



## 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 :

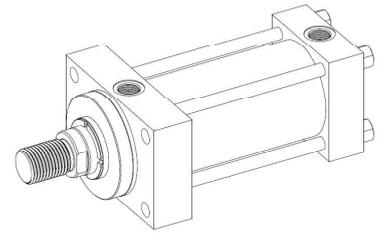
<b>Cylinder Series:</b> R2 [ISO 6020-2]	<b>Mounting Style:</b> see section <a href="#">1</a>	<b>Bore Size:</b> From $\varnothing$ 40 - 200 mm, see section <a href="#">13</a>	<b>Rod Size:</b> From $\varnothing$ 18 - 140 mm, see section <a href="#">13</a>	<b>Second Rod Size</b> (for double rod): From $\varnothing$ 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
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\*NOTE: 1) F or style L [MT4], XV Dimension must be indicated in the order code, see section [8](#)

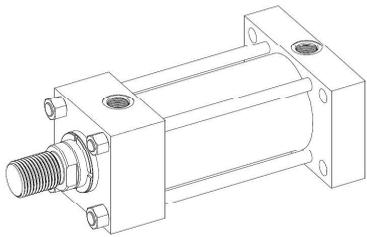
2) Double Rod not available for styles- C, D, H, P & S

**1 Mounting Style :**

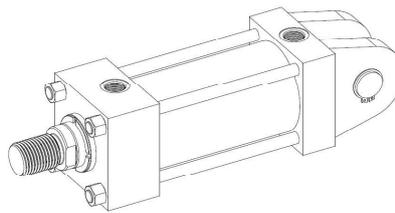
- 12 different standard styles of mounting as shown below
- Browse through subsequent pages for technical details and mounting dimensions
- Piston Rod End dimensions are given separately in section [13](#)



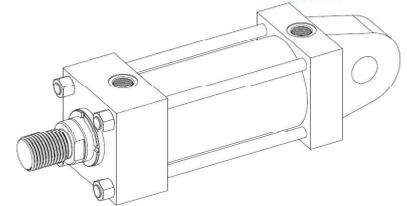
**ISO ME5**  
**Style N [Front Rectangular Flange]**



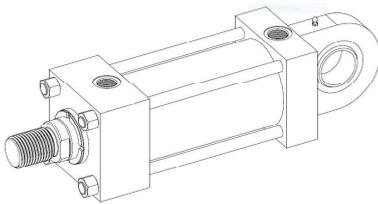
**ISO ME6**  
**Style P [Rear Rectangular Flange]**



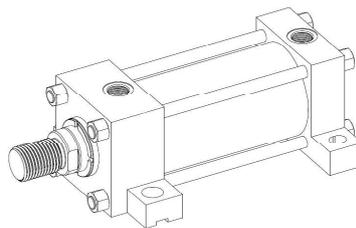
**ISO MP1**  
**Style C [Fixed Clevis]**



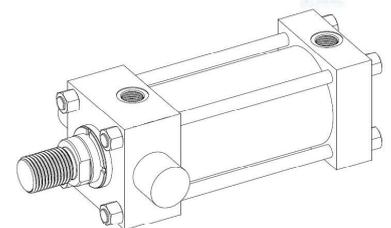
**ISO MP3**  
**Style D [Fixed Eye]**



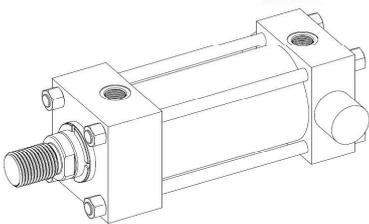
**ISO MP5**  
**Style S [Fixed Eye with Spherical Bearing]**



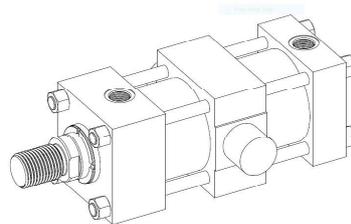
**ISO MF2**  
**Style E [Foot Mounting]**



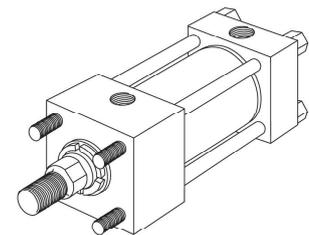
**ISO MT1**  
**Style G [Front Trunnion]**



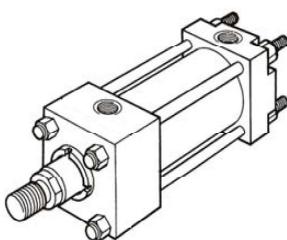
**ISO MT2**  
**Style H [Rear Trunnion]**



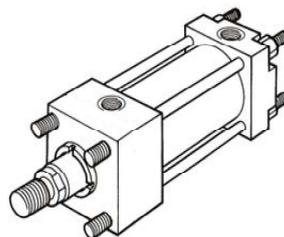
**ISO MT4**  
**Style L [Intermediate Trunnion]**



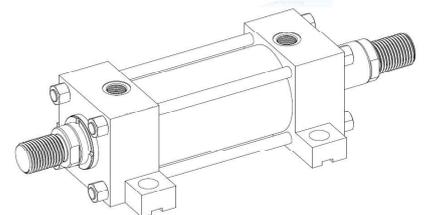
**ISO MX3**  
**Style Y [Front End Tie Rods Extended]**



**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]:**

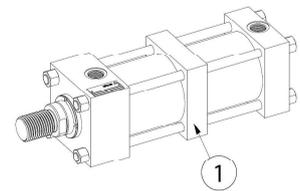
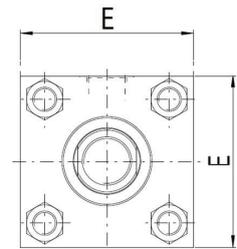
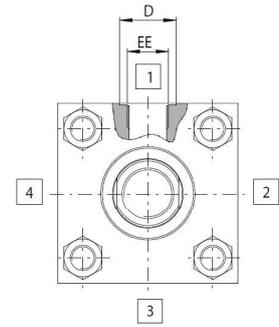
Bore $\varnothing$		40	50	63	80	100	125	160	200
Standard Oil Ports	D <sub>min</sub>	25	29	29	36	36	42	42	52
	EE (BSPP)	G ¾	G ½	G ½	G ¾	G ¾	G 1	G 1	G 1 ½
Oversized Oil Ports	D1 <sub>min</sub>	29	36	36	42	42	52	52	58
	EE1 (BSPP)	G ½	G ¾	G ¾	G 1	G 1	G 1 ½	G 1 ½	G 1 ½

- 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 $\varnothing$	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.

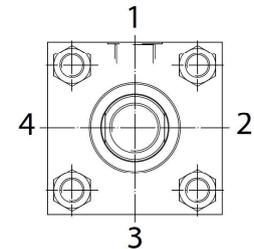


**3 Position of Oil Ports:**

- 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:

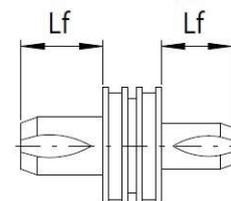
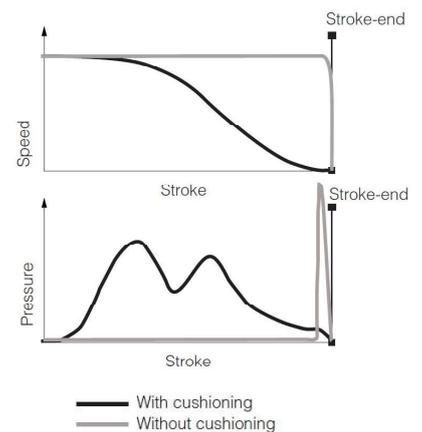
- The piston makes a full stroke with speed over than 0.05 m/s;
- It is necessary to reduce undesirable noise and mechanical shocks;
- Vertical application with heavy loads.

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 $\varnothing$		40		50		63		80		100		125		160		200	
Rod $\varnothing$		18	22 28	22	28 36	28	36 45	36	45 56	45	56 70	56	70 90	70	90 110	90	140 110
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

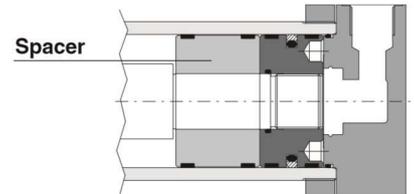
Stroke tolerances:

- 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.

**\* 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
<b>MT [Nm]</b>	20	70	70	160
<b>Wrench</b>	13	19	19	24
Bore Ø	100	125	160	200
<b>MT [Nm]</b>	160	460	820	1160
<b>Wrench</b>	24	32	41	46

**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.

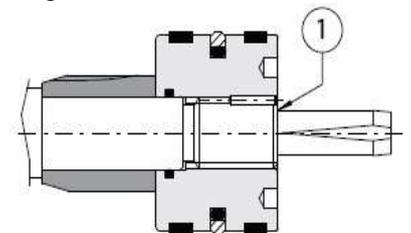
**11 Rod - Piston Coupling:**

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.

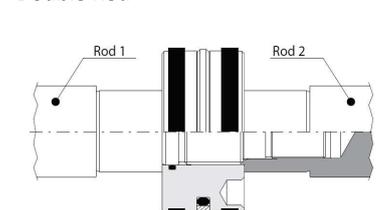
**12 Double Rod:**

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.

Single Rod

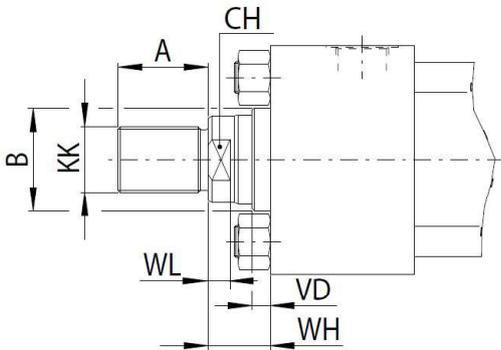


Double Rod

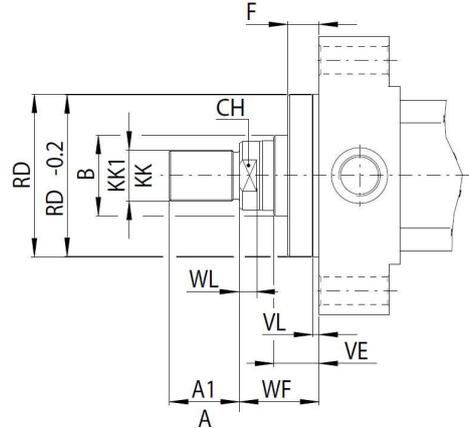


**13 Piston Rod End Data :**

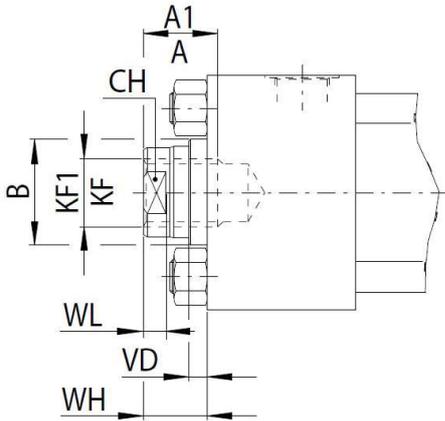
**Rod End [Male] Code 1**  
For all styles except N



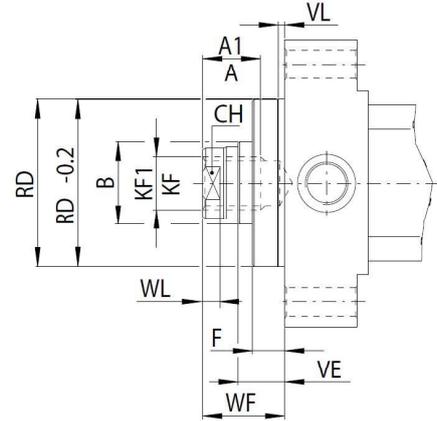
**Rod End [Male] Code 3**  
For style N



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



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



**Rod End Dimensions :**

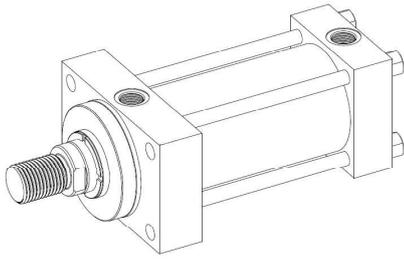
Bore ∅	Rod ∅	Male Thread		Female Thread		A (KK or KF)	A1 (KK1 or KF1)	B f9	CH H14	F max	RD f8	VD	VE max	VL min	WF ±2	WH ±2	WL min
		KK 6g Code 1,3	KK1 6g Code 3	KF 6H Code 2,4	KF1 6H Code 2,4												
40	18	M14 X 1.5	NA	M12 X 1.25	NA	18	NA	30	15	10	62	6	16	3	35	25	5
	22	M16 X 1.5	M14 X 1.5	M16 X 1.5	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 .

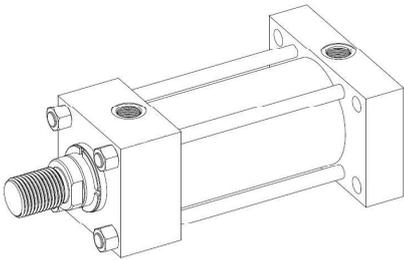
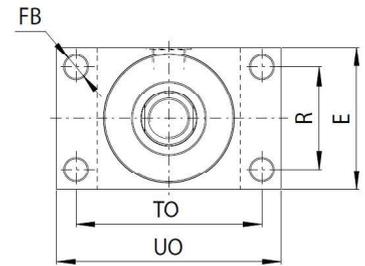
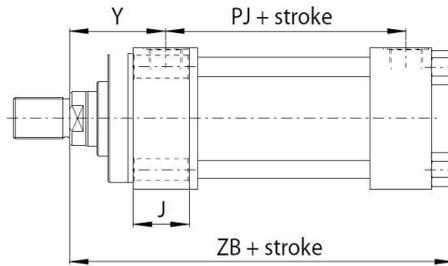
**NOTE:**

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

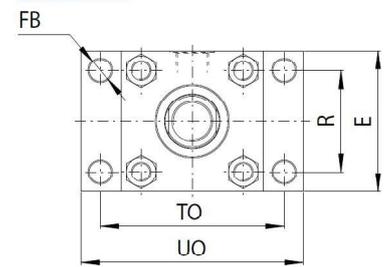
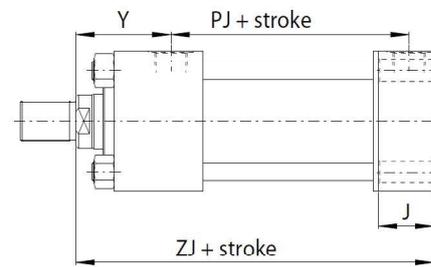
14 Rectangular Flange Mountings :



Style N  
ISO ME5  
Front Rectangular Flange



Style P  
ISO ME6  
Rear Rectangular Flange



Installation Dimensions - ME5 & ME6

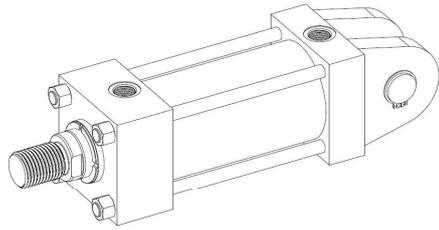
Bore Ø	Rod Ø	E	FB H13	J ref	R js13	TO js13	UO max	Y	Y1	+Stroke			
										PJ	PJ2	ZB max	ZJ
40	18	63	11	38	41	87	110	62	63	73	73	166	153
	22												
	28												
50	22	75	14	38	52	105	130	67	65.5	74	76	176	159
	28												
	36												
63	28	90	14	38	65	117	145	71	70	80	80	185	168
	36												
	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 .

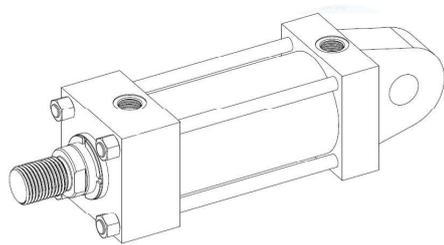
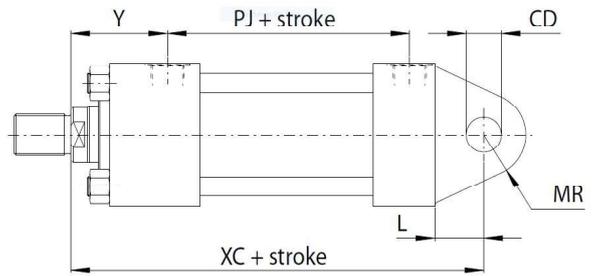
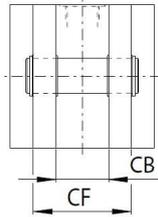
NOTE:

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

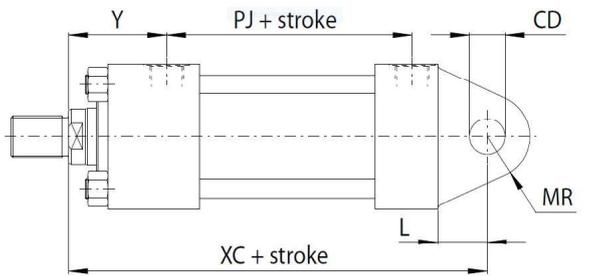
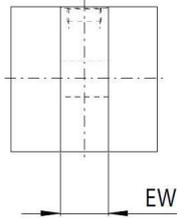
15 Pivot Mountings :



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



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



Installation Dimensions - MP1 & MP3

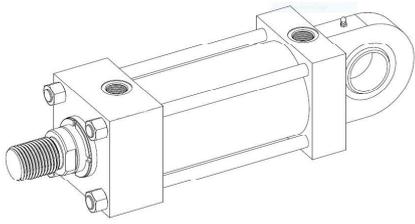
Bore ∅	Rod ∅	CB A13	CD H9	CF max	EW h14	L min	MR max	Y	Y1	+Stroke		
										PJ	PJ2	XC
40	18	20	14	42	20	19	17	62	63	73	73	172
	22											
	28											
50	22	30	20	62	30	32	29	67	65.5	74	76	191
	28											
	36											
63	28	30	20	62	30	32	29	71	70	80	80	200
	36											
	45											
80	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 .

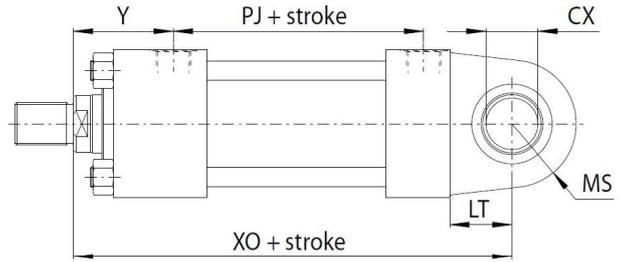
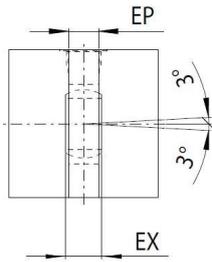
NOTE:

- 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**

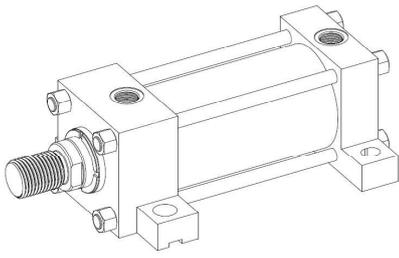
Bore ∅	Rod ∅	CX	EP max	EX	LT min	MS max	Y	Y1	+Stroke		
									PJ	PJ2	XO
40	18	20 <sup>-0.012</sup>	13	16 <sup>-0.12</sup>	25	29	62	63	73	73	178
	22										
	28										
50	22	25 <sup>-0.012</sup>	17	20 <sup>-0.12</sup>	31	33	67	65.5	74	76	190
	28										
	36										
63	28	30 <sup>-0.012</sup>	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 .

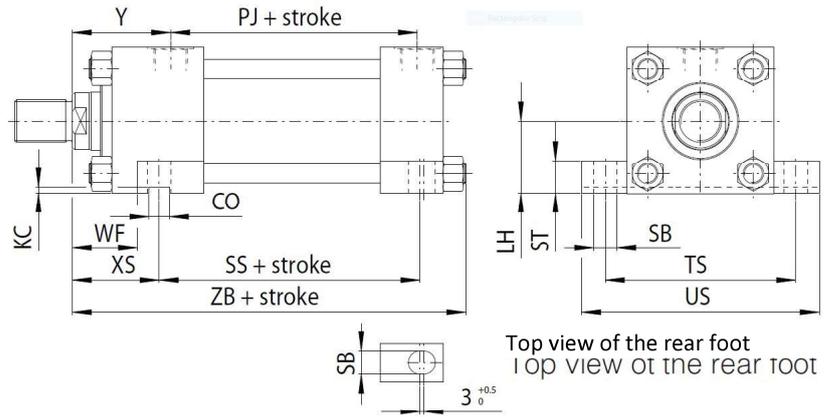
**NOTE:**

- 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**

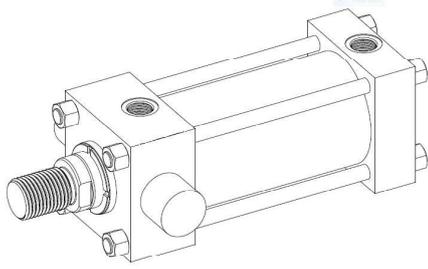
Bore Ø	Rod Ø	CO N9	KC min	LH h10	SB H13	ST js13	TS js13	US max	WF ±2	XS	Y	Y1	+Stroke			
													PJ	PJ2	SS	ZB max
40	18	12	4	31	11	12.5	83	103	35	45	62	63	73	73	97	166
	22															
	28															
50	28	12	4.5	37	14	19	102	127	41	54	67	65.5	74	76	91	176
	36															
	45											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

All dimensions are in mm .

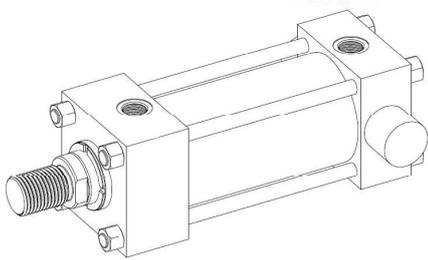
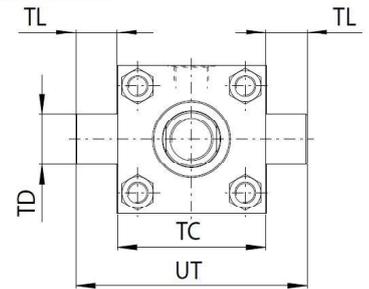
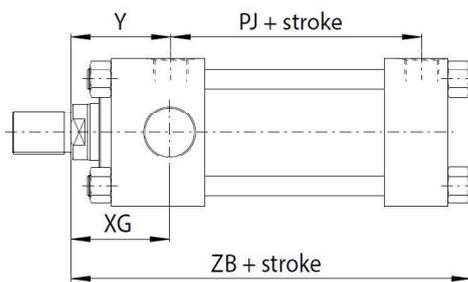
**NOTE:**

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

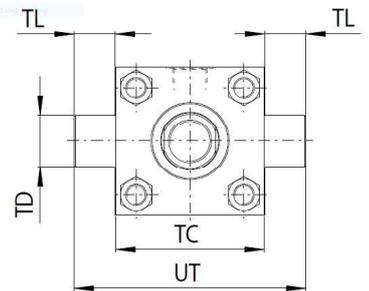
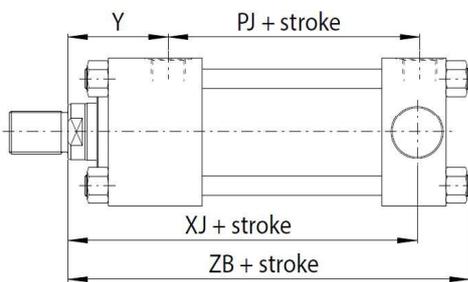
17 Trunnion Mountings :



Style G  
ISO MT1  
Front Trunnion



Style H  
ISO MT2  
Rear Trunnion



Installation Dimensions - MT1 & MT2

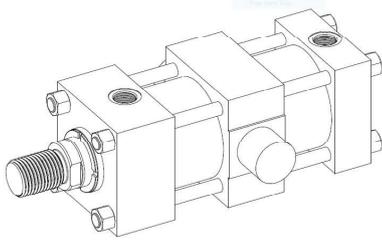
Bore ∅	Rod ∅	TC h14	TD f8	TL js13	UT ref	XG	Y	Y1	+Stroke			
									PJ	PJ2	XJ	ZB max
40	18	63	20	16	95	57	62	63	73	73	134	166
	22											
	28											
50	22	76	25	20	116	64	67	65.5	74	76	140	176
	28											
	36											
63	28	89	32	25	139	70	71	70	80	80	149	185
	36											
	45											
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 .

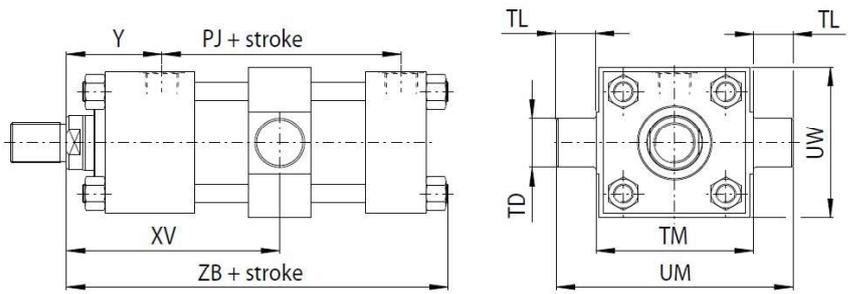
NOTE:

- 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

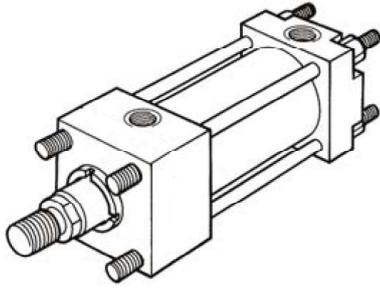
Bore Ø	Rod Ø	TM h14	TD f8	TL js13	UM ref	UW max	Y	Y1	Min. Stroke	XV min	+Stroke			
											XV max	PJ	PJ2	ZB max
40	18	76	20	16	108	70	62	63	5	100	99	73	73	166
	22										98	74	76	176
	28										100	80	80	185
50	28	89	25	20	129	88	67	65.5	15	109	98	74	76	176
	36										100	80	80	185
	45					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

All dimensions are in mm .

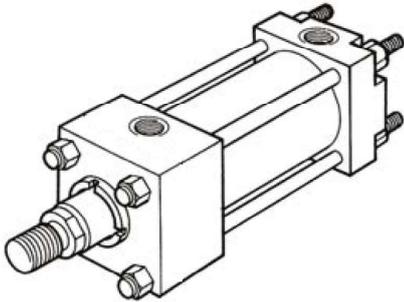
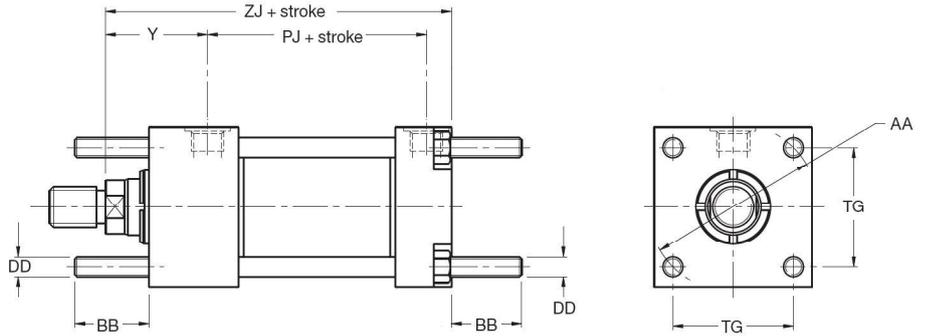
NOTE:

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

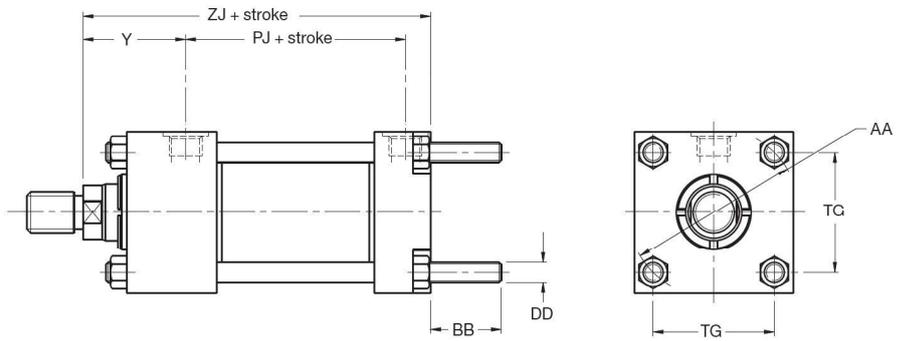
18 Tie Rod Mountings :



Style W  
ISO MX1  
Both End Tie Rods Extended



Style V  
ISO MX2  
Rear End Tie Rods Extended



Installation Dimensions - MX1 & MX2

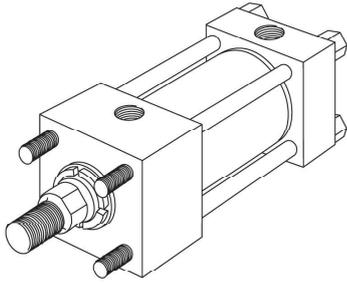
Bore Ø	Rod Ø	AA	BB +3/0	DD 6g	TG js13	Y	Y1	+Stroke		
								PJ	PJ2	ZJ
40	18	59	35	M8 X 1	41.7	62	63	73	73	153
	22									
	28									
50	22	74	46	M12 X 1.25	52.3	67	65.5	74	76	159
	28									
	36									
63	28	91	46	M12 X 1.25	64.3	71	70	80	80	168
	36									
	45									
80	36	117	59	M16 X 1.5	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 .

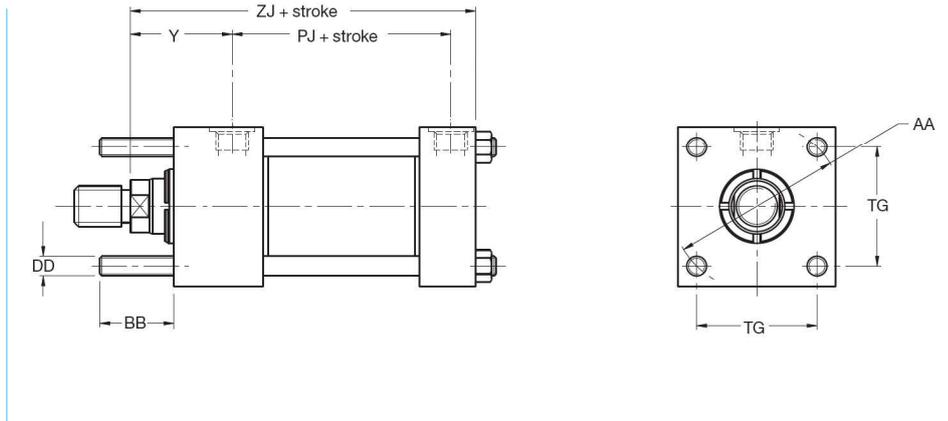
NOTE:

- 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**

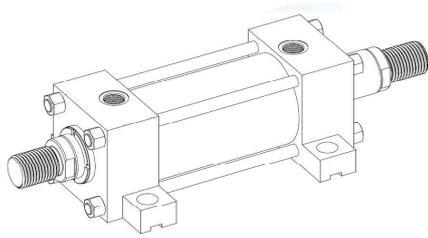
Bore Ø	Rod Ø	AA	BB +3/0	DD 6g	TG js13	Y	Y1	+Stroke		
								PJ	PJ2	ZJ
40	18	59	35	M8 X 1	41.7	62	63	73	73	153
	22									
	28									
50	22	74	46	M12 X 1.25	52.3	67	65.5	74	76	159
	28									
	36									
63	28	91	46	M12 X 1.25	64.3	71	70	80	80	168
	36									
	45									
80	36	117	59	M16 X 1.5	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 .

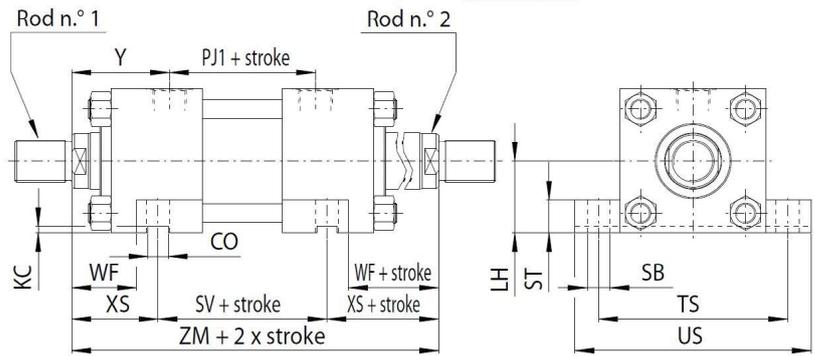
**NOTE:**

- 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](#)