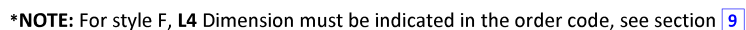


Non - ISO: Nominal pressure of 160 bar and max 250 bar

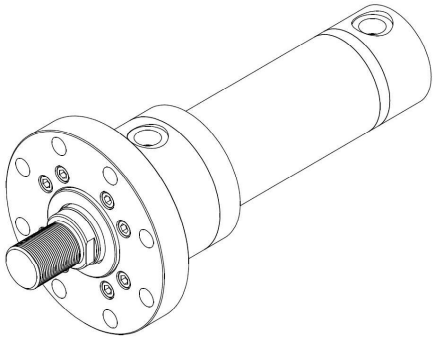
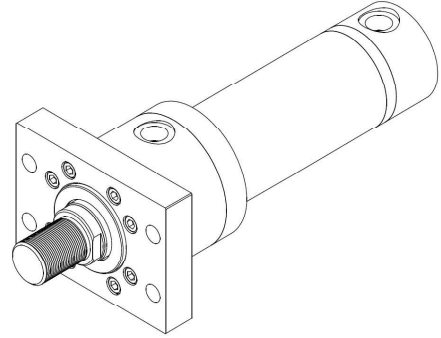
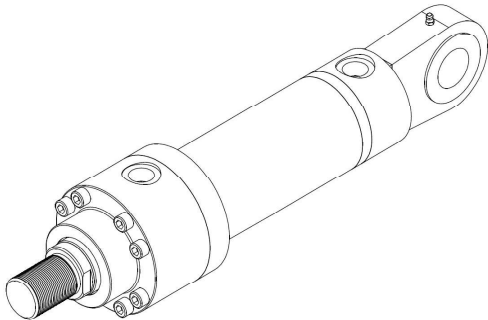
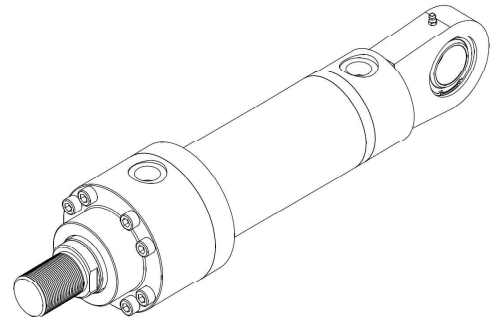
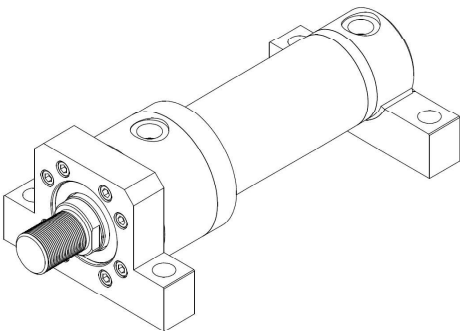
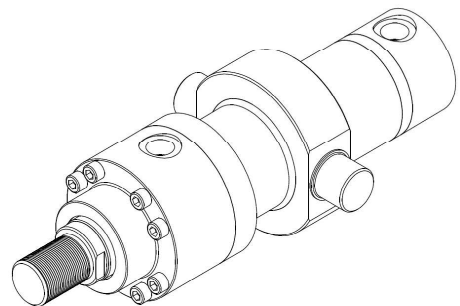
### Standard Specifications :

- ### Ordering Instructions :



**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 Ø		50	63	80	100	125	160	200	250
Standard Oil Ports	D min	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 Ø		50	63	80	100	125	160	200	250
Front Head Ø	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.

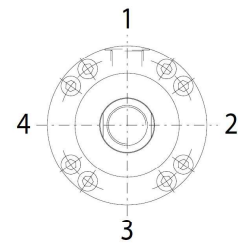
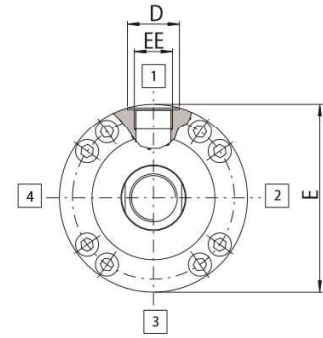
- SAE 3000 flanges are available on request. Contact our Technical office.

## 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.

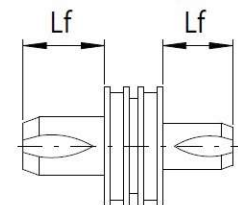
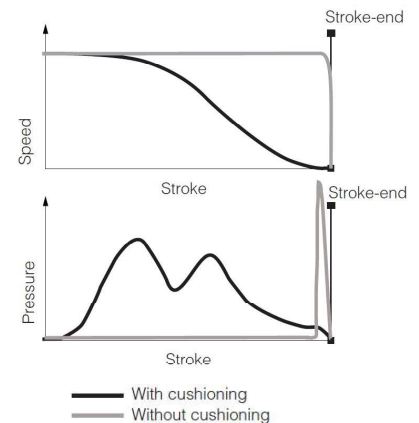
The stroke-end cushioning are hydraulic dampers specifically designed to dissipate the energy of the mass connected to the cylinder rod, by progressively increasing the pressure in the cushioning chamber and thus reducing the rod speed before the cylinder's mechanical stroke-end (see the graphics at 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 Ø		50		63		80		100		125		160		200		250	
Rod Ø		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

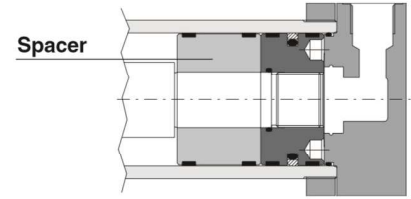
Stroke tolerances:

- 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:

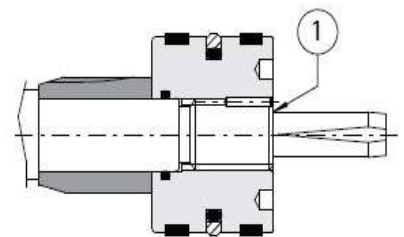
The cylinder's housings are made in "cold drawn and stressed steel"; the internal surfaces are lapped: diameter tolerance H8, roughness Ra ≤ 0.25 µm.

## 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.

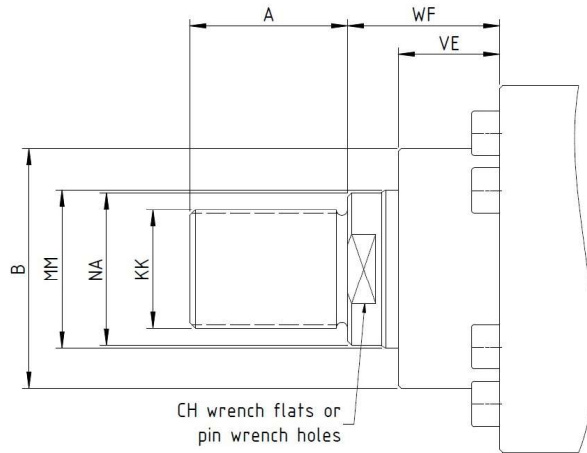


## 12 Welded Rear End Construction:

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:

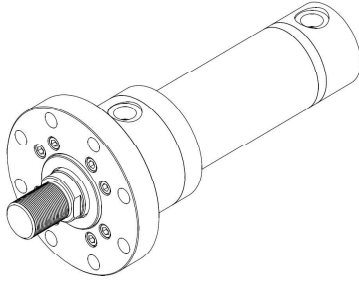
- cost effective construction method
- Compact construction
- Good bearing lengths achieved
- Aesthetically simple, they blend into and can enhance the look of the equipment to which they are installed
- Reliable

**13** Piston Rod End Data :**Rod End Dimensions :**

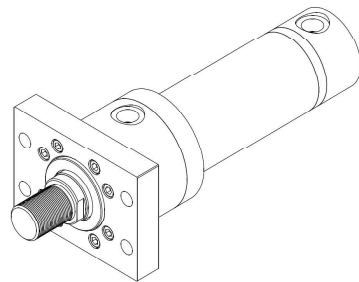
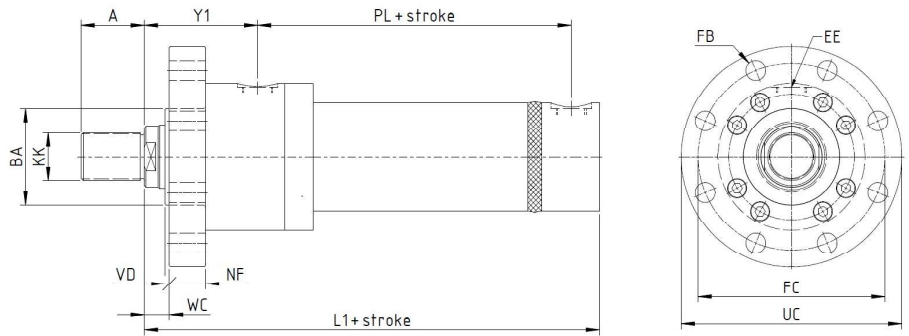
Bore Ø	Rod/MM Ø	A max	B f8	KK 6g	CH	NA	VE max	WF
50	28 36	28 36	60	M20 X 1.5 M27 X 2	22 30	26 34	24	38
63	36 45	36 45	70	M27 X 2 M33 X 2	30 39	34 43	29	45
80	45 56	45 56	85	M33 X 2 M42 X 2	39 48	43 54	36	54
100	56 70	56 63	106	M42 X 2 M48 X 2	48 62	54 68	37	57
125	70 90	63 85	132	M48 X 2 M64 X 3	62 80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

All dimensions are in mm .

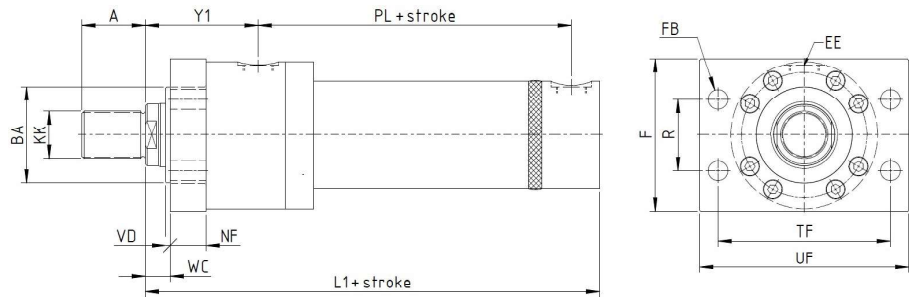
## 14 Front Flange Mountings :



**Style A**  
Front Round Flange



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



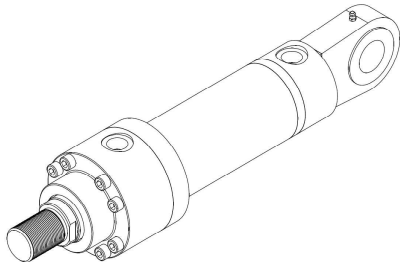
### Installation Dimensions - style A & B

Bore Ø	Rod Ø	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

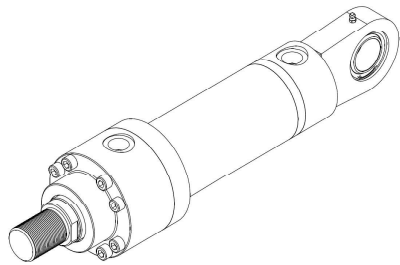
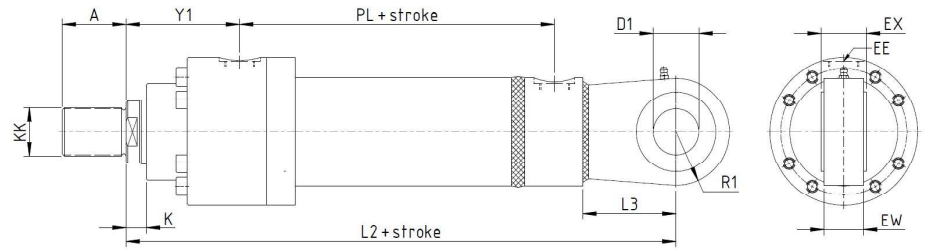
All dimensions are in mm unless otherwise stated.

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

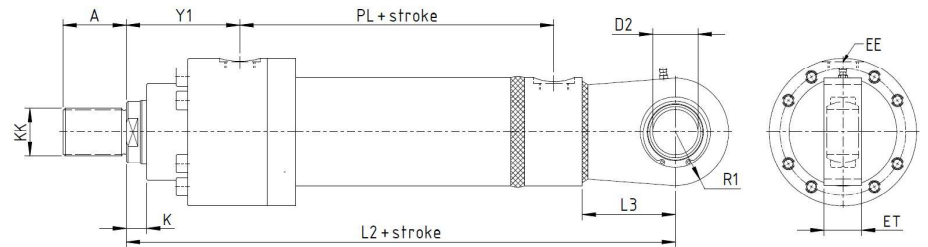
## 15 Pivot Mountings :



**Style C**  
Fixed Eye



**Style D**  
Fixed Eye with Spherical Bearing



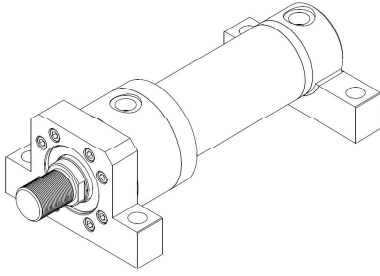
### Installation Dimensions - style C & D

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

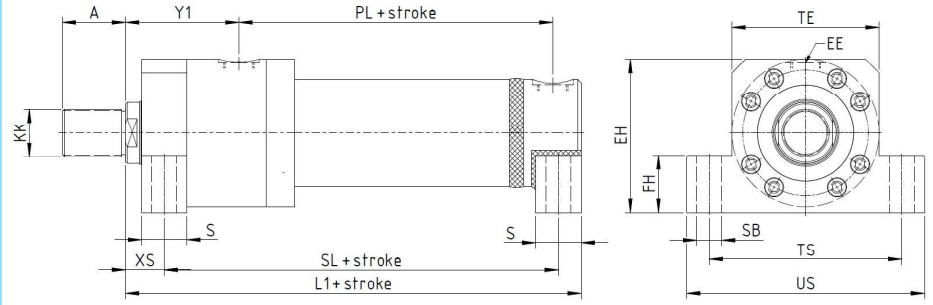
All dimensions are in mm unless otherwise stated.

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

## 16 Foot Mounting :



**Style E**  
Foot Mounting



### Installation Dimensions - style E

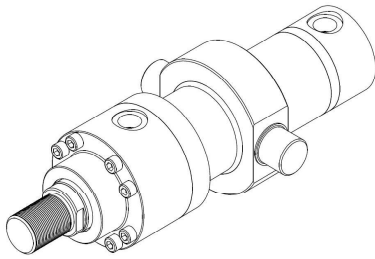
Bore Ø	Rod Ø	A max	KK 6g	EE (BSPP)	EH max	FH h10	S js13	SB H13	TE js13	TS js13	US max	XS	Y1	+Stroke		
														PL	SL	L1
50	28 36	28 36	M20 X 1.5 M27 X 2	G ½	100	32	32	14	95	120	145	22	88	114	186	224
63	36 45	36 45	M27 X 2 M33 X 2	G ¾	120	42	32	18	116	150	180	29	96	124	200	245
80	45 56	45 56	M33 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.

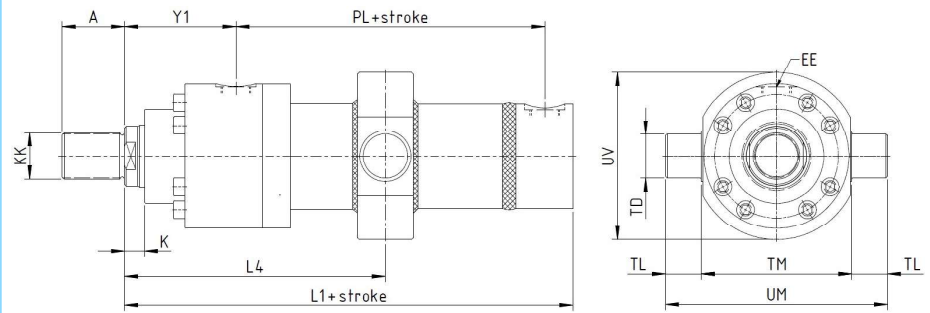
**NOTE:** For Rod End Dimensions refer to the section [13](#)



## 17 Trunnion Mounting :



**Style F**  
Intermediate Trunnion



### Installation Dimensions - style F

Bore Ø	Rod Ø	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](#)