	36											
	45											
80	36	114	40	32	178	76	77	75.5	93	93	168	212
	45											
	56											
100	45	127	50	40	207	71	82	83	101	99	187	225
	56											
	70											
125	56	165	63	50	265	75	86	84	117	121	209	260
	70											
	90											
160	70	203	80	63	329	75	86	79.5	130	143	230	279
	90											
	110											
200	90	241	100	80	401	85	98	97	165	167	276	336
	110											
	140											

All dimensions are in mm .

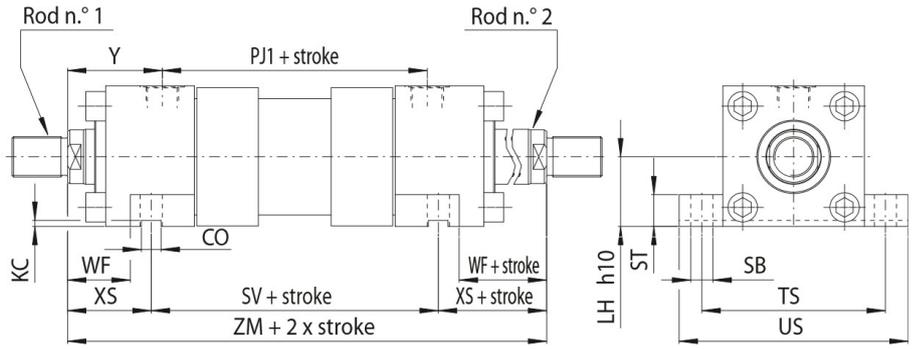
**NOTE:**

- For oversized oil ports, dimensions **PJ** & **Y** are respectively modified to **PJ2** & **Y1**.
- For Rod End Dimensions refer to the section [13](#)

**18 Double Rod Cylinders :**



**Style E**  
**Non - ISO**  
 Foot Mounting  
 Available with Styles N,E,G



**Installation Dimensions -**

Bore Ø	Rod Ø	CO N9	KC min	LH h10	SB H13	ST js13	TS js13	US max	Y	+(2xStroke) ZM	+Stroke			
											PJ1	XS	SV	WF
63	28	16	4.5	44	18	26	124	161	71	223	81	65	93	48
	36													
	45													
80	36	16	5	57	18	26	149	186	77	246	92	68	110	51
	45													
	56													
100	45	16	6	63	26	32	172	216	82	265	101	79	107	57
	56													
	70													
125	56	20	6	82	26	32	210	254	86	289	117	79	131	57
	70													
	90													
160	70	30	8	101	33	38	260	318	86	302	130	86	130	57
	90													
	110													
200	90	40	8	122	39	44	311	381	98	356	160	92	172	57
	110													
	140													

All dimensions are in mm .

**NOTE:**

- For oversized oil ports, dimensions **PJ** & **Y** are respectively modified to **PJ2** & **Y1**.
- For Rod End Dimensions refer to the section [13](#)



## Hydraulic Cylinders Type R4 - Big bore sizes

Conforms to ISO 6020-3: Nominal pressure of 160 bar and max 250 bar

Series R4 hydraulic cylinders are designed for heavy mill duty application and conforms to ISO 6020-3. It is completely interchangeable among manufacturers. It allows manufacturers of hydraulic equipments flexibility in the design of cylinders while it does not restrict technical development; however, it does provide basic guidelines.

### Standard Specifications :

- Heavy duty construction
- Double Acting Design
- Bore Sizes: **250 mm to 400 mm**
- Rod Sizes: **140 mm to 220 mm**
- Strokes up to **5000 mm**
- **Two** seals options
- **Air Bleed** at both ends
- **Six** standard mounting styles
- **Adjustable** cushioning
- **Standard & SAE Flange** oil port options

### Ordering Instructions :

**R4** **P** - **250** / **140** / **0500** - **0** **K** **0** **S** **0** - **B1X1**

**Cylinder Series:**  
R4 [ISO 6020-3]

**Mounting Style:** see section [1](#)

	REF. ISO
C - Fixed Clevis	MP1
G - Front Trunnion	MT1
L - Intermediate Trunnion	MT4*
N - Front Square Flange	MF5
P - Rear Square Flange	MF6
S - Fixed Eye with Spherical Bearing	MP5

**Bore Size:** From  $\varnothing$ 250 - 400 mm, see section [13](#)

**Rod Size:** From  $\varnothing$ 140 - 220 mm, see section [13](#)

**Stroke:** Up to 5000 mm, see section [6](#)

**Oil Port Positions:** see section [4](#)  
**B1;B2;B3 & B4** - Front Head Oil Port at Location 1;2;3 & 4  
**X1;X2;X3 & X4** - Rear Head Oil Port at Location 1;2;3 & 4

**Oil Port options:** see section [2](#) & [3](#)  
**0** - Standard [BSPP]  
**M** - Front & Rear SAE Flange Oil Port

#### Sealing System:

**S** - Standard [NBR + PTFE + PU] [-20°C to 85°C]  
**V** - Viton, For High Temp. [FKM + PTFE] [-20°C to 120°C]

**Spacer:** see section [7](#)

**0** - None; **2** - 50 mm; **4** - 100 mm; **6** - 150 mm; **8** - 200 mm

**Rod Treatment:** see section [8](#)

**K** - Ground & hard chrome plated  
**T** - Induction hardened, Ground & hard chrome plated

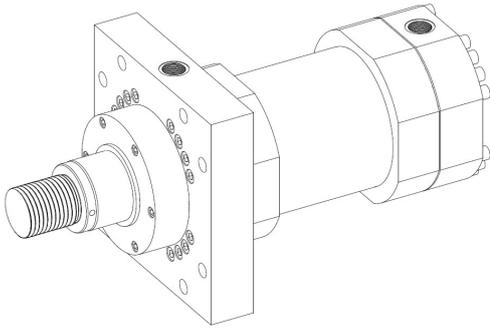
**Cushioning:** see section [5](#)

**0** - None  
**Slow Adjustable**  
**1** - Rear end  
**2** - Front end  
**3** - Both ends

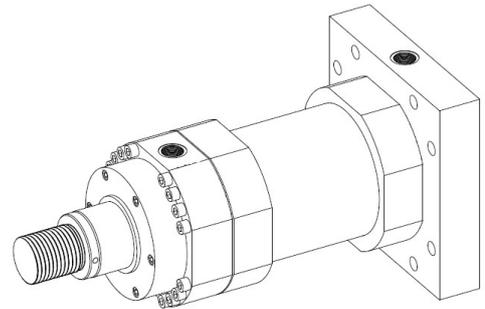
\*NOTE: For style L [MT4], **XV** Dimension must be indicated in the order code, see section [9](#)

**1 Mounting Style :**

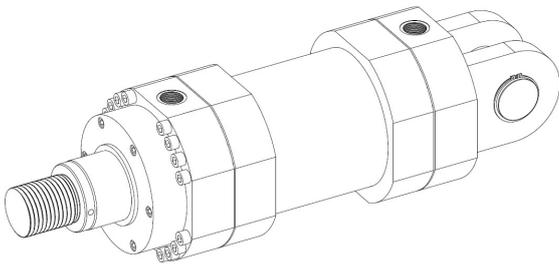
- 6 different standard styles of mounting as shown below
- Browse through subsequent pages for technical details and mounting dimensions
- Piston Rod End dimensions are given separately in section [13](#)



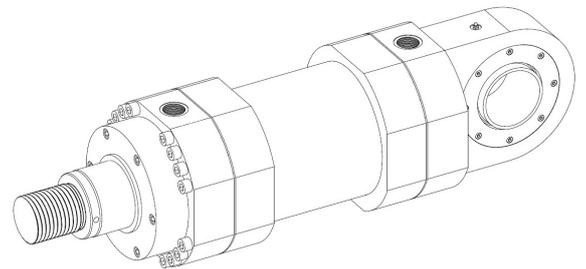
**ISO MF5**  
**Style N [Front Square Flange]**



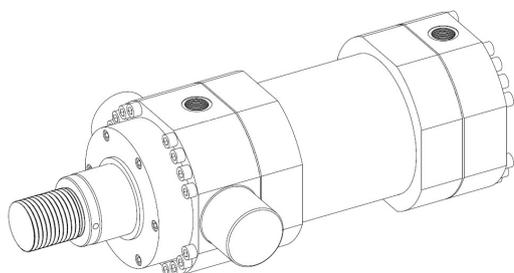
**ISO MF6**  
**Style P [Rear Square Flange]**



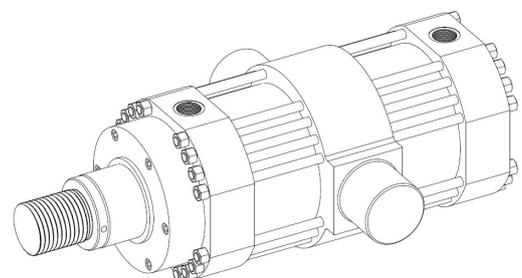
**ISO MP1**  
**Style C [Fixed Clevis]**



**ISO MP5**  
**Style S [Fixed Eye with Spherical Bearing]**



**ISO MT1**  
**Style G [Fixed Trunnion]**



**ISO MT4**  
**Style L [Intermediate Trunnion]**

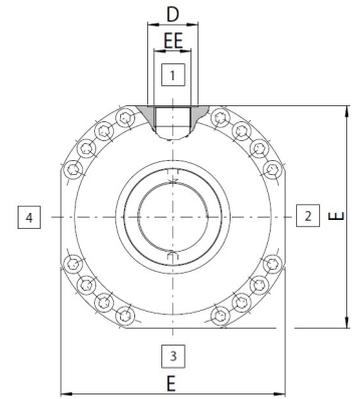
**2 Size Of Oil Ports & Round Head Dimension [mm]:**

Bore $\phi$		250	320	400
Standard Oil Ports	D <sub>min</sub>	58	58	69
	EE (BSPP)	G 1 ½	G 1 ½	G 2

• Oil ports EE are threaded according to GAS standard with counter bore dimension D.

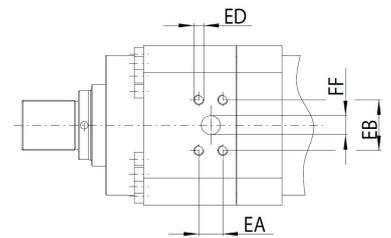
Bore $\phi$		250	320	400
Front & Rear Head $\phi$	E <sub>max</sub>	320	400	500

• If not otherwise specified, E is the value of the front and rear round heads dimension for all the mounting styles.



**3 SAE 6000 Flange Oil Port Dimensions (ISO 6162-2) [mm]:**

Bore $\phi$	DN	EA $\pm 0.25$	EB $\pm 0.25$	ED 6g	FF 0/-1.5
250	38	36.5	79.3	M16	38
320					
400	51	44.5	96.8	M20	51

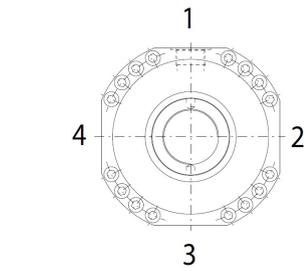


**4 Position of Oil Ports:**

- FRONT HEAD: B\* = oil port position;
- REAR HEAD: X\* = oil port position;
- \*Selected position (1, 2, 3 or 4)

The oil ports and cushioning adjustments positions are available, respectively on sides 1 and 3 for all styles except E (see the figure at side): the style E has the cushioning adjustments on side 2.

Unless otherwise specified by customer, the standard oil port position remains as shown in figure at side, i.e. B1 & X1.



**5 Cushioning:**

Cushioning is recommended for applications where:

- The piston makes a full stroke with speed over than 0.05 m/s;
- It is necessary to reduce undesirable noise and mechanical shocks;
- Vertical application with heavy loads.

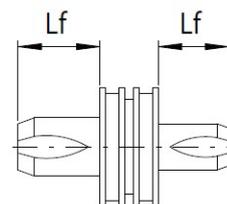
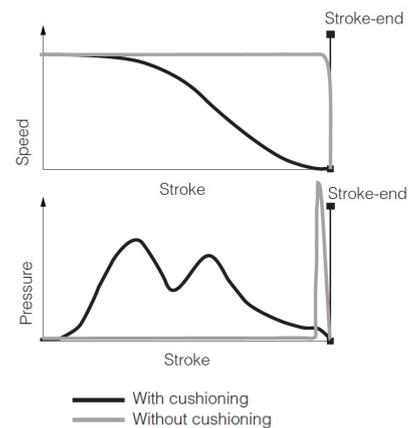
The stroke-end cushioning are hydraulic dampers specifically designed to dissipate the energy of the mass connected to the cylinder rod, by progressively increasing the pressure in the cushioning chamber and thus reducing the rod speed before the cylinder's mechanical stroke-end (see the graphics at side). The regulating screws are supplied fully screwed in (max cushioning effect).

In case of high masses and/or very high operating speeds it is recommended to back them off to optimize the cushioning effect. The adjustment screw has a special design to prevent unlocking and expulsion. The cushioning effect is highly ensured even in case of variation of the fluid viscosity.

**Cushioning Length:**

L<sub>f</sub> is the total cushioning length. When the stroke-end cushioning are used as safety devices, to mechanically preserve the cylinder and the system, it is advisable to select the cylinder's stroke longer than the operating one by an amount equal to the cushioning length L<sub>f</sub>; in this way the cushioning effect does not influence the movement during the operating stroke.

Bore $\phi$		250	320	400
Rod $\phi$		140	180	220
Cushioning Length [mm]	L <sub>f</sub> Front	50	60	70
	L <sub>f</sub> Rear	56	64	64



**6 Stroke Selection:**

Stroke has to be selected a few mm longer than the working stroke, to prevent to use the cylinder heads as mechanical stroke-end.

Minimum stroke [mm]: see table at side

Maximum stroke: 5000 mm

Stroke tolerances:

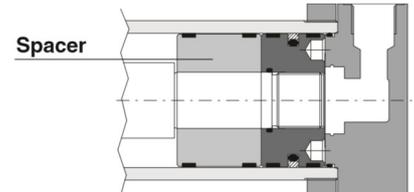
- 0 +2 mm for strokes up to 1250 mm
- 0 +5 mm for strokes from 1250 to 3150 mm
- 0 +8 mm for strokes over 3150 mm

Bore $\varnothing$	250	320	400
Minimum Stroke	65	70	40

**7 Spacer:**

For strokes longer than 1000 mm, proper spacers have to be introduced in the cylinder's construction to increase the rod and piston guide and to protect them from overloads and premature wear. Spacers can be omitted for cylinders working in traction mode. The introduction of spacers increases the overall cylinder's dimensions: spacers' length has to be added to all stroke dependent dimensions.

Stroke [mm]	1001 to 1500	1501 to 2000	2001 to 2500	2501 to 5000
Spacer Code	2	4	6	8
Length [mm]	50	100	150	200



**8 Rod Features & options:**

The rods materials have high strength - EN8D / C45 & the rod surface is chrome plated: diameter tolerances f7, roughness Ra  $\leq$  0.25  $\mu$ m.

Rod hardness can be improved selecting the options T :

**K** = Ground and hard chrome plated (for rods from 22 to 110mm)

**T** = Induction surface hardening, ground & hard chrome plated

- 56-60 HRC (613-697 HV) hardness

**9 Note [Trunnion Mounting]:**

**XV** - For cylinders with mounting style **L** the stroke must always exceed the minimum values reported in the table. The requested XV value must be included between **XV min** and **XV max** and it must be always indicated, with dimension in millimetres, together with the cylinder code. See the following example:

R4 L - 50 / 28 / 0500 - 0 K 0 S 0 - B1X1

**XV = 200**

**10 Cylinder's Housing Features:**

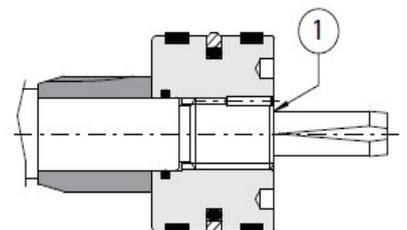
The cylinder's housings are made in "hot rolled steel"; the internal surfaces are lapped: diameter tolerance H8, roughness Ra  $\leq$  0.25  $\mu$ m.

**11 Fluid Requirements:**

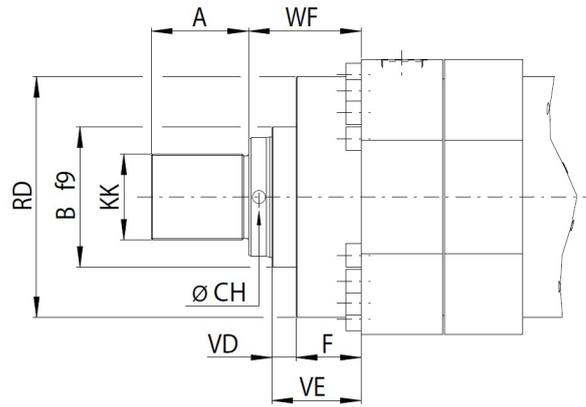
Cylinders and servo cylinders are suitable for operation with mineral oils with or without additives (**HH, HL, HLP, HLP-D, HM, HV**), fire resistant fluids (**HFA** oil in water emulsion, 90-95% water and 5-10% oil; **HFB** water in oil emulsion, 40% water; **HFC** water glycol, max 45% water) and synthetic fluids (**HFD-U** organic esters, **HFD-R** phosphate esters). The fluid must have a viscosity within 15 and 100 mm<sup>2</sup>/s, a temperature within 0 and 70°C and fluid contamination class ISO 20/18/15 according to ISO 4406 NAS1638 class 9.

**12 Rod - Piston Coupling:**

The rod and piston are mechanically coupled by a threaded connection in which the thread on the rod is at least equal to the external thread KK. The piston is screwed to the rod by a pre-fixed tightening torque in order to improve the fatigue resistance. The Grub screw **1** avoids the piston unscrewing.



**13** Piston Rod End Data :

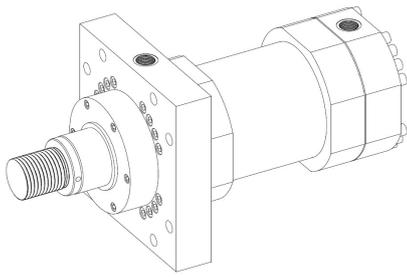


**Rod End Dimensions :**

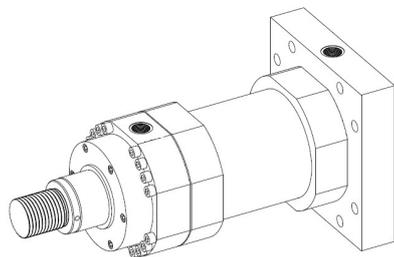
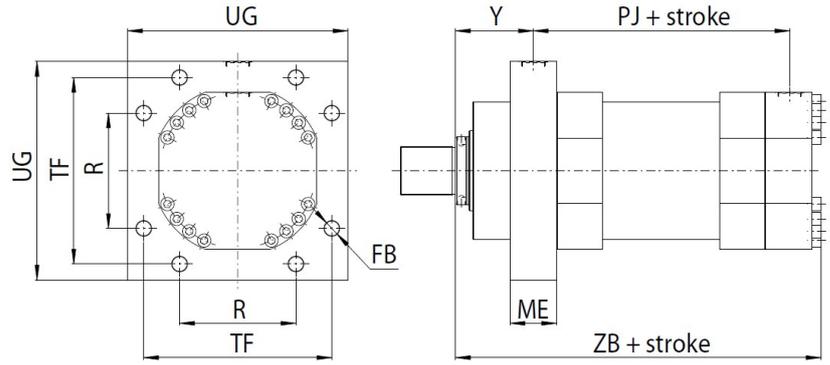
Bore ∅	Rod ∅	A	B f9	CH	F max	KK 6g	RD f8	VD	VE max	WF ±2
250	140	112	163	15	75	M100 X 3	280	8	83	110
320	180	125	205	15	75	M125 X 4	325	8	83	110
400	220	160	245	15	75	M160 X 4	380	8	83	110

All dimensions are in mm .

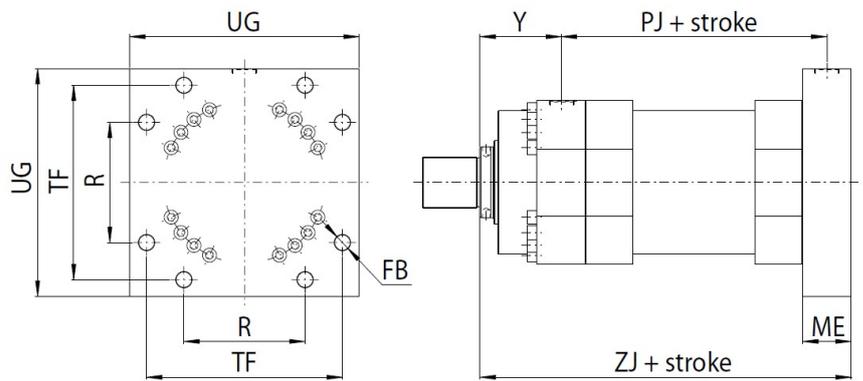
14 Square Flange Mountings :



Style N  
ISO MF5  
Front Square Flange



Style P  
ISO MF6  
Rear Square Flange



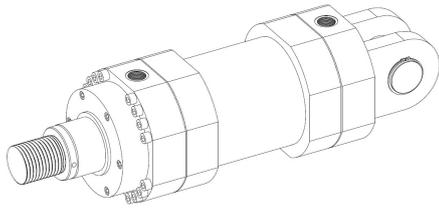
Installation Dimensions - MF5 & MF6

Bore Ø	Rod Ø	FB	ME ref	R js13	TF	UG max	Y	+Stroke		
								PJ	ZJ	ZB max
250	140	30	94	235	380	445	157	218	420	460
320	180	36	114	283	472	549	167	252	475	520
400	220	45	140	340	588	683	180	320	580	625

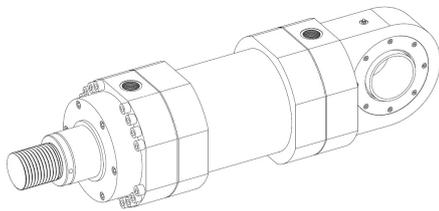
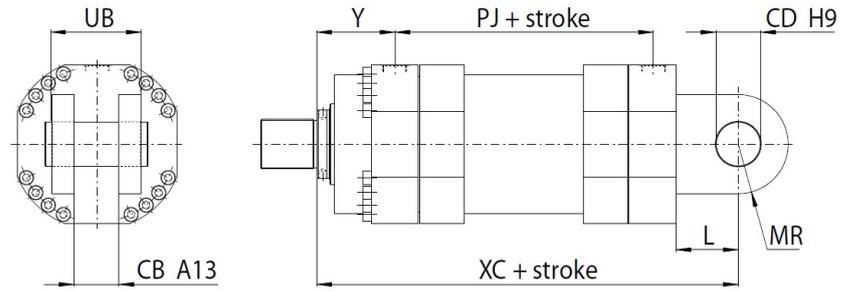
All dimensions are in mm .

NOTE: For Rod End Dimensions refer to the section [13](#)

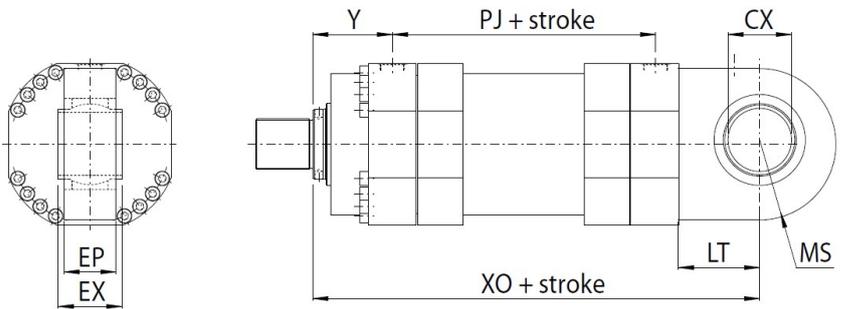
15 Pivot Mountings :



**Style D**  
**ISO MP3**  
Rear Fixed Eye



**Style S**  
**ISO MP5**  
Rear Fixed Eye with Spherical Bearing



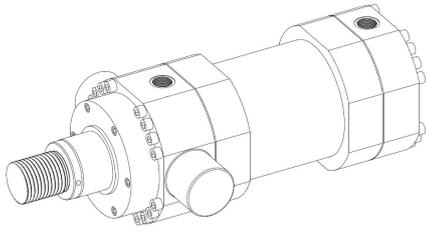
**Installation Dimensions - MP3 & MP5**

Bore ∅	Rod ∅	CB A13	CD H9	CX H7	EP	EX	L min	LT min	MR max	MS max	UB	Y	+Stroke		
													PJ	XC	XO
250	140	90	90	125	102	125	125	160	100	160	180	157	218	545	580
320	180	110	110	160	130	160	152	200	120	200	220	167	252	627	675
400	220	140	140	200	162	200	195	250	160	250	280	180	320	775	830

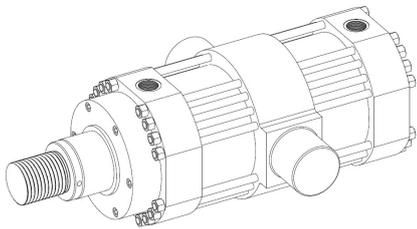
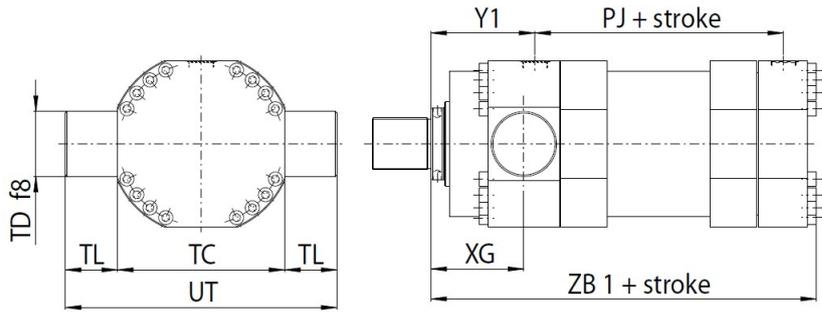
All dimensions are in mm .

**NOTE:** For Rod End Dimensions refer to the section [13](#)

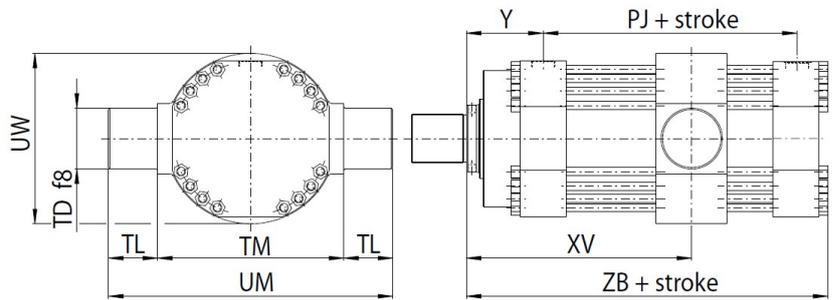
16 Trunnion Mountings :



Style G  
ISO MT1  
Front Trunnion



Style L  
ISO MT4  
Intermediate Trunnion



Installation Dimensions - MT1 & MT4

Bore ∅	Rod ∅	TC h14	TD f8	TL js13	TM h14	UM ref	UT ref	UW max	Y1	Y	XG	Min. Stroke	XV min	+Stroke			
														XV max	PJ	ZB1 max	ZB max
250	140	320	125	100	380	580	520	480	199	157	178	20	275	255	218	505	460
320	180	400	160	125	485	735	650	600	223	167	195	35	312	273	252	580	520
400	220	500	200	160	605	925	820	750	260	180	215	26	358	332	320	685	625

All dimensions are in mm .

NOTE: For Rod End Dimensions refer to the section [13](#)



## Hydraulic Cylinders Type R5 - Round heads with counter flanges

Conforms to ISO 6022: Nominal pressure of 250 bar and max 320 bar

Series R5 hydraulic cylinders are designed for heavy mill duty application and conforms to ISO 6022. It is completely interchangeable among manufacturers. It allows manufacturers of hydraulic equipments flexibility in the design of cylinders while it does not restrict technical development; however, it does provide basic guidelines.

### Standard Specifications :

- Heavy duty construction
- Double Acting Design
- Bore Sizes: **50 mm to 320 mm**
- Rod Sizes: **36 mm to 220 mm**
- Strokes up to **5000 mm**
- **Two** seals options
- **Air Bleed** at both ends
- **Five** standard mounting styles
- **Adjustable** cushioning
- **Oversized & SAE Flange** oil port options

### Ordering Instructions :

R5 A - 050 / 036 / 0500 - 0 K 0 S 0 - B1X1

#### Cylinder Series:

R5 [ISO 6022]

#### Mounting Style: see section [1](#)

	REF. ISO
A - Front Round Flange	MF3
B - Rear Round Flange	MF4
L - Intermediate Trunnion	MT4*
S - Fixed Eye with Spherical Bearing	MP5
Z - Front Threaded Holes	Non-ISO

**Bore Size:** From Ø50 - 320 mm, see section [13](#)

**Rod Size:** From Ø36 - 220 mm, see section [13](#)

**Stroke:** Up to 5000 mm, see section [6](#)

#### Oil Port Positions: see section [4](#)

**B1;B2;B3 & B4** - Front Head Oil Port at Location 1;2;3 & 4  
**X1;X2;X3 & X4** - Rear Head Oil Port at Location 1;2;3 & 4

#### Oil Port options: see section [2](#) & [3](#)

**0** - Standard [BSPP]  
**1** - Front & Rear Oversized Oil Ports  
**D** - Front Oversized Oil Port  
**Y** - Rear Oversized Oil Port  
**M** - Front & Rear SAE Flange Oil Port

#### Sealing System:

**S** - Standard [NBR + PTFE + PU] [-20°C to 85°C]  
**V** - Viton, For High Temp. [FKM + PTFE] [-20°C to 120°C]

#### Spacer: see section [7](#)

**0** - None; **2** - 50 mm; **4** - 100 mm; **6** - 150 mm; **8** - 200 mm

#### Rod Treatment: see section [8](#)

**K** - Ground & hard chrome plated  
**T** - Induction hardened, Ground & hard chrome plated

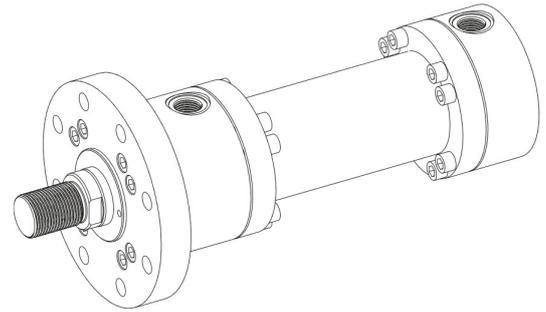
#### Cushioning: see section [5](#)

**0** - None  
**Slow Adjustable**  
**1** - Rear end  
**2** - Front end  
**3** - Both ends

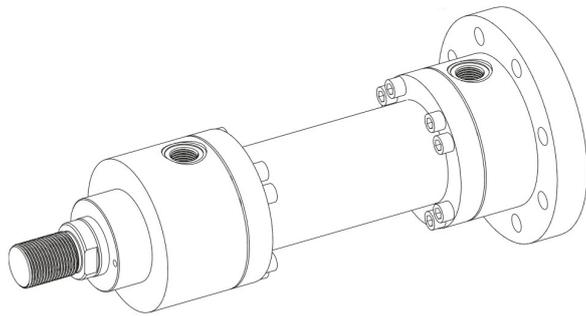
\*NOTE: For style L [MT4], **XV** Dimension must be indicated in the order code, see section [9](#)

**1 Mounting Style :**

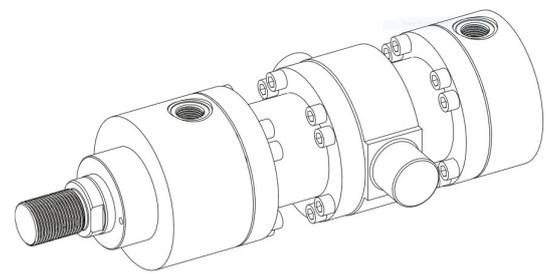
- 5 different standard styles of mounting as shown below
- Browse through subsequent pages for technical details and mounting dimensions
- Piston Rod End dimensions are given separately in section [13](#)



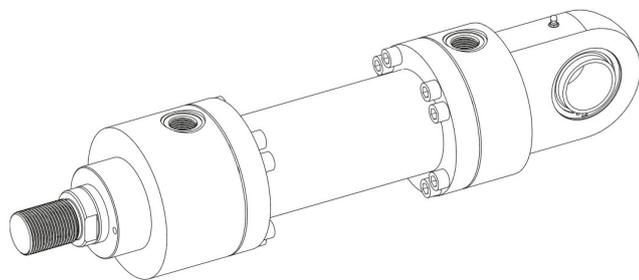
**ISO MF3**  
**Style A [Front Round Flange]**



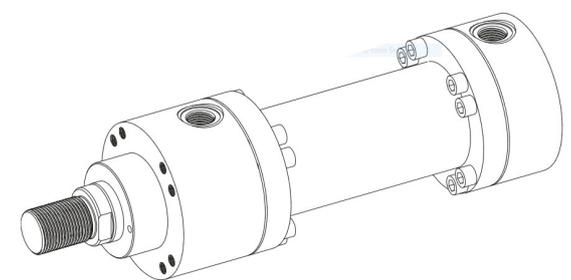
**ISO MF4**  
**Style B [Rear Round Flange]**



**ISO MT4**  
**Style L [Intermediate Trunnion]**



**ISO MP5**  
**Style S [Fixed Eye with Spherical Bearing]**



**Non - ISO**  
**Style Z [Front Threaded Holes]**

## Series R5 [Round Head with Counter Flanges - High Pressure]

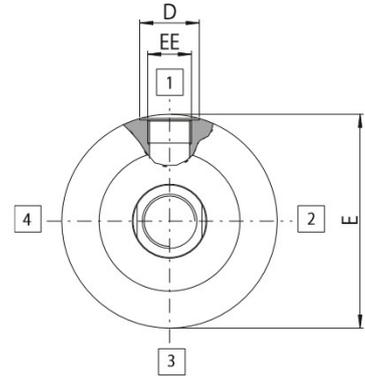
### 2 Size Of Oil Ports & Round Head Dimension [mm]:

Bore $\phi$		50	63	80	100	125	140	160	180	200	250	320
Standard Oil Ports	D <sub>min</sub>	29	36	36	42	42	52	52	52	52	58	58
	EE (BSPP)	G ½	G ¾	G ¾	G 1	G 1	G 1 ¼	G 1 ¼	G 1 ¼	G 1 ¼	G 1 ½	G 1 ½
Oversized Oil Ports	D1 <sub>min</sub>	36	42	42	52	52	58	58	58	58	69	69
	EE1 (BSPP)	G ¾	G 1	G 1	G 1 ¼	G 1 ¼	G 1 ½	G 1 ½	G 1 ½	G 1 ½	G 2	G 2

- Oil ports EE are threaded according to GAS standard with counter bore dimension D.
- When oversized oil ports are selected dimensions D and EE are respectively modified into D1 and EE1.

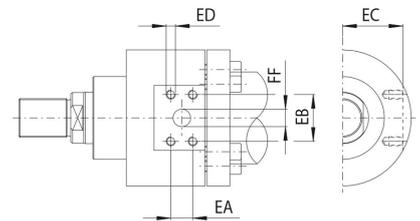
Bore $\phi$		50	63	80	100	125	140	160	180	200	250	320
Front & Rear Head $\phi$	E <sub>max</sub>	108	124	148	175	214	255	270	315	330	412	510

- If not otherwise specified, E is the value of the front and rear round heads dimension for all the mounting styles.



### 3 SAE 6000 Flange Oil Port Dimensions (ISO 6162-2) [mm]:

Bore $\phi$	DN	EC	EA	EB	ED	FF
50	13	46	$\pm 0.25$ 18.2	$\pm 0.25$ 40.5	M8 X 1.25	13
63	19	51	23.8	50.8	M10 X 1.5	19
80		65				
100	25	77	27.8	57.2	M12 X 1.75	25
125		99				
140	32	118	31.6	66.6	M14 X 2	32
160		126				
180		150				
200		158				
250	38	195	36.7	79.3	M16 X 2	38
320	51	245	44.5	96.8	M20 X 2.5	51



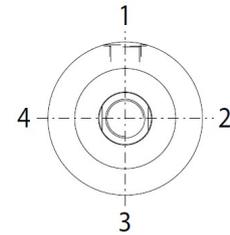
SAE 6000 flange not available for style B (ISO MF4) bores 50 and 63

### 4 Position of Oil Ports:

- FRONT HEAD: B\* = oil port position;
- REAR HEAD: X\* = oil port position; \*Selected position (1, 2, 3 or 4)

The oil ports and cushioning adjustments positions are available, respectively on sides 1 and 3 for all styles except E (see the figure at side): the style E has the cushioning adjustments on side 2.

Unless otherwise specified by customer, the standard oil port position remains as shown in figure at side, i.e. B1 & X1.



### 5 Cushioning:

Cushioning is recommended for applications where:

- The piston makes a full stroke with speed over than 0.05 m/s;
- It is necessary to reduce undesirable noise and mechanical shocks;
- Vertical application with heavy loads.

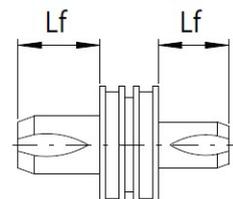
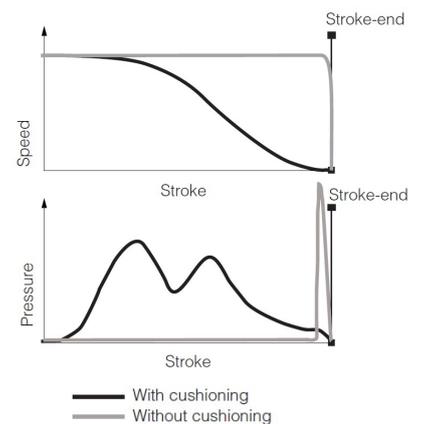
The stroke-end cushioning are hydraulic dampers specifically designed to dissipate the energy of the mass connected to the cylinder rod, by progressively increasing the pressure in the cushioning chamber and thus reducing the rod speed before the cylinder's mechanical stroke-end (see the graphics at side). The regulating screws are supplied fully screwed in (max cushioning effect).

In case of high masses and/or very high operating speeds it is recommended to back them off to optimize the cushioning effect. The adjustment screw has a special design to prevent unlocking and expulsion. The cushioning effect is highly ensured even in case of variation of the fluid viscosity.

#### Cushioning Length:

Lf is the total cushioning length. When the stroke-end cushioning are used as safety devices, to mechanically preserve the cylinder and the system, it is advisable to select the cylinder's stroke longer than the operating one by an amount equal to the cushioning length Lf; in this way the cushioning effect does not influence the movement during the operating stroke.

Bore $\phi$		50	63	80	100	125	140	160	180	200	250	320
Rod $\phi$		36	45	56	70	90	90	110	110	140	180	220
Cushioning Length [mm]	Lf Front	29	40	45	50	60	60	64	64	64	80	100
	Lf Rear	35	38	45	50	60	60	64	64	64	64	64



## 6 Stroke Selection:

Stroke has to be selected a few mm longer than the working stroke, to prevent to use the cylinder heads as mechanical stroke-end.

Minimum stroke [mm]: see table at side

Maximum stroke: 5000 mm

Stroke tolerances:

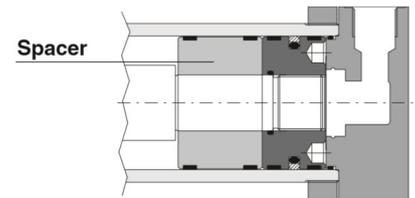
- 0 +2 mm for strokes up to 1250 mm
- 0 +5 mm for strokes from 1250 to 3150 mm
- 0 +8 mm for strokes over 3150 mm

<b>Bore <math>\phi</math></b>	<b>50</b>	<b>63</b>	<b>80</b>	<b>100</b>	<b>125</b>	<b>140</b>
<b>Minimum Stroke</b>	70	70	20	25	50	50
<b>Bore <math>\phi</math></b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>250</b>	<b>320</b>	-
<b>Minimum Stroke</b>	50	70	70	80	120	-

## 7 Spacer:

For strokes longer than 1000 mm, proper spacers have to be introduced in the cylinder's construction to increase the rod and piston guide and to protect them from overloads and premature wear. Spacers can be omitted for cylinders working in traction mode. The introduction of spacers increases the overall cylinder's dimensions: spacers' length has to be added to all stroke dependent dimensions.

Stroke [mm]	1001 to 1500	1501 to 2000	2001 to 2500	2501 to 5000
<b>Spacer Code</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>8</b>
Length [mm]	50	100	150	200



## 8 Rod Features & options:

The rods materials have high strength - EN8D / C45 & the rod surface is chrome plated: diameter tolerances f7, roughness Ra  $\leq$  0.25  $\mu$ m.

Rod hardness can be improved selecting the options T :

**K** = Ground and hard chrome plated (for rods from 22 to 110mm)

**T** = Induction surface hardening, ground & hard chrome plated

- 56-60 HRC (613-697 HV) hardness

## 9 Note [Trunnion Mounting]:

**XV** - For cylinders with mounting style **L** the stroke must always exceed the minimum values reported in the table. The requested XV value must be included between **XV min** and **XV max** and it must be always indicated, with dimension in millimetres, together with the cylinder code. See the following example:

R5 L - 50 / 28 / 0500 - 0 K O S O - B1X1

**XV = 200**

## 10 Cylinder's Housing Features:

The cylinder's housings are made in different materials depending to the bore (see table at side); the internal surfaces are lapped: diameter tolerance H8, roughness Ra  $\leq$  0.25  $\mu$ m.

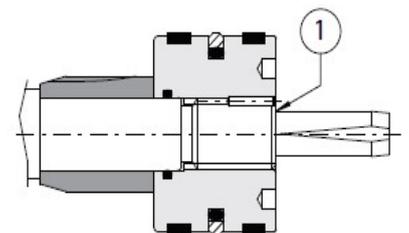
<b>Bore <math>\phi</math></b>	<b>Material</b>
<b>50 - 200</b>	cold drawn and stressed steel
<b>250 - 320</b>	Hot rolled steel

## 11 Fluid Requirements:

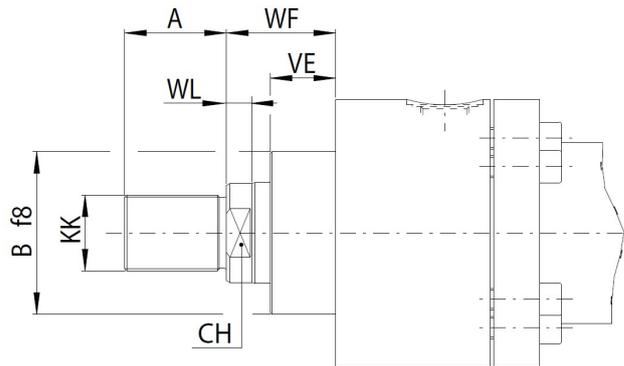
Cylinders and servo cylinders are suitable for operation with mineral oils with or without additives (**HH**, **HL**, **HLP**, **HLP-D**, **HM**, **HV**), fire resistant fluids (**HFA** oil in water emulsion, 90-95% water and 5-10% oil; **HFB** water in oil emulsion, 40% water; **HFC** water glycol, max 45% water) and synthetic fluids (**HFD-U** organic esters, **HFD-R** phosphate esters). The fluid must have a viscosity within 15 and 100 mm<sup>2</sup>/s, a temperature within 0 and 70°C and fluid contamination class ISO 20/18/15 according to ISO 4406 NAS1638 class 9.

## 12 Rod - Piston Coupling:

The rod and piston are mechanically coupled by a threaded connection in which the thread on the rod is at least equal to the external thread KK. The piston is screwed to the rod by a pre-fixed tightening torque in order to improve the fatigue resistance. The Grub screw **1** avoids the piston unscrewing.



**13 Piston Rod End Data :**

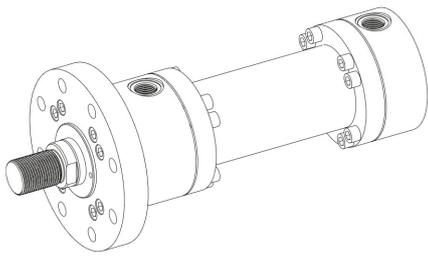


**Rod End Dimensions :**

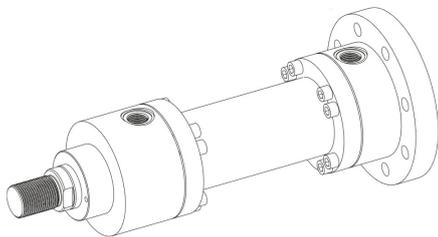
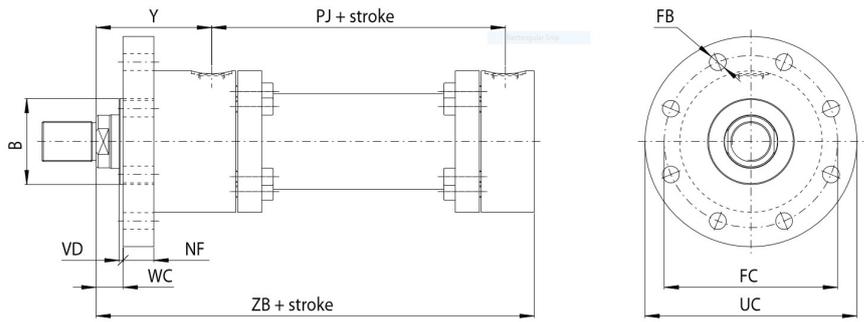
Bore Ø	Rod Ø	A Max	B f8	CH Flat/Hole	KK 6g	VE max	WF	WL min
50	36	36	63	30	M27 X 2	29	47	8
63	45	45	75	39	M33 X 2	32	53	10
80	56	56	90	48	M42 X 2	36	60	10
100	70	63	110	62	M48 X 2	41	68	10
125	90	85	132	80	M64 X 3	45	76	15
140	90	90	145	Ø10 X 4	M72 X 3	45	76	15
160	110	95	160	Ø10 X 4	M80 X 3	50	85	15
180	110	105	185	Ø10 X 4	M90 X 3	55	95	15
200	140	112	200	Ø12 X 4	M100 X 3	61	101	15
250	180	125	250	Ø15 X 4	M125 X 4	71	113	-
320	220	160	320	Ø15 X 4	M160 X 4	88	136	-

All dimensions are in mm .

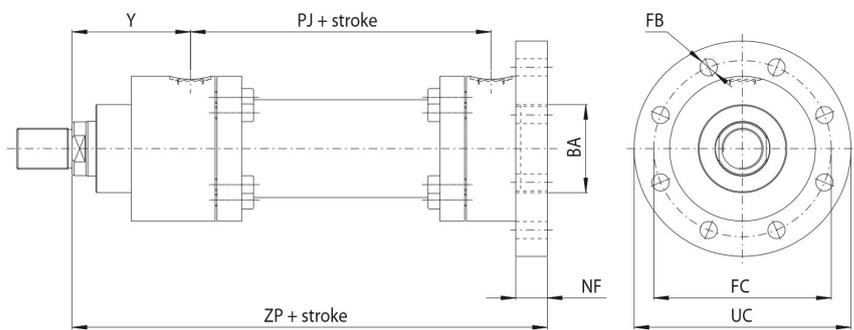
## 14 Round Flange Mountings :



**Style A**  
**ISO MF3**  
Front Round Flange



**Style B**  
**ISO MF4**  
Rear Round Flange



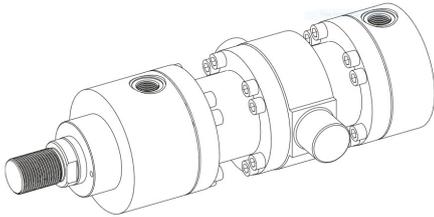
### Installation Dimensions - MF3 & MF4

Bore Ø	Rod Ø	B/BA f8/H8	FC js13	FB H13	NF js13	UC max	VD min	WC	Y ±2	+ Stroke		
										PJ	ZB max	ZP
50	36	63	132	13.5	25	160	4	22	98	120	244	265
63	45	75	150	13.5	28	180	4	25	112	133	274	298
80	56	90	180	17.5	32	215	4	28	120	155	305	332
100	70	110	212	22	36	260	5	32	134	171	340	371
125	90	132	250	22	40	300	5	36	153	205	396	430
140	90	145	300	26	40	340	5	36	181	208	430	465
160	110	160	315	26	45	370	5	40	185	235	467	505
180	110	185	365	33	50	425	5	45	205	250	505	550
200	140	200	385	33	56	455	5	45	220	278	550	596
250	180	250	475	39	63	545	8	50	260	325	652	703
320	220	320	600	45	80	680	8	56	310	350	764	830

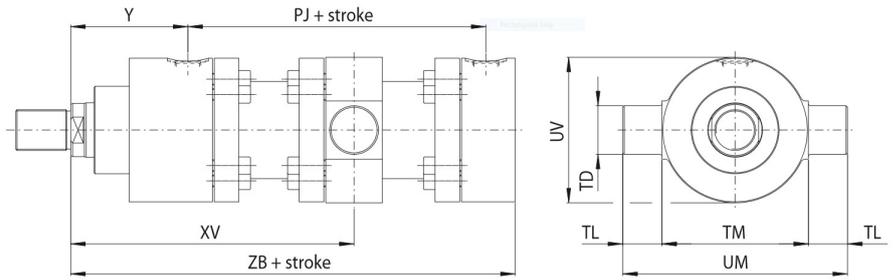
All dimensions are in mm .

**NOTE:** For Rod End Dimensions refer to the section [13](#)

**15 Trunnion Mounting :**



**Style L**  
**ISO MT4**  
Intermediate Trunnion



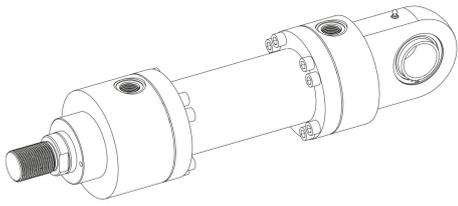
**Installation Dimensions - MT4**

Bore ∅	Rod ∅	TD f8	TL js13	TM h12	UM	UV	Y ±2	Min. Stroke	XV min	+ Stroke		
										XV max	PJ	ZB
50	36	32	25	112	162	108	98	175	260	85	120	244
63	45	40	32	125	189	124	112	185	285	100	133	274
80	56	50	40	150	230	150	120	150	290	140	155	305
100	70	63	50	180	280	180	134	160	320	160	171	340
125	90	80	63	224	350	219	153	245	410	165	205	396
140	90	90	70	265	405	260	181	250	440	190	208	430
160	110	100	80	280	440	280	185	260	465	205	235	467
180	110	110	90	320	500	315	205	350	540	190	250	505
200	140	125	100	335	535	333	220	390	590	200	278	550
250	180	160	125	425	675	412	260	460	690	230	325	652
320	220	200	160	530	850	510	310	560	820	260	350	764

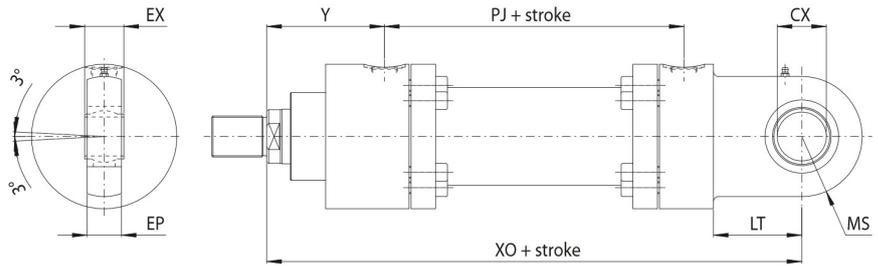
All dimensions are in mm .

**NOTE:** For Rod End Dimensions refer to the section [13](#)

**16 Pivot Mounting :**



**Style S**  
**ISO MP5**  
Rear Fixed Eye with Spherical Bearing



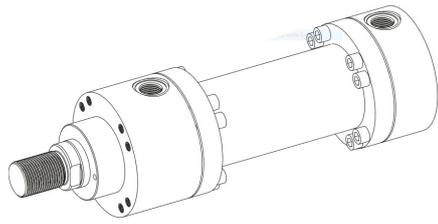
**Installation Dimensions - MP5**

Bore Ø	Rod Ø	CX H7	EX h12	EP	LT min	MS max	Y ±2	+Stroke	
								PJ	XO
50	36	32	32	27	40	40	98	120	305
63	45	40	40	35	50	50	112	133	348
80	56	50	50	40	63	63	120	155	395
100	70	63	63	52	71	71	134	171	442
125	90	80	80	66	90	90	153	205	520
140	90	90	90	65	113	113	181	208	580
160	110	100	100	84	112	112	185	235	617
180	110	110	110	88	135	118	205	250	690
200	140	125	125	102	160	160	220	278	756
250	180	160	160	130	200	200	260	325	903
320	220	200	200	162	250	250	310	350	1080

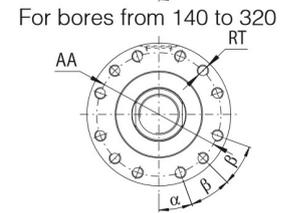
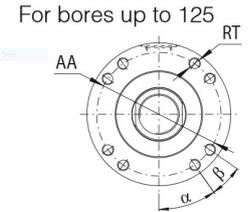
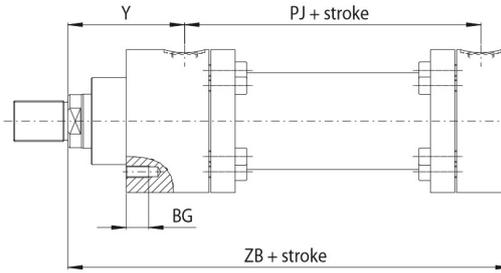
All dimensions are in mm .

**NOTE:** For Rod End Dimensions refer to the section [13](#)

**17 Threaded holes Mounting :**



**Style Z**  
**Non - ISO**  
Front Threaded Holes



**Installation Dimensions -**

Bore Ø	Rod Ø	AA	BG min	Y ±2	RT		α	β	+Stroke	
					Qty	Size			PJ	ZB max
50	36	90	20	98	8	M8	32.5°	25°	120	244
63	45	105	23	112	8	M10	32°	26°	133	274
80	56	128	23	120	8	M12	35°	20°	155	305
100	70	152	30	134	8	M14	35°	20°	171	340
125	90	188	33	153	8	M16	35°	20°	205	396
140	90	215	33	181	12	M16	27.5°	17.5°	208	430
160	110	241	43	185	12	M18	25°	20°	235	467
180	110	275	40	205	12	M20	25°	20°	250	505
200	140	295	40	220	12	M22	25°	20°	278	550
250	180	365	58	260	12	M27	27°	18°	325	652
320	220	458	70	310	12	M33	25°	20°	350	764

All dimensions are in mm .

**NOTE:** For Rod End Dimensions refer to the section [13](#)



## Hydraulic Cylinders Type RWB - Welded & Bolted

Non - ISO: Nominal pressure of 160 bar and max 250 bar

Series RWB hydraulic cylinders are manufactured by RAX Hydraulics are of welded & bolted type construction and it is designed for heavy mill duty application. These Cylinders are cost-effective and suitable for a variety of applications.

### Standard Specifications :

- Heavy duty construction
- Double Acting Design
- Bore Sizes: **50 mm to 250 mm**
- Rod Sizes: **28 mm to 180 mm**
- Strokes up to **2000 mm**
- **Two** rod diameters per bore
- **Two** seals options
- **Air Bleed** at both ends
- **Six** standard mounting styles
- **Adjustable** or **Fixed** cushioning

### Ordering Instructions :

RWB A - 050 / 036 / 0500 - 0 K 0 S - B1X1

#### Cylinder Series:

RWB [Non - ISO]

#### Mounting Style: see section 1

- A - Front Round Flange
- B - Front Rectangular Flange
- C - Fixed Eye
- D - Fixed Eye with Spherical Bearing
- E - Foot
- F - Intermediate Trunnion\*

**Bore Size:** From Ø50 - 250 mm, see section 13

**Rod Size:** From Ø28 - 180 mm, see section 13

**Stroke:** Up to 2000 mm, see section 6

#### Oil Port Positions: see section 4

- B1;B2;B3 & B4 - Front Head Oil Port at Location 1;2;3 & 4
- X1;X2;X3 & X4 - Rear Head Oil Port at Location 1;2;3 & 4

#### Sealing System:

- S - Standard [NBR + PTFE + PU] [-20° C to 85° C]
- V - Viton, For High Temp. [FKM + PTFE] [-20° C to 120° C]

#### Spacer: see section 7

0 - None; 2 - 50 mm; 4 - 100 mm

#### Rod Treatment: see section 8

- K - Ground & hard chrome plated
- T - Induction hardened, Ground & hard chrome plated

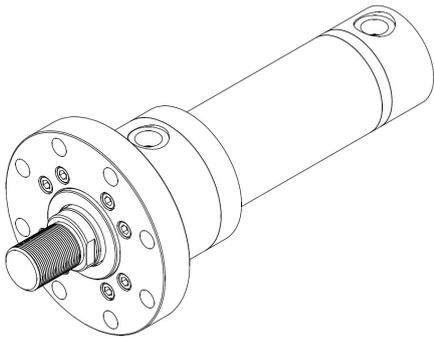
#### Cushioning: see section 5

- 0 - None
- Slow Adjustable**
- 1 - Rear end
- 2 - Front end
- 3 - Both ends
- Slow Fixed**
- 7 - Rear end
- 8 - Front end
- 9 - Both ends

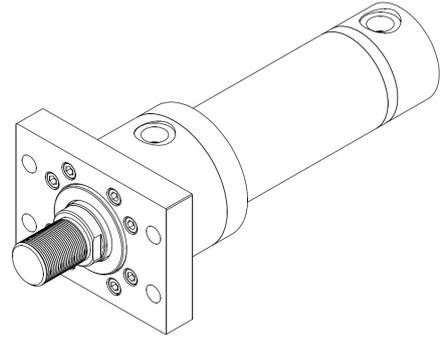
\*NOTE: For style F, L4 Dimension must be indicated in the order code, see section 9

**1 Mounting Style :**

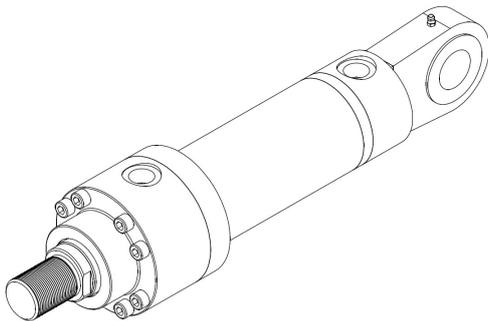
- 6 different standard styles of mounting as shown below
- Browse through subsequent pages for technical details and mounting dimensions
- Piston Rod End dimensions are given separately in section [13](#)



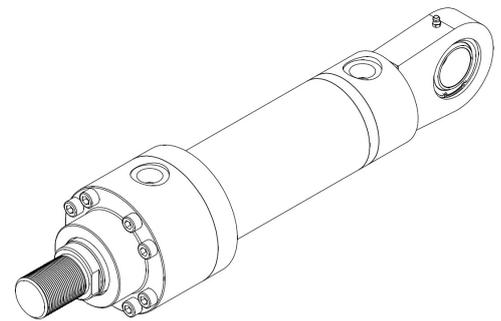
**Style A [Round Flange]**



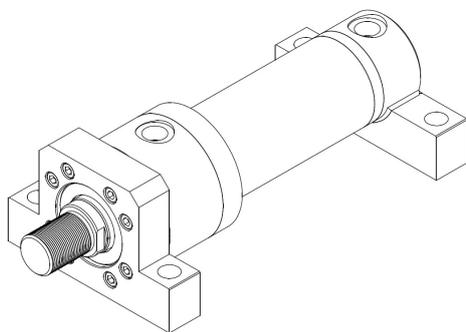
**Style B [Rectangular Flange]**



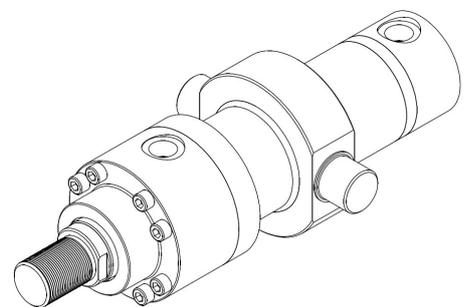
**Style C [Fixed Eye]**



**Style D [Fixed Eye with Spherical Bearing]**



**Style E [Foot Mounting]**



**Style F [Intermediate Trunnion]**

**2 Size Of Oil Ports & Round Head Dimension [mm]:**

Bore $\varnothing$		50	63	80	100	125	160	200	250
Standard Oil Ports	D <sub>min</sub>	29	36	36	42	42	52	52	58
	EE (BSPP)	G ½	G ¾	G ¾	G 1	G 1	G 1 ¼	G 1 ¼	G 1 ½

• Oil ports EE are threaded according to GAS standard with counter bore dimension D.

Bore $\varnothing$		50	63	80	100	125	160	200	250
Front Head $\varnothing$	E <sub>max</sub>	95	116	130	158	192	238	285	365

• If not otherwise specified, E is the value of the front round heads dimension for all the mounting styles.

• SAE 3000 flanges are available on request. Contact our Technical office.

**3 Position of Oil Ports:**

- FRONT HEAD: B\* = oil port position;
- REAR HEAD: X\* = oil port position;
- \*Selected position (1, 2, 3 or 4)

The oil ports and cushioning adjustments positions are available, respectively on sides 1 and 3 for all styles except E (see the figure at side): the style E has the cushioning adjustments on side 2.

Unless otherwise specified by customer, the standard oil port position remains as shown in figure at side, i.e. B1 & X1.

**4 Cushioning:**

Cushioning is recommended for applications where:

- The piston makes a full stroke with speed over than 0.05 m/s;
- It is necessary to reduce undesirable noise and mechanical shocks;
- Vertical application with heavy loads.

The stroke-end cushioning are hydraulic dampers specifically designed to dissipate the energy of the mass connected to the cylinder rod, by progressively increasing the pressure in the cushioning chamber and thus reducing the rod speed before the cylinder's mechanical stroke-end (see the graphics at side). The regulating screws are supplied fully screwed in (max cushioning effect).

In case of high masses and/or very high operating speeds it is recommended to back them off to optimize the cushioning effect. The adjustment screw has a special design to prevent unlocking and expulsion. The cushioning effect is highly ensured even in case of variation of the fluid viscosity.

**Cushioning Length:**

Lf is the total cushioning length. When the stroke-end cushioning are used as safety devices, to mechanically preserve the cylinder and the system, it is advisable to select the cylinder's stroke longer than the operating one by an amount equal to the cushioning length Lf; in this way the cushioning effect does not influence the movement during the operating stroke.

Bore $\varnothing$		50		63		80		100		125		160		200		250	
Rod $\varnothing$		28	36	36	45	45	56	56	70	70	90	90	110	110	140	140	180
Cushioning Length [mm]	Lf Front	29	29	29	29	27	27	26	26	27	27	34	34	34	49	49	49
	Lf Rear	30		32		32		32		41		56		56		56	

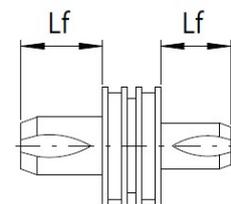
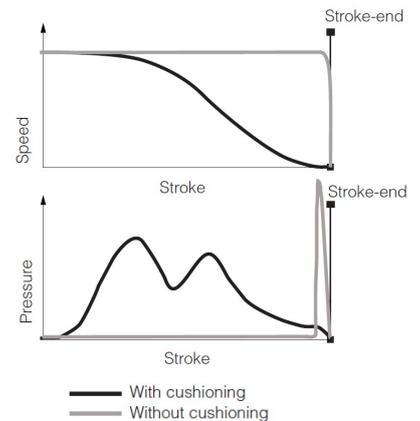
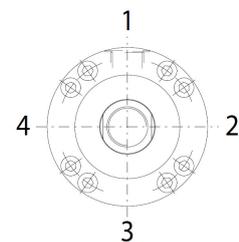
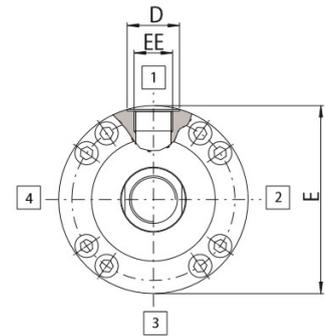
**5 Stroke Selection:**

Stroke has to be selected a few mm longer than the working stroke, to prevent to use the cylinder heads as mechanical stroke-end.

Maximum stroke: 2000 mm

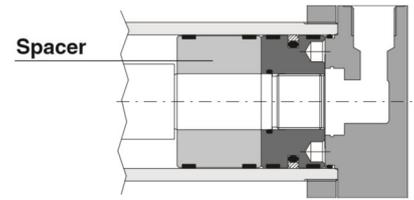
Stroke tolerances:

- 0 +2 mm for strokes up to 1250 mm
- 0 +5 mm for strokes from 1250 to 2000 mm



**6 Spacer:**

For strokes longer than 1000 mm, proper spacers have to be introduced in the cylinder's construction to increase the rod and piston guide and to protect them from overloads and premature wear. Spacers can be omitted for cylinders working in traction mode. The introduction of spacers increases the overall cylinder's dimensions: spacers' length has to be added to all stroke dependent dimensions.



Stroke [mm]	1001 to 1500	1501 to 2000
Spacer Code	2	4
Length [mm]	50	100

**7 Rod Features & options:**

The rods materials have high strength - EN8D / C45 & the rod surface is chrome plated: diameter tolerances f7, roughness Ra ≤ 0.25 µm.

Rod hardness can be improved selecting the options T :

**K** = Ground and hard chrome plated (for rods from 22 to 110mm)

**T** = Induction surface hardening, ground & hard chrome plated

- 56-60 HRC (613-697 HV) hardness

**8 Note [Trunnion Mounting]:**

**L4** - For cylinders with mounting style **F** the stroke must always exceed the minimum values reported in the table. The requested **L4** value must be included between **L4 min** and **L4 max** and it must be always indicated, with dimension in millimetres, together with the cylinder code. See the following example:

RWB F - 50 / 28 / 0500 - 0 K 0 S - B1X1

**L4 = 200**

**9 Cylinder's Housing Features:**

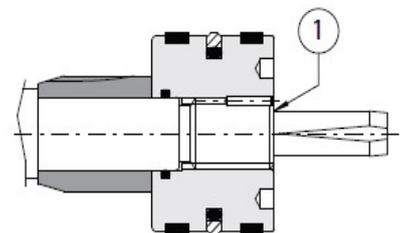
The cylinder's housings are made in "cold drawn and stressed steel"; the internal surfaces are lapped: diameter tolerance H8, roughness Ra ≤ 0.25 µm.

**10 Fluid Requirements:**

Cylinders and servo cylinders are suitable for operation with mineral oils with or without additives (**HH, HL, HLP, HLP-D, HM, HV**), fire resistant fluids (**HFA** oil in water emulsion, 90-95% water and 5-10% oil; **HFB** water in oil emulsion, 40% water; **HFC** water glycol, max 45% water) and synthetic fluids (**HFD-U** organic esters, **HFD-R** phosphate esters). The fluid must have a viscosity within 15 and 100 mm<sup>2</sup>/s, a temperature within 0 and 70°C and fluid contamination class ISO 20/18/15 according to ISO 4406 NAS1638 class 9.

**11 Rod - Piston Coupling:**

The rod and piston are mechanically coupled by a threaded connection in which the thread on the rod is at least equal to the external thread KK. The piston is screwed to the rod by a pre-fixed tightening torque in order to improve the fatigue resistance. The Grub screw **1** avoids the piston unscrewing.



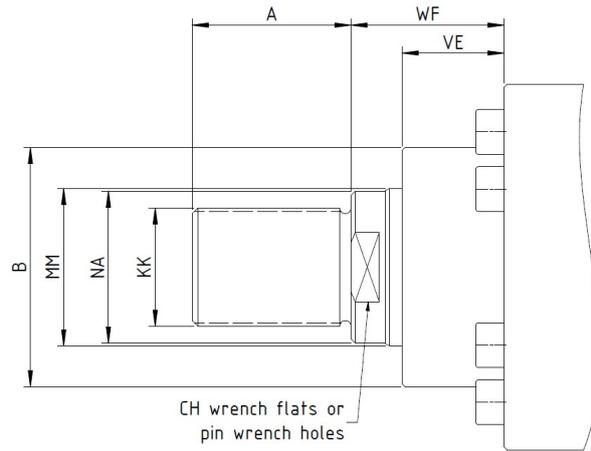
**12 Welded Rear End Construction:**

These welded & bolted hydraulic cylinders have rear end welded to one end of the barrel and the front end or gland is bolted with retaining flange (threaded coupling with barrel) to the opposite end, this allows the piston rod assembly and rod seals to be removed for servicing.

**Benefits:**

- cost effective construction method
- Compact construction
- Good bearing lengths achieved
- Aesthetically simple, they blend into and can enhance the look of the equipment to which they are installed
- Reliable

**13** Piston Rod End Data :

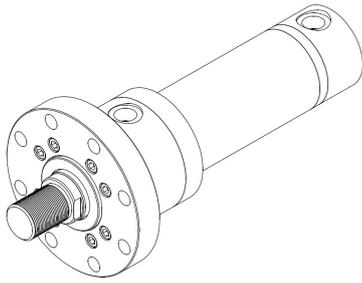


**Rod End Dimensions :**

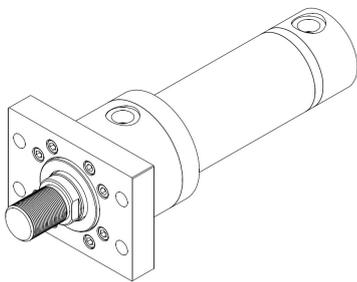
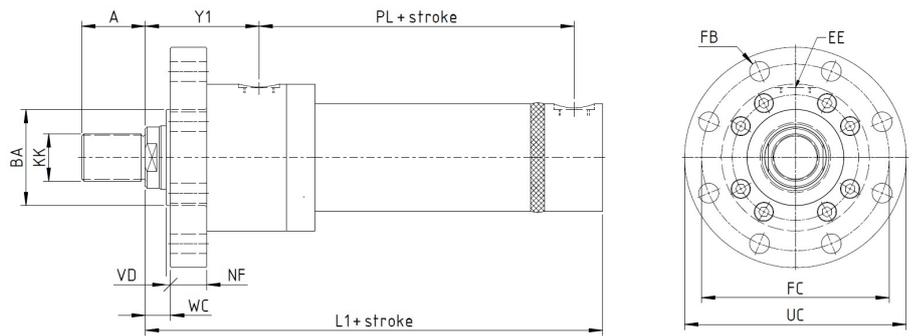
Bore Ø	Rod/MM Ø	A max	B f8	KK 6g	CH	NA	VE max	WF
50	28	28	60	M20 X 1.5	22	26	24	38
	36	36		M27 X 2	30	34		
63	36	36	70	M27 X 2	30	34	29	45
	45	45		M33 X 2	39	43		
80	45	45	85	M33 X 2	39	43	36	54
	56	56		M42 X 2	48	54		
100	56	56	106	M42 X 2	48	54	37	57
	70	63		M48 X 2	62	68		
125	70	63	132	M48 X 2	62	68	37	60
	90	85		M64 X 3	80	88		
160	90	85	160	M64 X 3	80	88	41	66
	110	95		M80 X 3	100	108		
200	110	95	200	M80 X 3	100	108	45	75
	140	112		M100 X 3	128	138		
250	140	112	250	M100 X 3	128	138	64	96
	180	125		M125 X 4	Ø15 x 4	175		

All dimensions are in mm .

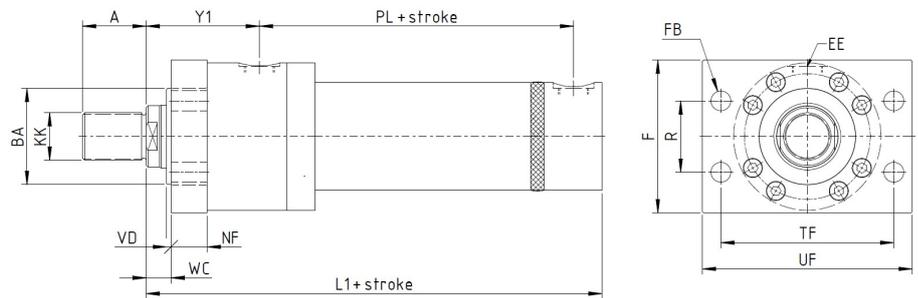
14 Front Flange Mountings :



**Style A**  
Front Round Flange



**Style B**  
Front Rectangular Flange  
[Not For bores 160 - 250]



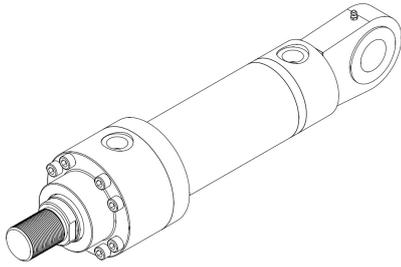
Installation Dimensions - style A & B

Bore ∅	Rod ∅	A max	KK 6g	EE (BSPP)	BA H8	F max	FC js13	FB H13	NF js13	R js13	UC max	UF max	TF js13	VD min	WC	Y1	+ Stroke	
																	PL	L1
50	28 36	28 36	M20 X 1.5 M27 X 2	G ½	60	100	126	11	20	48.2	148	140	116.4	4	18	88	114	224
63	36 45	36 45	M27 X 2 M33 X 2	G ¾	70	120	145	13.5	25	55.5	170	160	134	4	20	96	124	245
80	45 56	45 56	M33 X 2 M42 X 2	G ¾	85	135	165	17.5	32	63.1	195	185	152.5	4	22	100	127	252
100	56 70	56 63	M42 X 2 M48 X 2	G 1	106	160	200	22	32	76.5	238	225	184.8	5	25	104	136	267
125	70 90	63 85	M48 X 2 M64 X 3	G 1	132	195	235	22	32	90.2	272	255	217.1	5	28	127	156	313
160	90 110	85 95	M64 X 3 M80 X 3	G 1 ¼	160	-	280	22	36	-	316	-	-	5	30	135	174	343
200	110 140	95 112	M80 X 3 M100 X 3	G 1 ¼	200	-	340	26	40	-	385	-	-	5	35	154	182	374
250	140 180	112 125	M100 X 3 M125 X 4	G 1 ½	250	-	420	33	56	-	500	-	-	8	40	181	200	421

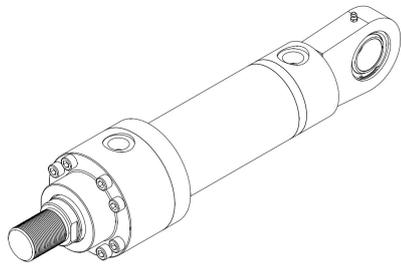
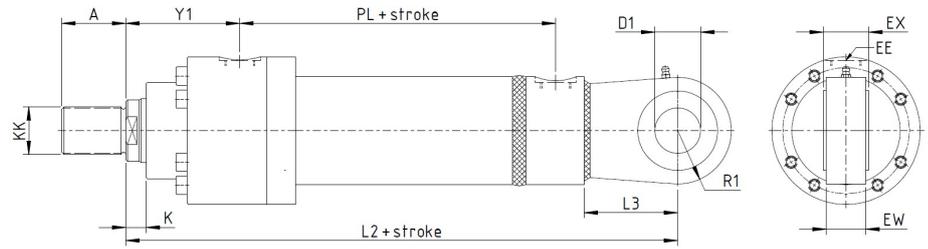
All dimensions are in mm unless otherwise stated.

NOTE: For Rod End Dimensions refer to the section 13

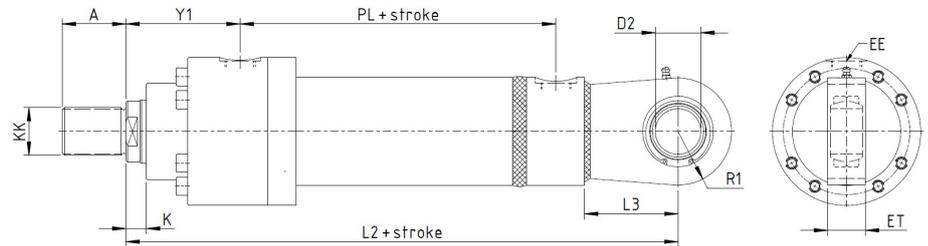
15 Pivot Mountings :



**Style C**  
Fixed Eye



**Style D**  
Fixed Eye with Spherical Bearing



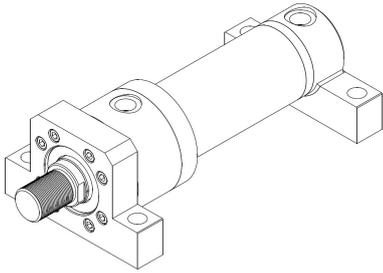
Installation Dimensions - style C & D

Bore Ø	Rod Ø	A max	KK 6g	K	EE (BSPP)	D1 H9	D2 H7	EX h12	EW	ET	L3 min	R1 max	Y1	+Stroke	
														PL	L2
50	28 36	28 36	M20 X 1.5 M27 X 2	14	G ½	25	25	25	22	22	52	30	88	114	276
63	36 45	36 45	M27 X 2 M33 X 2	16	G ¾	32	30	32	28	28	65	37	96	124	310
80	45 56	45 56	M33 X 2 M42 X 2	18	G ¾	40	40	40	35	33	82	47	100	127	334
100	56 70	56 63	M42 X 2 M48 X 2	20	G 1	50	50	50	44	40	95	57	104	136	362
125	70 90	63 85	M48 X 2 M64 X 3	23	G 1	63	60	63	56	53	103	70	127	156	416
160	90 110	85 95	M64 X 3 M80 X 3	25	G 1 ¼	80	80	80	72	67	135	90	135	174	478
200	110 140	95 112	M80 X 3 M100 X 3	30	G 1 ¼	100	100	100	91	85	165	112	154	182	539
250	140 180	112 125	M100 X 3 M125 X 4	32	G 1 ½	125	120	125	115	103	223	140	181	200	644

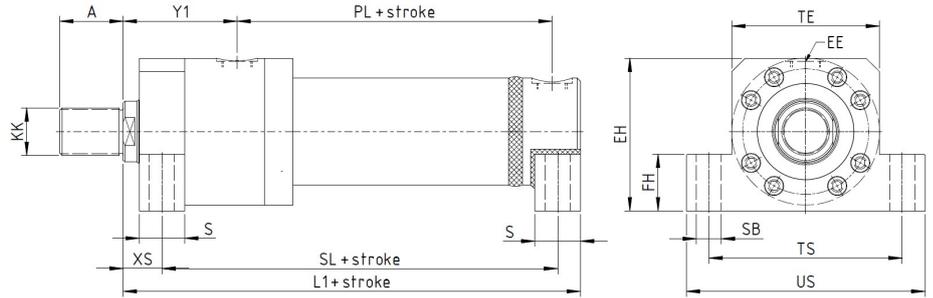
All dimensions are in mm unless otherwise stated.

**NOTE:** For Rod End Dimensions refer to the section [13](#)

16 Foot Mounting :



Style E  
Foot Mounting



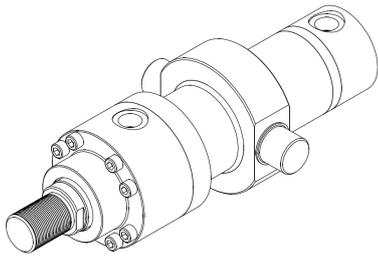
Installation Dimensions - style E

Bore Ø	Rod Ø	A max	KK 6g	EE (BSPP)	EH max	FH h10	S js13	SB H13	TE js13	TS js13	US max	XS	Y1	+Stroke		
														PL	SL	L1
50	28 36	28 36	M20 X 1.5 M27 X 2	G ½	100	32	32	14	95	120	145	22	88	114	186	224
63	36 45	36 45	M27 X 2 M33 X 2	G ¾	120	42	32	18	116	150	180	29	96	124	200	245
80	45 56	45 56	M33 X 2 M42 X 2	G ¾	135	50	40	22	130	170	210	34	100	127	198	252
100	56 70	56 63	M42 X 2 M48 X 2	G 1	161	62	50	26	158	205	250	32	104	136	210	267
125	70 90	63 85	M48 X 2 M64 X 3	G 1	196	80	56	33	192	245	300	32	127	156	253	313
160	90 110	85 95	M64 X 3 M80 X 3	G 1 ¼	238	99	60	33	238	295	350	36	135	174	277	343
200	110 140	95 112	M80 X 3 M100 X 3	G 1 ¼	288	125	72	39	285	350	415	39	154	182	299	374

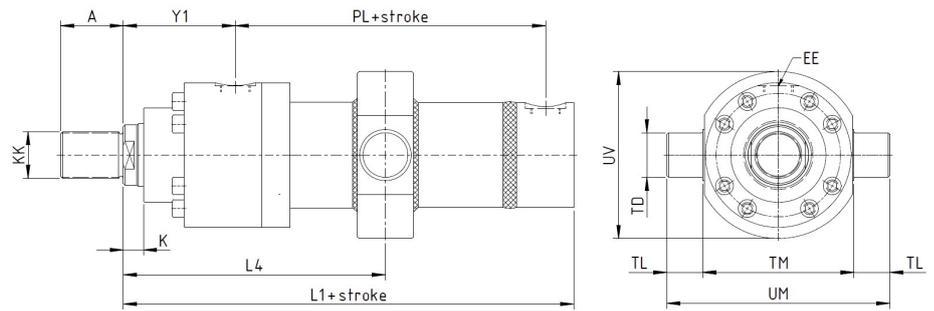
All dimensions are in mm unless otherwise stated.

NOTE: For Rod End Dimensions refer to the section [13](#)

17 Trunnion Mounting :



Style F  
Intermediate Trunnion



Installation Dimensions - style F

Bore ∅	Rod ∅	A max	KK 6g	K	EE (BSPP)	TD f8	TL js13	TM h12	UM	UV	Y1	Min. Stroke	L4 min	+ Stroke		
														L4 max	PL	L1
50	28 36	28 36	M20 X 1.5 M27 X 2	14	G ½	25	20	105	145	108	88	55	176	121	114	224
63	36 45	36 45	M27 X 2 M33 X 2	16	G ¾	32	25	120	170	124	96	85	206	121	124	245
80	45 56	45 56	M33 X 2 M42 X 2	18	G ¾	40	32	135	199	150	100	90	214	124	127	252
100	56 70	56 63	M42 X 2 M48 X 2	20	G 1	50	40	160	240	180	104	110	234	145	136	267
125	70 90	63 85	M48 X 2 M64 X 3	23	G 1	63	50	195	295	219	127	135	278	144	156	313
160	90 110	85 95	M64 X 3 M80 X 3	25	G 1 ¼	80	63	240	366	280	135	170	315	145	174	343
200	110 140	95 112	M80 X 3 M100 X 3	30	G 1 ¼	100	80	295	455	333	154	190	344	154	182	374
250	140 180	112 125	M100 X 3 M125 X 4	32	G 1 ½	125	100	370	570	400	181	230	402	181	200	421

All dimensions are in mm unless otherwise stated.

NOTE: For Rod End Dimensions refer to the section 13

**About Series RW:**

RW series compact hydraulic cylinders manufactured by RAX Hydraulics are of welded, threaded & non-cushioned type. These are highly cost-effective and suitable for a variety of applications. Shipping usually takes 2-3 business days.

- Max Working Pressure : **Up to 250 bar**
- Standard Bores : **40/50/63/80/100 mm**
- Standard Strokes : **50 mm to 1000 mm**



**Type - RW1**  
[Both End Pin]



**Type - RW2**  
[Both End Pin]



**Type - RW3**  
[Cap End Male Clevis; Rod End Threaded]



**Type - RW4**  
[Cap End Pin; Rod End Thru Hole]



**Type - RW5**  
[Front Circular Flange; Rod End Threaded]



**Type - RW6**  
[Rear Circular Flange; Rod End Threaded]



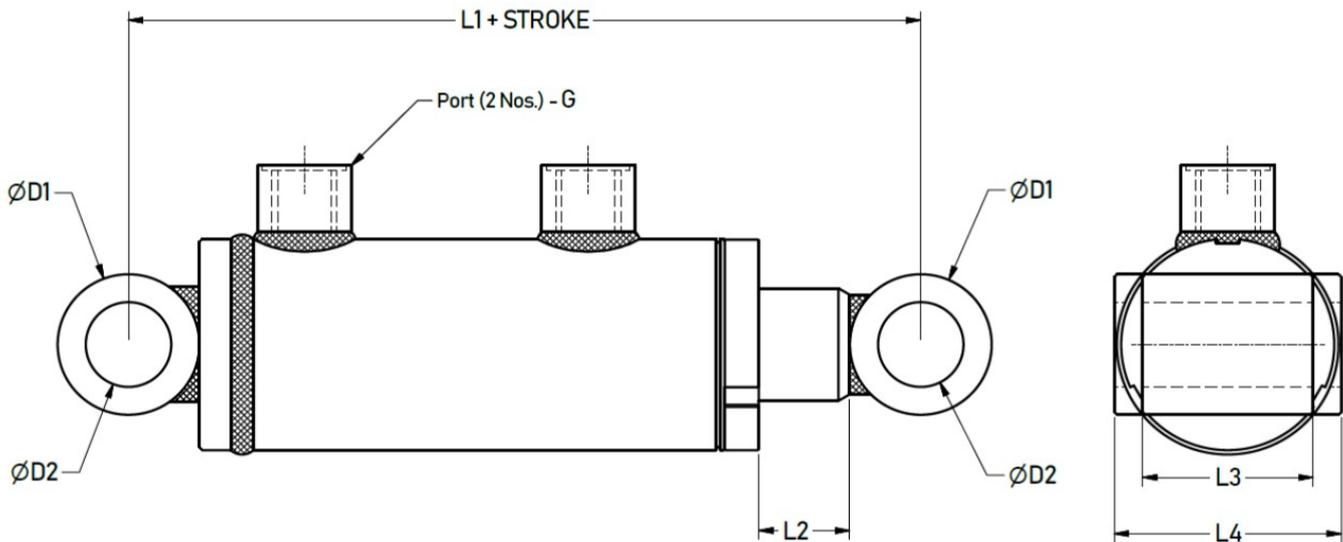
**Type - RW7**  
[Both End Foot Mounted]

Features

- ❖ Threaded & Welded Type
- ❖ Cost Effective
- ❖ Short Lead Time
- ❖ Low Maintenance
- ❖ Double Acting Cylinder

Technical Details

Available Bore Sizes	Ø 40 / Ø 50 / Ø 63 / Ø 80 / Ø 100
Maximum Working Pressure	240 bar
Hydraulic Oil	Mineral Oil (HL / HLP)
Materials of Construction	CDS Tube Grade ST52 / C45 / En8
Temperature Range	-10 to +90°C



Installation Dimensions & Specifications :

BORE DIA.	ROD DIA.	L1	L2	L3	L4	D1	D2	G (BSP)	Max. Load Carrying Capacity (metric ton)		Genuine Seal Kit Part No.
									Push	Pull	
40	25	202	24	40	55	45	25	3/8"	3.0	1.8	RX1601-Z
50	30	211	24	45	70	50	30	1/2"	4.7	3.0	RX1602-Z
63	40	229	32	60	80	50	30	1/2"	7.5	4.5	RX1603-Z
80	45	235	32	60	100	50	30	1/2"	12.1	8.2	RX1604-Z
100	56	268	36	80	120	60	40	3/4"	18.9	13.0	RX1605-Z

\* Stroke Tolerance : ± 1.5mm [for strokes 50 to 400 mm] & ±2.0mm [for strokes 401 to 1000 mm]

\* Higher bore sizes and /or longer strokes are available upon request.

\* All dimensions are in mm unless otherwise specified.

\* Single Acting Option available.

Ordering Instructions for RW1 Compact Cylinder :

**R W 1** —    —

MODEL No. Both End Pin      CYLINDER BORE (mm) Standard Bores available : 040 / 050 / 063 / 080 / 100      STROKE (mm) Standard Strokes available : 50 mm to 1000 mm ( in 5 mm increments )

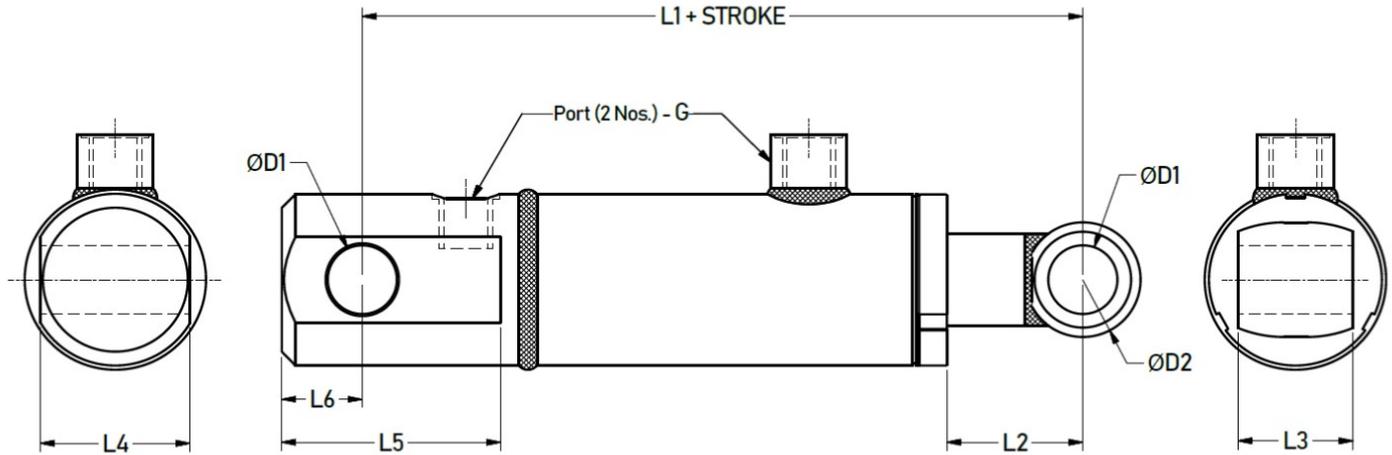
**Example:** For a cylinder of Bore Ø 63mm & Stroke 900 mm the order code shall be : **RW1-063-0900**

Features

- ❖ Threaded & Welded Type
- ❖ Cost Effective
- ❖ Short Lead Time
- ❖ Low Maintenance
- ❖ Double Acting Cylinder

Technical Details

Available Bore Sizes	Ø 40 / Ø 50 / Ø 63 / Ø 80 / Ø 100
Maximum Working Pressure	240 bar
Hydraulic Oil	Mineral Oil (HL / HLP)
Materials of Construction	CDS Tube Grade ST52 / C45 / En8
Temperature Range	-10 to +90°C



Installation Dimensions & Specifications :

BORE DIA.	ROD DIA.	L1	L2	L3	L4	L5	L6	D1	D2	G (BSP)	Max. Load Carrying Capacity (metric ton)		Genuine Seal Kit Part No.
											Push	Pull	
40	25	228	48	35	40	77	27	25	45	3/8"	3.0	1.8	RX1601-Z
50	30	246	51	40	50	91	30	30	50	1/2"	4.7	3.0	RX1602-Z
63	40	263	59	50	65	95	35	30	50	1/2"	7.5	4.5	RX1603-Z
80	45	274	64	55	84	95	35	36	60	1/2"	12.1	8.2	RX1604-Z
100	56	317	68	66	104	125	45	40	60	3/4"	18.9	13.0	RX1605-Z

\* Stroke Tolerance : ± 1.5mm [for strokes 50 to 400 mm] & ±2.0mm [for strokes 401 to 1000 mm]

\* Higher bore sizes and /or longer strokes are available upon request.

\* All dimensions are in mm unless otherwise specified.

\* Single Acting Option available.

Ordering Instructions for RW1 Compact Cylinder :

**R W 2** —    —

MODEL No. Both End Pin      CYLINDER BORE (mm) Standard Bores available : 040 / 050 / 063 / 080 / 100      STROKE (mm) Standard Strokes available : 50 mm to 1000 mm ( in 5 mm increments )

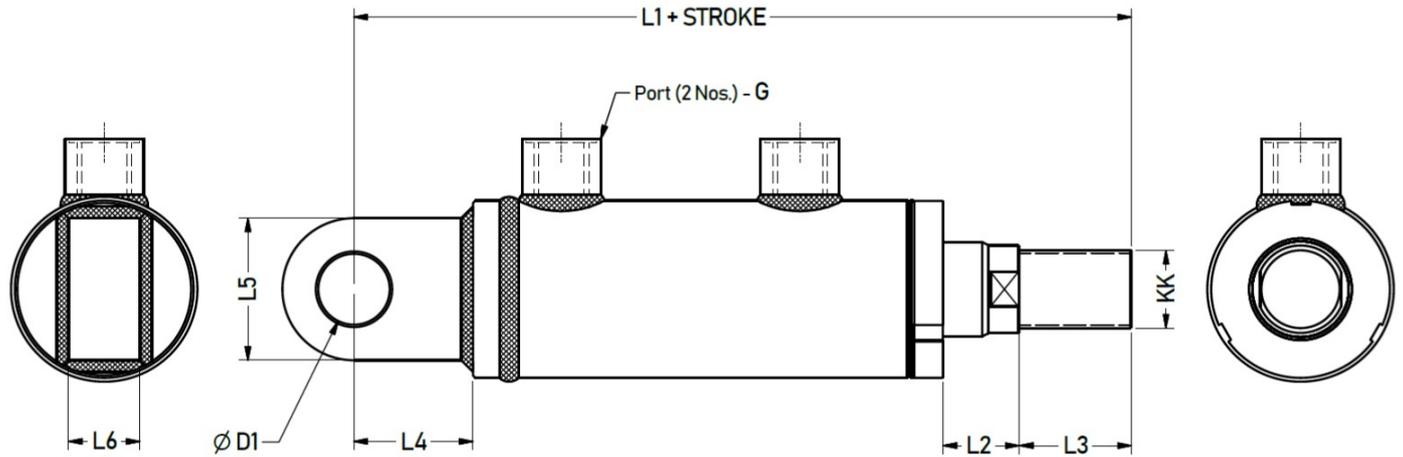
Example: For a cylinder of Bore Ø 63mm & Stroke 900 mm the order code shall be : **RW2-063-0900**

Features

- ❖ Threaded & Welded Type
- ❖ Cost Effective
- ❖ Short Lead Time
- ❖ Low Maintenance
- ❖ Double Acting Cylinder

Technical Details

Available Bore Sizes	∅ 40 / ∅ 50 / ∅ 63 / ∅ 80 / ∅ 100
Maximum Working Pressure	240 bar
Hydraulic Oil	Mineral Oil (HL / HLP)
Materials of Construction	CDS Tube Grade ST52 / C45 / En8
Temperature Range	-10 to +90°C



Installation Dimensions & Specifications :

BORE DIA.	ROD DIA.	L1	L2	L3	L4	L5	L6	KK	D1	G (BSP)	Max. Load Carrying Capacity (metric ton)		Genuine Seal Kit Part No.
											Push	Pull	
40	25	220	24	24	39	38	22	M20 x 1.5	22	3/8"	3.0	1.8	RX1601-Z
50	30	230	24	24	45	50	25	M24 x 2.0	25	1/2"	4.7	3.0	RX1602-Z
63	40	276	32	47	50	60	30	M33 x 2.0	30	1/2"	7.5	4.5	RX1603-Z
80	45	289	32	47	57	74	30	M33 x 2.0	30	1/2"	12.1	8.2	RX1604-Z
100	56	333	36	58	67	84	40	M42 x 2.0	40	3/4"	18.9	13.0	RX1605-Z

\* Stroke Tolerance : ± 1.5mm [for strokes 50 to 400 mm] & ±2.0mm [for strokes 401 to 1000 mm]

\* Higher bore sizes and /or longer strokes are available upon request.

\* All dimensions are in mm unless otherwise specified.

\* Single Acting Option available.

Ordering Instructions for RWI Compact Cylinder :

**R W 3**

MODEL No.  
Cap End Male Clevis  
Rod End Threaded



CYLINDER BORE (mm)  
Standard Bores available :  
040 / 050 / 063 / 080 / 100

STROKE (mm)  
Standard Strokes available :  
50 mm to 1000 mm ( in 5 mm increments )

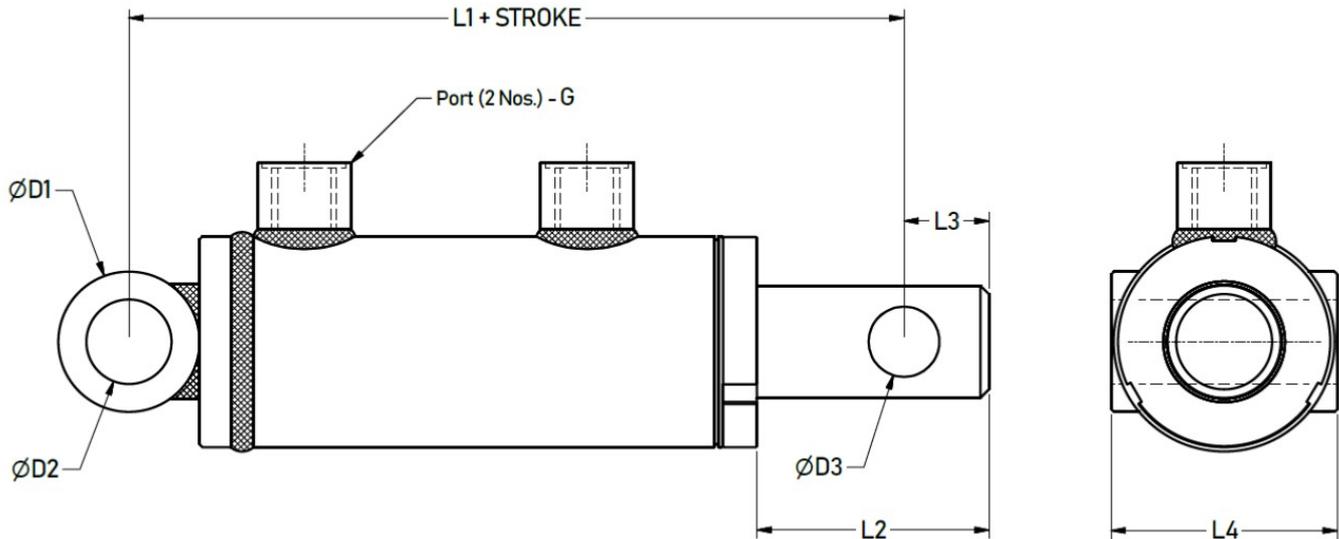
Example: For a cylinder of Bore ∅ 63mm & Stroke 900 mm the order code shall be : **RW3-063-0900**

Features

- ❖ Threaded & Welded Type
- ❖ Cost Effective
- ❖ Short Lead Time
- ❖ Low Maintenance
- ❖ Double Acting Cylinder

Technical Details

Available Bore Sizes	Ø 40 / Ø 50 / Ø 63 / Ø 80 / Ø 100
Maximum Working Pressure	240 bar
Hydraulic Oil	Mineral Oil (HL / HLP)
Materials of Construction	CDS Tube Grade ST52 / C45 / En8
Temperature Range	-10 to +90°C



Installation Dimensions & Specifications :

BORE DIA.	ROD DIA.	L1	L2	L3	L4	D1	D2	D3	G (BSP)	Max. Load Carrying Capacity (metric ton)		Genuine Seal Kit Part No.
										Push	Pull	
40	25	200	65	20	55	45	25	12	3/8"	3.0	1.8	RX1601-Z
50	30	208	70	24	70	50	30	16	1/2"	4.7	3.0	RX1602-Z
63	40	224	82	30	80	50	30	25	1/2"	7.5	4.5	RX1603-Z
80	45	231	85	32	100	50	30	30	1/2"	12.1	8.2	RX1604-Z
100	56	267	100	35	120	60	40	35	3/4"	18.9	13.0	RX1605-Z

\* Stroke Tolerance : ± 1.5mm [for strokes 50 to 400 mm] & ±2.0mm [for strokes 401 to 1000 mm]

\* Higher bore sizes and /or longer strokes are available upon request.

\* All dimensions are in mm unless otherwise specified.

\* Single Acting Option available.

Ordering Instructions for RWI Compact Cylinder :

**R W 4** —    —

MODEL No.                      CYLINDER BORE (mm)                      STROKE (mm)  
 Cap End Pin                      Standard Bores available :                      Standard Strokes available :  
 Rod End Thru Hole                      040 / 050 / 063 / 080 / 100                      50 mm to 1000 mm ( in 5 mm increments )

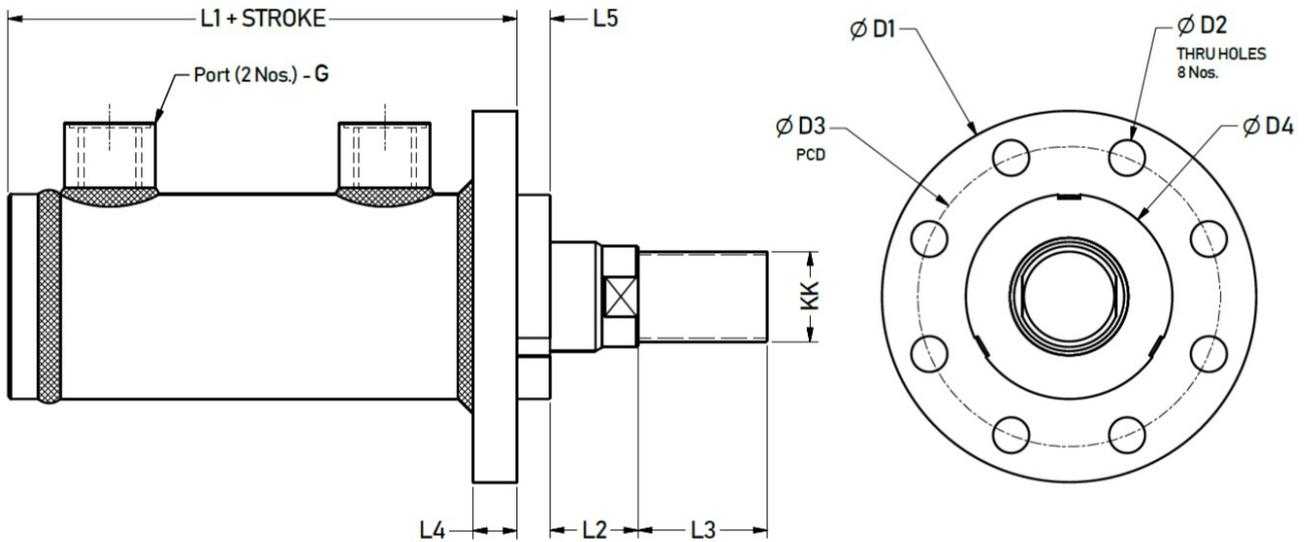
Example: For a cylinder of Bore Ø 63mm & Stroke 900 mm the order code shall be : **RW4-063-0900**

Features

- ❖ Threaded & Welded Type
- ❖ Cost Effective
- ❖ Short Lead Time
- ❖ Low Maintenance
- ❖ Double Acting Cylinder

Technical Details

Available Bore Sizes	Ø 40 / Ø 50 / Ø 63 / Ø 80 / Ø 100
Maximum Working Pressure	240 bar
Hydraulic Oil	Mineral Oil (HL / HLP)
Materials of Construction	CDS Tube Grade ST52 / C45 / En8
Temperature Range	-10 to +90°C



Installation Dimensions & Specifications :

BORE DIA.	ROD DIA.	L1	L2	L3	L4	L5	KK	D1	D2	D3	D4	G (BSP)	Max. Load Carrying Capacity (metric ton)		Genuine Seal Kit Part No.
													Push	Pull	
40	25	123	24	24	12	10	M20 x 1.5	108	9	87	50	3/8"	3.0	1.8	RX1601-Z
50	30	127	24	24	12	10	M24 x 2.0	123	11	98	63	1/2"	4.7	3.0	RX1602-Z
63	40	135	32	47	16	12	M33 x 2.0	136	13	110	75	1/2"	7.5	4.5	RX1603-Z
80	45	139	32	47	21	14	M33 x 2.0	165	13	140	94	1/2"	12.1	8.2	RX1604-Z
100	56	158	36	58	23	14	M42 x 2.0	195	17	160	114	3/4"	18.9	13.0	RX1605-Z

\* Stroke Tolerance : ± 1.5mm [for strokes 50 to 400 mm] & ±2.0mm [for strokes 401 to 1000 mm]

\* Higher bore sizes and /or longer strokes are available upon request.

\* All dimensions are in mm unless otherwise specified.

\* Single Acting Option available.

Ordering Instructions for RW1 Compact Cylinder :



MODEL No.  
Front Circular  
Flange  
Rod End Threaded

CYLINDER BORE (mm)  
Standard Bores available :  
040 / 050 / 063 / 080 / 100

STROKE (mm)  
Standard Strokes available :  
50 mm to 1000 mm ( in 5 mm increments )

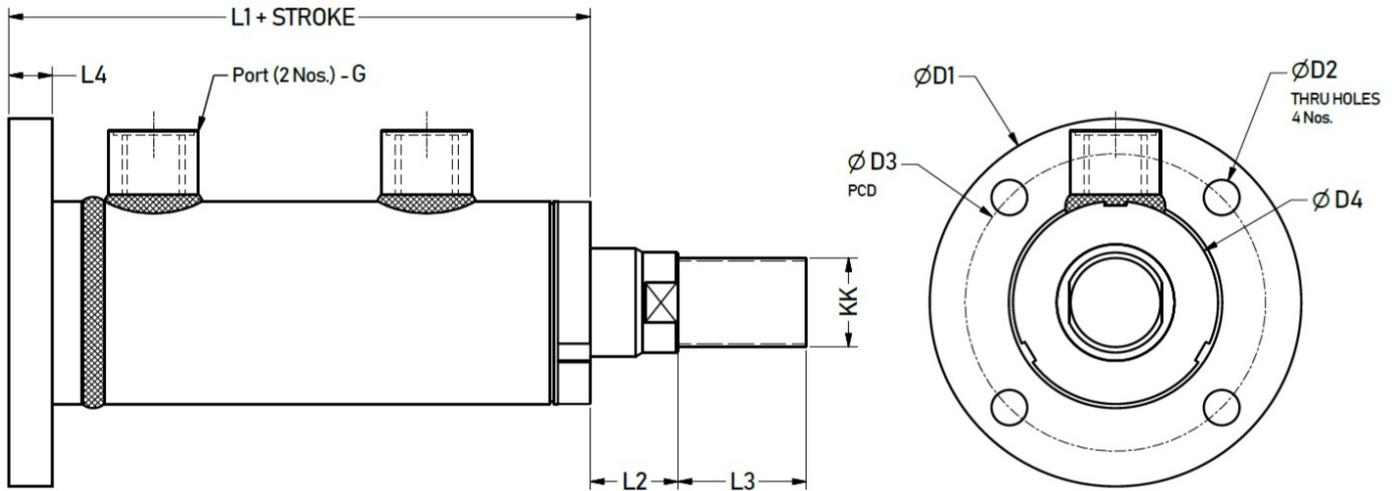
Example: For a cylinder of Bore Ø 63mm & Stroke 900 mm the order code shall be : **RW5-063-0900**

Features

- ❖ Threaded & Welded Type
- ❖ Cost Effective
- ❖ Short Lead Time
- ❖ Low Maintenance
- ❖ Double Acting Cylinder

Technical Details

Available Bore Sizes	Ø 40 / Ø 50 / Ø 63 / Ø 80 / Ø 100
Maximum Working Pressure	240 bar
Hydraulic Oil	Mineral Oil (HL / HLP)
Materials of Construction	CDS Tube Grade ST52 / C45 / En8
Temperature Range	-10 to +90°C



\*Note: This design is suitable only for pushing applications.

Installation Dimensions & Specifications :

BORE DIA.	ROD DIA.	L1	L2	L3	L4	KK	D1	D2	D3	D4	G (BSP)	Max. Load Carrying Capacity (metric ton)	Genuine Seal Kit Part No.
												Push	
40	25	145	24	24	12	M20 x 1.5	108	9	87	50	3/8"	3.0	RX1601-Z
50	30	149	24	24	12	M24 x 2.0	123	11	98	63	1/2"	4.7	RX1602-Z
63	40	163	32	47	16	M33 x 2.0	136	13	110	75	1/2"	7.5	RX1603-Z
80	45	174	32	47	21	M33 x 2.0	165	13	140	94	1/2"	12.1	RX1604-Z
100	56	195	36	58	23	M42 x 2.0	195	17	160	114	3/4"	18.9	RX1605-Z

\* Stroke Tolerance : ± 1.5mm [for strokes 50 to 400 mm] & ±2.0mm [for strokes 401 to 1000 mm]

\* Higher bore sizes and /or longer strokes are available upon request.

\* All dimensions are in mm unless otherwise specified.

\* Single Acting Option available.

Ordering Instructions for RWI Compact Cylinder :

**R W 6**



MODEL No.  
Rear Circular Flange  
Rod End Threaded

CYLINDER BORE (mm)  
Standard Bores available :  
040 / 050 / 063 / 080 / 100

STROKE (mm)  
Standard Strokes available :  
50 mm to 1000 mm ( in 5 mm increments )

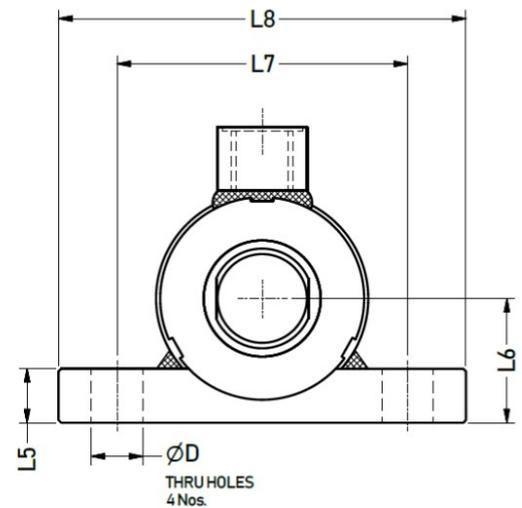
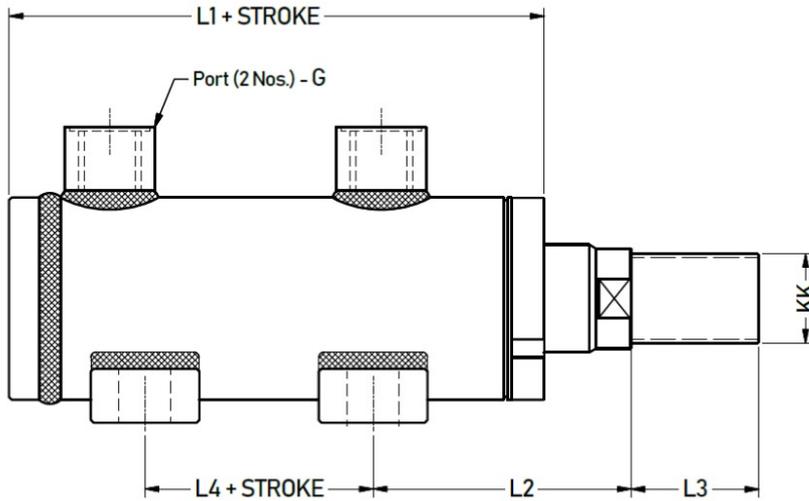
Example: For a cylinder of Bore Ø 63mm & Stroke 900 mm the order code shall be : **RW6-063-0900**

Features

- ❖ Threaded & Welded Type
- ❖ Cost Effective
- ❖ Short Lead Time
- ❖ Low Maintenance
- ❖ Double Acting Cylinder

Technical Details

Available Bore Sizes	∅ 40 / ∅ 50 / ∅ 63 / ∅ 80 / ∅ 100
Maximum Working Pressure	240 bar
Hydraulic Oil	Mineral Oil (HL / HLP)
Materials of Construction	CDS Tube Grade ST52 / C45 / En8
Temperature Range	-10 to +90°C



Installation Dimensions & Specifications :

BORE DIA.	ROD DIA.	L1	L2	L3	L4	L5	L6	L7	L8	KK	D	G (BSP)	Max. Load Carrying Capacity (metric ton)		Genuine Seal Kit Part No.
													Push	Pull	
40	25	133	81	24	36	20	35	72	100	M20 x 1.5	13	3/8"	3.0	1.8	RX1601-Z
50	30	137	82	24	34	20	40	90	120	M24 x 2.0	13	1/2"	4.7	3.0	RX1602-Z
63	40	147	95	47	34	20	46	109	150	M33 x 2.0	17	1/2"	7.5	4.5	RX1603-Z
80	45	153	99	47	36	25	58	123	164	M33 x 2.0	17	1/2"	12.1	8.2	RX1604-Z
100	56	172	114	58	39	25	68	145	190	M42 x 2.0	21	3/4"	18.9	13.0	RX1605-Z

\* Stroke Tolerance : ± 1.5mm [for strokes 50 to 400 mm] & ±2.0mm [for strokes 401 to 1000 mm]

\* Higher bore sizes and /or longer strokes are available upon request.

\* All dimensions are in mm unless otherwise specified.

\* Single Acting Option available.

Ordering Instructions for RWI Compact Cylinder :

**R W 7**



MODEL No.  
Both End Foot  
Mounted

CYLINDER BORE (mm)  
Standard Bores available :  
040 / 050 / 063 / 080 / 100

STROKE (mm)  
Standard Strokes available :  
50 mm to 1000 mm ( in 5 mm increments )

Example: For a cylinder of Bore ∅ 63mm & Stroke 900 mm the order code shall be : **RW7-063-0900**

## 1 Mounting Style :

### Rod End Mountings -

- 5 different standard styles of mounting as shown below
- Browse through subsequent pages for technical details and mounting dimensions



**RXPC [Plain Clevis]**



**RXFC [Fork Clevis]**



**RXSR [Self Aligning Clevis - Short]**

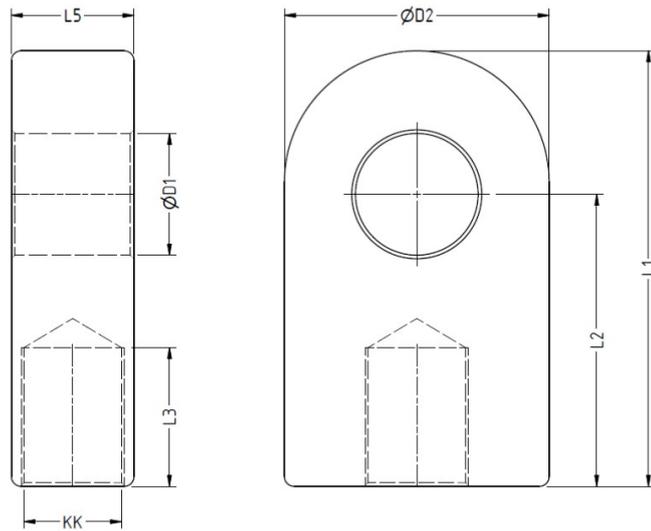


**RXLR [Self Aligning Clevis - Long]**



**RXLR [Self Aligning Clevis - Long]**

2 Plain Clevis :



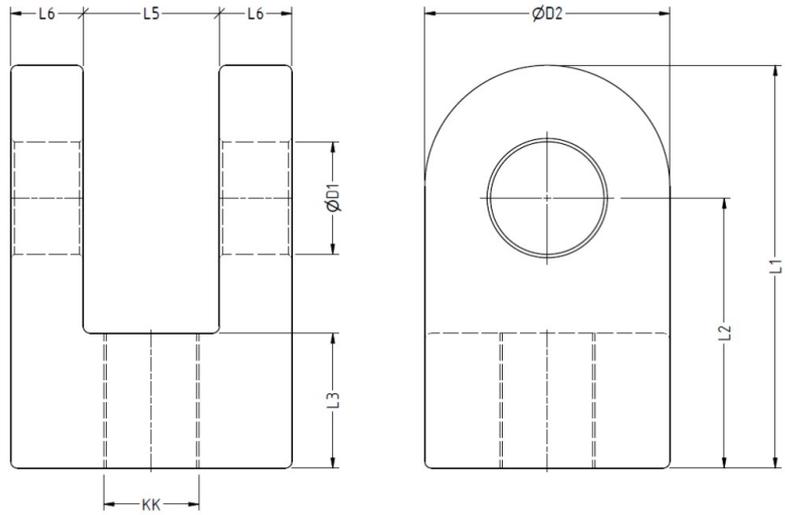
Installation Dimensions :

PART NUMBER	DIMENSIONS						
	D1	D2	KK (6H)	L1	L2	L3	L5
RXPC16	16	40	M12X1.5	64	44	19	16
RXPC20	20	47	M16X1.5	77	52	23	20
RXPC25	25	58	M20X1.5	96	65	29	25
RXPC32	32	70	M27X2	118	80	37	32
RXPC40	40	89	M33X2	145.5	97	46	40
RXPC50	50	108	M42X2	179	120	57	50
RXPC63	63	132	M48X2	211	140	64	63
RXPC80	80	168	M64X3	270	180	86	80
RXPC90	90	185	M72X3	296	195	91	90
RXPC100	100	210	M80X3	322	210	96	100
RXPC110	110	235	M90X3	364	235	106	110
RXPC125	125	262	M100X3	405	260	113	125
RXPC160	160	326	M125X3	488	310	126	160
RXPC200	200	418	M160X4	620	390	161	200
RXPC250	250	590	M200X4	845	520	200	250

All dimensions are in mm .

**NOTE:** For Left Hand thread, add suffix – “L” to Part Number. Example: RXPC110-L

**3 Fork Clevis :**



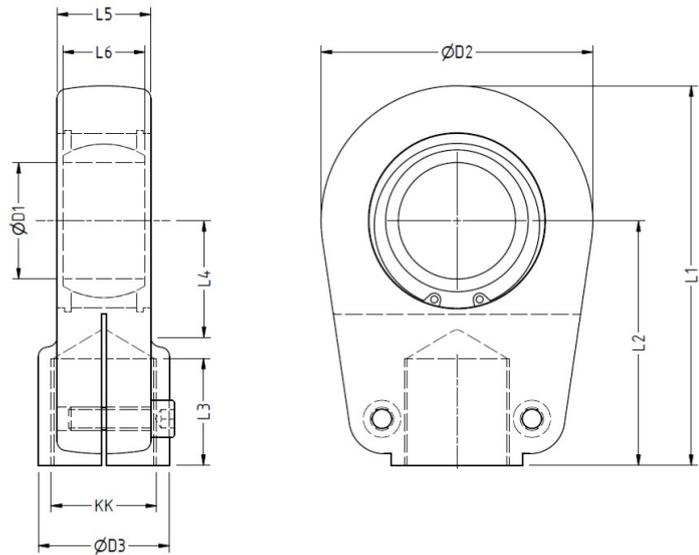
**Installation Dimensions :**

PART NUMBER	DIMENSIONS							
	D1	D2	KK (6H)	L1	L2	L3	L5	L6
RXFC16	16	40	M12X1.5	64	44	20	20	13
RXFC20	20	47	M16X1.5	77	52	25	30	16
RXFC25	25	58	M20X1.5	96	65	30	30	16
RXFC32	32	70	M27X2	118	80	40	40	19
RXFC40	40	89	M33X2	145.5	97	48	50	25
RXFC50	50	108	M42X2	179	120	60	60	32
RXFC63	63	132	M48X2	211	140	70	70	32
RXFC80	80	168	M64X3	270	180	90	70	32
RXFC90	90	185	M72X3	296	195	95	80	35
RXFC100	100	210	M80X3	322	210	100	80	35
RXFC110	110	235	M90X3	364	235	-	-	-
RXFC125	125	262	M100X3	405	260	-	-	-
RXFC160	160	326	M125X3	488	310	-	-	-
RXFC200	200	418	M160X4	620	390	-	-	-
RXFC250	250	590	M200X4	845	520	-	-	-

All dimensions are in mm .

**NOTE:** For Left Hand thread, add suffix – “L” to Part Number. Example: RXFC110-L

4 Self Aligning Clevis - Short :



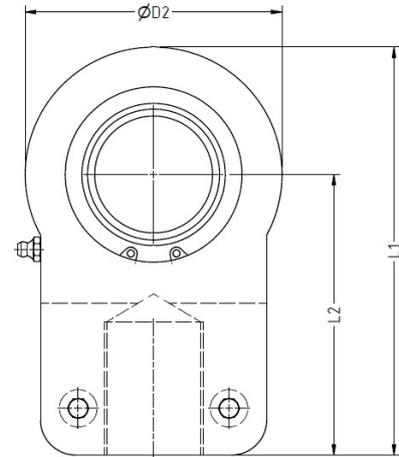
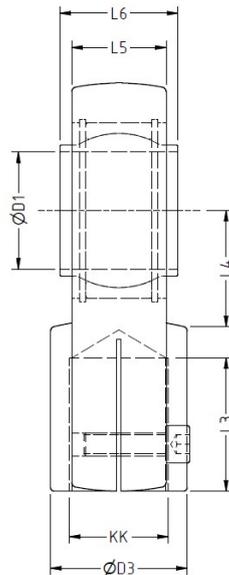
Installation Dimensions & Specifications :

PART NUMBER	DIMENSIONS										LOAD RATING (kN)		WEIGHT (kg)
	D1	D2	D3	KK (6H)	L1	L2	L3	L4	L5	L6	Dynamic	Static	
RXSR20	20	56	25	M16X1.5	80	50	17	25	19	16	30	81	0.44
RXSR25	25	56	25	M16X1.5	80	50	17	25	23	20	48	72	0.47
RXSR30	30	64	32	M22X1.5	94	60	23	30	28	22	62	106	0.77
RXSR35	35	78	40	M28X1.5	112	70	29	38	30	25	79	153	1.24
RXSR40	40	94	49	M35X1.5	135	85	36	45	35	28	99	250	2.12
RXSR50	50	116	61	M45X1.5	168	105	45	55	40	35	156	365	3.74
RXSR60	60	130	75	M58X1.5	200	130	59	65	50	44	245	400	6.49
RXSR70	70	154	86	M65X1.5	232	150	66	75	55	49	313	540	9.88
RXSR80	80	176	105	M80X2	265	170	81	80	60	55	400	670	14.2
RXSR90	90	206	124	M100X2	323	210	101	90	65	60	488	980	23.5
RXSR100	100	231	138	M110X2	360	235	111	105	70	70	607	1120	32.14
RXSR110	110	266	152	M120X3	407	265	125	115	80	70	654	1700	47.6
RXSR120	120	340	172	M130X3	490	310	135	140	90	85	950	2900	72

All dimensions are in mm .

**NOTE:** For Left Hand thread, add suffix – “L” to Part Number. Example: RXLR110-L

5 Self Aligning Clevis - Long :



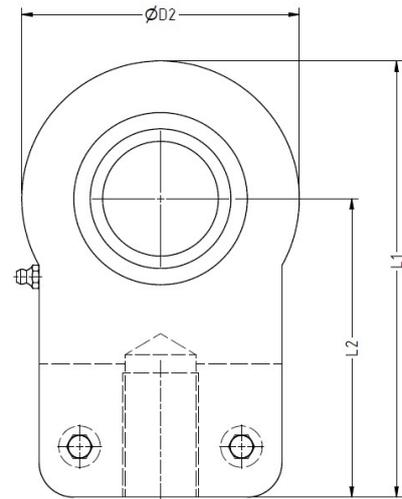
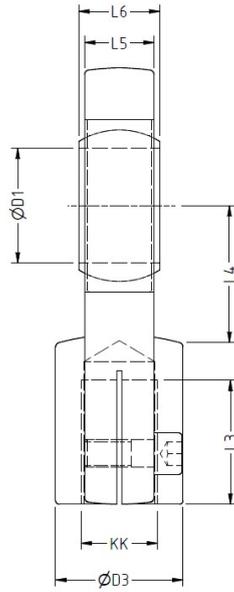
Installation Dimensions & Specifications :

PART NUMBER	DIMENSIONS										LOAD RATING (kN)		WEIGHT (kg)
	D1	D2	D3	KK (6H)	L1	L2	L3	L4	L5	L6	Dynamic	Static	
RXLR12	12	32	16	M12x1.25	54	38	17	14	11	12	10	24.5	0.11
RXLR16	16	40	21	M14x1.5	64	44	19	18	14	16	17	36.5	0.20
RXLR20	20	47	25	M16x1.5	77	52	23	22	17	20	30	48	0.35
RXLR25	25	58	30	M20x1.5	96	65	29	27	22	25	48	78	0.62
RXLR32	32	71	38	M27x2	118.5	80	42	32	28	32	65	114	1.15
RXLR40	40	90	47	M33x2	146	97	52.5	41	33	40	99	204	2.18
RXLR50	50	109	58	M42x2	179.5	120	63.5	50	40	50	156	310	3.96
RXLR63	63	136	70	M48x2	211	140	72	62	53	63	253	430	6.23
RXLR70	70	155	80	M56x2	245	160	84	70	57	70	313	540	11.1
RXLR80	80	170	90	M64x3	270	180	92.5	78	67	80	400	695	15.1
RXLR90	90	185	100	M72x3	296	195	103	85	72	90	488	750	19.1
RXLR100	100	211	110	M80x3	322.5	210	108	98	85	100	607	1060	25.5
RXLR110	110	235	125	M90x3	364	235	118	105	88	110	654	1200	36.6
RXLR125	125	265	135	M100X3	405	260	125	120	103	125	950	1430	52.6
RXLR160	160	326	165	M125X4	488	310	138	150	130	160	1360	2200	79
RXLR200	200	418	215	M160X4	620	390	173	195	162	200	2120	3650	164

All dimensions are in mm .

NOTE: For Left Hand thread, add suffix – “L” to Part Number. Example: RXLR110-L

6 Self Aligning Clevis - Long :



Installation Dimensions & Specifications :

PART NUMBER	DIMENSIONS										LOAD RATING (kN)		WEIGHT (kg)
	D1	D2	D3	KK (6H)	L1	L2	L3	L4	L5	L6	Dynamic	Static	
RXLR12	12	35	17	M10x1.25	59.5	42	15	16	8	10	10	17	0.12
RXLR16	16	45	21	M12x1.25	70.5	48	17	20	11	14	21	28.5	0.22
RXLR20	20	55	25	M14x1.5	85.5	58	19	25	13	16	30	42.5	0.43
RXLR25	25	65	30	M16x1.5	100.5	68	23	30	17	20	48	67	0.67
RXLR30	30	80	36	M20x1.5	125	85	29	35	19	22	62	108	1.25
RXLR40	40	100	45	M27x2	155	105	37	45	23	28	99	156	2.16
RXLR50	50	120	55	M33x2	190	130	54	58	30	35	156	245	3.90
RXLR60	60	160	68	M42x2	230	150	65	68	38	44	245	380	8.2
RXLR80	80	205	90	M48x2	287.5	185	75	92	47	55	400	585	16.2
RXLR100	100	240	110	M64x3	360	240	102	116	57	70	607	865	28.4

All dimensions are in mm .

NOTE: For Left Hand thread, add suffix – “L” to Part Number. Example: RXLR110-L







## CAUTION

A FAILURE, A WRONG CHOICE OR AN IMPROPER USE OF OUR PRODUCTS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE. IT IS THE RESPONSIBILITY OF THE USER TO SELECT, INSTALL AND USE THE HDYRAULIC CYLINDERS IN THE CORRECT WAY.

For more information please contact the RAX customer service.

Edition : January 2020  
Printed in India

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