SMART POWER

Tie Rods hydraulic Cylinders Catalog

2T Series - ISO 6020/2

IT'S FLUIDMEC WORLD
Member of

EFFEGI SYSTEMS
MOVE & POWER

EFFEGI
SYSTEMS
MOVE & POWER

We **design** and **manufacture** hydraulic and pneumatic cylinders and hydraulic power units, **to supply complete motion systems for special applications**.

All the Effegi Systems solutions ensure maximum quality, creativity and uniqueness for a product **tailored to meet the customer needs**. Flexibility, dynamism and specialization allow us to satisfy different fields of application **with precision and speed**.

EFFEGI SYSTEMS
MOVE & POWER

Our quality

The excellent results arise from the rigorous management of the whole production process. In this regard, Effegi Systems has a certified quality system according to UNI EN ISO 9001 with the goal, not only to maintain the high quality level of each phase of the work, but also to pursue steadily improvement.

QUALITY SYSTEM CERTIFICATION
DNV·GL
ISO 9001

This attitude allows us to offer,
in each of our product or service,

smart power

Smart Power

SPECIAL CYLINDERS AND POWER UNITS

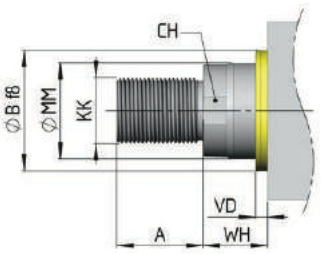
EFFEGI SYSTEMS
MOVE & POWER

EFFEGI Systems designs and fabricates special hydraulic and pneumatic cylinders in every size and shape.
The company uses the latest generation machinery and technique, submitting each fabrication stage to strict controls and tests to ensure the product quality and its efficiency in any specific application.

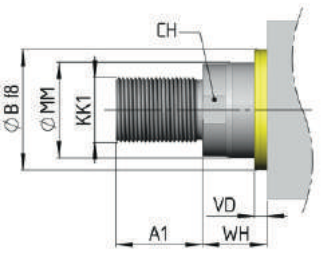
EFFEGI SYSTEMS
MOVE & POWER

Rod threads summary

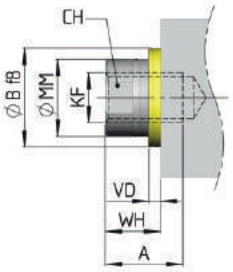
W: Rod Standard Male Threaded End



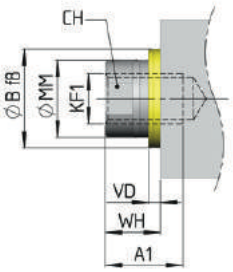
Y: Rod Light Male Threaded End



X: Rod Standard Female Threaded End



Z: Rod Light Female Threaded End



All the dimensions are in millimeters

Bore	Ø mm (Rod)	KK	KK1	KF	KF1	A	A1	CH	WH	B	VD
25	**12**	**M10x1,25**	-	M8x1	-	14	-	10	15	24	6
	18	**M14x1,5**	M10x1,25	M12x1,25	M8x1	18	14	16		30	
32	**14**	**M12x1,25**	-	M10x1,25	-	16	-	12	25	26	9
	18	M14x1,5	M10x1,25	M12x1,25	M8x1	18	14	16		30	
	22	**M16x1,5**	**M12x1,25**	M16x1,5	M10x1,25	22	16	19		34	
40	**18**	**M14x1,5**	M10x1,25*	M12x1,25	M8x1*	18	14	16	25	30	11
	22	M16x1,5	M12x1,25	M16x1,5	M10x1,25	22	16	19		34	
	28	**M20x1,5**	**M14x1,5**	M20x1,5	M12x1,25	28	18	24		42	
50	**22**	**M16x1,5**	M12x1,25*	M16x1,5	M10x1,25*	22	16	19	25	34	9
	28	M20x1,5	M14x1,5	M20x1,5	M12x1,25	28	18	24		42	7
	36	**M27x2**	**M16x1,5**	M27x2	M16x1,5	36	22	32		50	9
63	**28**	**M20x1,5**	M14x1,5*	M20x1,5	M12x1,25*	28	18	24	32	42	11
	36	M27x2	M16x1,5	M27x2	M16x1,5	36	22	32		50	13
	45	**M33x2**	**M20x1,5**	M33x2	M20x1,5	45	28	41		60	13
80	**36**	**M27x2**	M16x1,5*	M27x2	M16x1,5*	36	22	32	31	50	9
	45	M33x2	M20x1,5	M33x2	M20x1,5	45	28	41		60	
	56	**M42x2**	**M27x2**	M42x2	M27x2	56	36	50		72	
100	**45**	**M33x2**	M20x1,5*	M33x2	M20x1,5*	45	28	41	35	60	13
	56	M42x2	M27x2	M42x2	M27x2	56	36	50		72	7
	70	**M48x2**	**M33x2**	M48x2	M33x2	63	45	65		88	7
125	**56**	**M42x2**	M27x2*	M42x2	M27x2*	56	36	50	35	72	9
	70	M48x2	M33x2	M48x2	M33x2	63	45	65		88	7
	90	**M64x3**	**M42x2**	M64x3	M42x2	85	56	80		108	7
160	**70**	**M48x2**	M33x2*	M48x2	M33x2*	63	45	65	32	88	7
	90	M64x3	M42x2	M64x3	M42x2	85	56	80		108	
	110	**M80x3**	**M48x2**	M80x3	M48x2	95	63	100		133	
200	**90**	**M64x3**	M42x2*	M64x3	M42x2*	85	56	80	32	108	7
	110	M80x3	M48x2	M80x3	M48x2	95	63	100		133	
	140	**M100x3**	**M64x3**	M100x3	M64x3	112	85	130		163	

NOTE: 1) The bolded rod diameters and Threaded end are in accordance with ISO 6020/2.
2) The structural checks of the Thread followed by * are satiasfaid (with a proper safty factor) for pressure up to 100bar, for higher pressure standard thread shall be selected.

ID code

2	T	M	T	4	1	2	5	0	9	0	0	5	5	0	W	1	N	E	2	S	G	2	5	0	C	-	0	7	0	W	F
Catalogue ID (specify always)																											Second rod (if any)				

Cylinder Model

ME5	
ME6	
MP1	
MP3	
MP5	
MS2	
MT1	
MT2	
MT4	
MX1	
MX2	
MX3	
MX5	

- Stroke [mm]
- Rod Diameter $Ø_R$ [mm]
- Rod threaded end:
  W: Standard Male
  X: Standard Female
  Y: Light Male
  Z: Light Female
- Bore Diameter $Ø_B$ [mm]
- Oil Inlets Position (See page 3)
- Seals kit type:
  N: NBR
  F: FPM
  (See page 2)
- Cushioning
  A: Front only
  P: Rear only
  E: Both
  to be omitted if not requested
- Cushioning metering screw position (see page 1) to be omitted if standard
- **S:** Air bleedings presence
  to be omitted if not requested
- **G:** Inductive sensor for cylinder head
  H: Magnetic sensor for tie rod
  to be omitted if not requested
- XV distance value [mm]
  To be provide in case of MT4 cylinder only
- Accessories:
  C: Ball Joint End – C Type – ISO 6982 (See page 25)
  D: Ball Joint End – D Type – ISO 8133 (See page 26)
  F: Fork End – ISO 8133 (See page 27)

Example: **2TME5 063 045 0200 X 1 F A S C** → Tie rods hydraulic cylinder according to ISO 6020/2, 2T series, front flange, 63 mm bore diameter, 45 mm rod diameter, 200 mm stroke, with Standard female threaded rod end with oil inlets in position 1, FPM seals kit, with front cushion, with air bleeding and with type C ball joint end (ISO 6982).

Please contact our commercial or technical department for other optional items arrangement (i.e. proximity sensor, linear transducer, etc.)

For not mentioned accessories, please specify separately their code in the purchase order-

EFFEGI SYSTEMS
MOVE & POWER

Tie Rods hydraulic Cylinders Catalog
2T Series - ISO 6020/2

INDEX

page

1 Introduction **1**

2 Properties **2**

3 Cylinder sizing guide **4**

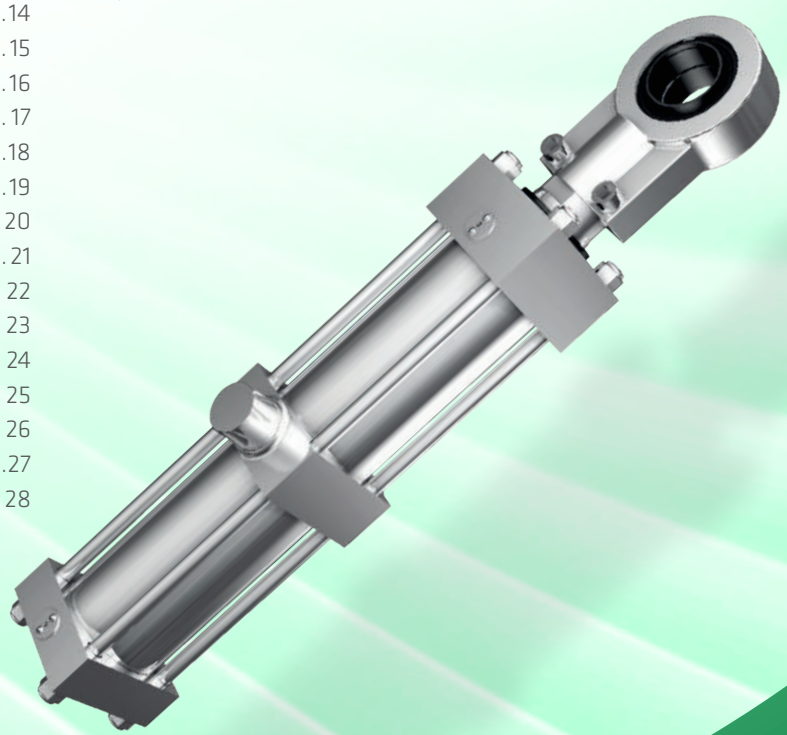
4 Cylinders storage, installation and maintenance **8**

5 Dimensional tables **10**

ME5: Front Flange 10
ME6: Rear Flange 11
MP1: Rear Fixed Female Hinge 12
MP3: Rear Fixed Male Hinge 13
MP5: Rear Fixed Male Hinge with ball joint 14
MS2: Foot Mounting 15
MT1: Front Male Trunnion 16
MT2: Rear Male Trunnion 17
MT4: Intermediate Male Trunnion 18
MX1: Both Ends Protruding Tie-Rods 19
MX2: Rear Protruding Tie-Rods 20
MX3: Front Protruding Tie-Rods 21
MX5: Threaded Holes on Front Head 22
Double Rod Cylinder 23
Hydraulic cylinders masses 24
C: Ball Joint End - C Type 25
D: Ball Joint End - D Type 26
F: Fork Joint Hinge 27
Bracket 90° for C Type Ball Joint End 28
Bracket 90° for D Type Ball Joint End and MP5 Cylinders 29
Bracket 180° 30
Bracket for Trunnion 31
PIN (for BRACKETS 90° and 180°) 32

1 Introduction

This catalog contains all the information regarding the tie rods cylinder standard configurations.
In particular shows the hydraulic cylinders external dimensions that are in compliance with ISO 6020/2.
Accurate execution, materials and seals quality make our cylinders extremely durable and suitable for any application.
EFFEGI supplies 13 different fixing arrangements with a wide range of accessories that allow to satisfy many types of use.
EFFEGI can also fabricate special cylinders not mentioned in this catalogue. For any information regarding special products please contact our commercial or technical department.



2 Properties

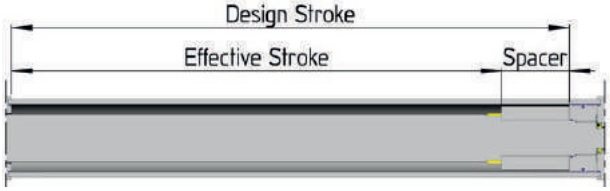
2.1 Bore and rod diameters

Bore diameters from 25 mm up to 200 mm are available with n° 2 rod diameters according to ISO 6020/2 plus an intermediate diameter.

Areas ratio		Bore Diameter [mm]									
		25	32	40	50	63	80	100	125	160	200
Rod Diameter [mm]	12	1,30									
	14		1,24								
	18	2,08	1,46	1,25							
	22		1,90	1,43	1,24						
	28			1,96	1,46	1,25					
	36				2,08	1,48	1,25				
	45					2,04	1,46	1,25			
	56						1,96	1,46	1,25		
	70							1,96	1,46	1,24	
	90								2,08	1,46	1,25
	110									1,90	1,43
	140										1,96

2.2 Strokes

All the stroke lengths are available compatibly with the rod buckling check (see paragraph 3.3).
In order to minimize the slidrings stress, for strokes longer than 1000 mm it is necessary to supply 50 mm spacer every 500 mm additional stroke. The spacer length shall be taken into account in the Cylinder dimensions evaluation.



Examples:

Effective Stroke 1020 mm → Spacer 50 mm → Design Stroke 1070 mm

Effective Stroke 1550 mm → Spacer 100 mm → Design Stroke 1650 mm

"Design Stroke" shall be used for the cylinder sizing.
NOTE: For double rod cylinder, spacer shall be considered twice.

2.3 Usage Parameters

The following table shows the design parameters:

Parameter	Design Value/range	Note
Nominal Working Pressure	≤ 160 Bar = 16 MPa	
Working Temperature	-20 ÷ +200 °C	Proper seals kit to be selected
Piston speed	≤ 15 m/s	Proper seals kit to be selected
Fluid type	See paragraph 2.4	
Fluid viscosity	12÷100 cSt	Equivalent to 12÷100 mm^2/s
Fluid max contamination	NAS 1638 CL. 9-10	To be achieved with filter $\beta_{25} \geq 75$

2.4 Seals

The following table shows the seals properties and their application limits:

ID	Type	Materials	Fluid	Temperature	Max Speed
N	Standard	PTFE+NBR	Mineral Oil / glycol water	-30°C ÷ +100°C	15 m/s
F	High temperature	PTFE+FPM	Special Fluid	-10°C ÷ +200°C	15 m/s

For other applications (i.e. fluid, temperature, speed, ...) please contact our commercial or technical department.

2.5 End Stop Cushioning

End Stop Cushioning are suggested to control the mass deceleration when the speed exceeds 0.1 m/s and the whole stroke is used. However this system is always suggested because, by reducing the pressure peeks due to hurts, a long life is ensured (and annoying noises are avoided). Cushions are embedded in the cylinder and could be supplied on request only at one end or at both the ends without dimension changes. The deceleration is set by means of screw valves that don't protrude from the cylinder body (even in the case of maximum opening). The screws can be set by hex wrench and could be installed on all the cylinders out of bore diameter 25 and 32 where the cushion is fixed (not settable). The rapid start is guaranteed by a check valve embedded in the cylinder head and it can be easily identified by the screwdriver slot. To

avoid that the cushion screw should be accidentally removed, they are protected with safety cover plates. In the table below the cushioning length is shown for each rod size.

Rod Diam.	12	14	18	22	28	36	45	56	70	90	110	140
Front Cushioning length [mm]	15	15	25	25	25	25	25	25	25	35	35	40
Rear Cushioning length [mm]	20	20	25	25	25	25	25	30	30	35	35	40

2.6 Oil Inlets

The standard oil connection is female BSP thread with counterbore for washer (ISO 1179).
For a correct hydraulic cylinder use the fluid velocity should not exceed 5 m/s.
For other application please contact our commercial or technical department.

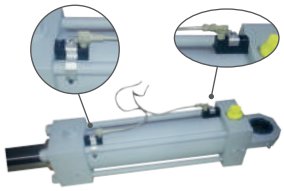
2.7 Air bleeding

Air bleedings, to evacuate air, are available on request.
They are useful when the piston doesn't run along the whole stroke or when the oil inlets are not facing upwards.

2.8 Proximity Sensors

End stop proximity sensors are available on request for any type of fixing arrangement; they can be mounted on cylinder heads or tie rods.

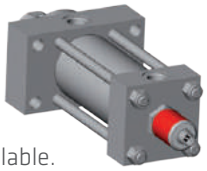
High pressure resistant inductive sensor for cylinder head



Magnetic sensor for tie rod

Please contact our commercial or technical department to define all the details.

2.9 Linear transducer



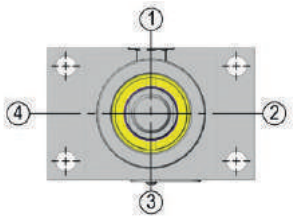
A wide range of linear transducer is available.
They can differ by shape, protrusion, electrical signal and accuracy. Please contact our commercial or technical department to define all the details.

2.10 Valves

A wide range of valves is available and, on request, can be mounted directly on the cylinder:
- Check valves
- Solenoid operated directional control valves
- Flow control valves
- Electric proportional control valves
- Servo valves

Please contact our commercial or technical department to define all the details.

2.11 Ports position



Port	Fixing Arrangement			
	ME5, ME6	MP1, MP3, MP5, MT4, MX1, MX2, MX3, MX5	MS2	MT1, MT2
Oil Inlets	1	1	1	1
Cushioning setting	3	2	2	3
Fast start valve	3	4	4	3
Air bleedings	2	3	4	3

Position of oil inlets (if not standard) and proximity sensors are to be evaluated with our commercial or technical department during the purchase order.

2.12 Double Rod Cylinder

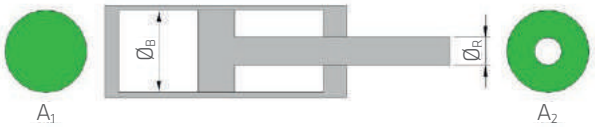
Mounting arrangement type ME5, MS2, MT1, MT4, MX1, MX2, MX3 and MX5 are available with double rod.
(See page 23)

3 Cylinder sizing guide

3.1 General information

Check always that the nominal pressure equal to 160 Bar is not superseded in the circuit even if the design could guarantees high safety factors. Considerate that throttling valves (flow regulation), vertical load with road facing downward and cushioning contribute to increase the fluid pressure.
For a global check of the systems an analysis by our engineering department is always recommended.

3.2 Cylinder Forces



p:	pressure [1 MPa = 10 bar]
$Ø_B$:	Bore diameter
$Ø_R$:	Rod diameter
$A_1 = Ø_B^2/4 \cdot \pi$	Pushing Area (circular cross section)
$A_2 = (Ø_B^2 - Ø_R^2)/4 \cdot \pi$	Pulling Area (annular cross section)
$F_1 = A_1 \cdot p$	Theoretical pushing Force [$cm^2 \cdot bar \approx kg$] or [$mm^2 \cdot MPa = N$]
$F_2 = A_2 \cdot p$	Theoretical pulling Force [$cm^2 \cdot bar \approx kg$] or [$mm^2 \cdot MPa = N$]
$v_1 = \frac{1000}{60} \cdot \frac{Q[lt/min]}{A_1[mm^2]} = [m/s]$	Rod exit speed
$v_2 = \frac{1000}{60} \cdot \frac{Q[lt/min]}{A_2[mm^2]} = [m/s]$	Rod return speed

Where Q is the flow rate in [lt/min]

3.3 Rod buckling check

The rod buckling check shall be carried out according the following formulas:

$$F_B = \begin{cases} \frac{\pi \cdot Ø_R^2 \cdot (355 - 0.62 \cdot \lambda)}{4 \cdot S}, & \text{if } \lambda \le \lambda_g \text{ (Tetmajer)} \\ \frac{\pi^2 \cdot E \cdot J}{S \cdot L_B^2}, & \text{if } \lambda > \lambda_g \text{ (Euler)} \end{cases}$$

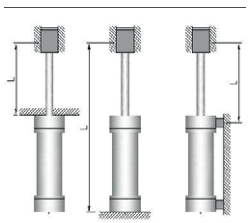
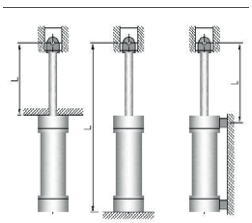
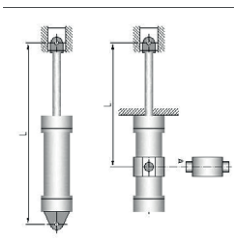
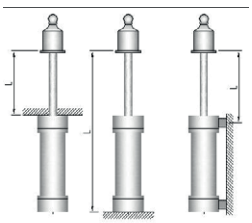
Where:

F_B:	Buckling Resistance [N]
$\lambda = \frac{4 \cdot L_B}{Ø_R}$	Slenderness
$\lambda_g = \pi \cdot \sqrt{\frac{1{,}25 \cdot E}{f_y}}$	Slenderness reference value

That considering the variation of f_y due to the diameter changing is:

$Ø_R$	[mm]	12	14	18	22	28	36	45	56	70	90	110	140
λ_g	[-]	87	87	92	92	92	92	92	92	92	92	97	97

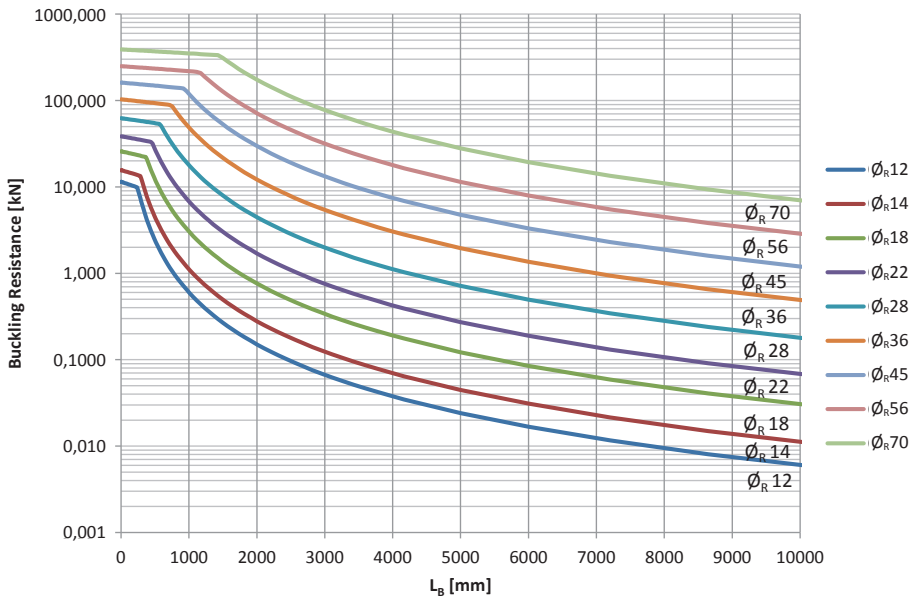
S = 3.5	Safety Factor
$J = \frac{\pi \cdot Ø_R^4}{64}$	Rod Cross Section Moment of Inertia [mm^4]
E : (210'000 MPa for Steel)	Young modulus of rod material [MPa]
f_y :	Rod material yielding stress [MPa]
$L_B = \beta \cdot L$	Buckling length [mm]
L:	Cylinder fixing points distance [mm] (see table and Note)
β:	Buckling length coefficient (see table)

Case 1	Case 2	Case 3	Case 4
			
β: 0.5	β: 0.7	β: 1.0	β: 2.0

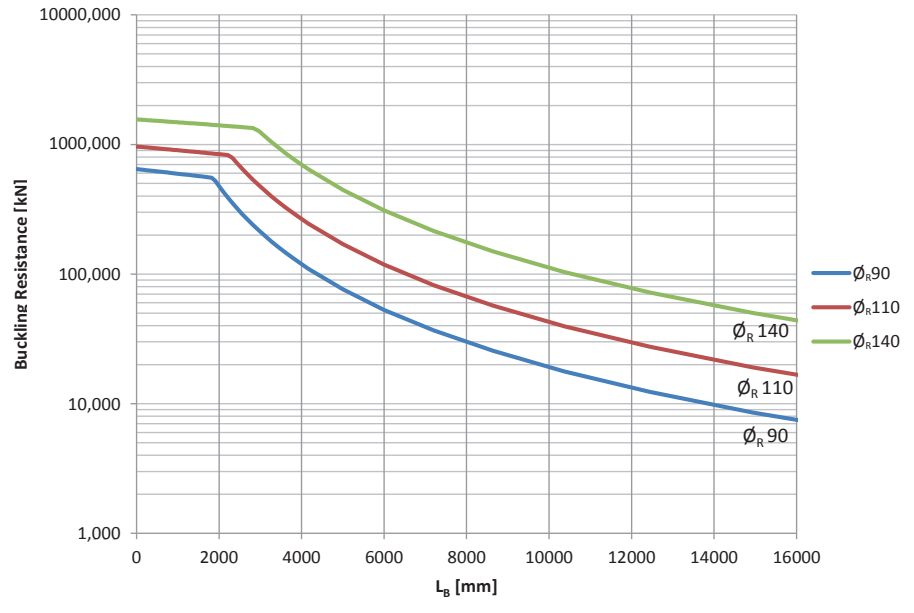
NOTE: for the length "L" evaluation please read paragraph 2.2 and consider the" Design Stroke" (if spacer is needed) to evaluate the closed cylinder overall length.
To calculate the extended cylinder overall length, the Effective stroke shall be added to the closed cylinder overall length.

In the following two graphs, the correlation between "buckling Length" (L_B), "Rod Diameter" ($Ø_R$) and "Buckling Load" (F_B) is shown.
The check is satisfied if the intersection point is under the curve relevant to the selected rod diameter.

Buckling Resistance vs Buckling length
$Ø_R$ = 12÷70 mm



Buckling Resistance vs Buckling length
$Ø_R$ = 90÷140 mm



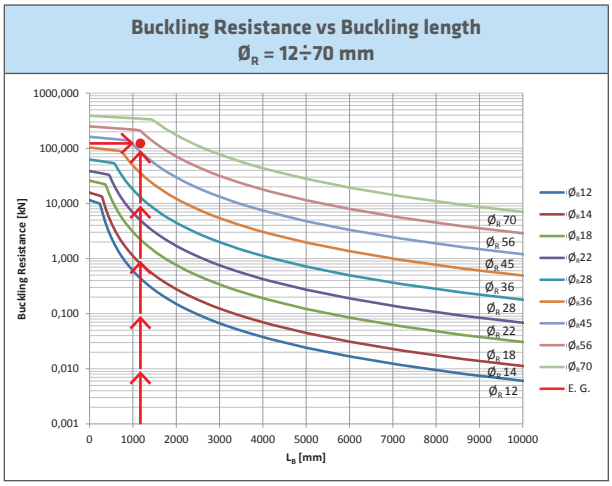
Example

Input data

A cylinder 1500 mm stroke and 115 KN force is required. The fixing arrangement is composed by rigid front flange with guided ball joint rod end.

Cylinder configuration

The selected cylinder arrangement is the ME5 with 100 mm bore diameter that, considering 160 bar pressure, ensures 125 kN force. The 56 mm diameter rod is selected, provided with its "Ball Joint End – C Type".



Buckling check - simplified method

Considering that this situation corresponds to the "CASE 2", the length "L" is equal to 1677 mm and is given by the summation of:

WF = 57 mm	see "ME5" chapter
Stroke = 1500 mm	input data (Effective Stroke)
H =120 mm	see "Ball Joint End – C Type" chapter

The Fixing arrangement corresponds to the Case 2 with $\beta = 0.7$.
So the buckling length $L_B = \beta \cdot L = 0.7 \cdot 1677 = 1174$ mm
By entering in the first graph with L_B =1174 mm and F = 125 kN, the intersection point stays in the Ø56 area, so the check is satisfied.

NOTE: the "Simplified Method" is slightly conservative for $\lambda \approx \lambda_g$, if the check is not satisfied, it is possible to use the "Precise Method" and check again.

Buckling check - precise method

$$\lambda = \frac{4 \cdot L_B}{Ø_R} = \frac{4 \cdot 1174\ mm}{56\ mm} = 84$$ Slenderness

$$\lambda_g = \pi \cdot \sqrt{\frac{1{,}25 \cdot E}{f_y}} = \pi \cdot \sqrt{\frac{1{,}25 \cdot 210000 MPa}{305 MPa}} = 92$$ Slenderness reference value

$\lambda < \lambda_g \rightarrow$ Tetmajer

$$F_B = \frac{\pi \cdot Ø_R^2 \cdot (355 - 0.62 \cdot \lambda)}{4 \cdot S} = \frac{\pi \cdot (56mm)^2 \cdot (355 - 0.62 \cdot 84)}{4 \cdot 3.5} = 213\ kN > 125\ kN$$ Buckling resistance

Check Satisfied

4 Cylinders storage, installation and maintenance

4.1 Storage

If cylinder are stored for a certain period before the installation, it is recommended to respect the following good practices:

1. Store the cylinder indoors, where the air is dry enough, clean and without corrosive agents.
2. If possible store the cylinder in vertical position, with the rod facing upwards. This position reduces the possibility that corrosion due to inner condensations occurs.
3. Oil inlet and other ports shall be closed by proper caps that should be removed only at the cylinder installation.
4. Centering, rod, threads and all the other coupling parts shall be protected from corrosion and hurts.
5. To preserve the seals, keep the cylinder away from heat sources.

4.2 Installation and safety rules

During the cylinder installation following good practices shall be respected:

1. The cleaning is an important aspect for the cylinder proper functioning, for this EFFEGI Systems during the cylinder assembly plugs the oil inlet with protective caps. They shall be removed only at the cylinder installation.
2. Cylinders that may operate in the presence of fast drying substances (very volatile chemicals, paints, ...) or in dangerous situations (i.e. dusty environments) shall be provided with proper protection tor rod and seals. Great caution must be exercised in order to have a perfect alignment (during the whole stroke) between the rod and the parts connected to it. If this alignment is not guarantee, wear could be occurs on front guide, on rod and on the tube inner surface.
3. In case of cushioning system, the screw housing holes are closed with cover plates, if the setting is allowed, the cover plate has a proper hole for hex wrench.
4. Verify that all the circuit components are suitable with respect to the requested fluid pressure.
5. Use always pressure gauges to check the effective cylinder internal pressure and force.
6. For applications with high number of cycles, use only high pressure pipe and junction
7. Do not apply maximum pressure when the piston is at stroke ends, this cause unnecessary and damaging stress.
8. Keep away the cylinder from heat sources, flames, moving machinery, sharp edges, chemicals. For any doubt please contact our commercial or technical department.
9. Avoid tight bends and coils shaped hoses.
10. **IMPORTANT:** bleed the hydraulic circuit before the machine effective start. The presence of air in the circuit causes malfunctions. To bleed the air, carry out several cycles without load till the motion becomes uniform.

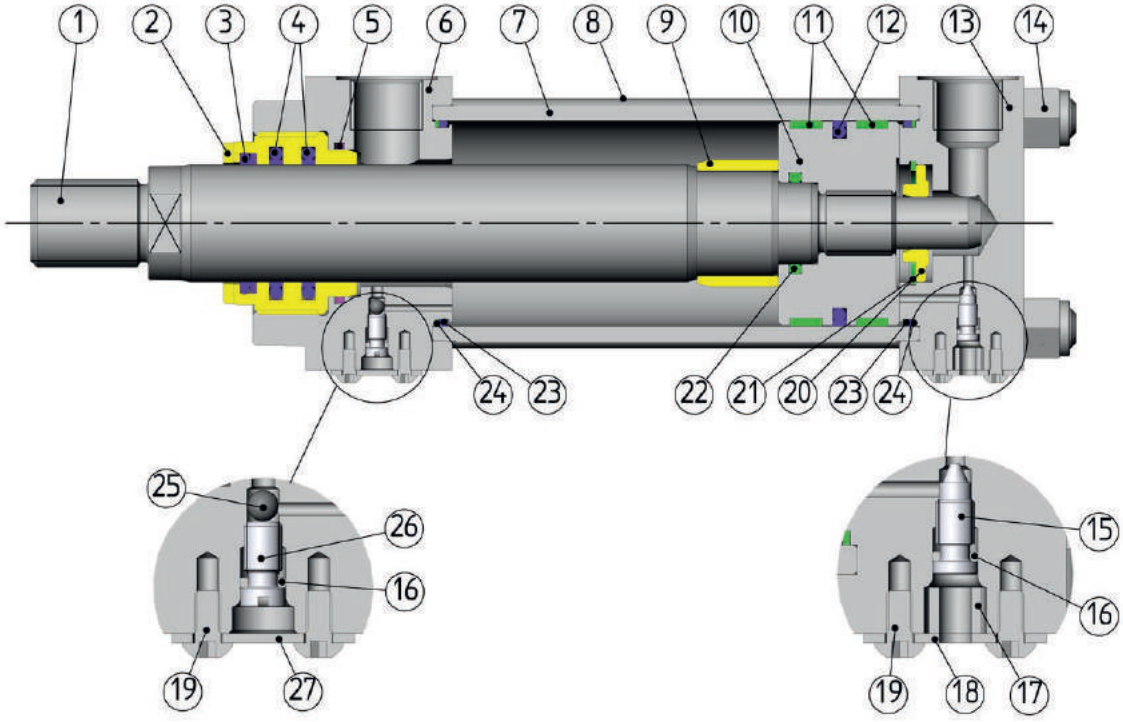
4.3 Maintenance

Maintenance shall be performed every time ware or leakage are noticed. Check and inspect periodically all the components to assess their status and replace the damaged (if any).
Keep clean all the hydraulic components, check periodically, pipes, hoses and joints to prevent any fluid leakage. Fluid shall be replaced as specify in the power unit user manual.
IMPORTANT: maintenance shall be carried out by qualified technician. For any doubt please contact our commercial or technical department

4.4 Warning

In this document EFFEGI Systems supplies information about hydraulic cylinder addressed to qualified technicians. Improper use of our cylinder could compromise the people safety or cause damages; for this reason it is very important that, before the use, the safe use of all the systems is examined. Considering the vastness of the fields of use and variety of applications, the user is the unique responsible for the cylinder choice and use.
EFFEGI Systems suggests to users to assess, through proper analysis and tests, that all the safety conditions and the required performances are satisfied.
Our commercial or technical department is at your disposal for any information and clarification.

Spare parts list

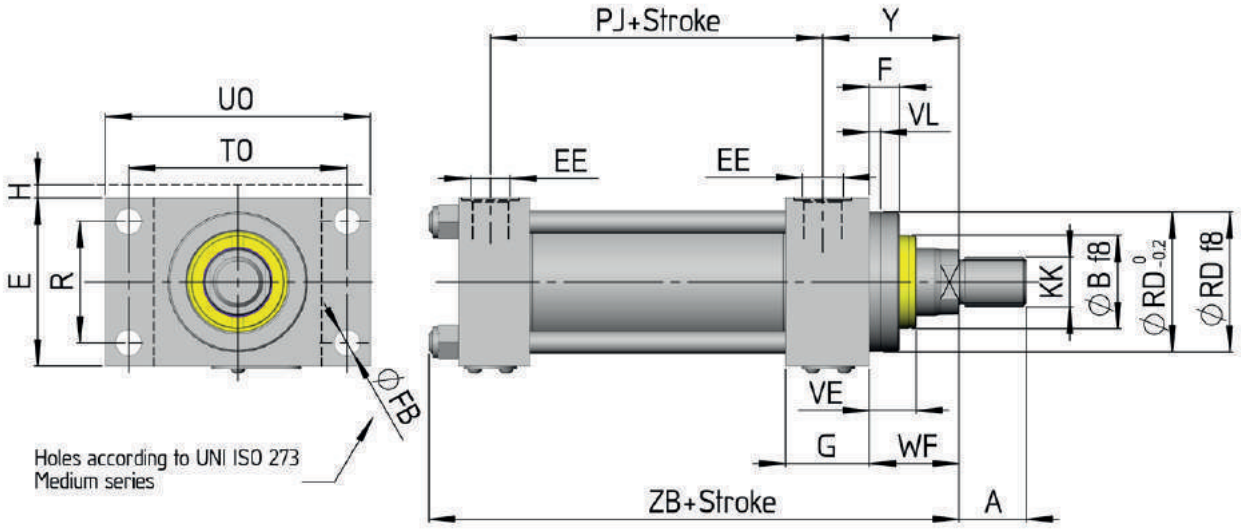


"Quantities shown in the table are referred to number one 2T series standard cylinder with both cushions, for any other specific case please contact our commercial or technical department.
ATTENTION: in case of spare parts order, please specify the cylinder entire "ID code" and spare part ID."

ID	DESCRIPTION	Q.ty
01	CHROME PLATED PISTON ROD	01
02	GUIDING BUSH	01
03	SCRAPER	01
04	BUSH SEAL	02
05	GUIDING BUSH O-RING	01
06	CYLINDER FRONT HEAD	01
07	CYLINDER TUBE	01
08	TIE ROD	04
09	FRONT CUSHION RING	01
10	PISTON	01
11	PISTON SLYDRING	02
12	PISTON SEAL	01
13	CYLINDER REAR HEAD	01
14	TIE ROD SELF-BLOCKING NUT	04

ID	DESCRIPTION	Q.ty
15	CUSHION METERING SCREW	02
16	METERING SCREW AND GRUB SCREW O-RING	03
17	CUSHION SAFETY END STOP PIPE	02
18	CUSHION HOUSING COVER PLATE	02
19	COVER PLATE FIXING SCREW	06
20	REAR CUSHION FLOATING RING	01
21	REAR CUSHION SNAP RING	01
22	PISTON O-RING	01
23	CYLINDER HEAD O-RING	02
24	CYLINDER HEAD BACK-UP RING	02
25	FAST START BALL	01
26	FAST START GRUB SCREW	01
27	FAST START HOUSING COVER PLATE	01

ME5: Front Flange



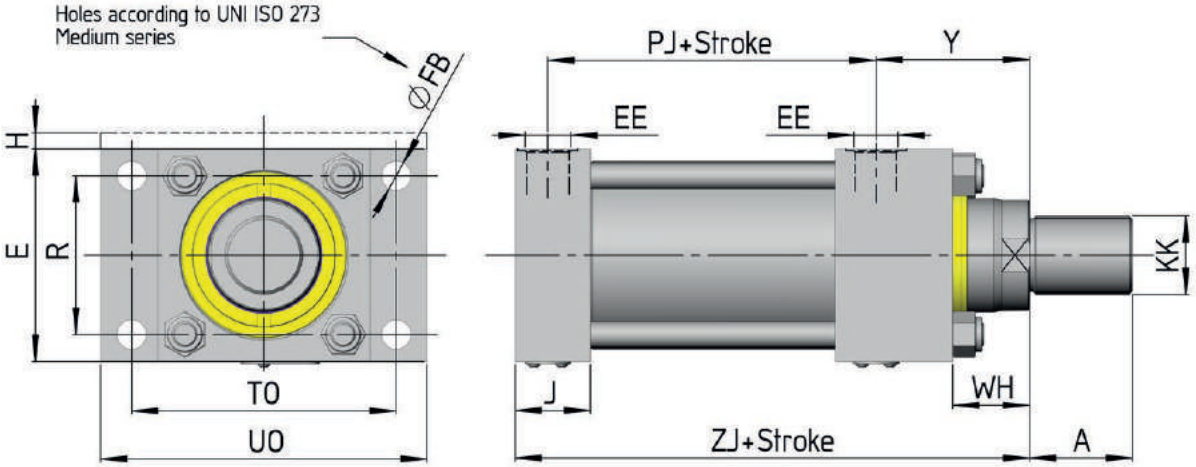
All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	RD	G	TO	FB	R	WF	F	VE	VL	B	UO	ZB+
25	12	5	40	50	53	G 1/4	38	40	51	5,5	27	25	10	16	5	24	65	121
	18															30		
32	14	5	45	60	56	G 1/4	42	40	58	6,6	33	35	10	19	5	26	70	137
	18															30		
	22															34		
40	18	-	63	62	73	G 3/8	62	45	87	11	41	35	10	21	5	30	110	162
	22															34		
	28															42		
50	22	-	75	67	74	G 1/2	74	45	105	14	52	41	16	25	6	34	130	174
	28															42		
	36															50		
63	28	-	90	71	80	G1/2	75	45	117	14	65	48	16	27	6	42	145	184
	36						88							29		50		
	45															60		
80	36	-	115	77	93	G 3/4	82	50	149	18	83	51	20	29	8	50	180	209
	45						105									60		
	56															72		
100	45	-	130	82	101	G 3/4	92	50	162	18	97	57	22	35	8	60	200	225
	56						125							29		72		
	70															88		
125	56	-	165	86	117	G 1	105	58	208	22	126	57	22	31	7	72	250	258
	70						150							29		88		
	90															108		
160	70	-	205	86	130	G 1	125	61	253	26	155	57	25	32	8	88	300	277
	90						170									108		
	110															133		
200	90	-	245	98	165	G 1-1/4	150	80	300	33	190	57	25	32	8	108	360	332
	110						210									133		
	140															163		

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

EFFEGI SYSTEMS
MOVE & POWER

ME6: Rear Flange

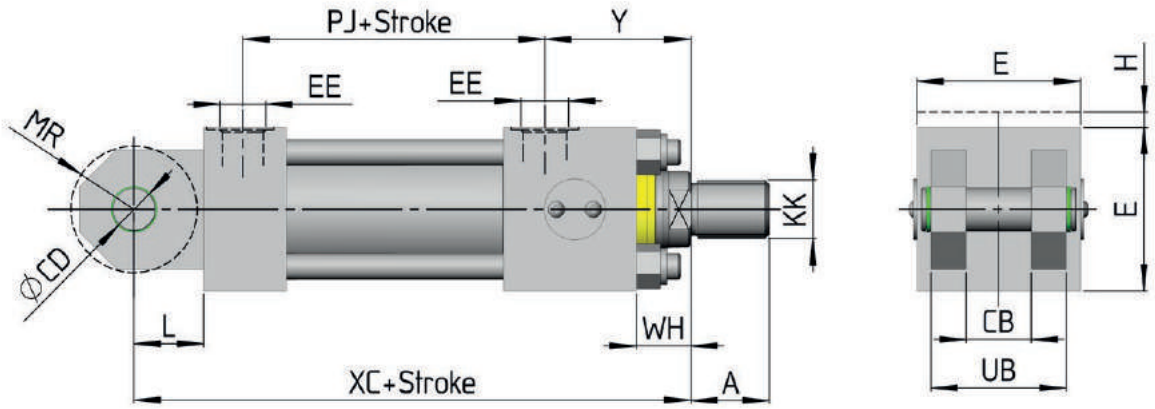


All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	J	TO	FB	R	WH	UO	ZJ+
25	12 18	5	40	50	53	G 1/4	25	51	5,5	27	15	65	114
32	14 18 22	5	45	60	56	G 1/4	27	58	6,6	33	25	70	128
40	18 22 28	-	63	62	73	G 3/8	38	87	11	41	25	110	153
50	22 28 36	-	75	67	74	G 1/2	38	105	14	52	25	128	159
63	28 36 45	-	90	71	80	G1/2	38	117	14	65	32	142	168
80	36 45 56	-	115	77	93	G 3/4	45	149	18	83	31	180	190
100	45 56 70	-	130	82	101	G 3/4	46	162	18	97	35	200	203
125	56 70 90	-	165	86	117	G 1	58	208	22	126	35	247	232
160	70 90 110	-	205	86	130	G 1	58	253	26	155	32	300	245
200	90 110 140	-	245	98	165	G 1-1/4	80	300	33	190	32	360	299

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

MP1: Rear Fixed Female Hinge



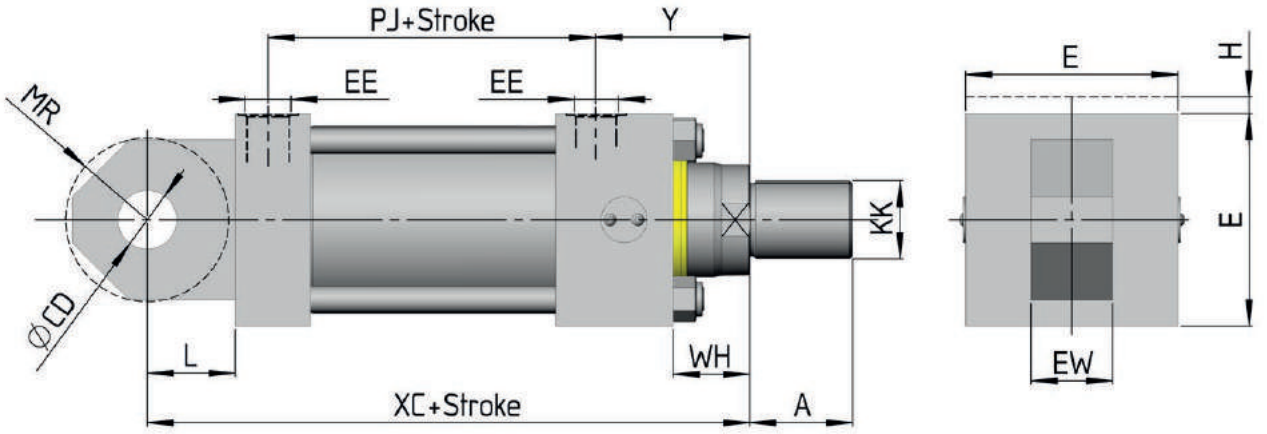
All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	CB	CD	MR	L	UB	WH	XC+
25	12	5	40	50	53	G 1/4	12	10	12	13	26	15	127
	18												
32	14	5	45	60	56	G 1/4	16	12	17	19	34	25	147
	18												
	22												
40	18	-	63	62	73	G 3/8	20	14	17	19	42	25	172
	22												
	28												
50	22	-	75	67	74	G 1/2	30	20	29	32	62	25	191
	28												
	36												
63	28	-	90	71	80	G1/2	30	20	29	32	62	32	200
	36												
	45												
80	36	-	115	77	93	G 3/4	40	28	34	39	83	31	229
	45												
	56												
100	45	-	130	82	101	G 3/4	50	36	50	54	103	35	257
	56												
	70												
125	56	-	165	86	117	G 1	60	45	53	57	123	35	289
	70												
	90												
160	70	-	205	86	130	G 1	70	56	59	63	143	32	308
	90												
	110												
200	90	-	245	98	165	G 1-1/4	80	70	78	82	163	32	381
	110												
	140												

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
The hydraulic cylinder will be supplied complete with pin (in accordance with UNI ISO 8133) and snap rings.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

EFFEGI SYSTEMS
MOVE & POWER

MP3: Rear Fixed Male Hinge

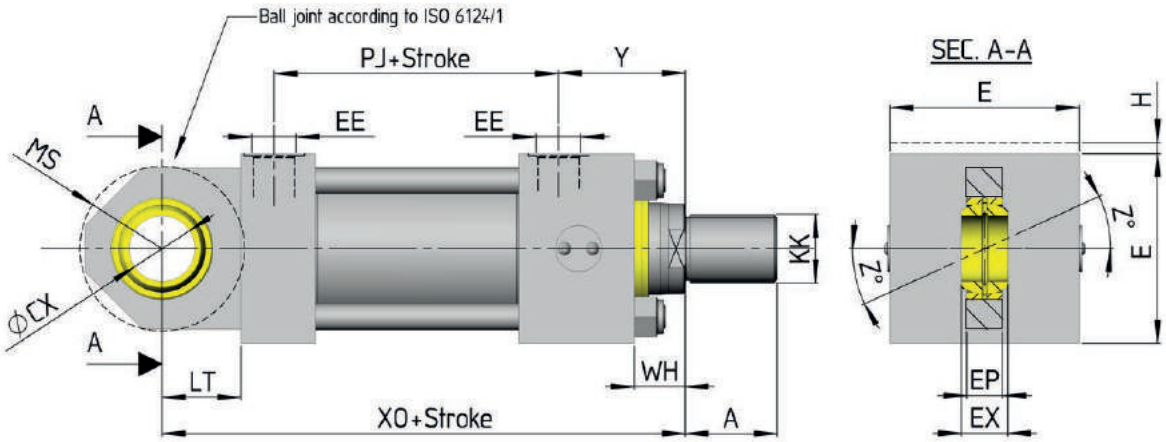


All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	EW	CD	MR	L	WH	XC+
25	12	5	40	50	53	G 1/4	12	10	12	13	15	127
	18											
32	14	5	45	60	56	G 1/4	16	12	17	19	25	147
	18											
	22											
40	18	-	63	62	73	G 3/8	20	14	17	19	25	172
	22											
	28											
50	22	-	75	67	74	G 1/2	30	20	29	32	25	191
	28											
	36											
63	28	-	90	71	80	G1/2	30	20	29	32	32	200
	36											
	45											
80	36	-	115	77	93	G 3/4	40	28	34	39	31	229
	45											
	56											
100	45	-	130	82	101	G 3/4	50	36	50	54	35	257
	56											
	70											
125	56	-	165	86	117	G 1	60	45	53	57	35	289
	70											
	90											
160	70	-	205	86	130	G 1	70	56	59	63	32	308
	90											
	110											
200	90	-	245	98	165	G 1-1/4	80	70	78	82	32	381
	110											
	140											

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

MP5: Rear Fixed Male Hinge with ball joint

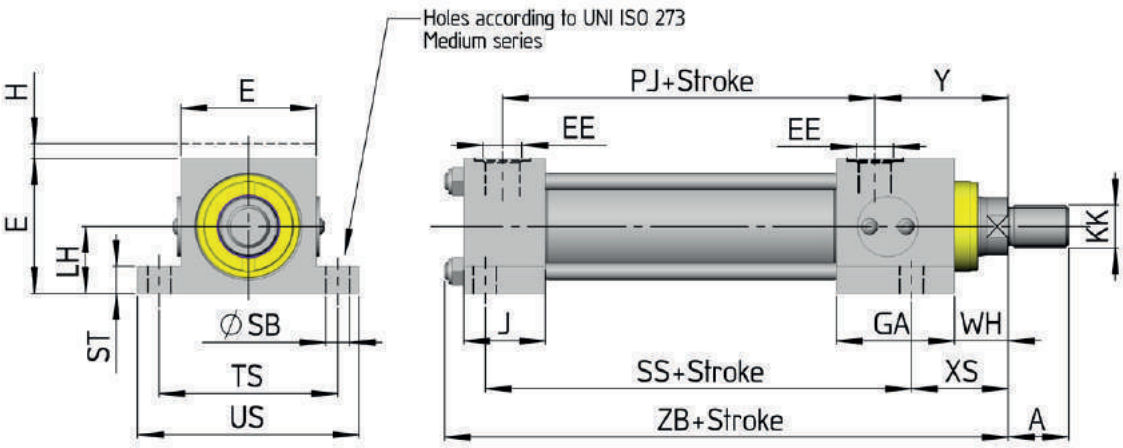


All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	EP	EX	CX	MS	LT	Z (min.)	WH	XO+
25	12	5	40	50	53	G 1/4	8	10 $^{0}_{-0,12}$	12 $^{0}_{-0,008}$	20	16	3	15	130
	18													
32	14	5	45	60	56	G 1/4	11	14 $^{0}_{-0,12}$	16 $^{0}_{-0,008}$	22,5	20	3	25	148
	18													
	22													
40	18	-	63	62	73	G 3/8	13	16 $^{0}_{-0,12}$	20 $^{0}_{-0,010}$	29	25	3	25	178
	22													
	28													
50	22	-	75	67	74	G 1/2	17	20 $^{0}_{-0,12}$	25 $^{0}_{-0,010}$	33	31	3	25	190
	28													
	36													
63	28	-	90	71	80	G1/2	19	22 $^{0}_{-0,12}$	30 $^{0}_{-0,010}$	40	38	3	32	206
	36													
	45													
80	36	-	115	77	93	G 3/4	23	28 $^{0}_{-0,12}$	40 $^{0}_{-0,012}$	50	48	3	31	238
	45													
	56													
100	45	-	130	82	101	G 3/4	30	35 $^{0}_{-0,12}$	50 $^{0}_{-0,012}$	62	58	3	35	261
	56													
	70													
125	56	-	165	86	117	G 1	38	44 $^{0}_{-0,15}$	60 $^{0}_{-0,015}$	80	72	3	35	304
	70													
	90													
160	70	-	205	86	130	G 1	47	55 $^{0}_{-0,15}$	80 $^{0}_{-0,015}$	100	92	3	32	337
	90													
	110													
200	90	-	245	98	165	G 1-1/4	57	70 $^{0}_{-0,20}$	100 $^{0}_{-0,020}$	120	116	3	32	415
	110													
	140													

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

MS2: Foot Mounting

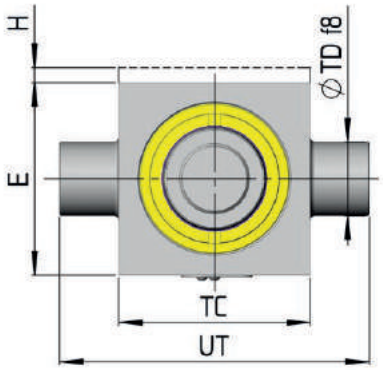


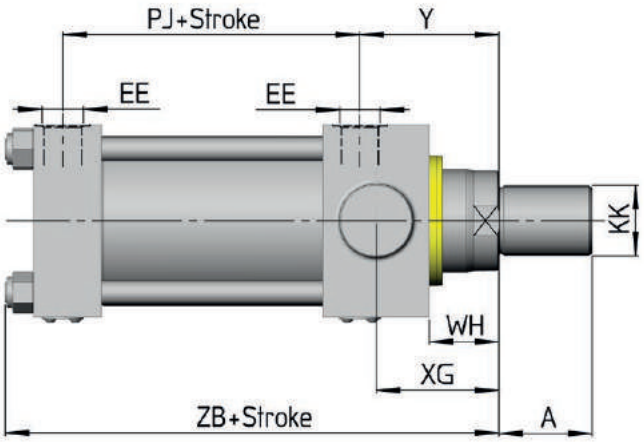
All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	WH	GA	J	TS	SB	LH	XS	SS+	ZB+	ST	US
25	12	5	40	50	53	G 1/4	15	50	25	54	6,6	19	33	73	121	8,5	72
	18																
32	14	5	45	60	56	G 1/4	25	50	27	63	9	22	45	73	137	12,5	84
	18																
	22																
40	18	-	63	62	73	G 3/8	25	55	38	83	11	31	45	98	162	12,5	103
	22																
	28																
50	22	-	75	67	74	G 1/2	25	61	38	102	14	37	54	92	174	19	127
	28																
	36																
63	28	-	90	71	80	G1/2	32	61	38	124	18	44	65	86	183	26	161
	36																
	45																
80	36	-	115	77	93	G 3/4	31	70	45	149	18	57	68	105	209	26	186
	45																
	56																
100	45	-	130	82	101	G 3/4	35	72	46	172	26	63	79	102	222	32	216
	56																
	70																
125	56	-	165	86	117	G 1	35	80	58	210	26	82	79	131	258	32	254
	70																
	90																
160	70	-	205	86	130	G 1	32	86	58	260	33	101	86	130	277	38	318
	90																
	110																
200	90	-	245	98	165	G 1-1/4	32	105	76	311	39	122	92	172	332	44	381
	110																
	140																

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

MT1: Front Male Trunnion



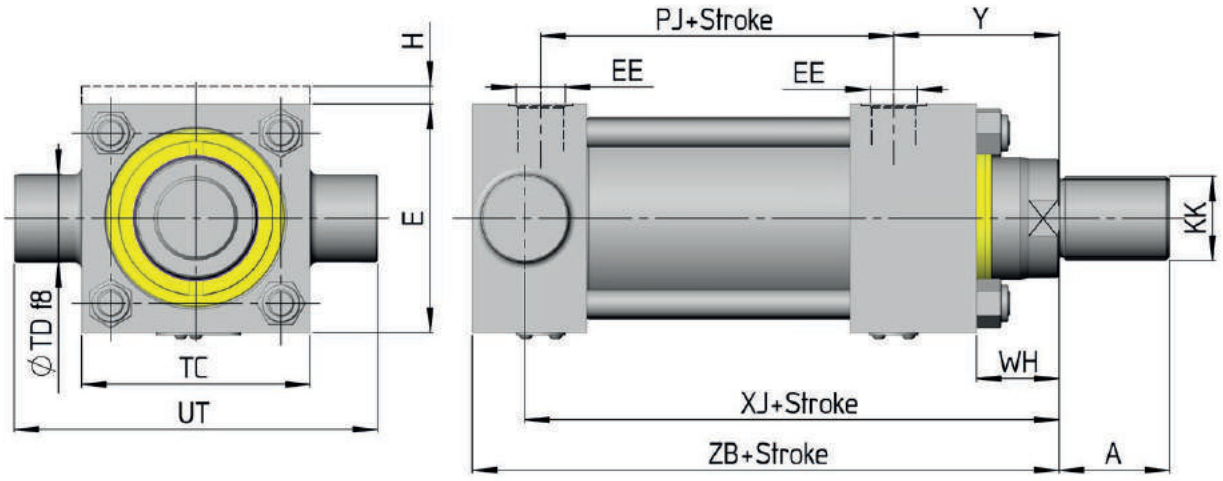


All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	WH	TC	UT	TD	XG	ZB+
25	12	5	40	50	53	G 1/4	15	38	58	12	44	121
	18											
32	14	5	45	60	56	G 1/4	25	44	68	16	54	137
	18											
	22											
40	18	-	63	62	73	G 3/8	25	63	95	20	57	162
	22											
	28											
50	22	-	75	67	74	G 1/2	25	76	116	25	64	174
	28											
	36											
63	28	-	90	71	80	G1/2	32	89	139	32	70	183
	36											
	45											
80	36	-	115	77	93	G 3/4	31	114	178	40	76	209
	45											
	56											
100	45	-	130	82	101	G 3/4	35	127	207	50	71	222
	56											
	70											
125	56	-	165	86	117	G 1	35	165	265	63	75	258
	70											
	90											
160	70	-	205	86	130	G 1	32	203	329	80	75	277
	90											
	110											
200	90	-	245	98	165	G 1-1/4	32	241	401	100	85	332
	110											
	140											

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

MT2: Rear Male Trunnion

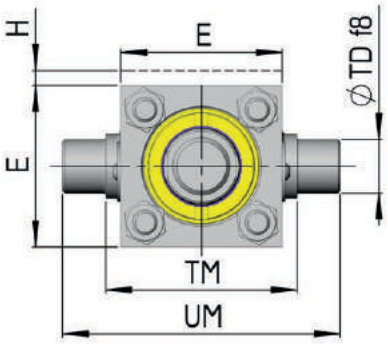


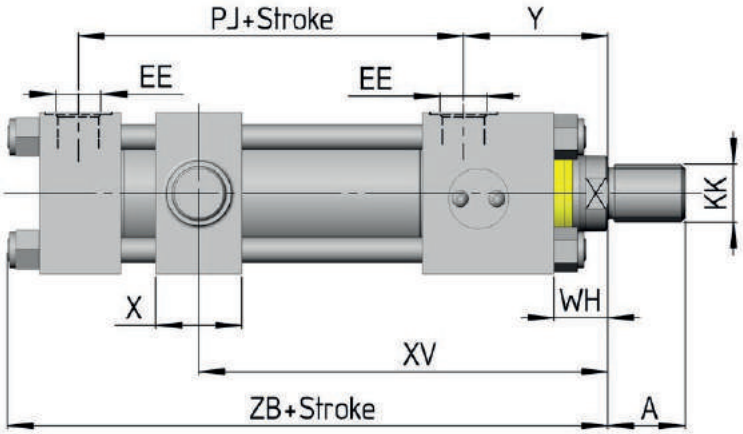
All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	WH	TC	UT	TD	XJ+	ZB+
25	12	5	40	50	53	G 1/4	15	38	58	12	101	114
	18											
32	14	5	45	60	56	G 1/4	25	44	68	16	115	128
	18											
	22											
40	18	-	63	62	73	G 3/8	25	63	95	20	134	153
	22											
	28											
50	22	-	75	67	74	G 1/2	25	76	116	25	140	159
	28											
	36											
63	28	-	90	71	80	G1/2	32	89	139	32	149	168
	36											
	45											
80	36	-	115	77	93	G 3/4	31	114	178	40	168	190
	45											
	56											
100	45	-	130	82	101	G 3/4	35	127	207	50	187	217
	56											
	70											
125	56	-	165	86	117	G 1	35	165	265	63	209	244
	70											
	90											
160	70	-	205	86	130	G 1	32	203	329	80	230	273
	90											
	110											
200	90	-	245	98	165	G 1-1/4	32	241	401	100	276	333
	110											
	140											

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

MT4: Intermediate Male Trunnion





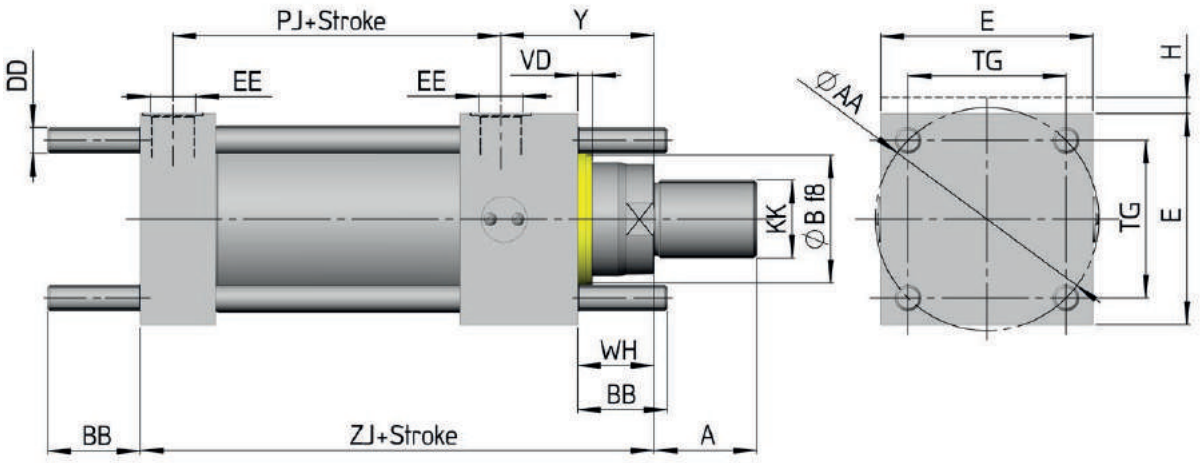
All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	WH	TM	UM	TD	X	XV min.	Stroke min.*	ZB+
25	12	5	40	50	53	G 1/4	15	48	68	12	20	75	0	121
	18													
32	14	5	45	60	56	G 1/4	25	55	79	16	25	87,5	0	137
	18													
	22													
40	18	-	63	62	73	G 3/8	25	76	108	20	30	95	0	162
	22													
	28													
50	22	-	75	67	74	G 1/2	25	89	129	25	35	130,5	0	174
	28													
	36													
63	28	-	90	71	80	G1/2	32	100	150	32	40	113	3	183
	36													
	45													
80	36	-	115	77	93	G 3/4	31	127	191	40	50	126	6	209
	45													
	56													
100	45	-	130	82	101	G 3/4	35	140	220	50	60	137	10	225
	56													
	70													
125	56	-	165	86	117	G 1	35	178	278	63	70	150	4	258
	70													
	90													
160	70	-	205	86	130	G 1	32	215	341	80	90	163	21	277
	90													
	110													
200	90	-	245	98	165	G 1-1/4	32	279	439	100	110	192	28	332
	110													
	140													

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
It is possible to provide cylinder with shorter stroke with respect to the minimum listed in the table; but however the minimum stroke in the table shall be added to the length ZB. For further clarification please contact our technical department.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the “design stroke” shall be used (according to paragraph 2.2)

EFFEGI SYSTEMS
MOVE & POWER

MX1: Both Ends Protruding Tie-Rods

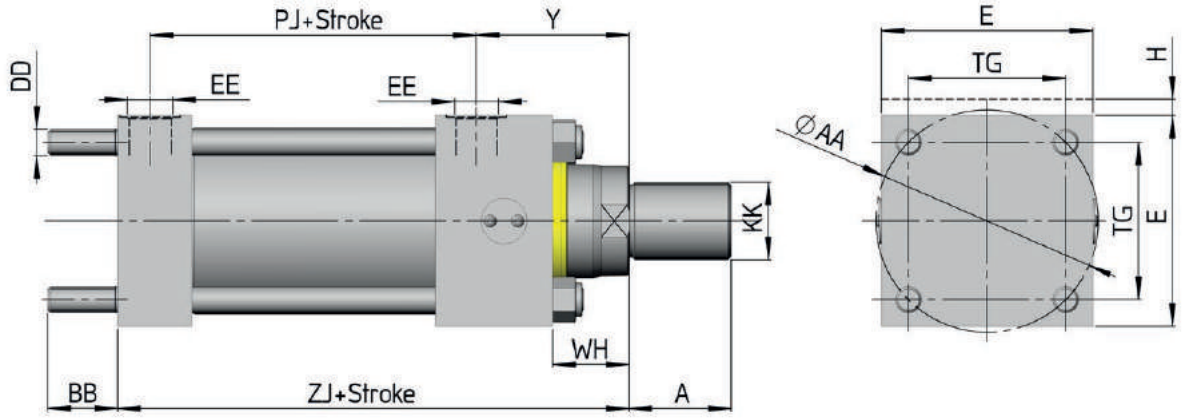


All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	DD	BB	AA	WH	ZJ+	B	VD	TG
25	12	5	40	50	53	G 1/4	M5x0,8	19	40	15	114	24	6	28,3
	18											30		
32	14	5	45	60	56	G 1/4	M6x1	24	47	25	128	26	9	33,2
	18											30		
	22											34		
40	18	-	63	62	73	G 3/8	M8x1	35	59	25	153	30	11	41,7
	22											34		
	28											42		
50	22	-	75	67	74	G 1/2	M12x1,25	46	74	25	159	34	9	52,3
	28											42		
	36											50		
63	28	-	90	71	80	G1/2	M12x1,25	46	91	32	168	42	11	64,3
	36											50	13	
	45											60	13	
80	36	-	115	77	93	G 3/4	M16x1,5	59	117	31	190	50	9	82,7
	45											60		
	56											72		
100	45	-	130	82	101	G 3/4	M16x1,5	59	137	35	203	60	13	96,9
	56											72	7	
	70											88	7	
125	56	-	165	86	117	G 1	M22x1,5	81	178	35	232	72	9	125,9
	70											88	7	
	90											108	7	
160	70	-	205	86	130	G 1	M27x2	92	219	32	245	88	7	154,9
	90											108		
	110											133		
200	90	-	245	98	165	G 1-1/4	M30x2	115	269	32	299	108	7	190,2
	110											133		
	140											163		

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

MX2: Rear Protruding Tie-Rods



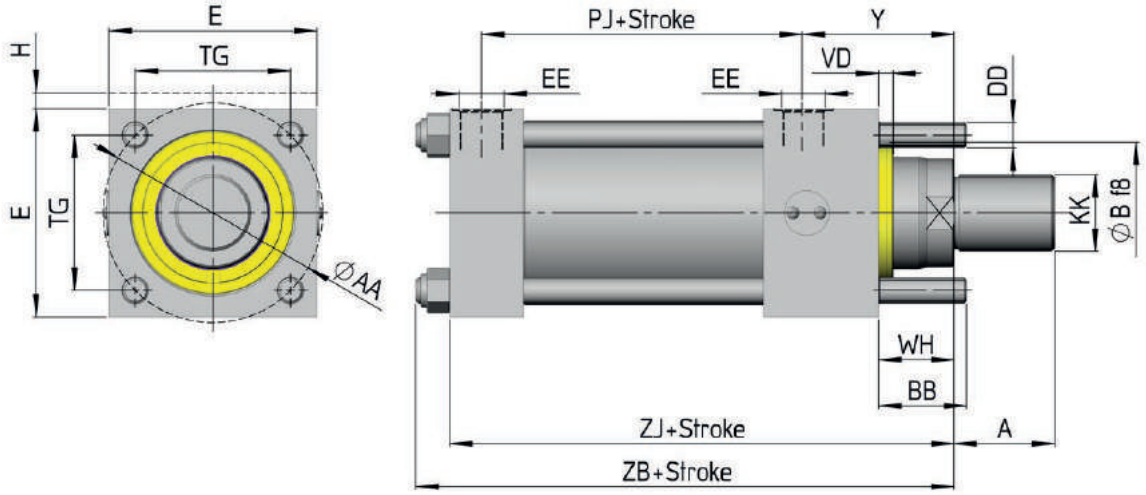
All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	DD	BB	AA	WH	ZJ+	TG
25	12 18	5	40	50	53	G 1/4	M5x0,8	19	40	15	114	28,3
32	14 18 22	5	45	60	56	G 1/4	M6x1	24	47	25	128	33,2
40	18 22 28	-	63	62	73	G 3/8	M8x1	35	59	25	153	41,7
50	22 28 36	-	75	67	74	G 1/2	M12x1,25	46	74	25	159	52,3
63	28 36 45	-	90	71	80	G1/2	M12x1,25	46	91	32	168	64,3
80	36 45 56	-	115	77	93	G 3/4	M16x1,5	59	117	31	190	82,7
100	45 56 70	-	130	82	101	G 3/4	M16x1,5	59	137	35	203	96,9
125	56 70 90	-	165	86	117	G 1	M22x1,5	81	178	35	232	125,9
160	70 90 110	-	205	86	130	G 1	M27x2	92	219	32	245	154,9
200	90 110 140	-	245	98	165	G 1-1/4	M30x2	115	269	32	299	190,2

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

EFFEGI SYSTEMS
MOVE & POWER

MX3: Front Protruding Tie-Rods



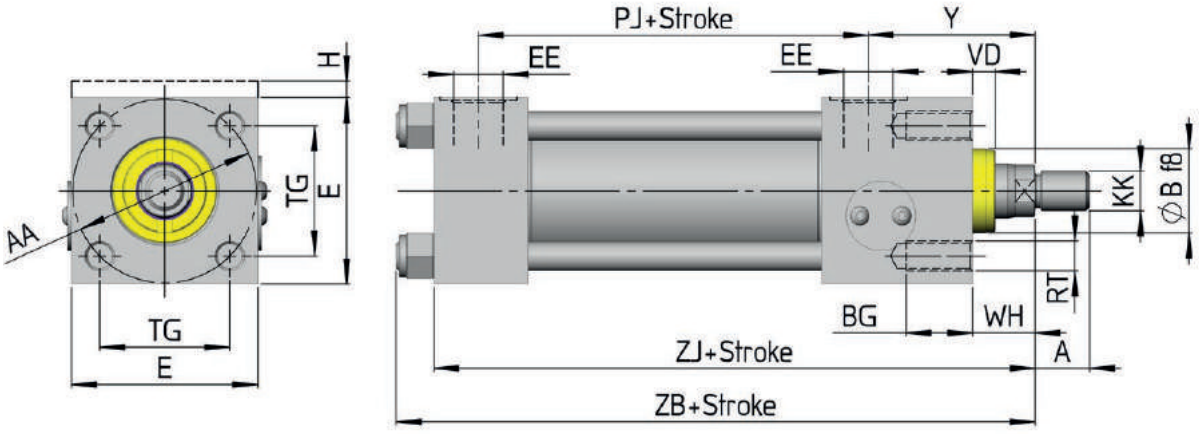
All the dimensions are in millimeters

Bore	Rod	H	E	Y	PJ+	EE	DD	BB	AA	WH	ZJ+	ZB+	B	VD	TG
25	12	5	40	50	53	G 1/4	M5x0,8	19	40	15	114	121	24	6	28,3
	18												30		
32	14	5	45	60	56	G 1/4	M6x1	24	47	25	128	137	26	9	33,2
	18												30		
	22												34		
40	18	-	63	62	73	G 3/8	M8x1	35	59	25	153	162	30	11	41,7
	22												34		
	28												42		
50	22	-	75	67	74	G 1/2	M12x1,25	46	74	25	159	174	34	9	52,3
	28												42		
	36												50		
63	28	-	90	71	80	G1/2	M12x1,25	46	91	32	168	183	42	11	64,3
	36												50	13	
	45												60	13	
80	36	-	115	77	93	G 3/4	M16x1,5	59	117	31	190	209	50	9	82,7
	45												60		
	56												72		
100	45	-	130	82	101	G 3/4	M16x1,5	59	137	35	203	222	60	13	96,9
	56												72	7	
	70												88	7	
125	56	-	165	86	117	G 1	M22x1,5	81	178	35	232	258	72	9	125,9
	70												88	7	
	90												108	7	
160	70	-	205	86	130	G 1	M27x2	92	219	32	245	277	88	7	154,9
	90												108		
	110												133		
200	90	-	245	98	165	G 1-1/4	M30x2	115	269	32	299	332	108	7	190,2
	110												133		
	140												163		

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2)

MX5: Threaded Holes on Front Head

(mounting arrangement not mentioned in ISO 6020/2)



All the dimensions are in millimeters

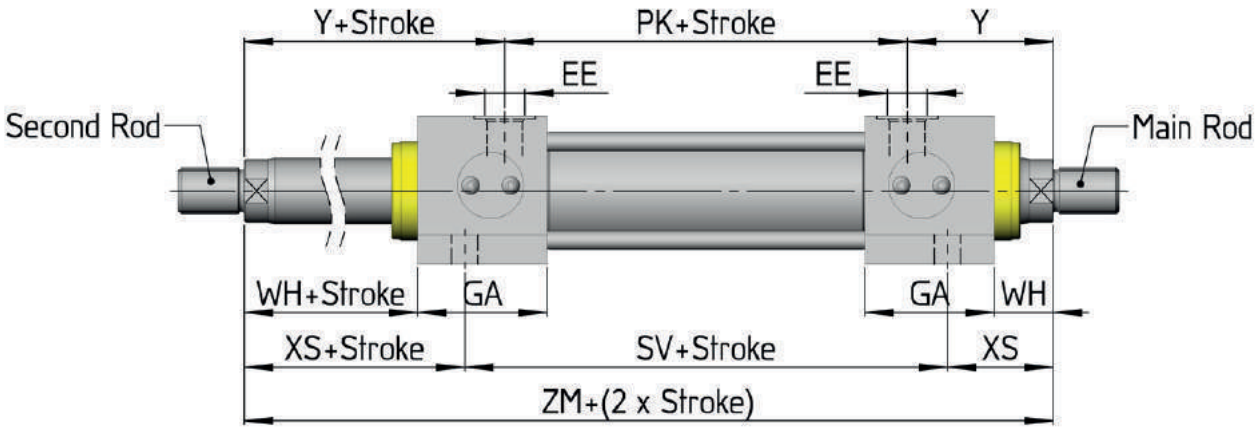
Bore	Rod	H	E	Y	PJ+	EE	RT	BG	AA	WH	ZJ+	B	VD	TG
25	12	5	40	50	53	G 1/4	M5x0,8	8	40	15	114	24	6	28,3
	18											30		
32	14	5	45	60	56	G 1/4	M6x1	9	47	25	128	26	9	33,2
	18											30		
	22											34		
40	18	-	63	62	73	G 3/8	M8x1.25	12	59	25	153	30	11	41,7
	22											34		
	28											42		
50	22	-	75	67	74	G 1/2	M12x1,75	18	74	25	159	34	9	52,3
	28											42		
	36											50		
63	28	-	90	71	80	G1/2	M12x1,75	18	91	32	168	42	11	64,3
	36											50	13	
	45											60	13	
80	36	-	115	77	93	G 3/4	M16x2	24	117	31	190	50	9	82,7
	45											60		
	56											72		
100	45	-	130	82	101	G 3/4	M16x2	24	137	35	203	60	13	96,9
	56											72	7	
	70											88	7	
125	56	-	165	86	117	G 1	M22x2,5	33	178	35	232	72	9	125,9
	70											88	7	
	90											108	7	
160	70	-	205	86	130	G 1	M27x3	40	219	32	245	88	7	154,9
	90											108		
	110											133		
200	90	-	245	98	165	G 1-1/4	M30x3.5	45	269	32	299	108	7	190,2
	110											133		
	140											163		

Rod threaded ends dimensions (A, KK and possible variants) are listed in the specific table.
ATTENTION: For strokes longer then 1000 mm, spacer is required. For the cylinder sizing, the “design stroke” shall be used (according to paragraph 2.2)

EFFEGI SYSTEMS
MOVE & POWER

Double Rod Cylinder

Mounting arrangement type ME5, MS2, MT1, MT4, MX1, MX2, MX3 and MX5 are available with double rod.



All the dimensions are in millimeters

Bore	Rod	Y	PK+	EE	WH	GA	XS	SV+	ZM+
25	12	50	54	G 1/4	15	50	33	88	154
	18								
32	14	60	56	G 1/4	25	50	45	86	176
	18								
	22								
40	18	62	71	G 3/8	25	55	45	105	195
	22								
	28								
50	22	67	73	G 1/2	25	61	54	99	207
	28								
	36								
63	28	71	81	G1/2	32	61	65	93	223
	36								
	45								
80	36	77	92	G 3/4	31	70	68	110	246
	45								
	56								
100	45	82	100	G 3/4	35	72	79	106	264
	56								
	70								
125	56	86	117	G 1	35	80	79	131	289
	70								
	90								
160	70	86	133	G 1	32	86	86	133	305
	90								
	110								
200	90	98	160	G 1-1/4	32	105	92	172	356
	110								
	140								

NOTE: 1) For the other dimensions see the relevant single rod model table.

2) The diameter of the Second Rod can be different from the diameter of the Main one. Both shall be selected in accordance to the "Rod" and "Bore" columns.

ATTENTION: For strokes longer then 100 mm, two spacers are required. For the cylinder sizing, the "design stroke" shall be used (according to paragraph 2.2), obtained considering double spacer lengtn.

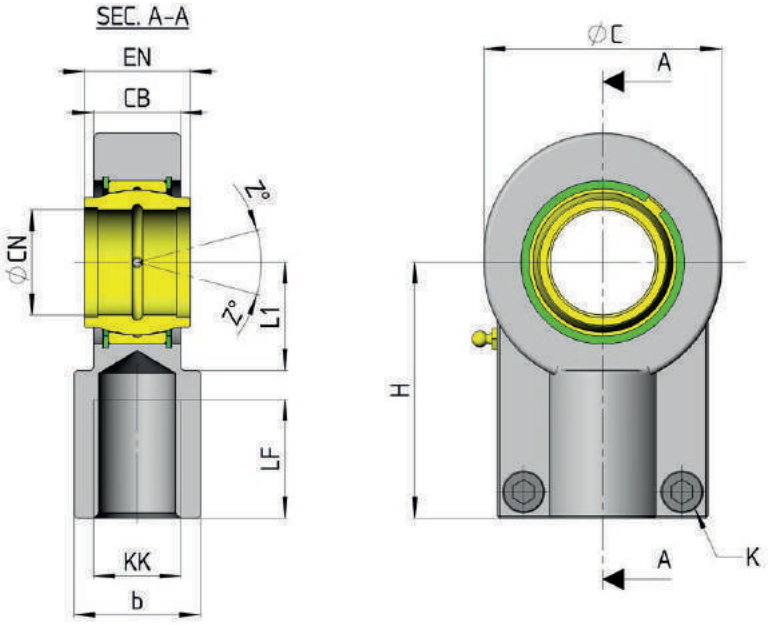
Hydraulic cylinders masses

Bore	Rod	Constant Mass						Variable Mass [per 10mm stroke]
		Cylinder Model						
		MX1-MX2-MX3-MX5	MS2	ME5-ME6	MP1-MP3-MP5	MT1-MT2	MT4	
mm	mm	Kg	Kg	Kg	Kg	Kg	Kg	Kg/cm
25	12	1,2	1,4	1,2	1,4	1,3	1,5	0,052
	18	1,2	1,4	1,2	1,4	1,3	1,6	0,063
32	14	1,5	2	1,5	1,7	1,5	2	0,056
	18			1,5	1,8			0,064
	22	2	2	2	2	2	2	0,074
40	18	3,5	4	4	4	4	4,5	0,091
	22	4	5,0	4,5	4,5	4,5	5	0,101
	28	4	5,0	4,5	4,5	4,5	5	0,120
50	22	6	6,5	5,5	6	6	8	0,133
	28	6	7	6,0	7	6,5	8,5	0,152
	36	7	7	6,5	7	6,5	8,5	0,183
63	28	8,5	9,5	8,5	9	9	10,5	0,168
	36	9	10	9	9	9,5	11	0,199
	45	9	10	9	10	9,5	11	0,244
80	36	16	19	18	19	16,5	21	0,305
	45	16,5	19	18,5	19,5	17	21	0,350
	56	16,5	20	19	20	17	21	0,418
100	45	22	25	24	27	23	26	0,387
	56	23	26	25	28	23	27	0,455
	70	23	26	25,5	29	23	27	0,564
125	56	42	44	42	45	43	48	0,646
	70	43	44	43	50	44	49	0,754
	90	43	45	44	54	44	50	0,952
160	70	69	72	69	77	71	84	1,027
	90	70	73	71	80	72	85	1,225
	110	70	74	73	83	73	85	1,471
200	90	122	129	123	140	127	153	1,517
	110	123		128	145	128	154	1,763
	140	124	131	133	150	129	155	2,226

Table shows approximate mass values

Hydraulic cylinder Mass [kg] = Variable Mass [kg/cm] x Stroke [cm] + Constant Mass [kg]

C: Ball Joint End - C Type

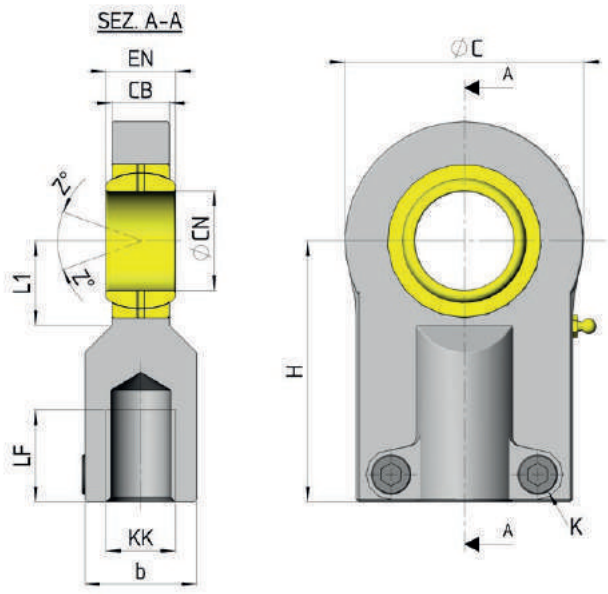


All the dimensions are in millimeters

Rod	KK	CN H7	H Js13	LF	EN h12	CB	b	L1	C	Z° (min.)	K UNI 5931	Dyn. L. [kN]	St. L. [kN]	Mass [Kg]
12	M10x1,25	-	-	-	-	-	-	-	-	-	-	-	-	-
14	M12x1,25	12	38	17	12	11	16	14	32	4	M5 L16	10,8	24,5	0,11
18	M10x1,25	-	-	-	-	-	-	-	-	-	-	-	-	-
	M14x1,5	16	44	19	16	13	21	20	40	4	M6 L14	17,6	36,5	0,20
22	M12x1,25	12	38	17	12	11	16	14	32	4	M5 L16	10,8	24,5	0,11
	M16x1,5	20	52	23	20	17	25	22	47	4	M8 L20	30	48	0,35
28	M14x1,5	16	44	19	16	13	21	20	40	4	M6 L14	17,6	36,5	0,20
	M20x1,5	25	65	29	25	22	30	27	58	4	M8 L20	48	78	0,62
36	M16x1,5	20	52	23	20	17	25	22	47	4	M8 L20	30	48	0,35
	M27x2	32	80	37	32	28	38	32	71	4	M10 L25	67	114	1,15
45	M20x1,5	25	65	29	25	22	30	27	58	4	M8 L20	48	78	0,62
	M33x2	40	97	46	40	33	47	41	90	4	M10 L30	100	204	2,18
56	M27x2	32	80	37	32	28	38	32	71	4	M10 L25	67	114	1,15
	M42x2	50	120	57	50	41	58	50	109	4	M12 L35	156	310	3,96
70	M33x2	40	97	46	40	33	47	41	90	4	M10 L30	100	204	2,18
	M48x2	63	140	64	63	53	70	62	136	4	M16 L40	255	430	6,80
90	M42x2	50	120	57	50	41	58	50	109	4	M12 L35	156	310	3,96
	M64x3	80	180	86	80	67	90	78	170	4	M20 L50	400	695	13,00
110	M48x2	63	140	64	63	53	70	62	136	4	M16 L40	255	430	6,80
	M80x3	100	210	96	100	85	110	98	211	4	M24 L60	610	1060	25,00
140	M64x3	80	180	86	80	67	90	78	170	4	M20 L50	400	695	13,00
	M100x3	125	260	113	125	103	135	120	265	4	M24 L70	950	1430	46,00

NOTE: For a correct operation the ball joint end shall be screwed completely on the rod before locking.
Adequate lubrication is needed for a ball joint end proper performance.

D: Ball Joint End - D Type

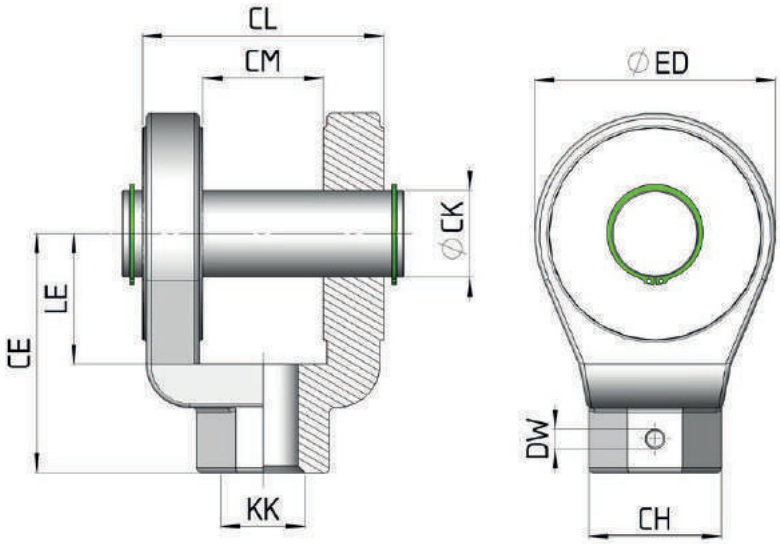


All the dimensions are in millimeters

Rod	KK	CN	H Js13	LF	EN	CB	b	L1	C	Z° (min.)	K UNI 5931	Dyn. L. [kN]	St. L. [kN]	Mass (Kg)
12	M10x1,25	$12^{0}_{-0,008}$	42	15	$10^{0}_{-0,012}$	8	17	16	35	3	M6 L14	10,8	17	0,12
14	M12x1,25	$16^{0}_{-0,008}$	48	17	$14^{0}_{-0,012}$	11	21	20	45	3	M6 L14	21,1	28,5	0,22
18	M10x1,25	$12^{0}_{-0,008}$	42	15	$10^{0}_{-0,012}$	8	17	16	35	3	M6 L14	10,8	17	0,12
	M14x1,5	$20^{0}_{-0,010}$	58	19	$16^{0}_{-0,012}$	13	25	28	55	3	M8 L18	30	42,5	0,43
22	M12x1,25	$16^{0}_{-0,008}$	48	17	$14^{0}_{-0,012}$	11	21	20	45	3	M6 L14	21,1	28,5	0,22
	M16x1,5	$25^{0}_{-0,010}$	68	23	$20^{0}_{-0,012}$	17	30	31	65	3	M8 L18	48	67	0,67
28	M14x1,5	$20^{0}_{-0,010}$	58	19	$16^{0}_{-0,012}$	13	25	28	55	3	M8 L18	30	42,5	0,43
	M20x1,5	$30^{0}_{-0,010}$	85	29	$22^{0}_{-0,012}$	19	36	35	80	3	M10 L20	62	108	1,25
36	M16x1,5	$25^{0}_{-0,010}$	68	23	$20^{0}_{-0,012}$	17	30	31	65	3	M8 L18	48	67	0,67
	M27x2	$40^{0}_{-0,012}$	105	37	$28^{0}_{-0,012}$	23	45	45	100	3	M10 L25	100	156	2,16
45	M20x1,5	$30^{0}_{-0,010}$	85	29	$22^{0}_{-0,012}$	19	36	35	80	3	M10 L20	62	108	1,25
	M33x2	$50^{0}_{-0,012}$	130	46	$35^{0}_{-0,012}$	30	55	58	120	3	M12 L30	156	245	3,90
56	M27x2	$40^{0}_{-0,012}$	105	37	$28^{0}_{-0,012}$	23	45	45	100	3	M10 L25	100	156	2,16
	M42x2	$60^{0}_{-0,015}$	150	57	$44^{0}_{-0,015}$	38	68	68	160	3	M16 L40	245	380	7,15
70	M33x2	$50^{0}_{-0,012}$	130	46	$35^{0}_{-0,012}$	30	55	58	120	3	M12 L30	156	245	3,90
	M48x2	$80^{0}_{-0,015}$	185	64	$55^{0}_{-0,015}$	47	90	82	205	3	M20 L50	400	585	15,00
90	M42x2	$60^{0}_{-0,015}$	150	57	$44^{0}_{-0,015}$	38	68	68	160	3	M16 L40	245	380	7,15
	M64x3	$100^{0}_{-0,020}$	240	86	$70^{0}_{-0,020}$	55	110	116	240	3	M24 L60	610	865	27,30
110	M48x2	$80^{0}_{-0,015}$	185	64	$55^{0}_{-0,015}$	47	90	82	205	3	M20 L50	400	585	15,00
	M80x3	–	–	–	–	–	–	–	–	–	–	–	–	–
140	M64x3	$100^{0}_{-0,020}$	240	86	$70^{0}_{-0,020}$	55	110	116	240	3	M24 L60	610	865	27,30
	M100x3	–	–	–	–	–	–	–	–	–	–	–	–	–

NOTE: For a correct operation the ball joint end shall be screwed completely on the rod before locking.
Adequate lubrication is needed for a ball joint end proper performance

F: Fork Joint Hinge

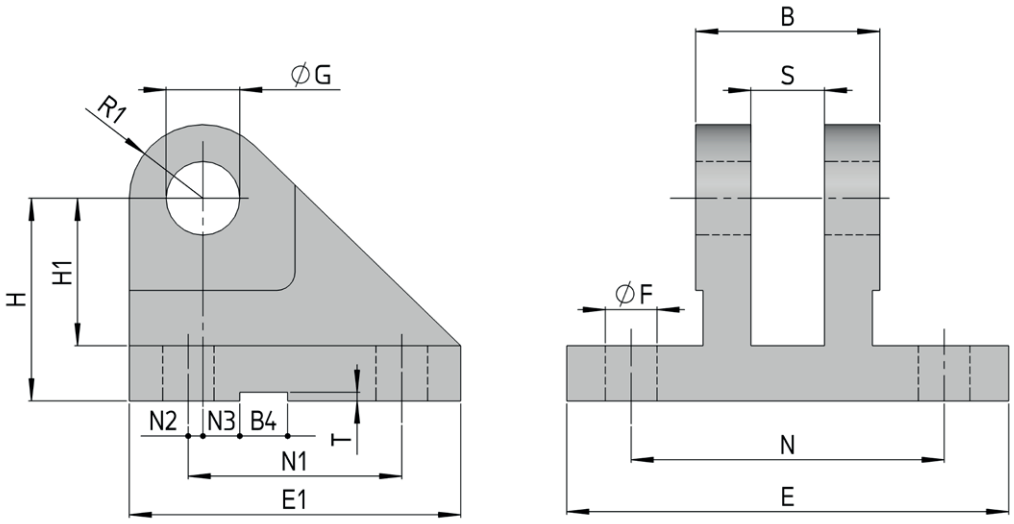


All the dimensions are in millimeters

Rod	KK	CK H11	CE Js13	CM A16	LE	CL	CH	DW	Load [kN]	Mass (Kg)
12	M10x1,25	10	32	12	13	24	19	M5 L5	8	0,10
14	M12x1,25	12	36	16	19	32	21	M5 L5	12,5	0,18
18	M10x1,25	10	32	12	13	24	19	M5 L5	8	0,10
	M14x1,5	14	38	20	19	40	21	M5 L5	20	0,23
22	M12x1,25	12	36	16	19	32	21	M5 L5	12,5	0,18
	M16x1,5	20	54	30	32	60	32	M6 L6	32	0,90
28	M14x1,5	14	38	20	19	40	21	M5 L5	20	0,23
	M20x1,5	20	60	30	32	60	32	M6 L6	50	0,91
36	M16x1,5	20	54	30	32	60	32	M6 L6	32	0,90
	M27x2	28	75	40	39	80	40	M6 L6	80	1,92
45	M20x1,5	20	60	30	32	60	32	M6 L6	50	0,91
	M33x2	36	99	50	54	100	55	M8 L8	125	4,92
56	M27x2	28	75	40	39	80	40	M6 L6	80	1,92
	M42x2	45	113	60	57	120	56	M8 L8	200	6,53
70	M33x2	36	99	50	54	100	55	M8 L8	125	4,92
	M48x2	56	126	70	63	140	75	M8 L8	320	10,11
90	M42x2	45	113	60	57	120	56	M8 L8	200	6,53
	M64x3	70	168	80	83	160	95	M12 L12	500	19,20
110	M48x2	56	126	70	63	140	75	M8 L8	320	10,11
	M80x3	70	168	80	83	160	95	M12 L12	500	18,42 *
140	M64x3	70	168	80	83	160	95	M12 L12	500	19,20
	M100x3	-	-	-	-	-				-

NOTE: Fork will be supplied with its pin (according to UNI ISO 8133) and secure rings. For a correct operation the fork shall be screwed completely on the rod before locking.
* Not mentioned in ISO 8133

Bracket 90° for C Type Ball Joint End

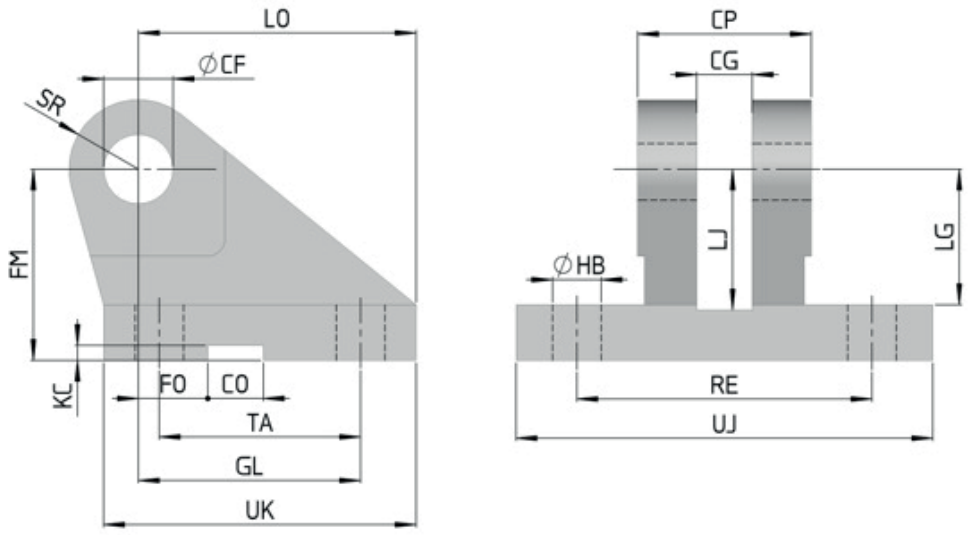


All the dimensions are in millimeters

Code	G H9	B	B4	E	E1	ØF	H	H1	N	N1	N2	N3	R1	S	T	Nom. L [kN]	Mass [kg]
B1	10	24	8	56	60	6,6	32	22	39	44	2,0	10	10	10	3,3	5,0	0,31
B2	12	28	10	72	65	9,0	34	22	52	45	2,0	10	12	12	3,3	8,0	0,55
B3	16	36	16	90	80	11,0	40	27	65	55	3,5	10	16	16	4,3	12,5	0,90
B4	20	45	16	100	95	11,0	45	30	75	70	7,5	10	20	20	4,3	20,0	1,50
B5	25	56	25	120	115	13,5	55	37	90	85	10,0	10	25	25	5,4	32,0	2,70
B6	32	70	25	145	145	17,5	65	43	110	110	14,5	6	32	32	5,4	50,0	4,50
B7	40	90	36	185	170	22,0	76	52	140	125	17,5	6	40	40	8,4	80,0	8,50
B8	50	110	36	215	200	26,0	95	65	165	150	25,0	0	50	50	8,4	125,0	13,50
B9	63	140	50	270	230	33,0	112	75	210	170	33,0	0	63	63	11,4	200,0	23,40
B10	80	170	50	320	280	39,0	140	95	250	210	45,0	0	80	80	11,4	320,0	38,50
B11	100	210	63	405	345	52,0	180	120	315	250	52,5	0	100	100	12,4	500,0	90,30

NOTE: Item not considered in the cylinder "ID CODE". In case of order please specify separately the code (see first column) in the purchase order.

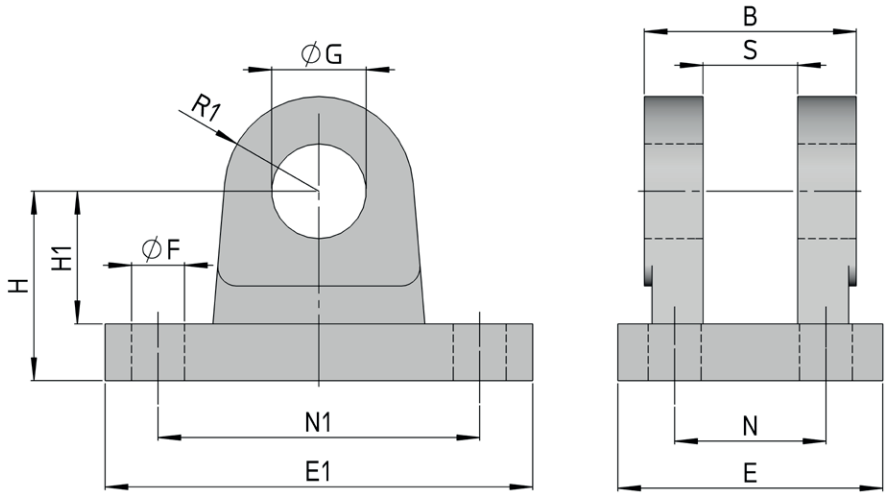
Bracket 90° for D Type Ball Joint End and MP5 Cylinders



All the dimensions are in millimeters

Code	CP	CG	FM	CF K7	LJ	LG	LO	SR	UJ	UK	GL	TA	RE	FO	CO	KC	HB	Nom. L [kN]	Mass [kg]
K1	30	10	40	12	29	28	56	12	75	60	46	40	55	16	10	3,3	9	8,0	0,52
K2	40	14	50	16	38	37	74	16	95	80	61	55	70	18	16	4,3	11	12,5	1,05
K3	50	16	55	20	40	39	80	20	120	90	64	58	85	20	16	4,3	13,5	20,0	1,72
K4	60	20	65	25	49	48	98	25	140	110	78	70	100	22	25	5,4	15,5	32,0	2,72
K5	70	22	85	30	63	62	120	30	160	135	97	90	115	24	25	5,4	17,5	50,0	5,15
K6	80	28	100	40	73	72	148	40	190	170	123	120	135	24	36	8,4	22	80,0	9,30
K7	100	35	125	50	92	90	190	50	240	215	155	145	170	35	36	8,4	30	125,0	18,30
K8	120	44	150	60	110	108	225	60	270	260	187	185	200	35	50	11,4	39	200,0	35,00
K9	160	55	190	80	142	140	295	80	320	340	255	260	240	35	50	11,4	45	320,0	63,00
K10	200	70	210	100	152	150	335	100	400	400	285	300	300	35	63	12,4	48	500,0	109,00

Bracket 180°

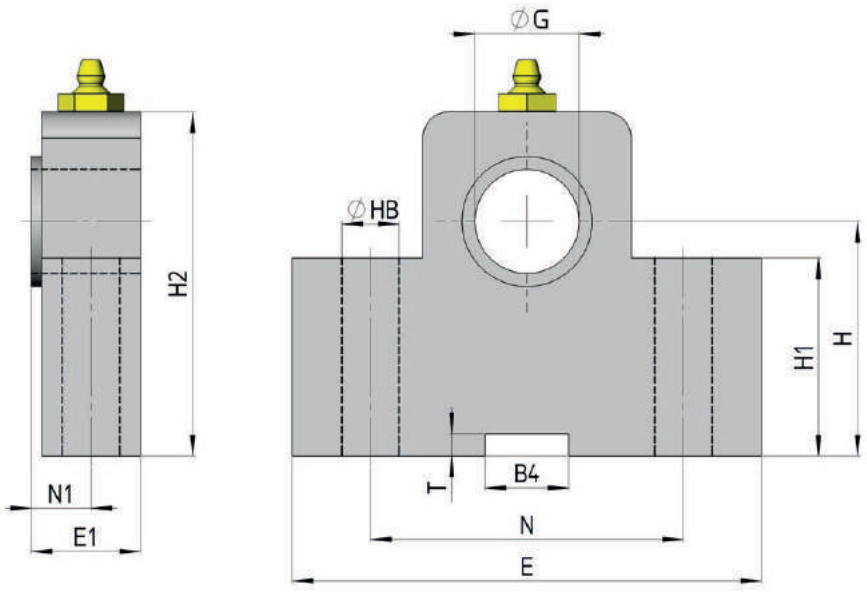


All the dimensions are in millimeters

Code	G H9	B	E	E1	ØF	H	H1	N	N1	R1	S	Nom. L [kN]	Mass [kg]
L1	10	24	33	60	6,6	32	22	17	42	10	10	5,0	0,10
L2	12	28	40	70	9,0	34	22	20	50	12	12	8,0	0,31
L3	16	36	50	90	11,0	40	27	26	65	16	16	12,5	0,59
L4	20	45	58	98	11,0	45	30	32	75	20	20	20,0	0,90
L5	25	56	70	113	13,5	55	37	40	85	25	25	32,0	1,60
L6	32	70	85	143	17,5	65	43	50	110	32	32	50,0	2,80
L7	40	90	108	170	22,0	76	52	65	130	40	40	80,0	5,00
L8	50	110	130	220	26,0	95	65	80	170	50	50	125,0	10,10
L9	63	140	160	270	33,0	112	75	100	210	63	63	200,0	15,40
L10	80	170	210	320	39,0	140	95	125	250	80	80	320,0	30,00
L11	100	210	260	400	45,0	180	120	160	315	100	100	500,0	60,20

NOTE: Item not considered in the cylinder "ID CODE". In case of order please specify separately the code (see first column) in the purchase order.

Bracket for Trunnion

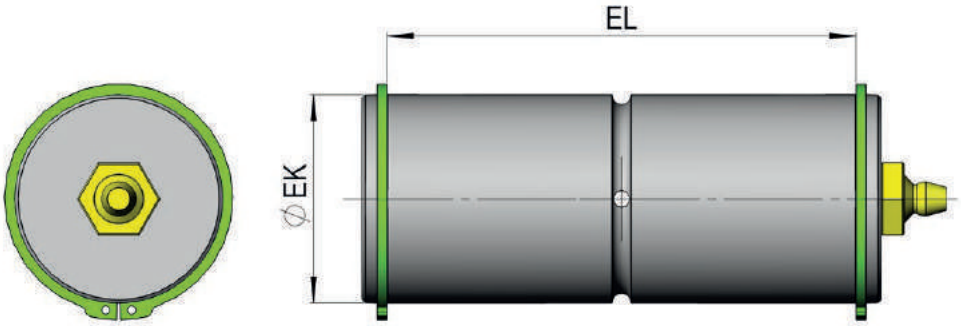


All the dimensions are in millimeters

Code	Bore	G H7	H	H1	H2	E	E1	N	N1	B4 N9	T	ØHB H13	Nom. L [kN]	Mass [kg]
M1	25	12	34	25	49	63,0	17	40	8	10	3,3	9,0	8,0	0,46
M2	32	16	40	30	59	80,0	21	50	10	16	4,3	11,0	12,5	0,83
M3	40	20	45	38	69	90,0	21	60	10	16	4,3	11,0	20,0	1,21
M4	50	25	55	45	80	110,0	26	80	12	25	5,4	13,5	32,0	2,15
M5	63	32	65	52	100	150,0	33	110	15	25	5,4	17,5	50,0	4,63
M6	80	40	76	60	120	170,0	41	125	16	36	8,4	22,0	80,0	7,78
M7	100	50	95	75	140	210,0	51	160	20	36	8,4	26,0	125,0	14,30
M8	125	63	112	85	177	265,0	61	200	25	50	11,4	33,0	200,0	23,40
M9	160	80	140	112	220	325,0	81	250	31	50	11,4	39,0	320,0	53,10
M10	200	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTE: Item not considered in the cylinder "ID CODE". In case of order please specify separately the code (see first column) in the purchase order.

PIN (for BRACKETS 90° and 180°)



All the dimensions are in millimeters

Code	ØEK f8	EL H16	Nom. L [kN]	Mass [kg]
P1	10	25	5,0	0,01
P2	12	29	8,0	0,03
P3	16	37	12,5	0,60
P4	20	46	20,0	0,13
P5	25	57	32,0	0,25
P6	32	72	50,0	0,50
P7	40	92	80,0	1,00
P8	50	112	125,0	1,90
P9	63	142	200,0	3,80
P10	80	172	320,0	7,60

NOTE: Grease Niple according to DIN 71412
Item not considered in the cylinder "ID CODE". In case of order please specify separately the code (see first column) in the purchase order.

soluzionegroup.com

C2T001 - Rev. 01 - Apr. 2017

EFFEGI SYSTEMS
MOVE & POWER

EFFEGI SYSTEMS Srl: 25010 Isorella (Brescia - Italy) - **registered office:** Via Garibaldi, 9 - **headquarters:** Via 1° Maggio, 31
tel. +39 030 99 58 684 - fax +39 030 99 52 802 - info@effegisystems.com - **www.effegisystems.com**

QUALITY SYSTEM CERTIFICATION DNV·GL ISO 9001

IT'S FLUIDMEC WORLD Member of
www.fluidmecworld.com

FLUIDMEC | op | EFFEGI SYSTEMS | SINDE | CEPROM SYSTEMS | UNISEALS | BRESCIA HYDROSERVICE | BRESCIA HYDROPOWER