ISO 6020/2 hydraulic cylinders with counterflanges are suitable for a wide range of industrial applications, when a compact, highly reliable and easy-to-maintain product is required, thanks to the use of the best materials and technical choices based on years of experience.

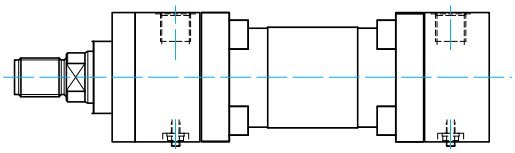
The special configuration with counterflanges and high-strength screws makes them particularly suitable for applications with long strokes. In these cases, in fact, while maintaining the same overall dimensions of a cylinder with tie rods, this configuration is more stable because it does not require the presence of excessively long tie rods. The overall dimensions and the mounting configurations comply with ISO 6020/2, while the working pressure can rise up to 210 bar. The cylinder can be provided with reliable end-of-stroke cushioning, equipped with a quick restart system and adjustable to suit the needs and loads to be cushioned. Available in various sealing configurations to suit the desired operating conditions and performance. Before delivery, each cylinder is tested in accordance with ISO 10100 and we record these results in our systems to ensure product quality and performance. They can be equipped with various types of switches to detect the piston at the end of its stroke or with position transducers for continuous detection along the entire stroke. In addition, the cylinder can be equipped with a CETOP plate for the installation of a control valve with ISO 4401 mounting surfaces.

Spare parts are easy to find and are always available at our warehouse, with rapid support service to deal with any urgency.

Standard		ISO 6020/2 - DIN 24554 - with counterflanges	
Bore	mm	from 50 to 200	
Pressure	bar	operational 210	testing 315
Maximum stroke	mm	4000	
Fluid		Mineral hydraulic oil Phosphoric esters HFC-fluid	

HYDRAULIC CYLINDERS SERIES WITH COUNTERFLANGES

HD	Bore from 50 to 100
HK	Bore from 125 to 200

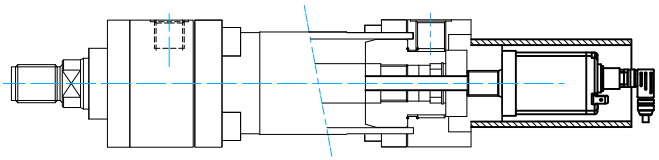


The HD and HK series hydraulic cylinders are the basic version of the ISO 6020/2 counter-flange cylinders. The technical features, dimensions, and available versions and options are detailed from page 27.

They are available in a wide variety of configurations, with rod in various materials, with CETOP plate for valve and with end-stroke sensors integrated in the cylinder heads, and many other special options.

HYDRAULIC CYLINDERS SERIES WITH COUNTERFLANGES AND POSITION TRANSDUCER

TH	Alésage 50 à 100
TX	Alésage 125 à 200



The TH and TX series hydraulic servo-cylinders have the same technical features, dimensions and available options as the basic HD and HK series, but are equipped with a magnetostrictive linear position transducer (see page 39) for accurate and continuous detection of the piston at any point in the cylinder stroke.

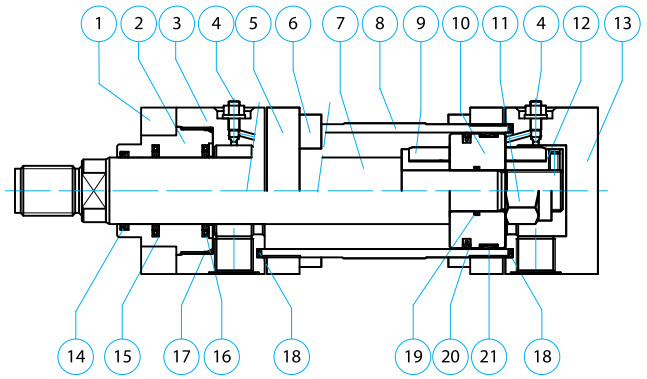
The external parts of the position transducer are protected against accidental impacts during transport, installation and operation by a removable steel cover.

AVAILABLE SEALS

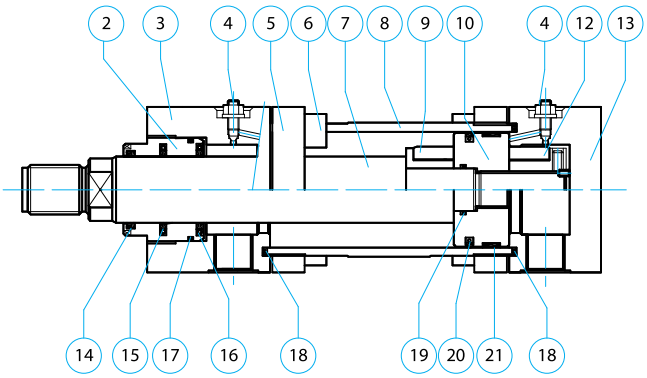
Seal code	Performances					Fluid		
	High sealing	Low friction	Max speed	Temp °C Min	Temp °C Max	Hydraulic oil	Phosphoric esters	HFC-fluid
S	√		0.5 m/s	-20	+80	√		
L		√	1 m/s	-20	+80	√		
H		√	1 m/s	-20	+150	√	√	
G		√	1 m/s	-20	+80			√

For speeds and temperatures exceeding the indicated limits, please contact our technical department.

BORE 50-100



BORE 125-200



	Component	Material	Features
1	Closing flange	Steel	Burnished
2	Guide bushing	Bronze	
3	Front head	Steel	Burnished
4	Cushioning adjusting + air bleed	Steel	
5	Counterflange	Steel	Burnished
6	Closing screw	Steel	Burnished
7	Piston rod	Chromeplated steel	Cr 25 µm ISO f7 - Ra 0.20 µm
8	Cylinder body	Steel	Honed H8 - Ra 0.40 µm
9	Front cushioning	Hardened steel	
10	Piston	Steel	
11	Rod self-locking nut	Steel	
12	Rear cushioning	Hardened steel	
13	Rear head	Steel	Burnished

The cylinders are equipped with a bronze guide bushing with wiper and double seal with high seal or low-friction.

The counterflanges are fixed to the heads by means of high-strength screws.

The original floating ring cushioning system guarantees perfect centring and performs the function of rapid opening for quick restart of the cylinder. Made of hardened steel guarantees a long service life, thanks to the steel housing of the cylinder head.

The screw adjustment system allows a precise adjustment of the cushioning effect and at the same time bleeding the air (see page 29).

	Component	Groove	Material			
			S	L	H	G
14	Rod wiper		NBR + PTFE	NBR + PTFE	Viton® + PTFE	NBR + PTFE CG
15	First rod seal	ISO 7425/2	NBR + PTFE	NBR + PTFE	Viton® + PTFE	NBR + PTFE CG
16	Second rod seal	ISO 7425/2	PU	NBR + PTFE	Viton® + PTFE	NBR + PTFE CG
17	Head / bushing sealing		NBR + PTFE	NBR + PTFE	Viton® + PTFE	NBR + PTFE
18	Tube seal		NBR	NBR	Viton®	NBR
19	Internal piston seal		NBR	NBR	Viton®	NBR
20	External piston seal	ISO 7425/1	NBR + PU	NBR + PTFE	Viton® + PTFE	NBR + PTFE CG
21	Piston guide		Resin	Resin	Resin	Resin

SIZING AND FORCES

Dimension		Piston area		Force at 100 bar		Force at 210 bar		Screws tightening torque
Bore	Rod	push	pull	push	pull	push	pull	
mm	mm	cm²	cm²	daN	daN	daN	daN	Nm
50	22	19.6	15.8	1963	1583	4123	3325	70
	28		13.5		1348		2830	
	36		9.5		946		1986	
63	28	31.2	25.0	3117	2501	6546	5253	70
	36		21.0		2099		4409	
	45		15.3		1527		3206	
80	36	50.3	40.1	5027	4009	10556	8418	160
	45		34.4		3436		7216	
	56		25.6		2564		5383	
100	45	78.5	62.6	7854	6264	16493	13153	160
	56		53.9		5391		11321	
	70		40.1		4006		8412	
125	56	122.7	98.1	12272	9809	25771	20599	460
	70		84.2		8423		17689	
	90		59.1		5910		12411	
160	70	201.1	162.6	20106	16258	42223	34141	820
	90		137.4		13744		29863	
	110		106.0		10603		22266	
200	90	314.2	250.5	31416	25054	65973	52614	1150
	110		219.1		21913		46016	
	140		160.2		16022		33646	

STROKE

During testing, the cylinder stroke is checked, assuring compliance with the tolerance of 0/+2 mm as per ISO 8131.

For space requirements of the cylinder components or switches, the stroke cannot be less than a minimum value in some circumstances. This problem can be overcome by inserting a spacer.

	Bore	50	63	80	100	125	160	200
Minimum stroke	HD/HK (mm)	75	75	90	115	120	190	200

OPERATIONAL LIFE-TIME

The cylinders are manufactured from high-quality materials and according to design guidelines validated by many years of experience with these products. Under ideal conditions, the cylinders are capable of working for millions of cycles requiring only regular basic maintenance and replacement of wear parts.
The real application situations can subject cylinders to conditions that reduce their service life and would therefore be preferable to avoid.

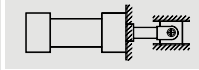
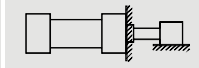
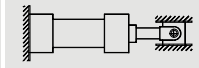
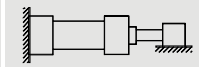
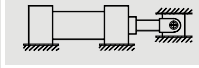
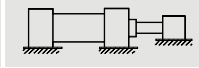
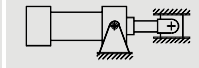
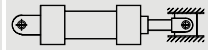
The most frequent are:

- radial loads, generated by external forces or misalignments in fixing to machinery
- end-stroke impacts and external impulsive forces
- pressure peaks and water hammers;
- contaminated hydraulic fluid;
- over-temperatures, caused either by the environment or internal causes such as frequent cycles with short strokes, which prevent sufficient oil change.

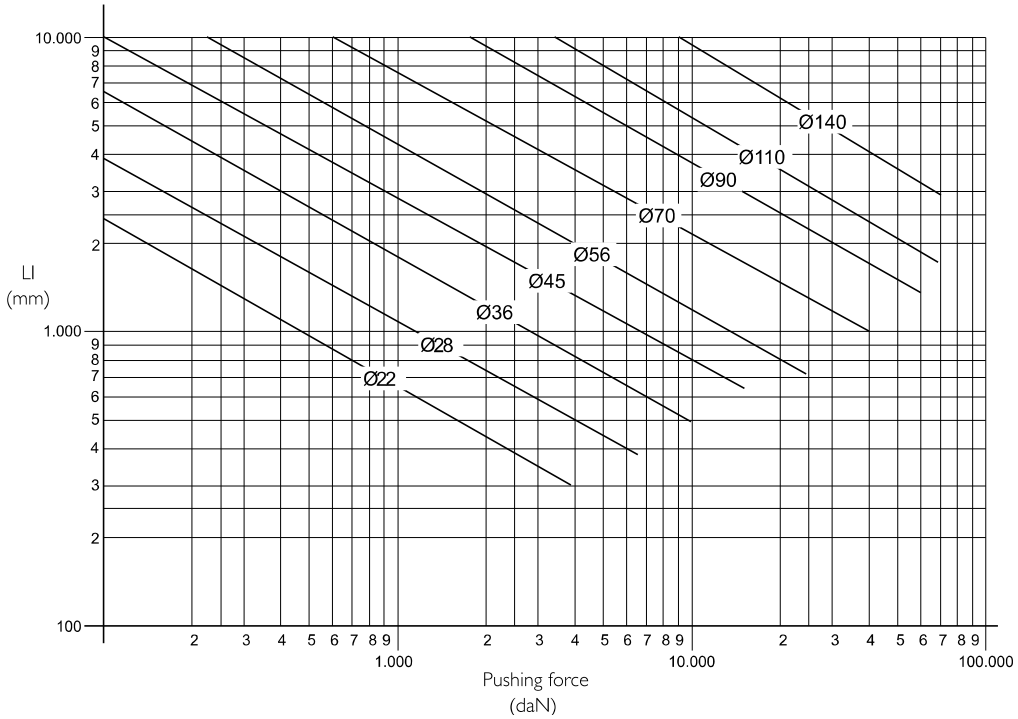
Our technical department will be able to advise you on how best to prevent or reduce problems.

BUCKLING VERIFICATION

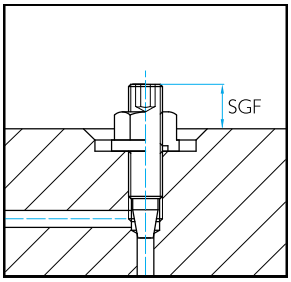
When the cylinder is pushing, it can be subject to buckling instability, depending on mounting, stroke and pushing force.
The graph illustrates the boundary working conditions for each rod. Stay below for optimal operation.
The mounting of the cylinder determines the stroke factor FC. Multiplying the cylinder stroke CO by FC gives the ideal length LI.
The value of LI, read on the vertical axis, meets the line corresponding to the diameter of the rod to be checked, identifying on the horizontal axis the maximum possible push.
If the actual thrust does not exceed this limit value, the verification is passed.
Spacers and rod extensions must be added to the stroke to obtain the CO value to be multiplied by FC.

MOUNTING		FC
X (MX5) A (ME5)		0.7
		2
B (ME6) T (MX6)		1.5
		4
E (MS2)		0.7
		2
G (MT1)		1
C (MP3) D (MP5) L (MT2) M (MP1)		2

ROD SELECTION CHART



CUSHIONING ADJUSTMENT AND AIR BLEEDING



All the cushioned cylinders are equipped with a screw that allows the cushioning adjustment.

Slightly loosen the Seal-Lock® sealing nut, adjust the screw and tighten carefully.

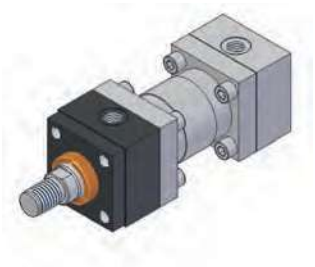
The cushioning adjustment unit can also be used as an air bleeder by loosening the nut until the air has escaped.

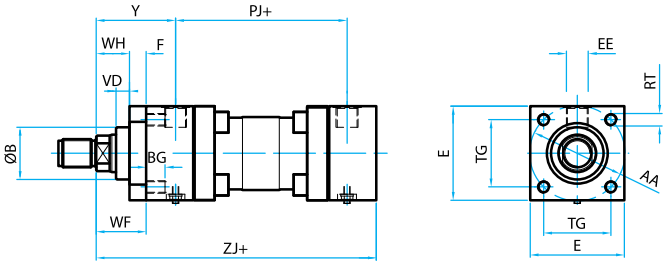
On cylinders with cushioning, if the stroke is shorter than the cushioning length, the cylinder is always cushioned.

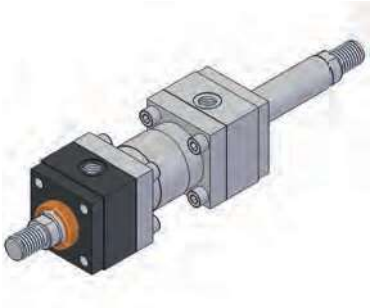
Bore		50	63	80	100	125	160	200
Cushioning lenght	mm	21	21	28	28	26	30	44
Cushioning area	cm²	8.3	13.8	23.8	38	56	99	151
SGF	mm	5	2	0	0	0	0	0

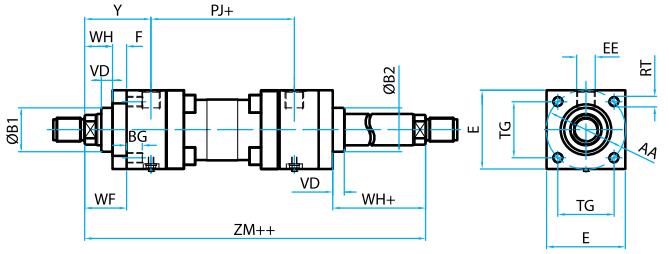
ISO MX5 - FRONT THREADED HOLES

X



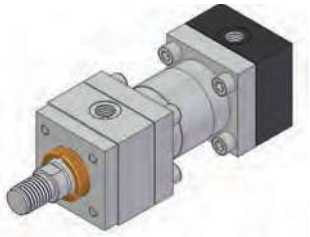


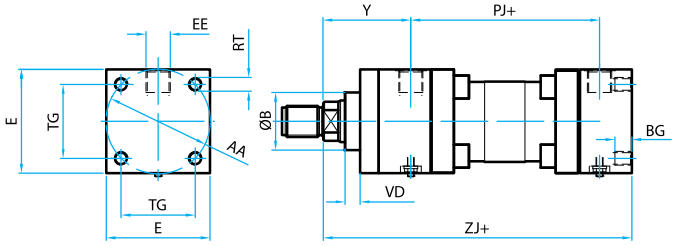




ISO MX6 - REAR THREADED HOLES

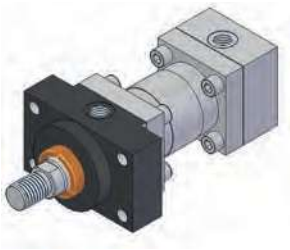
T

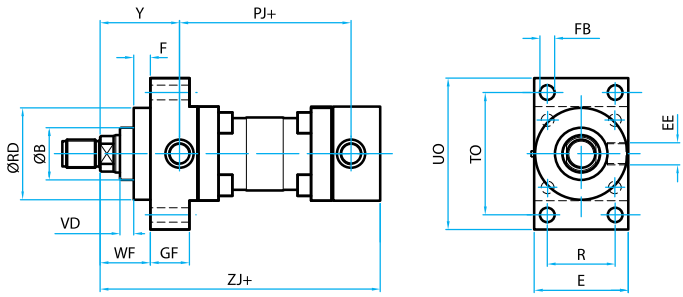


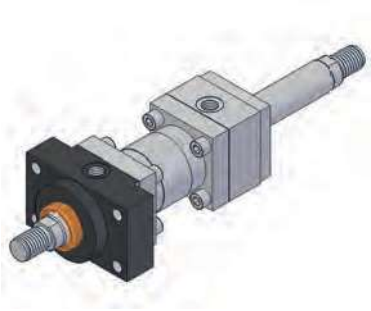


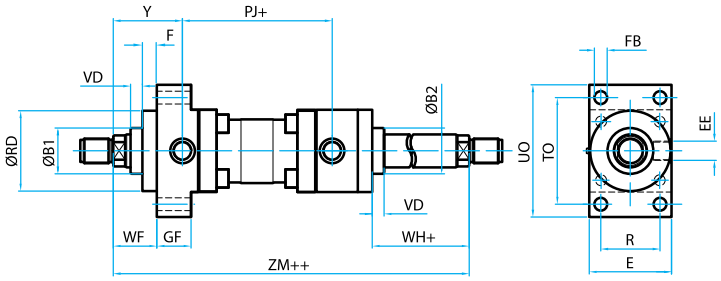
ISO ME5 - FRONT FLANGE

A



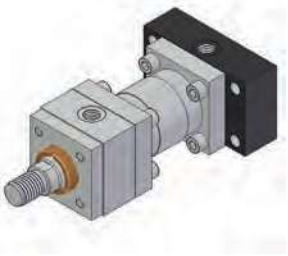


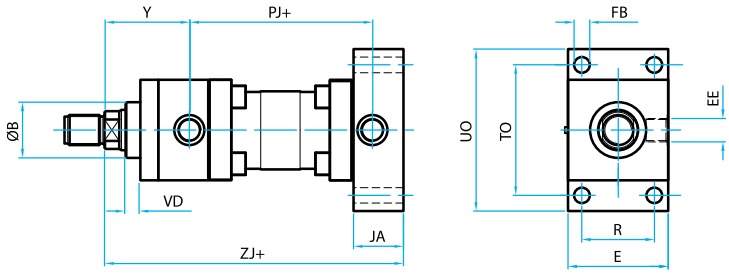




ISO ME6 - REAR FLANGE

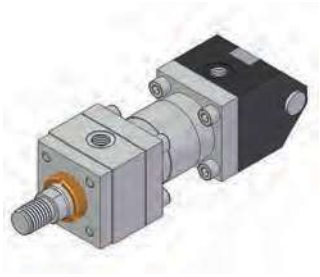
B

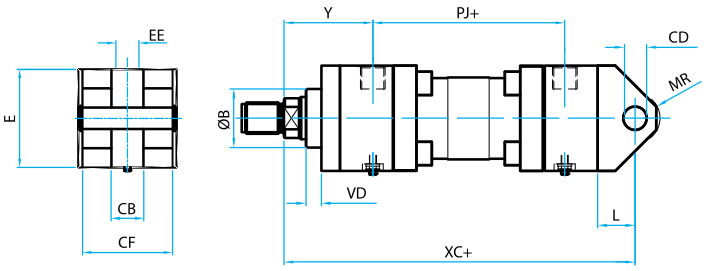




ISO MP1 - FEMALE CLEVIS

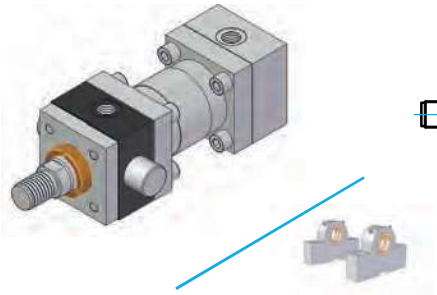
M

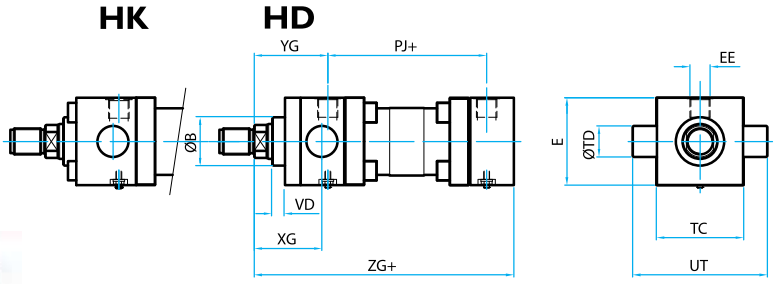




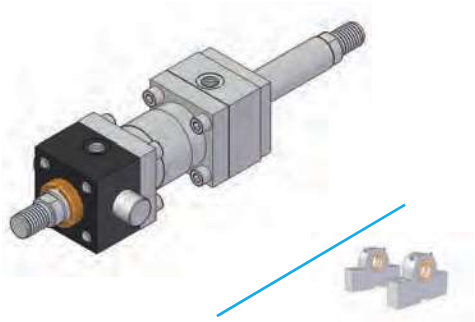
ISO MT1 - FRONT TRUNNIONS

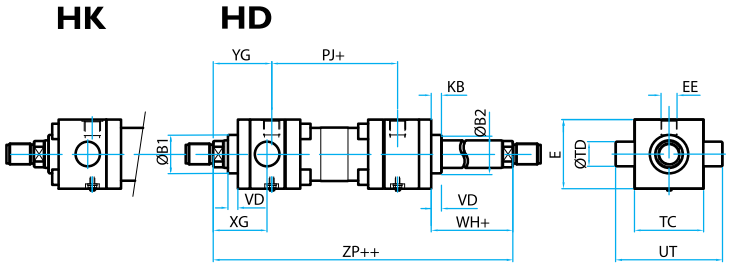
G





Accessory LK available on page 59

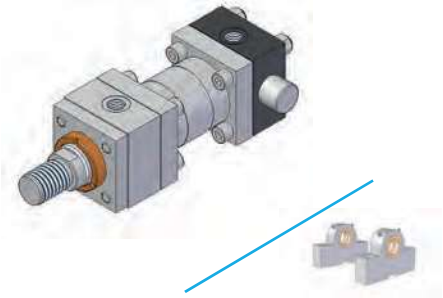


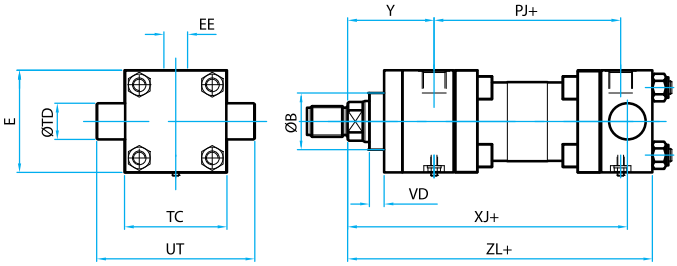


Accessory LK available on page 59

ISO MT2 - REAR TRUNNIONS

L

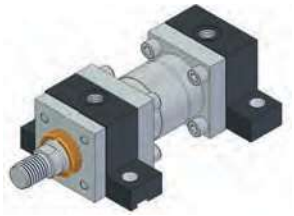


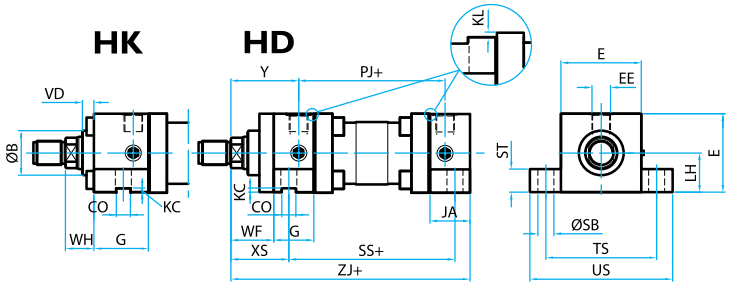


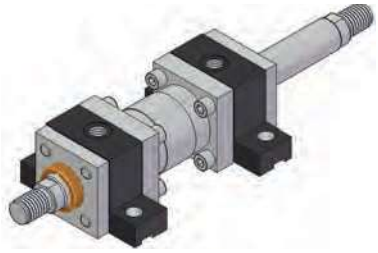
Accessory LK available on page 59

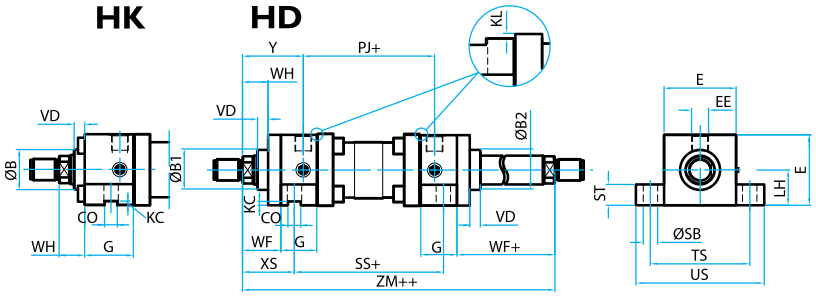
ISO MS2 - FEET

E





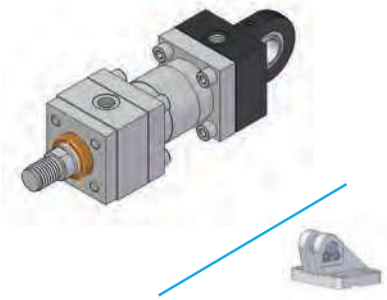


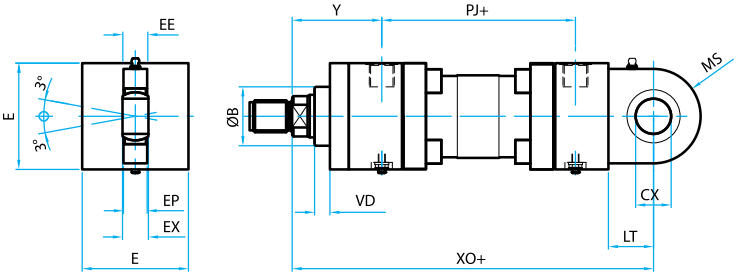


The counterflange is protruding from the base of the foot (see dimension KL)

ISO MP5 - BALL JOINTED EYE

D

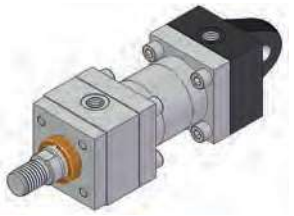


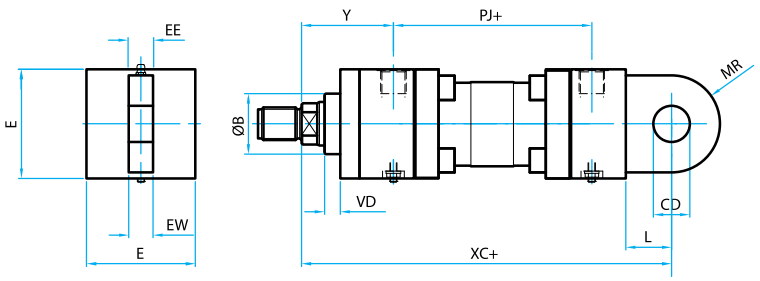


Accessory LD available on page 58

ISO MP3 - MALE CLEVIS

C





Bore	50			63			80			100			125			160			200		
Rod	22	28	36	28	36	45	36	45	56	45	56	70	56	70	90	70	90	110	90	110	140
B f9	34	42	50	42	50	60	50	60	72	60	72	88	72	88	108	88	108	133	108	133	163
AA	74			91			117			137			178			219			269		
BD	38			48			58			68			88			108			125		
BG	18			18			24			24			30			35			40		
CB	30			30			40			50			64(*)			80(*)			80		
CD H9	20			20			28			36			45			56			70		
CF	74			90			110			130			164			200			240		
CO H8	12			16			16			16			20			30			40		
CX	25 $^{0}_{-0.012}$			30 $^{0}_{-0.012}$			40 $^{0}_{-0.012}$			50 $^{0}_{-0.012}$			60 $^{0}_{-0.015}$			80 $^{0}_{-0.015}$			100 $^{0}_{-0.020}$		
DD	M12x1.25			M12x1.25			M16x1.5			M16x1.5			M22x1.5			M27x2			M30x2		
E max	75			90			115			130			165			200			245		
EE (page 36)	G 1/2"			G 1/2"			G 3/4"			G 3/4"			G 1"			G 1"			G 1 1/4"		
EP	18			20			24			30			38			47			58		
EW h14	30			30			40			50			60			70			80		
EX	20 $^{0}_{-0.12}$			22 $^{0}_{-0.12}$			28 $^{0}_{-0.12}$			35 $^{0}_{-0.12}$			44 $^{0}_{-0.15}$			55 $^{0}_{-0.15}$			70 $^{0}_{-0.20}$		
F max	16			16			20			22			22			25			25		
FB H13	14			14			18			18			22			26			33		
G	45			45			52			55			87			95			117		
GF	38			38			45			45			58			58			76		
JA	45			45			52			55			65			70			92		
KC	4.5			4.5			5			6			6			8			8		
KL	1			2			2			6			3			1			5		
L min	32			32			39			54			57			63			82		
LH h10	37			44			57			63			82			101			122		
LT min	31			38			48			58			72			92			116		
MR max	29			29			34			50			53			59			78		
MS max	33			40			50			62			80			100			120		
PJ	62+ (*)			64+ (*)			77+ (*)			78+ (*)			117+			130+			165+		
R	52			65			83			97			126			155			190		
RD f8	74			88 (**)			105 (**)			125 (**)			150 (**)			170 (**)			210 (**)		
RT	M12			M12			M16			M16			M22			M27			M30		
SB H13	14			18			18			26			26			33			39		
SS	92+			86+			105+			102+			131+			130+			172+		
ST	19			26			26			32			32			38			44		
TC	76			89			114			127			165			203			241		
TD f8	25			32			40			50			63			80			100		
TG	52.3			64.3			82.7			96.9			125.9			154.9			190.2		
TO	105			117			149			162			208			253			300		
TS	102			124			149			172			210			260			311		
UO max	130			145			180			200			250			300			360		
US	127			161			186			216			254			318			381		
UT	116			139			178			207			265			329			401		
UW	90			100			130			140			180			215			300		
VD	9			13			9			10			9	10	10	10	10	7	10	7	7
WF	41			48			51			57			57			57			57		
WH	25			32			31			35			35			32			32		
XC	191+			200+			229+			257+			289+			308+			381+		
XG	64			70			76			71			75			75			85		
XJ	136+ (*)			146+ (*)			165+ (*)			177+ (*)			214+ (*)			227+ (*)			271+ (*)		
XO	190+			206+			238+			261+			304+			337+			415+		
XS	54			65			68			79			79			86			92		
Y	69 (*)			76 (*)			82 (*)			91 (*)			86			86			98		
YG	69 (*)			76 (*)			82 (*)			79 (*)			86			86			98		
ZG	159+			168+			190+			191+			232+			245+			299+		
ZJ	159+			168+			190+			203+			232+			245+			299+		
ZL	159+			168+			190+			203+			254+			270+			324+		
ZM	200++			216++			241++			260++			289++			302++			356++		
ZP	200++			216++			241++			248++			289++			302++			356++		

(*) Dimension not compliant with ISO 6020/2

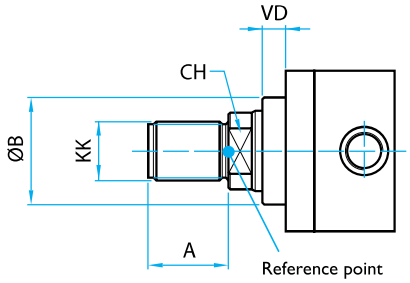
(**) Unified RD dimension, with reference to the bigger rod in compliance with ISO 6020/2. Smaller RD available on request.

\+ = add the stroke

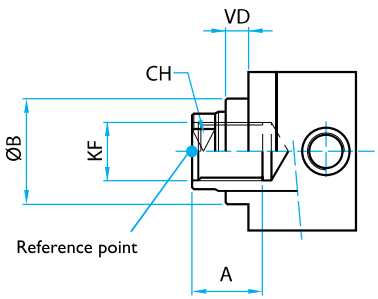
++ = add twice the stroke

ROD END

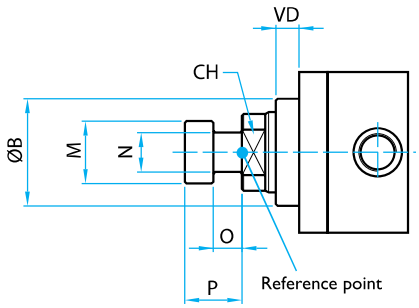
- Male thread ISO 6020/2



SF Female thread



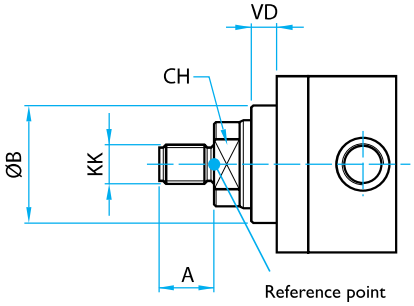
ST Floating joint



Rod	22	28	36	45	56	70	90	110	140
A	22	28	36	45	56	63	85	95	112
B f9	34	42	50	60	72	88	108	133	163
CH	19	22	30	36	46	60	75	95	120
KK	M16x1.5	M20x1.5	M27x2	M33x2	M42x2	M48x2	M64x3	M80x3	M100x3
KF	M16x1.5	M20x1.5	M27x2	M33x2	M42x2	M48x2	M64x3	M80x3	M100x3
M	18	22	28	35	45	56	70	106	136
N	11	14	18	22	28	35	45	65	70
O	8	10	13	16	20	25	35	35	45
P	16	20	25	32	40	50	70	70	90

For the ISO 6020/2 standard male rod end, ball-joint or clevis pin ends are available on page 56.
Different threads, lengths and rod extensions are available on request.

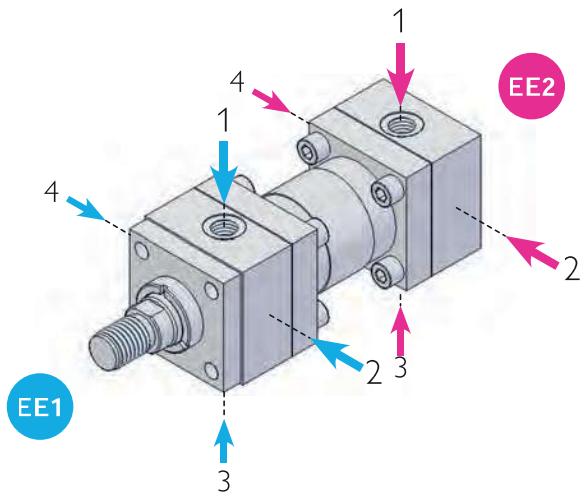
SL Male thread DIN 24554



Bore	50			63			80			100			125			160			200		
Rod	22	28	36	28	36	45	36	45	56	45	56	70	56	70	90	70	90	110	90	110	140
A	22			28			36			45			56			63			85		
B f9	34	42	50	42	50	60	50	60	72	60	72	88	72	88	108	88	108	133	108	133	163
CH	19	22	30	22	30	36	30	36	46	36	46	60	46	60	75	60	75	95	75	95	120
KK	M16x1.5			M20x1.5			M27x2			M33x2			M42x2			M48x2			M64x3		
VD	9			13			9			10			9	10	10	10	10	7	10	7	7

For the SL rod end with male thread DIN 24554, ball-joint or clevis pin ends are available on page 56.

OIL PORTS



Bore	Side	ISO 1179-1 (GAS)		SAE 3000	
		Standard	Oversize	Standard	Oversize
50	Front	G 1/2"	-	-	-
	Rear	G 1/2"	G 3/4"	-	-
63	Front	G 1/2"	-	-	-
	Rear	G 1/2"	G 3/4"	-	-
80	Front	G 3/4"	-	3/4"	1"
	Rear	G 3/4"	G 1"	3/4"	1"
100	Front	G 3/4"	-	3/4"	1"
	Rear	G 3/4"	G 1"	3/4"	1"
125	Front	G 1"	G 1 1/4"	1"	1 1/4"
	Rear	G 1"	G 1 1/4"	1"	1 1/4"
160	Front	G 1"	G 1 1/4"	1"	1 1/4"
	Rear	G 1"	G 1 1/4"	1"	1 1/4"
200	Front	G 1 1/4"	G 1 1/2"	1 1/4"	1 1/2"
	Rear	G 1 1/4"	G 1 1/2"	1 1/4"	1 1/2"

The standard configuration has the oil port in position 1 and the cushioning adjustment or air bleed on position 3, except for the mounting type E where they are in position 2.

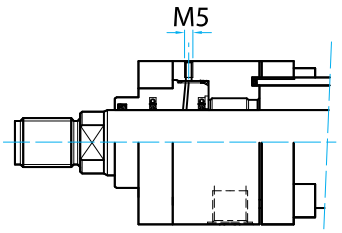
ROD MATERIAL

-	CK45 chromeplated steel
RRX	Chromeplated Stainless steel
RRB	Hardened and tempered chromeplated steel
RRK	Nikrom steel
RRH	Hardened chromeplated steel

The cylinder rod is made of high-quality chrome-plated ground steel to reduce seal wear and achieve the best sealing performance over time.
The standard version is made of CK45 steel.
For special requirements regarding resistance to corrosion, mechanical stress and wear, stainless steel, Nikrom-coated, hardened and tempered steel or hardened steel rods are available.

BUSHING DRAIN

SD Stroke longer than 2000 mm and high-speed movement can generate a build-up of fluid between the wiper and the rod guide bushing seal.
The cylinder can be equipped with a bushing drain port to allow excess fluid to be removed and returned to the tank.
The drain port is normally located on the side opposite the oil port and must be connected to an atmospheric pressure tank.



METAL WIPER

RM The metal wiper is particularly suitable for keeping extraneous particles, even small ones, outside the cylinder in the surrounding operating environment, thanks to the perfect adhesion between the scraper and the cylinder rod.
Recommended in environments with a high quantity of small dust particles.

HIGH SEALING AND LOW FRICTION PISTON

BL A special version of the piston is available for applications where high sealing and high free-flowing performance are required at the same time: e.g. load balancing cylinders, applications with closed circuits or with different fluids (oil/air), etc.
Please consult our technical department to verify the applicability of this solution.

PISTON FOR HEAVY-DUTY APPLICATIONS

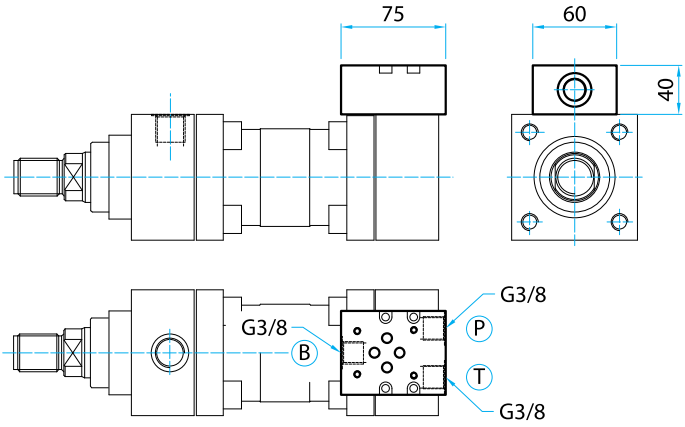
PQ A special version of the piston is available for heavy-duty applications, where shocks and impulsive forces cannot be avoided in any way and their damaging effects on cylinder life must be limited.
In these cases, we recommend the use of this piston in combination with a hardened and tempered steel piston rod.
Please consult our technical department to verify the applicability of this solution.

CETOP PLATES FOR ISO 4401 VALVES

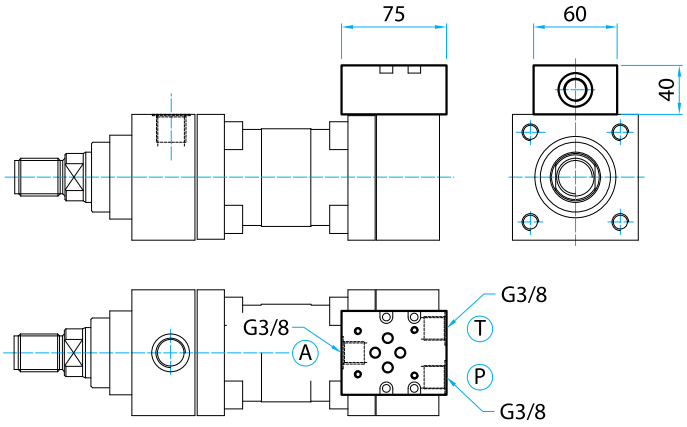
CETOP plates with ISO 4401 mounting surfaces allow fixing a four-way control valves to reduce oil volumes between the cylinder and the valve, achieving better control accuracy.
They are mounted directly on the rear head of the cylinder by means of a nipple and four screws, which ensure stable attachment even in the case of continuous vibrations. They are often chosen in combination with the use of position transducers for absolute and precise detection of the rod. On request, the cylinder can be supplied with the connection tube to the front end fitted.

CETOP 3 PLATES FOR ISO 4401-03 NG6 VALVES (for bores from 50 to 125)

BV3-A Link configuration A on rear side

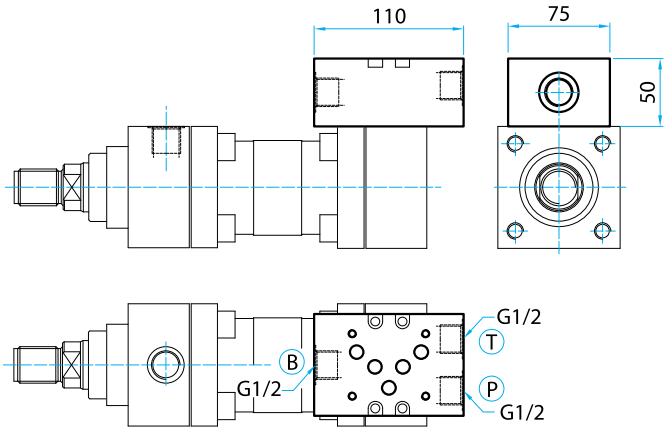


BV3-B Link configuration B on rear side

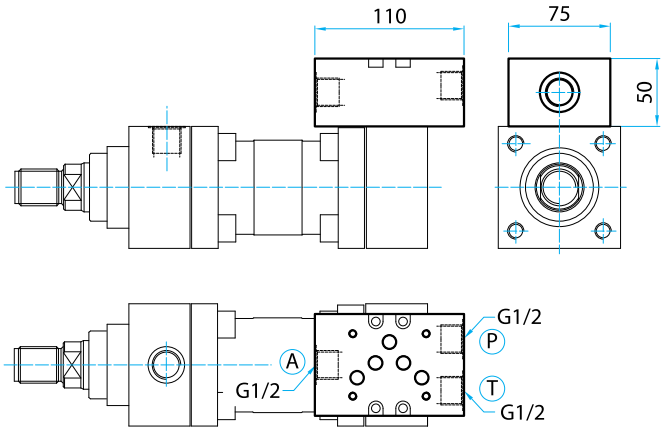


CETOP 5 PLATES FOR ISO 4401-05 NG10 VALVES (for bores from 50 to 200)

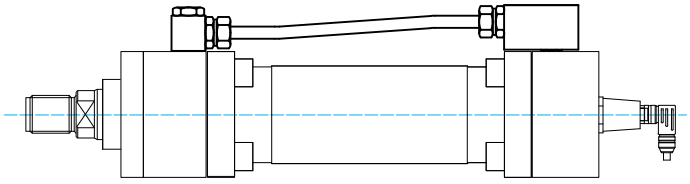
BV5-A Link configuration A on rear side



BV5-B Link configuration B on rear side



TBV Connection pipe to front head (on request)



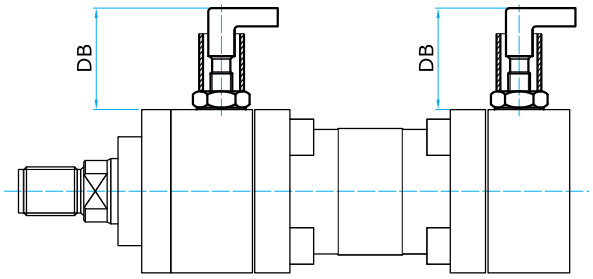
On request, it is possible to supply the cylinder already equipped with the connection pipe to the front head.

HYDRAULIC CYLINDERS WITH COUNTERFLANGES AND PROXIMITY SWITCHES

The HD and HK series cylinders can be equipped with proximity switches integrated in the cylinder heads, for detecting the position of the piston at the end of the stroke, on one or both sides.

The switches generates a magnetic field and it is able to detect the change resulting from the approaching of the cushioning bushing.

The switches are mounted on the cylinder head, usually in position 4, and are protected from accidental impact by a solid steel cover (see page 36).



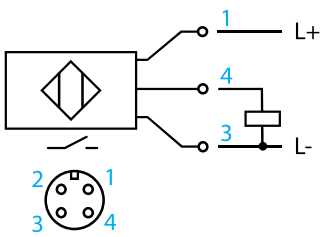
Bore	DB max (mm)
50	80
63	80
80	70
100	60
125	65
160	55
200	50

SPV	Front-side switch option
SPZ	Rear-side switch option
SPK	Front and rear side switches option

The switches are made of stainless steel and are supplied correctly mounted in the cylinder and tested before delivery.

The switches is supplied with a 5-meter PUR cable with M12 connector.

The output signal is regulated by a "normally open" contact.



Switch technical features	
Operating temperature	-25°C / +120°C
Maximum pressure	500 bar
Protection grade	IP69k
Connector	S4
Hysteresis	<= 15%
Repeatability	<= 5%
Wiring	3 wires
Switching function	Normally open
Output signal	PNP
Rated operational voltage	24 V DC
Rated operational current	200 mA
Supply voltage	10 / 36 V DC

CODE COMPOSITION

The entry fields for the example values are mandatory

HD		50	/	28	/		A		500		S			

	Bore	Type
Standard	50 / 100	HD
	125 / 200	HK

Special version (1) **SX**

	Bore	Rod
HD	50	28, 36
	63	28, 36, 45
	80	36, 45, 56
	100	45, 56, 70
HK	125	56, 70, 90
	160	70, 90, 110
	200	90, 110, 140

Second rod

	Mounting	ISO 6020/2	DIN 24554	See mounting list from page 30
X		MX5		Front tapped holes
T		MX6		Rear threaded holes
E		MS2	MS2	Feet
A		ME5	ME5	Front flange
B		ME6	ME6	Rear flange
D		MP5	MP5	Ball jointed eye
C		MP3		Male clevis
M		MP1		Female clevis
G		MT1		Front trunnions
L		MT2		Rear trunnions

Stroke in mm

Spacer	
-	For stroke from 0 to 1000
SJ 50	from 1000 to 1500
SJ 100	from 1500 to 2000
SJ 150	from 2000 to 3000
SJ 200	over 3000

Seals (see page 27)	
S	High sealing
L	Low friction
H	Viton®
G	HFC-fluid

Rod end (see page 35)		
-		Male thread
SF		Female thread
ST		Floating joint
SL		Male thread DIN 24554

Air bleed	
-	No air bleed
SV	Front
SZ	Rear
SK	Front + Rear

Options (see from page 36)

Adjustable cushioning		
-		Not cushioned
V		Front
Z		Rear
K		Front + Rear

(1) Indicate SX whenever the cylinder has special requests or executions, by filling in the options section of the code, followed by our drawing number if applicable. (see list of available options from page 36)

Interactive online coding wizard available at www.confortinet.com