

ZH-T Tie Rod Cylinders

ZH-T Tie Rod Construction Hydraulic Cylinder

Description

Series ZH-T hydraulic cylinders are of a tie rod construction conforming to the requirements of ISO 6020/2 – 1991, DIN 24554, they are of a heavy duty construction and are available in a wide range of mounting styles together with accessories and options enabling them to be used for a wide range of applications.

All designs are created utilizing 3D design software, which can then be exported, enabling customers to import the cylinder or actuator model directly into their own machine design. Component parts are manufactured using latest CNC machinery ensuring part interchangeability, we carry stocks of components enabling us to offer quick turn round on new cylinders and service items, all cylinders are tested to 1.5 x the designed working pressure.

Series ZH-T hydraulic cylinders are designed with generous internal bearing lengths, using high quality materials in their construction together with proven seal types and a choice of sealing systems and materials. End of stroke cushioning is available at either or both ends of stroke.

All Series ZH-T hydraulic cylinders can be supplied with custom designed mountings, internal full displacement positional transducers, end of stroke sensors, seals for all types of hydraulic fluids and operational speeds together with control valve packages having valves built directly into the cylinder endcap or manifolded onto the cylinder.

The cylinders are supplied as standard in satin black enamel paint, but can be supplied with external surfaces plated or shotblasted and marine specification painted.

Standard Cylinders:

Working pressure : 160 bar working, 210 bar peak.

Fluids: Mineral oils, soluble oils, HWB fluids, and ester based

Operational speeds: 500mm/sec subject to fluid type and pressure.

Temperature range: Standard seals -20C to + 80C, Viton seals -20C to + 150C

Materials of Construction:

Tubes: Up to & including 100 bore – ERW, DOM, grade E355 (ST52). Bore tolerance H9–H11. Surface finish 0.8 microns Ra max.

100 bore up to and including 200 bore – Cold drawn & honed, grade E355 (ST52). Bore tolerance ISO H8 –H9. Surface finish 0.3 microns Ra max.

Rods:

CK45 (EN8D) carbon steel.

431S29T stainless steel, hardened and tempered, stress relieved.

Micro Cracked hard chrome plated

Standard chrome plate deposit 25 microns

Additional plating depths or plating systems available if required.

Gland bearings:

Gland bearings are manufactured from a high grade self lubricating bronze and provide maximum rod support within the cylinder envelope dimensions. Longer stroke cylinders are fitted with internal stop tubes to increase the overall bearing length. When stop tubes are fitted, this length is in addition to the base length of the cylinder.

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Rod Bellows:

Series ZH-T cylinders are available fitted with collapsible rod bellows to assist piston rod protection, the bellows as standard are nitrile rubber can be supplied in a variety of materials including heat resistant fabrics.

The addition of rod bellows will require an increase in the length of the piston rod to accommodate the collapsed bellows. Please consult our technical department for further information.

Rod Positioning:

Full displacement with digital or analogue outputs available using internal linear transducers or internal linear potentiometers.

End of stroke and multiple mid stroke positioning is available using external proximity or reed switch sensors attached to the cylinder tie rods. External switches are used in conjunction with a stainless steel cylinder barrel. Please consult our technical department for further information.

Port Location:

As standard ports are positioned at location 1, ports can be positioned at locations 1,2,3 or 4 subject to cylinder mounting style.

For non standard port location, add option 003 to the Special Design Modification and indicate port location required e.g.

FH2 front head port located at position 2.

RH4 rear head port located at position 4.

Cushioning:

Series ZH-T cylinders can be supplied with built in cushioning at the head end, cap end or both ends of stroke without change to the external dimensions of the cylinder.

The cushion profile has been developed to produce an optimum deceleration curve and the cushioning rate can be easily externally adjusted to suit the application requirements.

A unique floating cushion also acts as a high flow one way valve to allow a positive cylinder start up with immediate full load capability.

Air Bleeds:

Air bleeds can be supplied in the cylinder heads, with the standard port location the bleed points are at position 2 or 3 subject to mounting style. Specify option 001 in the Special Design Modification for air bleeds.

Gland Drain Port

A gland drain port option can be supplied when required as a M5 female port in the cylinder head. The drain port should be connected to the oil reservoir using clear tubing. Specify option 002 in the Special Design Modification for the gland drain port.

Stroke Adjusters

For applications requiring precise stroke lengths, a screwed stroke adjuster can be supplied at the cylinder cap (not mounting styles D & M). This can be adjusted and set to provide an accurate stop position of the piston rod when fully retracted.

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Chart 1

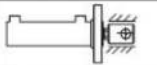
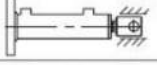

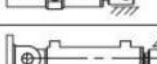
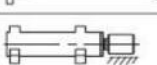
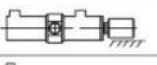


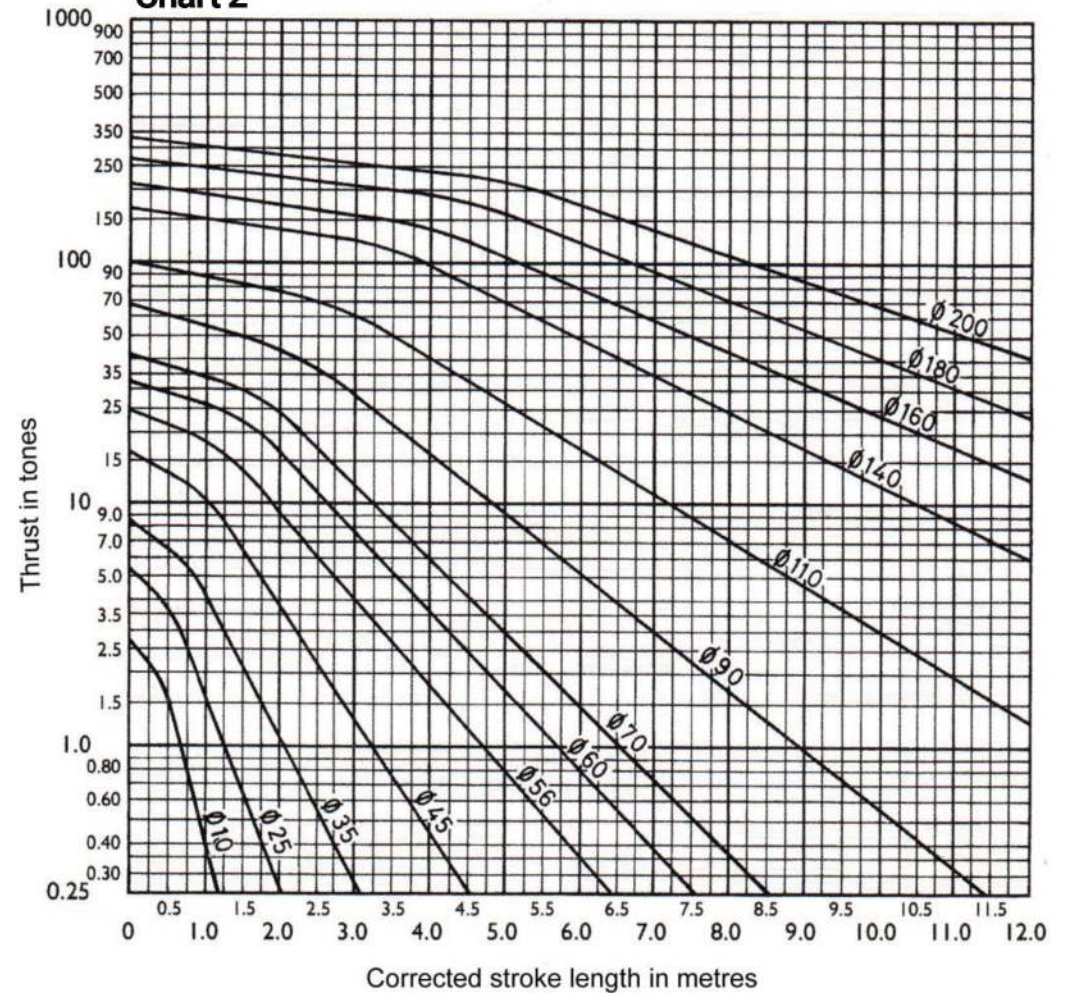
MOUNTING STYLE	MOUNTING TYPE	ROD END MOUNTING	CORRECTED STROKE LENGTH
A, R, X		GUIDED	0.7 X STROKE
B, S, T		GUIDED	1.0 X STROKE
G		GUIDED	1.0 X STROKE
H		GUIDED	1.5 X STROKE
D, L, M		GUIDED	2.0 X STROKE
E		UNGUIDED	2.0 X STROKE
H		UNGUIDED	3.0 X STROKE
B, S, T		UNGUIDED	4.0 X STROKE

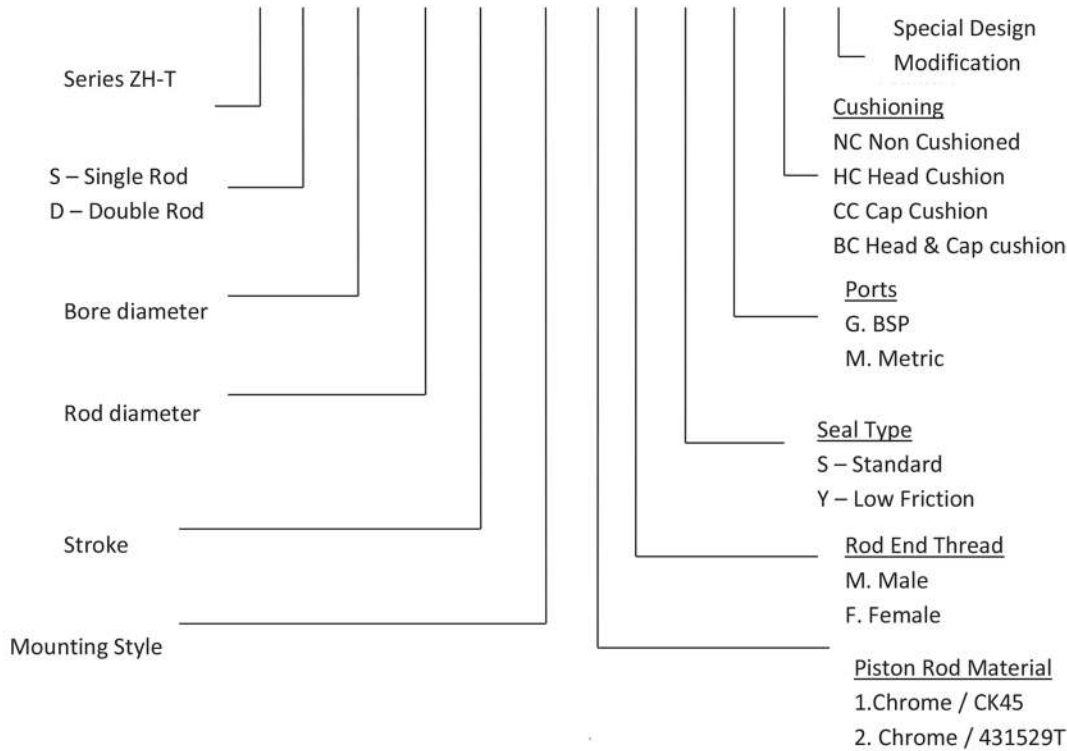
Chart 2



ZH-T Tie Rod Construction Hydraulic Cylinder

Ordering Code

Example: **ZH-T - S - 80 - 56 - 500 - H - 1 - M - S - G - BC - *****



- Front Tapped Holes
- Front Flange
- Rear Flange
- Feet
- Rear Spherical Brg
- Female Clevis
- Front Trunnion
- Intermediate Trunnion
- Rear Trunnion
- Ext' Front & Rear Tie Rods
- Ext' Front Tie Rods
- Ext' Rear Tie Rods
- Rear Tapped Holes

ISO6020/2

DIN24554

Mounting

MX5		X
ME5	ME5	A
ME6	ME6	B
MS2	MS2	E
MP5	MP5	D
MP1		M
MT1		G
MT4	MT4	H
MT2		L
MX1		Q
MX3		R
MX2		S
MX6		T

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Oversize Ports

For applications requiring oversize fluid ports, the chart below shows the sizes available, these can if required be supplemented by fitting additional ports.

Bore Diameter	Front (Head)Port	Rear (Cap)Port
25	G 3/8" W	G 3/8"
32	G 3/8" W	G 3/8"
40	G 1/2" W	G 1/2"
50	G 3/4" W	G 3/4"
63	G 3/4" W	G 3/4"
80	G 1" W	G 1"
100	G 1" W	G 1"
125	G 1 1/4"	G 1 1/4"
160	G 1 1/4"	G 1 1/4"
200	G 1 1/2"	G 1 1/2"

Metric and JIC port threads or SAE flange connections can be supplied if required. W denotes welded port boss.

Rod Buckling /Stroke Length Limitations

Piston rod selection

In order to correctly size the hydraulic cylinder, it is necessary to also consider the compressive loading applied to the piston rod together with the stroke length and mounting style required, a further factor is whether the piston rod end is guided or unguided.

Identify from Chart 1, Page 7, the body mounting style and rod guidance type, read across to give the corrected stroke length. Apply the corrected stroke length to Chart 2, Page 7 in conjunction with the required thrust to give the minimum piston rod diameter.

Internal stop tubes

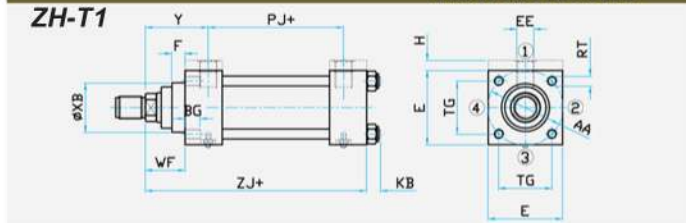
For stroke lengths in excess of 1 metre, it is recommended that the stop tube length is increased to provide additional spread length to reduce bearing loads.

For stroke lengths greater than 1 metre, an additional 25mm stop tube length is recommended for each additional 250 mm of stroke length.

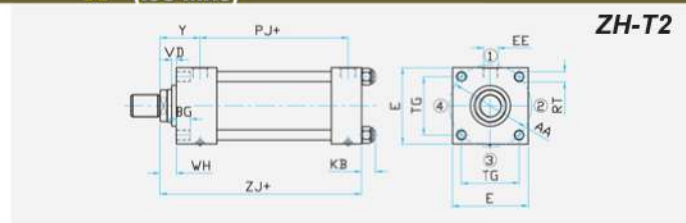
Note: additional stop tube length will have a corresponding increase in the overall length of the cylinder

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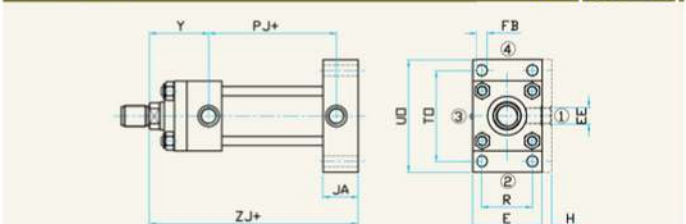
ZH-T1 FRONT TAPPED HOLES **X** (ISO MX5)



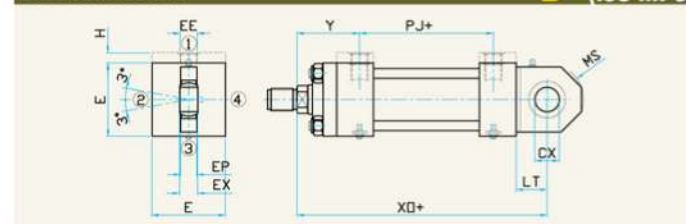
ZH-T2 FRONT FLANGE **A** (ISO ME5)



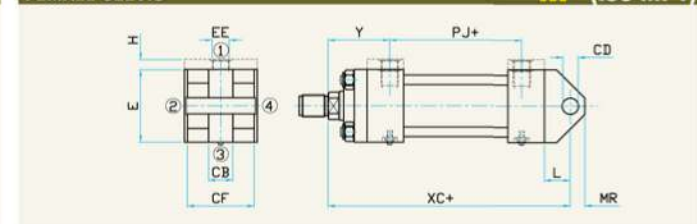
REAR FLANGE **B** (ISO ME6)



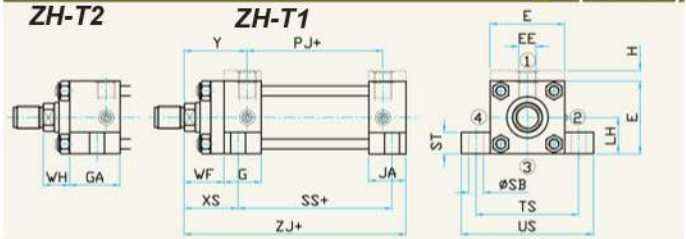
BALL JOINTED EYE **D** (ISO MP5)



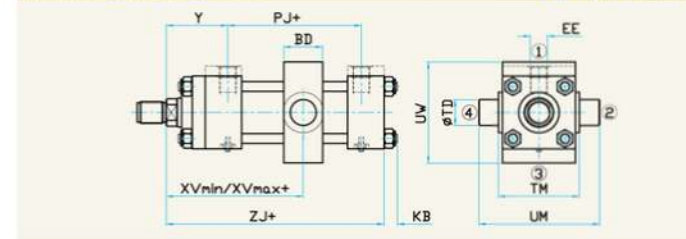
FEMALE CLEVIS **M** (ISO MP1)



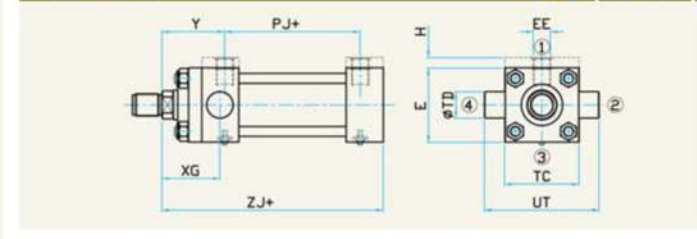
FEET **ZH-T2** **ZH-T1** **E** (ISO MS2)



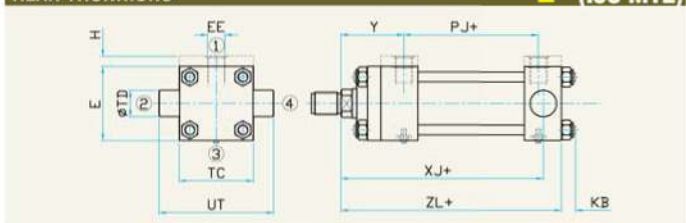
INTERMEDIATE TRUNNIONS **H** (ISO MT4)



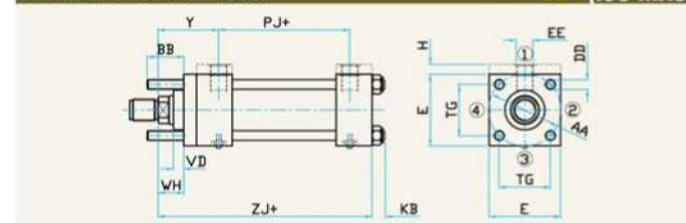
FRONT TRUNNIONS **G** (ISO MT1)



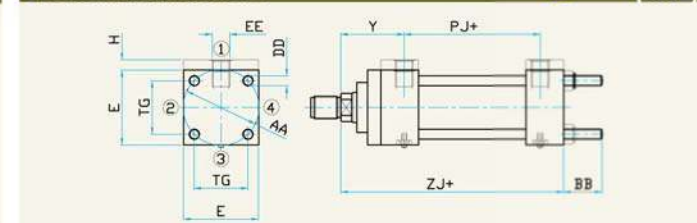
REAR TRUNNIONS **L** (ISO MT2)



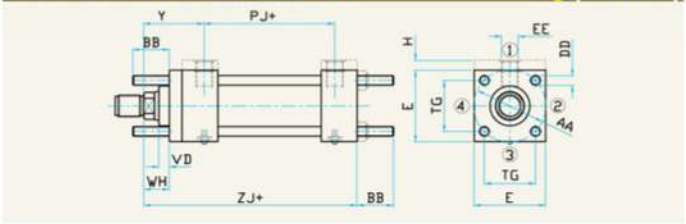
EXTENDED FRONT TIE-RODS **R** (ISO MX3)



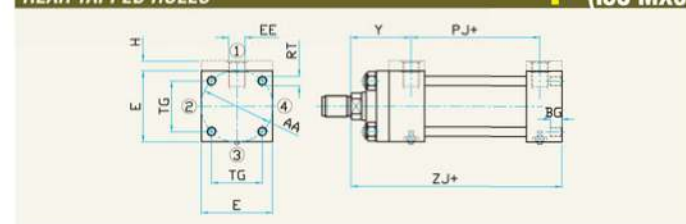
EXTENDED REAR TIE-RODS **S** (MX2)



EXTENDED FRONT AND REAR TIE-RODS **Q** (ISO MX1)



REAR TAPPED HOLES **T** (ISO MX6)



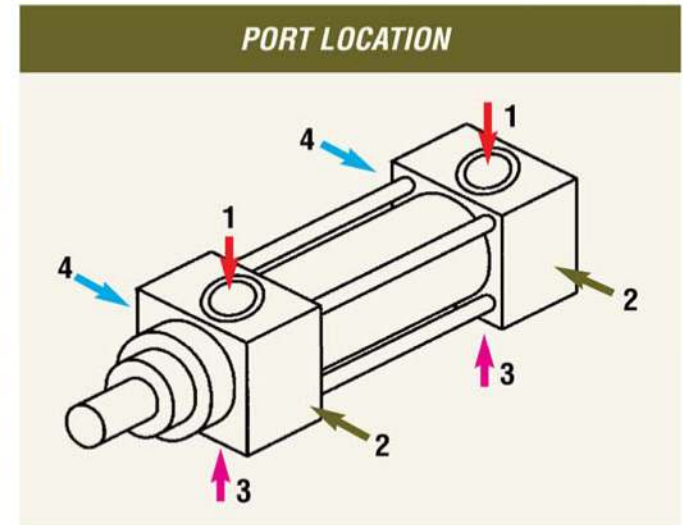
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Piston	Rod			AA	BB	BD	BG	CB	CD	CF	CX	DD	E	EE	EP	EX	F	FB	G	GA	H	JA
25	12		18	40	19	20	12	16(*)	10	40	12	M5x0.8	40	G1/4	9	10	10	5.5	32	—	5	32
32	14	18	22	47	24	25	15	16	12	45	16	M6x1	45	G1/4	12	14	10	6.6	35.5	—	5	35.5
40	18	22	28	59	35	29	16	20	14	60	20	M8x1	60	G3/8	14	16	10	11	46	—	—	46
50	22	28	36	74	46	38	18	30	20	74	25	M12x1.25	75	G1/2	18	20	16	14	45	—	—	45
63	28	36	45	91	46	48	18	30	20	90	30	M12x1.25	90	G1/2	20	22	16	14	45	—	—	45
80	36	45	56	117	59	58	24	40	28	110	40	M16x1.5	115	G3/4	24	28	20	18	52	—	—	52
100	45	56	70	137	59	68	24	50	36	130	50	M16x1.5	130	G3/4	30	35	22	18	55	—	—	55
125	56	70	90	178	81	88	30	64(*)	45	164	60	M22x1.5	165	G1	38	44	22	22	65	87	—	65
160	70	90	110	219	92	108	35	80(*)	56	200	80	M27x2	200	G1	47	55	25	26	70	95	—	70
200	90	110	140	269	115	125	40	80	70	240	100	M30x2	245	G1 1/4	58	70	25	33	92	117	—	92

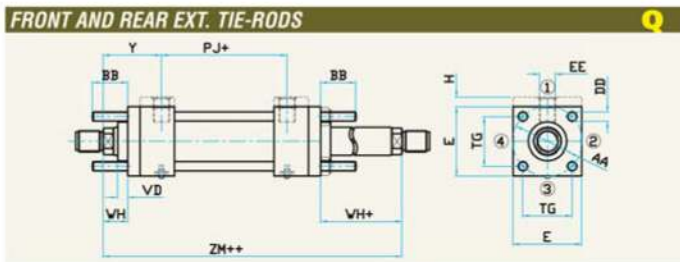
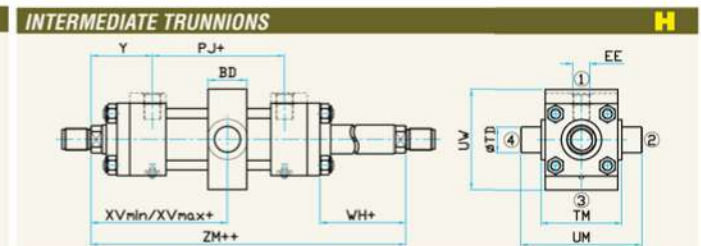
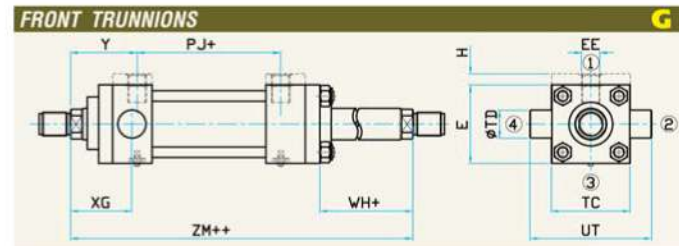
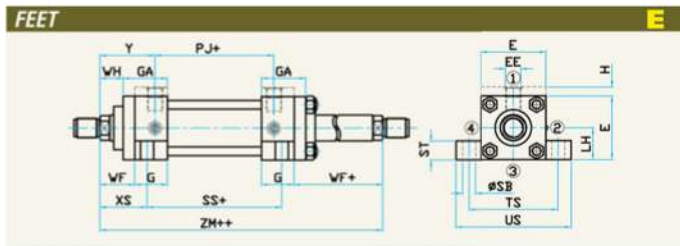
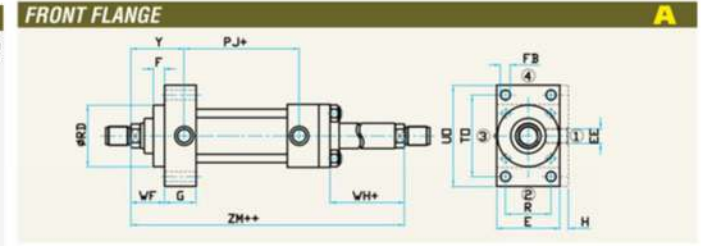
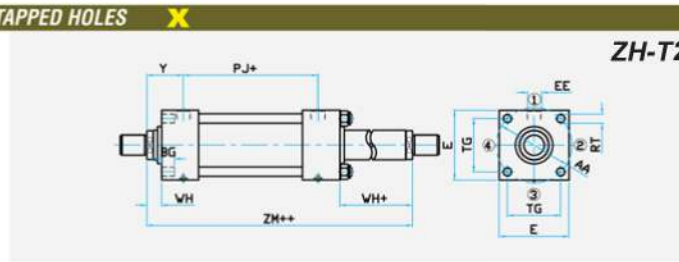
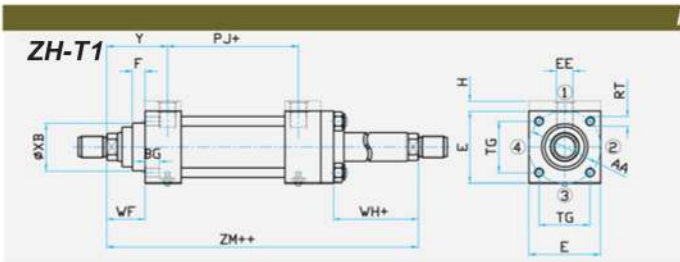
Piston	KB	L	LH H10	LT	MR	MS	PJ	R	RD f8	RT	SB	SS	ST	TC	TD f8	TG	TM	TO	TS	UM
25	7	13	19	16	12	20	49+ (*)	27	38	M5	6.6	73	8.5	38	12	28.3	48	51	54	68
32	10	19	22	20	11	25	47+ (*)	33	42	M6	9	73	12.5	44	16	33.2	55	58	63	79
40	13	19	31	25	16	30	58+ (*)	41	62	M8	11	98	12.5	63	20	41.7	76	87	83	108
50	17	32	37	31	18	35	62+ (*)	52	74	M12	14	92	19	76	25	52.3	89	105	102	129
63	17	32	44	38	18	40	64+ (*)	65	88(**)	M12	18	86	26	89	32	64.3	100	117	124	150
80	23	39	57	48	31	55	77+ (*)	83	105(**)	M16	18	105	26	114	40	82.7	127	149	149	191
100	23	54	63	58	46	65	78+ (*)	97	125(**)	M16	26	102	32	127	50	96.9	140	162	172	220
125	30	57	82	72	43	90	117	126	150(**)	M22	26	131	32	165	63	125.9	178	208	210	278
160	35	63	101	92	57	100	130	155	170(**)	M27	33	130	38	203	80	154.9	215	253	260	341
200	37	82	122	116	68	135	165	190	210(**)	M30	39	172	44	241	100	190.2	279	300	311	439

Piston	U0	US	UT	UW	VD	WF	WH	XB f9	XC	XG	XJ*	X0	XS	XV		Y	ZJ	ZL	(1)	(2)	(3)
														MIN	MAX						
25	65	72	58	45	6	25	15	30	127+	44	95+	130	33	67	72+	45 (*)	114+	114+	10	5	1000
32	70	84	68	50	12	35	25	34	147+	54	109+	148	45	83	80+	58 (*)	128+	128+	10	9	1200
40	110	103	95	70	12	35	25	42	172+	57	131+	178	45	96	92+	65 (*)	153+	153+	15	20	1500
50	130	127	116	90	9	41	25	50	191+	64	136+	190	54	106	94+	69 (*)	159+	159+	20	70	1800
63	145	161	139	100	13	48	32	60	200+	70	146+	206	65	118	98+	76 (*)	168+	168+	30	70	2300
80	180	186	178	130	9	51	31	72	229+	76	165+	238	68	133	108+	82 (*)	190+	190+	35	160	3000
100	200	216	207	140	10	57	35	88	257+	71	177+	261	79	147	113+	91 (*)	203+	203+	45	160	3500
125	250	254	265	180	10	57	35	—	289+	75	214+	304	79	166	123+	86	232+	254+	60	460	3500
160	300	318	329	215	7	57	32	—	308+	75	227+	337	86	182	120+	86	245+	270+	70	820	3500
200	360	381	401	300	7	57	32	—	381+	85	271+	415	92	213	142+	98	299+	324+	80	1150	3500



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- (1) Minimum Stroke for H mounting (ISO MT4)
- (2) Tightening Torque tie-rods value (in NM)
- (3) For longer strokes, a version with counter flanges is available

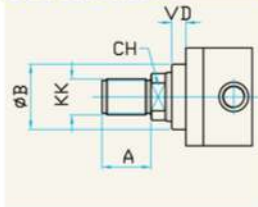
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Pistone Piston	Stelo Rod		AA	BB	BD	BG	DD	E	EE	F	FB	G	GA	H	JA	LH H10	PJ	R	RD f8	RT	SB	SS	ST
25	12	18	40	19	20	12	M5x0.8	40	G1/4	10	5.5	32	—	5	32	19	49+	27	38	M5	6.6	73	8.5
32	14	18	22	47	24	15	M6x1	45	G1/4	10	6.6	35.5	—	5	35.5	22	47+	33	42	M6	9	73	12.5
40	18	22	28	59	35	18	M8x1	60	G3/8	10	11	46	—	—	46	31	58+	41	62	M8	11	98	12.5
50	22	28	36	74	46	18	M12x1.25	75	G1/2	16	14	45	—	—	45	38	62+	52	74	M12	14	92	19
63	28	36	45	91	46	18	M12x1.25	90	G1/2	16	14	45	—	—	45	44	64+	65	88	M12	18	86	26
80	36	45	56	117	59	24	M16x1.5	115	G3/4	20	18	52	—	—	52	57	77+	83	105	M16	18	105	26
100	45	56	70	137	59	24	M16x1.5	130	G3/4	22	18	55	—	—	55	63	78+	97	125	M16	26	102	32
125	56	70	90	178	81	30	M22x1.5	165	G1	22	22	65	87	—	65	82	117	126	150	M22	26	131	32
160	70	90	110	219	92	35	M27x2	200	G1	25	26	70	95	—	70	101	130	155	170	M27	33	130	38
200	90	110	140	269	115	35	M30x2	245	G1 1/4	25	33	92	117	—	92	122	165	190	210	M30	39	172	44

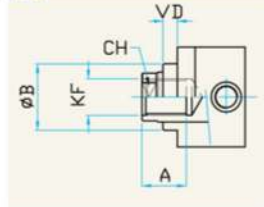
Pistone Piston	TC	TD f8	TG	TM	TO	TS	UM	UO	US	UT	UW	VD	WF	WH	XB f9	XG	XS	XV MIN MAX		Y	ZM	(1)	(2)	(3)
25	38	12	28.3	48	51	54	68	65	72	58	45	6	25	15	30	44	33	67	72+	45	139++	10	5	1000
32	44	16	33.2	55	58	63	79	70	84	68	50	12	35	25	34	54	45	83	80+	58	163++	10	9	1200
40	63	20	41.7	76	87	83	108	110	103	95	70	12	35	25	42	57	45	96	92+	65	188++	15	20	1500
50	76	25	52.3	89	105	102	129	130	127	116	90	9	41	25	50	64	54	106	94+	69	200++	20	70	1800
63	89	32	64.3	100	117	124	150	145	161	139	100	13	48	32	60	70	65	118	98+	76	216++	30	70	2300
80	114	40	82.7	127	149	149	191	180	186	178	130	9	51	31	72	76	68	133	108+	82	241++	35	160	3000
100	127	50	96.9	140	162	172	220	200	216	207	140	10	57	35	88	71	79	147	113+	91	260++	45	160	3500
125	165	63	125.9	178	208	210	278	250	254	265	180	10	57	35	—	75	79	166	123+	86	289++	60	460	3500
160	203	80	154.9	215	253	260	341	300	318	329	215	7	57	32	—	75	86	182	120+	86	302++	70	820	3500
200	241	100	190.2	279	300	311	439	360	381	401	300	7	57	32	—	85	92	213	142+	86	356++	80	1150	3500

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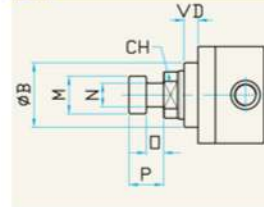
STANDARD



SF

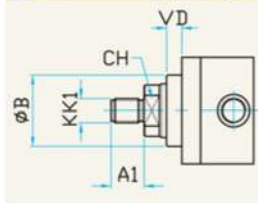


ST



Rod	12	14	18	22	28	36	45	56	70	90	110	140
A	14	16	18	22	28	36	45	56	63	85	95	112
B 19	24	26	30	34	42	50	60	72	88	108	133	163
CH	10	12	15	19	22	30	36	46	60	75	95	120
KK	M10x1.25	M12x1.25	M14x1.5	M16x1.5	M20x1.5	M27x2	M33x2	M42x2	M48x2	M64x3	M80x3	M100x3
KF	M8x1	M10x1.25	M12x1.25	M16x1.5	M20x1.5	M27x2	M33x2	M42x2	M48x2	M64x3	M80x3	M100x3
M	11	13	16	18	22	28	35	45	56	70		
N	6.5	8	10	11	14	18	22	28	35	45		
O	5	6	7	8	10	13	16	20	25	35		
P	10	12	14	16	20	25	32	40	50	70		

SL DIN 24554

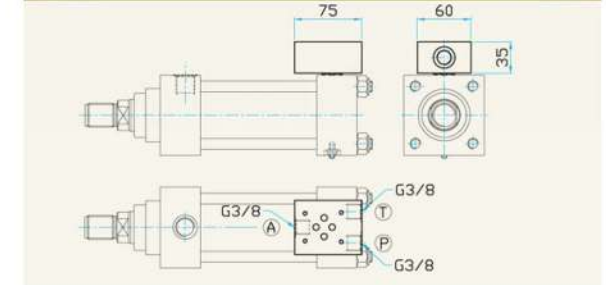


Piston	25		32			40			50			63			80			100			125			160			200		
Rod	12	18	14	18	22	18	22	28	22	28	36	28	36	45	36	45	56	45	56	70	56	70	90	70	90	110	90	110	140
A1	14		16			18			22			28			36			45			56			63			85		
B 19	24	30	26	30	34	30	34	42	34	42	50	42	50	60	50	60	72	60	72	88	72	88	108	88	108	133	108	133	163
CH	10	15	12	15	19	15	19	22	19	22	30	22	30	36	30	36	46	36	46	60	46	60	75	60	75	95	75	95	120
KK1	M10x1.25		M12x1.25			M14x1.5			M16x1.5			M20x1.5			M27x2			M33x2			M42x2			M48x2			M64x3		
VD	6		12			12			9			13			9			10			10			7			7		

INCORPORATED SUBPLATES

CETOP 3

BA3



CETOP 5

BA5

