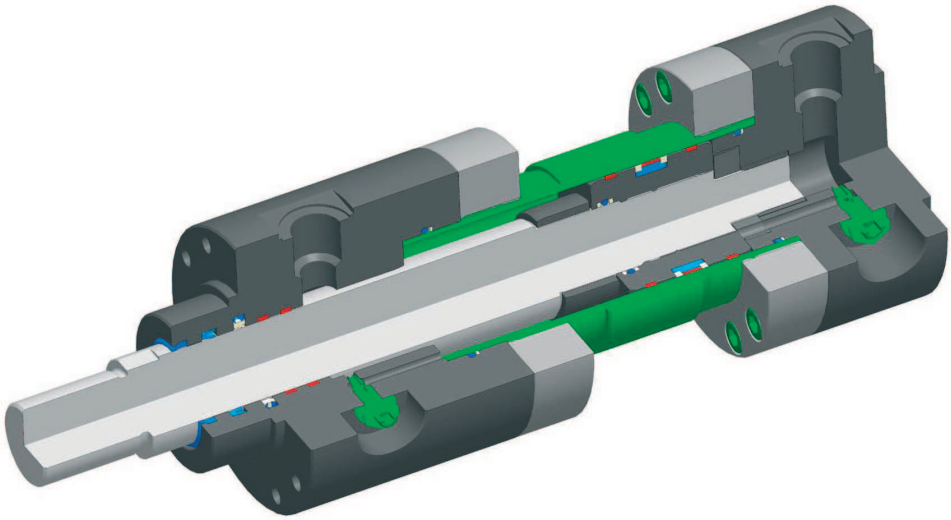


Linear Hydraulic Motors ISO 6022

TECHNICAL DESCRIPTION - PRODUCT FEATURES

Similar to previous products, also a linear hydraulic motor according to ISO 6022 transforms the pressure energy to the mechanical axial force of the piston rod in both directions. Due to its design, there are no special requirements for attendance and servicing. To ensure save and trouble-free operation, operational and technical conditions must be complied with.
A linear hydraulic motor according to ISO 6022 is equipped with end position regulated dumpers, and it enables regulated decrease of the piston rod movement speed, thus limiting end position shocks.
Its massive design and its non-welded construction ensures operation under the most demanding operational conditions, namely service life wise.
The pressure strength of the ISO 6022 line motor is designed for 25 MPa of the operational pressure. If adhering to technical conditions and max. stroke check, it is possible to increase the operational pressure limit to 30 MPa.
The motor is assembled from precisely machined elements, which are assembled, by means of fittings, to an assembly (threaded bolts and flanges).
This so-called flanged design is advantageous from the viewpoint of subsequent disassembly, e.g. servicing when replacing seals.
The basic dimensions, such as piston diameter, piston rod diameter, dimensions of mounting flanges, taps and loops correspond to the ISO 6022 standard.

OPERATING CONDITIONS

Linear hydraulic motors ISO 6022 do not require any special conditions for maintenance and operation.

- LHM must be assembled under conditions, which limit any damage to functional elements, and the internal space must be protected against any impurity infiltrations.
- LHM must be thoroughly connected to the pressure source (hazard of pressure oil leakage) and LHM must be well fitted to the kinematics system of the respective machinery.
- LHM can operate in any position, unless provided for otherwise.
- Any piston rod radial load by an external force (as well as by a radial force evoked by deflection of LHM due to its own weight) or any piston rod rotational movement during the work cycle are not permitted.
- When in operation, no mechanical damage to the piston rod may occur.
- In its end positions, the hydraulic motor may not be subjected to external forces or to inertia mass forces exceeding the 1.25 multiple of the nominal pressure.
- when fitted to mechanical parts of the machinery or equipment, free incline of the hydraulic cylinder body in the lateral direction within the extent of permitted incline of the hinge bearing must be ensured.
- During operation, hinge bearings must be regularly and sufficiently lubricated.
- To operate properly, it is required to bleed the LHM in the hydraulic system.
- LHM must not be exposed to any aggressive agents, aggressiveness of which would exceed the guaranteed resistance value for the motor piston rod used. The resistance value is specified in technical conditions.

TECHNICAL CONDITIONS

Working liquid	– hydraulic mineral oil (OH-HM32, OH-HM46, OH-HM64).
Required filtration	– min. 40 μm, we recommend 25 μm
Temperature range	– liquid -20°C ÷ +80°C
	– ambient -20°C ÷ +70°C
Climate resistance	– mild climate WT
Rated pressure	– 20MPa
Maximum pressure	– 25MPa (30MPa)
Test pressure	– 32MPa
Working speed	– max. 0,5 m. s-1
The piston rod resistance value in the salt chamber pursuant to ISO 4540	– 120 hours

PRODUCT MARKING

Each hydraulic motor manufactured is marked with the following data:

HYDRAULICS SEHRADICE
ORDER CODE
MAX. OPERATING PRESSURE
SERIAL NUMBER

The product is supplied with accompanying documentation, containing:

PRODUCT DOCUMENTATION and
PRODUCT QUALITY CERTIFICATE /documentation details see page no. 97-98/.

ORDER CODE

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
ISO6022	A	80	56	230	M	0	0	1	1	S	O	O	3	3	S	N	O

A
MF3
MF4
MT4
MS2
MP3, MP5, MP6
MP5H, MP6H

piston nominal diameter d in mm

piston rod diameter MM in mm

stroke Z in mm
check brace bar resistance

M pressure intake, metric thread
G pressure intake, pipe thread

PRESSURE INTAKE POSITION - FRONT LID

0	specifies the angle of rotation in respect to index plane	0°
1	specifies the angle of rotation in respect to index plane	30°
2	specifies the angle of rotation in respect to index plane	60°
3	specifies the angle of rotation in respect to index plane	90°
4	specifies the angle of rotation in respect to index plane	120°
5	specifies the angle of rotation in respect to index plane	150°
6	specifies the angle of rotation in respect to index plane	180°
7	specifies the angle of rotation in respect to index plane	210°
8	specifies the angle of rotation in respect to index plane	240°
9	specifies the angle of rotation in respect to index plane	270°
10	specifies the angle of rotation in respect to index plane	300°
11	specifies the angle of rotation in respect to index plane	330°

PRESSURE INTAKE POSITION - BACK LID

0	specifies the angle of rotation of planes	0°
1	specifies the angle of rotation of planes	30°
2	specifies the angle of rotation of planes	60°
3	specifies the angle of rotation of planes	90°
4	specifies the angle of rotation of planes	120°
5	specifies the angle of rotation of planes	150°
6	specifies the angle of rotation of planes	180°
7	specifies the angle of rotation of planes	210°
8	specifies the angle of rotation of planes	240°
9	specifies the angle of rotation of planes	270°
10	specifies the angle of rotation of planes	300°
11	specifies the angle of rotation of planes	330°

BLEEDER POSITION - FRONT LID

1	specifies the angle of rotation in respect to the pressure intake	90°
2	specifies the angle of rotation in respect to the pressure intake	180°
3	specifies the angle of rotation in respect to the pressure intake	270°

BLEEDER POSITION - BACK LID

1	specifies the angle of rotation in respect to the pressure intake	90°
2	specifies the angle of rotation in respect to the pressure intake	180°
3	specifies the angle of rotation in respect to the pressure intake	270°

NOTE
O no remark
XV distance in mm description

SURFACE FINISH
N standard coat SYNTETIC COAT RAL 9005
S SYNTETIC COAT RAL to be filled in :
O no surface treatment

SEALS
SUITABLE FOR MINERAL OILS
S standard sealing system
U to prevent low pressure leakage
T low friction *
CH ribbed sleeves **

SUITABLE FOR PHOSPHORIC ESTERS
SE standard sealing system
UE to prevent low pressure leakage
TE low friction *
CHE ribbed sleeves **

CONTORL ELEMENT POSITION – BACK LID

1	specifies the angle of rotation in respect to the pressure intake	90°
2	specifies the angle of rotation in respect to the pressure intake	180°
3	specifies the angle of rotation in respect to the pressure intake	270°

CONTORL ELEMENT POSITION – FRONT LID

1	specifies the angle of rotation in respect to the pressure intake	90°
2	specifies the angle of rotation in respect to the pressure intake	180°
3	specifies the angle of rotation in respect to the pressure intake	270°

DAMPING OF END POSITIONS WITH REGULATION
B no damping
O damping on both ends
V above-piston damping – annulus
Z below-piston damping

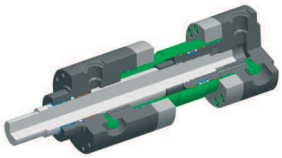
PISTON ROD TERMINATION
O external thread according to ISO 6022
I piston rod loops pursuant to ISO 6022
H piston rod loop standard HYDRAULICS

PISTON ROD QUALITY
S standard – strength up to Rm = 500 MPa salt-spray cabinet 100 hours pursuant to CSN ISO 9227
H Hiper – strength upto Rm = 500 MPa salt-spray cabinet 200 hours pursuant to CSN ISO 9227
N NiCr350 – strength up to Rm = 500 MPa salt-spray cabinet 350 hours pursuant to CSN ISO 9227
SV 42CrMo4V – strength up to Rm = 900 MPa salt-spray cabinet 100 hours pursuant to CSN ISO 9227
SVK 42Cr-IH – strength up to Rm = 900 MPa, surface hardening salt-spray cabinet 100 hours pursuant to CSN ISO 9227
NER strength at request, based on the semi-product Cr layer of 20 um

* in combination with leakage opening
** external design must be approved

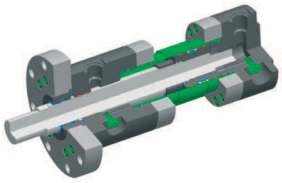
A

A
(ACCORDING TO DIN 24333, VARIANT A)



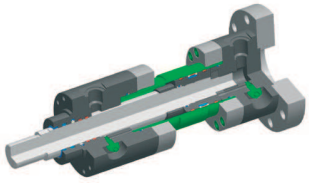
MF3

MF3
(ACCORDING TO DIN 24333, VARIANT CA)



MF4

MF4
(ACCORDING TO DIN 24333, VARIANT CB)

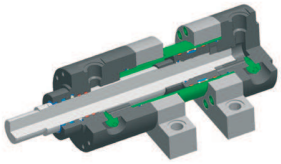


MT4

MT4
(ACCORDING TO DIN 24333, VARIANT B)

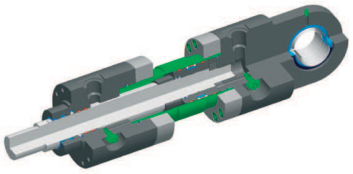
MS2

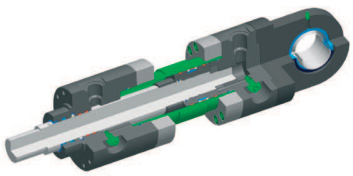
MS2



MP3, MP5, MP6

MP3, MP5, MP6
(ACCORDING TO DIN 24333, VARIANT DA)





MP5
fixed loop with hinge bearings
pursuant to ISO 6022

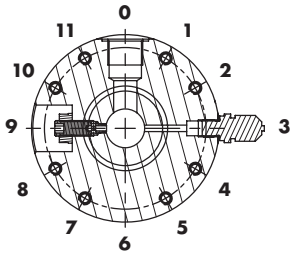
MP6
fixed loop with hinge bearings
pursuant to ISO 6022
(permitted codes of pressure supply
position on the back cover - 0, 3, 6, 9)

MP3
fixed loop with slide sleeve
pursuant to ISO 6022

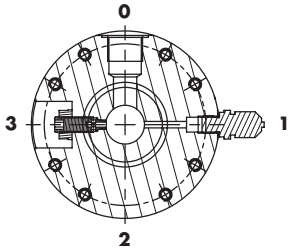
MP5H
fixed loop with standard
hinge bearing HYDRAULICS

MP6H
adjustable loop with standard
hinge bearing HYDRAULICS
(permitted codes of pressure supply
position on the back cover - 0, 3, 6, 9)

PRESSURE INLET POSITION
view from side of piston rod travel



BLEEDER POSITION
view from side of piston rod travel



POSITION OF DAMPING CONTROL ELEMENT
view from side of piston rod travel

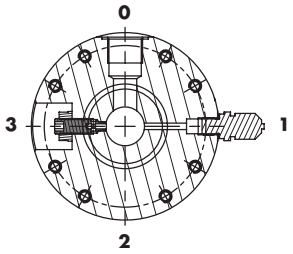


TABLE OF FORCES OF LINEAR HYDRAULIC MOTORS BY PRESSURES

		operating pressure 20 MPa		operating pressure 25 MPa		surface		Travel-in efficiency	Travel-out efficiency	Ratio of surfaces A1/A2
Ød	Ø MM	travel-out force (kN)	travel-in force (kN)	travel-out force (kN)	travel-in force (kN)	(A1) piston (cm^2)	(A2) circular ring (cm^2)			
50	32	37.68	21.78	47.10	27.23	19.63	11.59	0.94	0.96	1.69
50	36	37.68	17.77	47.10	22.21	19.63	9.45	0.94	0.96	2.08
63	40	59.82	34.96	74.78	43.70	31.16	18.60	0.94	0.96	1.68
63	45	59.82	28.69	74.78	35.86	31.16	15.26	0.94	0.96	2.04
80	50	96.46	57.56	120.58	71.95	50.24	30.62	0.94	0.96	1.64
80	56	96.46	48.17	120.58	60.21	50.24	25.62	0.94	0.96	1.96
100	63	150.72	89.01	188.40	111.26	78.50	47.34	0.94	0.96	1.66
100	70	150.72	75.27	188.40	94.08	78.50	40.04	0.94	0.96	1.96
125	80	235.50	136.14	294.38	170.18	122.66	72.42	0.94	0.96	1.69
125	90	235.50	111.05	294.38	138.82	122.66	59.07	0.94	0.96	2.08
140	90	295.41	169.72	369.26	212.15	153.86	90.28	0.94	0.96	1.70
140	100	295.41	141.68	369.26	177.10	153.86	75.36	0.94	0.96	2.04
160	100	385.84	230.22	482.30	287.78	200.96	122.46	0.94	0.96	1.64
160	110	385.84	199.23	482.30	249.04	200.96	105.98	0.94	0.96	1.90
180	110	488.33	299.59	610.42	374.48	254.34	159.36	0.94	0.96	1.60
180	125	488.33	247.57	610.42	309.46	254.34	131.68	0.94	0.96	1.93
200	125	602.88	359.73	753.60	449.66	314.00	191.34	0.94	0.96	1.64
200	140	602.88	301.06	753.60	376.33	314.00	160.14	0.94	0.96	1.96
250	160	942.00	544.57	1177.50	680.71	490.63	289.67	0.94	0.96	1.69
250	180	942.00	444.22	1177.50	555.27	490.63	236.29	0.94	0.96	2.08
320	200	1543.37	920.90	1929.22	1151.12	803.84	489.84	0.94	0.96	1.64
320	220	1543.37	796.93	1929.22	996.17	803.84	423.90	0.94	0.96	1.90

* Specified piston rod travel-out and travel-in forces are multiplied by the efficiency parameter

TABLE OF PERMISSIBLE VARIANTIONS OF DIMENSIONS OF LINEAR HYDRAULIC MOTORS

dimension specification	ZJ*	WF	WC	ZP*	XC,XD,XO,XN*	XV
STROKE			PERMISSIBLE VARIATION (mm)			
≤1250 mm	±1,5	±2	±2	±1,5	±1,5	±2
>1250 ≤ 3150mm	±3	±4	±4	±3	±3	±4
>3150 ≤ 8000mm	±5	±8	±8	±5	±5	±8

* The length is including the piston stroke.
The piston stroke tolerance specified in the bellow-mentioned table (tolerance of strokes of linear hydraulic motors) may not be added to the tolerance in this table.

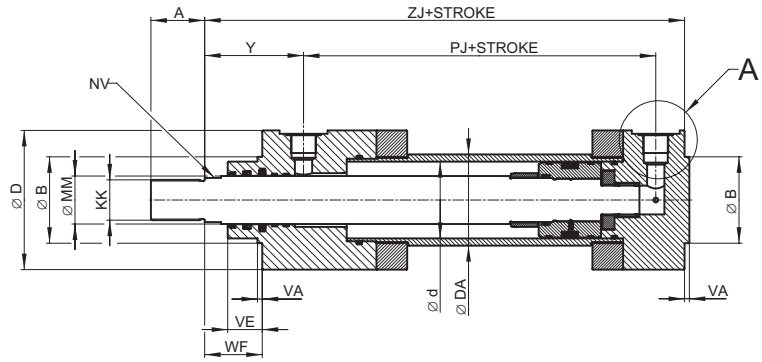
TABLE OF PERMISSIBLE TOLERANCES OF STROKES OF LINEAR HYDRAULIC MOTORS

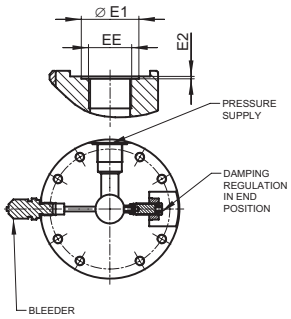
NOMINAL STROKE	PERMISSIBLE VARIATION
≤1250 mm	+2 mm / 0 mm
>1250 ≤ 3150 mm	+5 mm / 0 mm
>3150 ≤ 8000 mm	+8 mm / 0 mm

A - hydraulic motor basic module

for P_{max} 25 MPa

A

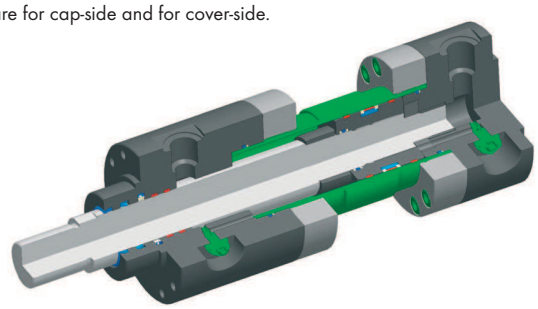




Ød	Ø MM	KK 6g	EE_M (Metric)	EE_G (Pipe)	ZJ	A	Y	PJ	WF	VE	NV	ØD	ØDA	VA	n	ØFB	ØD2	ØB	ØE1	E2	STROKE min.	Max. reccomended stroke	Stroke weight Z (kg)
50	32	M27x2	M22x1,5	G1/2	240	36	90	130	47	29	30	102	62	4	8	10	81	63	29	1	60	330	11,98 + Z x0,0145
50	36	M27x2	M22x1,5	G1/2	240	36	90	130	47	29	32	102	62	4	8	10	81	63	29	1	60	470	12,01 + Z x0,0161
63	40	M33x2	M27x2	G3/4	270	45	99	141	53	32	36	120	78	4	8	10	100	75	36	1,5	72	430	19,10 + Z x0,0230
63	45	M33x2	M27x2	G3/4	270	45	99	141	53	32	41	120	78	4	8	10	100	75	36	1,5	72	600	19,23 + Z x0,0255
80	50	M42x2	M27x2	G3/4	300	56	103	167	60	36	46	145	95	5	8	10	125	90	36	1,5	72	550	31,00 + Z x0,0320
80	56	M42x2	M27x2	G3/4	300	56	103	167	60	36	50	145	95	5	8	10	125	90	36	1,5	72	750	31,12 + Z x0,0350
100	63	M48x2	M33x2	G1	335	63	110	185	68	41	60	170	120	5	8	16	140	110	43	1,5	74	730	47,45 + Z x0,0500
100	70	M48x2	M33x2	G1	335	63	110	185	68	41	65	170	120	5	8	16	140	110	43	1,5	74	970	47,42 + Z x0,0572
125	80	M64x3	M33x2	G1	390	85	131	209	76	45	70	206	150	6	12	16	125	132	43	1,5	100	970	82,80 + Z x0,0816
125	90	M64x3	M33x2	G1	390	85	131	209	76	45	80	206	150	6	12	16	125	132	43	1,5	100	1310	83,05 + Z x0,0925
140	90	M72x3	M42x2	G11/4	425	90	131	234	76	48	80	231	170	6	12	16	200	145	49	2	110	1150	108,70 + Z x0,1000
140	100	M72x3	M42x2	G11/4	425	90	131	234	76	48	90	231	170	6	12	16	200	145	49	2	110	1500	114,10 + Z x0,1190
160	100	M80x3	M42x2	G11/4	460	95	140	250	85	50	90	265	190	7	12	16	220	160	49	2	135	1190	162,90 + Z x0,1270
160	110	M80x3	M42x2	G11/4	460	95	140	250	85	50	100	265	190	7	12	16	220	160	49	2	135	1530	163,60 + Z x0,1390
180	110	M90x3	M42x2	G11/4	497	106	155	257	95	55	*	292	210	8	12	20	245	185	49	2	150	1260	211,90 + Z x0,1680
180	125	M90x3	M42x2	G11/4	497	106	155	257	95	55	*	292	210	8	12	20	245	185	49	2	150	1770	215,10 + Z x0,1830
200	125	M100x3	M42x2	G11/4	540	112	161	294	101	61	*	306	245	10	16	20	260	200	49	2	180	1500	264,60 + Z x0,1850
200	140	M100x3	M42x2	G11/4	540	112	161	294	101	61	*	306	245	10	16	20	260	200	49	2	180	2010	262,30 + Z x0,2170
250	160	M125x4	M60x2	G11/2	640	125	198	347	113	71	*	400	300	12	20	24	341	250	70	2,5	195	2020	533,30 + Z x0,3260
250	180	M125x4	M60x2	G11/2	640	125	198	347	113	71	*	400	300	12	20	24	341	250	70	2,5	195	2720	534,70 + Z x0,3680
320	200	M160x4	M60x2	G11/2	750	160	226	414	136	88	*	490	395	14	24	24	440	320	70	2,5	275	2480	959,00 + Z x0,5100
320	220	M160x4	M60x2	G11/2	750	160	226	414	136	88	*	490	395	14	24	24	440	320	70	2,5	275	3150	962,00 + Z x0,5600

* Piston rod with openings for hook spanner.

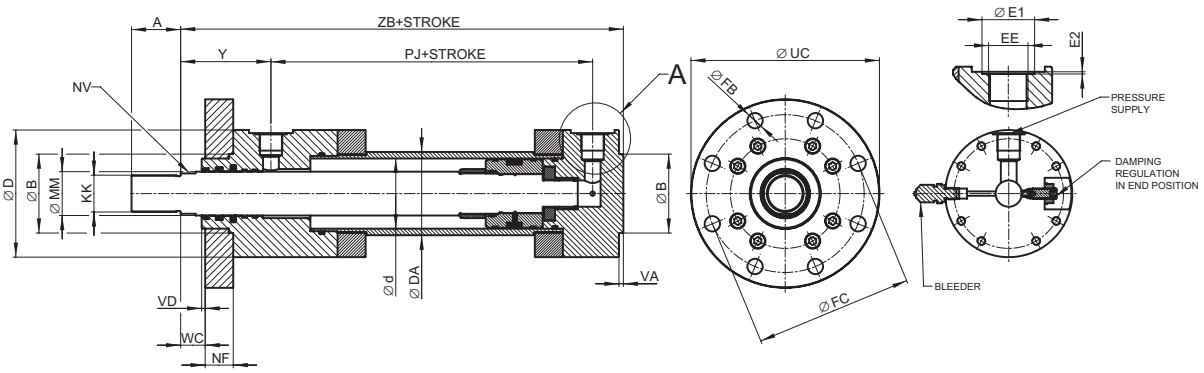
* Dimensions "D2", "FB" and "n" are for cap-side and for cover-side.



Weights specified are informative, ± 5%, specified in KGs
Custom piston rod stroke, for larger strokes check for ultimate resistance required.
Strokes lower than minimum are supplied with cylinder external fitting with minimum stroke (internal stroke limitation)

MF3 - flange on side of piston rod travel-out

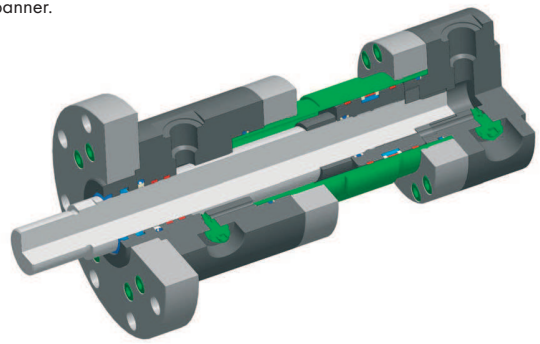
for P_{max} 25 MPa



MF3

Ød	Ø MM	KK 6g	EE_M (Metric)	EE_G (Pipe)	ZB	A	ØD	ØDA	WC	VD min	FB H13	FC js13	ØB H8/f8	Y	PJ	NV	UC	NF js13	ØE1	E2	STROKE min.	Stroke weight Z (kg)
50	32	M27x2	M22x1,5	G1/2	244	36	102	62	22	4	13,5	132	63	90	130	30	160	25	29	1	60	14,75 + Z x0,0145
50	36	M27x2	M22x1,5	G1/2	244	36	102	62	22	4	13,5	132	63	90	130	32	160	25	29	1	60	14,78 + Z x0,0161
63	40	M33x2	M27x2	G3/4	274	45	120	78	25	4	13,5	150	75	99	141	36	180	28	36	1,5	72	23,10 + Z x0,0230
63	45	M33x2	M27x2	G3/4	274	45	120	78	25	4	13,5	150	75	99	141	41	180	28	36	1,5	72	23,23 + Z x0,0255
80	50	M42x2	M27x2	G3/4	305	56	145	95	28	4	17,5	180	90	103	167	46	215	32	36	1,5	72	37,60 + Z x0,0320
80	56	M42x2	M27x2	G3/4	305	56	145	95	28	4	17,5	180	90	103	167	50	215	32	36	1,5	72	37,75 + Z x0,0350
100	63	M48x2	M33x2	G1	340	63	170	120	32	5	22	212	110	110	185	60	260	36	43	1,5	74	58,25+ Z x 0,0500
100	70	M48x2	M33x2	G1	340	63	170	120	32	5	22	212	110	110	185	65	260	36	43	1,5	74	58,22 + Z x0,0572
125	80	M64x3	M33x2	G1	396	85	206	150	36	5	22	250	132	131	209	70	300	40	43	1,5	100	98,60 + Z x0,0816
125	90	M64x3	M33x2	G1	396	85	206	150	36	5	22	250	132	131	209	80	300	40	43	1,5	100	98,85 + Z x0,0925
140	90	M72x3	M42x2	G11/4	430	90	231	170	36	5	26	285	145	131	234	80	340	40	49	2	110	129,82 + Z x0,1000
140	100	M72x3	M42x2	G11/4	430	90	231	170	36	5	26	285	145	131	234	90	340	40	49	2	110	162,20 + Z x0,1190
160	100	M80x3	M42x2	G11/4	467	95	265	190	40	5	26	315	160	140	250	90	370	45	49	2	135	191,40 + Z x0,1270
160	110	M80x3	M42x2	G11/4	467	95	265	190	40	5	26	315	160	140	250	100	370	45	49	2	135	192,10 + Z x0,1390
180	110	M90x3	M42x2	G11/4	505	106	292	210	45	5	33	355	185	155	257	*	425	50	49	2	150	255,20 + Z x0,1460
180	125	M90x3	M42x2	G11/4	505	106	292	210	45	5	33	355	185	155	257	*	425	50	49	2	150	255,90 + Z x0,1680
200	125	M100x3	M42x2	G11/4	550	112	306	245	45	5	33	385	200	161	294	*	455	56	49	2	180	317,50 + Z x0,1830
200	140	M100x3	M42x2	G11/4	550	112	306	245	45	5	33	385	200	161	294	*	455	56	49	2	180	315,20 + Z x0,2170
250	160	M125x4	M60x2	G11/2	652	125	400	300	50	8	39	475	250	198	347	*	545	63	70	2,5	195	616,60 + Z x0,3260
250	180	M125x4	M60x2	G11/2	652	125	400	300	50	8	39	475	250	198	347	*	545	63	70	2,5	195	662,70 + Z x0,3680
320	200	M160x4	M60x2	G11/2	764	160	490	395	56	8	45	600	320	226	414	*	680	80	70	2,5	275	1122,00 + Z x0,5100
320	220	M160x4	M60x2	G11/2	764	160	490	395	56	8	45	600	320	226	414	*	680	80	70	2,5	275	1125,00 + Z x0,5600

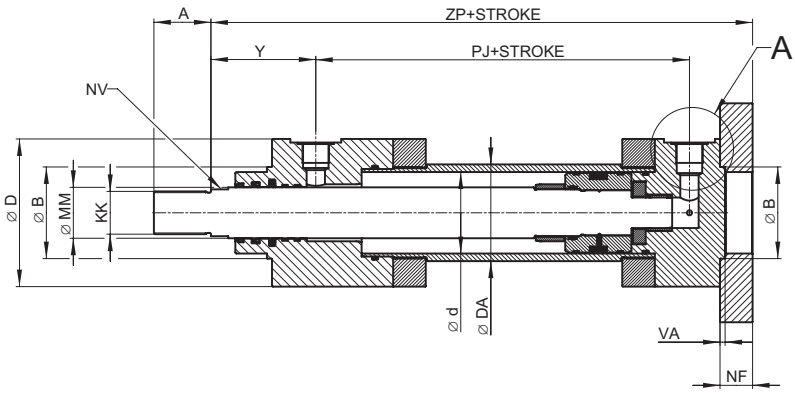
* Piston rod with openings for hook spanner.

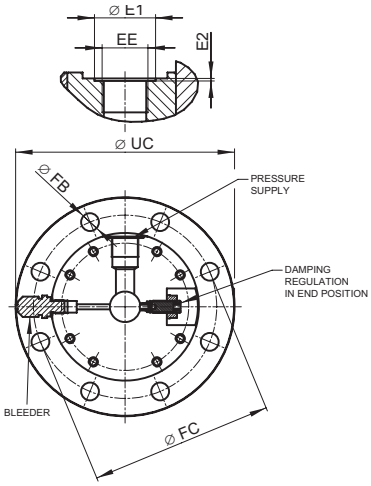


Weights specified are informative, ± 5%, specified in KGs
Custom piston rod stroke, for larger strokes check for ultimate resistance required.
Strokes lower than minimum are supplied with cylinder external fitting with minimum stroke (internal stroke limitation)

MF4 - with flange

for P_{max} 25 MPa

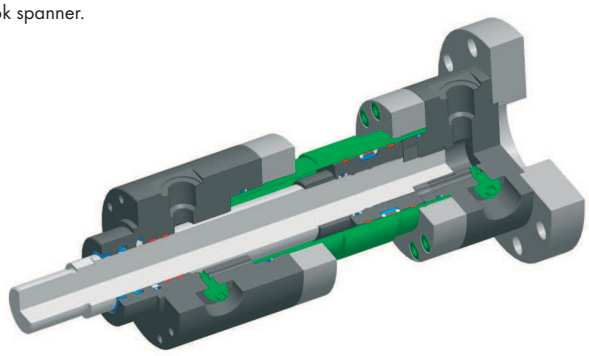




MF4

Ød	Ø MM	KK 6g	EE_M (Metric)	EE_G (Pipe)	ZP	A	ØD	ØDA	VA	NF js13	FB H13	FC js13	ØB H8/f8	Y	NV	UC	PJ	ØE1	E2	STROKE min.	Stroke weight Z (kg)
50	32	M27x2	M22x1,5	G1/2	265	36	102	60	4	25	13,5	132	63	90	30	160	130	29	1	60	14,75 + Z x 0,0145
50	36	M27x2	M22x1,5	G1/2	265	36	102	60	4	25	13,5	132	63	90	32	160	130	29	1	60	14,78 + Z x 0,0161
63	40	M33x2	M27x2	G3/4	298	45	120	78	4	28	13,5	150	75	99	36	180	141	36	1,5	72	23,10 + Z x 0,0230
63	45	M33x2	M27x2	G3/4	298	45	120	78	4	28	13,5	150	75	99	41	180	141	36	1,5	72	23,23 + Z x 0,0255
80	50	M42x2	M27x2	G3/4	332	56	145	95	5	32	17,5	180	90	103	46	215	167	36	1,5	72	37,60 + Z x 0,0320
80	56	M42x2	M27x2	G3/4	332	56	145	95	5	32	17,5	180	90	103	50	215	167	36	1,5	72	37,75 + Z x 0,0350
100	63	M48x2	M33x2	G1	371	63	170	120	5	36	22	212	110	110	60	260	185	43	1,5	74	58,25 + Z x 0,0500
100	70	M48x2	M33x2	G1	371	63	170	120	5	36	22	212	110	110	65	260	185	43	1,5	74	58,22 + Z x 0,0572
125	80	M64x3	M33x2	G1	430	85	206	150	6	40	22	250	132	131	70	300	209	43	1,5	100	98,60 + Z x 0,0816
125	90	M64x3	M33x2	G1	430	85	206	150	6	40	22	250	132	131	80	300	209	43	1,5	100	98,85 + Z x 0,0925
140	90	M72x3	M42x2	G11/4	465	90	231	170	6	40	26	285	145	131	80	340	234	49	2	110	129,82 + Z x 0,1000
140	100	M72x3	M42x2	G11/4	465	90	231	170	6	40	26	285	145	131	90	340	234	49	2	110	162,20 + Z x 0,1190
160	100	M80x3	M42x2	G11/4	505	95	265	190	7	45	26	315	160	140	90	370	250	49	2	135	191,40 + Z x 0,1270
160	110	M80x3	M42x2	G11/4	505	95	265	190	7	45	26	315	160	140	100	370	250	49	2	135	192,10 + Z x 0,1390
180	110	M90x3	M42x2	G11/4	550	106	292	210	8	50	33	355	185	155	*	425	257	49	2	150	255,20 + Z x 0,1460
180	125	M90x3	M42x2	G11/4	550	106	292	210	8	50	33	355	185	155	*	425	257	49	2	150	255,90 + Z x 0,1680
200	125	M100x3	M42x2	G11/4	596	112	306	245	10	56	33	385	200	161	*	455	294	49	2	180	317,50 + Z x 0,1830
200	140	M100x3	M42x2	G11/4	596	112	306	245	10	56	33	385	200	161	*	455	294	49	2	180	315,20 + Z x 0,2170
250	160	M125x4	M60x2	G11/2	703	125	400	300	12	63	39	475	250	198	*	545	347	70	2,5	195	616,60 + Z x 0,3260
250	180	M125x4	M60x2	G11/2	703	125	400	300	12	63	39	475	250	198	*	545	347	70	2,5	195	662,70 + Z x 0,3680
320	200	M160x4	M60x2	G11/2	830	160	490	395	14	80	45	600	320	226	*	680	414	70	2,5	275	1122,00 + Z x 0,5100
320	220	M160x4	M60x2	G11/2	830	160	490	395	14	80	45	600	320	226	*	680	414	70	2,5	275	1125,00 + Z x 0,5600

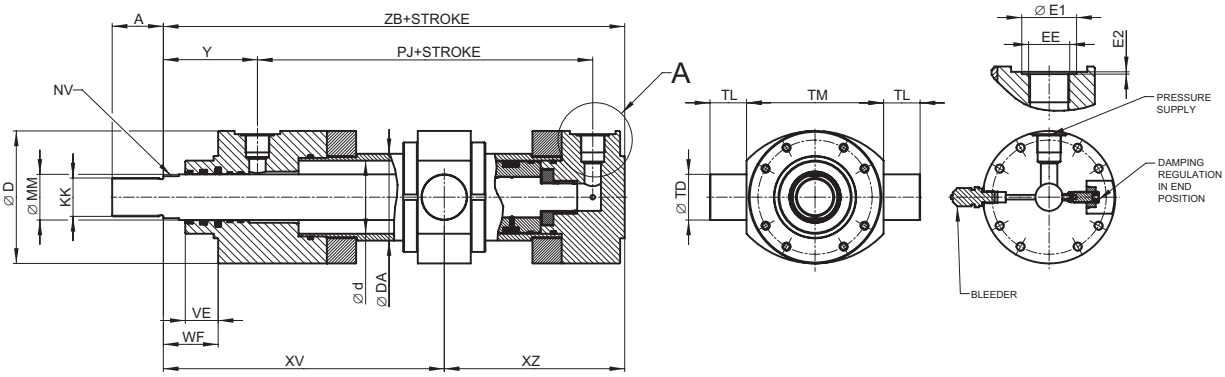
* Piston rod with openings for hook spanner.



Weights specified are informative, ± 5%, specified in KGs
Custom piston rod stroke, for larger strokes check for ultimate resistance required.
Strokes lower than minimum are supplied with cylinder external fitting with minimum stroke (internal stroke limitation)

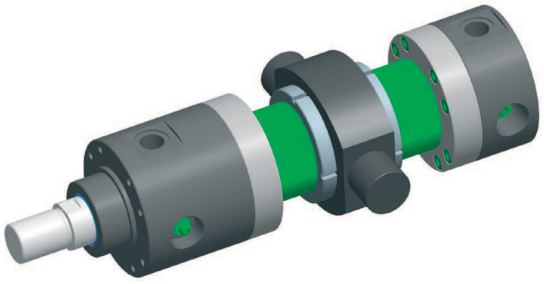
MT4 - swivel pivot mounting

for P_{max} 25 MPa



∅d	∅ MM	KK 6g	EE_M (Metric)	EE_G (Pipe)	ZB	A	Y	PJ	WF	VE	NV	∅D	∅ DA	XV min	XZ min	∅ $TD_{(f8)}$	$TL_{(J16)}$	$TM_{(h12)}$	∅E1	E2	STROKE min.	Stroke weight Z (kg)
50	32	M27x2	M22x1,5	G1/2	244	36	90	130	47	29	30	102	62	224	156	32	25	112	29	1	136	15,16 + Z x 0,0145
50	36	M27x2	M22x1,5	G1/2	244	36	90	130	47	29	32	102	62	224	156	32	25	112	29	1	136	15,19 + Z x 0,0161
63	40	M33x2	M27x2	G3/4	274	45	99	141	53	32	36	120	78	216	191	40	32	125	36	1,5	158	23,94 + Z x 0,0230
63	45	M33x2	M27x2	G3/4	274	45	99	141	53	32	41	120	78	216	191	40	32	125	36	1,5	158	24,07 + Z x 0,0255
80	50	M42x2	M27x2	G3/4	305	56	103	167	60	36	46	145	95	258	210	50	40	150	36	1,5	166	39,20 + Z x 0,0320
80	56	M42x2	M27x2	G3/4	305	56	103	167	60	36	50	145	95	258	210	50	40	150	36	1,5	166	39,30 + Z x 0,0350
100	63	M48x2	M33x2	G1	340	63	110	185	68	41	60	170	120	270	258	63	50	180	43	1,5	188	63,13 + Z x 0,0500
100	70	M48x2	M33x2	G1	340	63	110	185	68	41	65	170	120	270	258	63	50	180	43	1,5	188	63,10 + Z x 0,0572
125	80	M64x3	M33x2	G1	396	85	131	209	76	45	70	206	150	320	310	80	63	224	43	1,5	234	109,75 + Z x 0,0816
125	90	M64x3	M33x2	G1	396	85	131	209	76	45	80	206	150	320	310	80	63	224	43	1,5	234	110,00 + Z x 0,0925
140	90	M72x3	M42x2	G11/4	430	90	131	234	76	48	80	231	170	346	354	90	70	265	49	2	264	154,53 + Z x 0,1000
140	100	M72x3	M42x2	G11/4	430	90	131	234	76	48	90	231	170	346	354	90	70	265	49	2	264	160,00 + Z x 0,1190
160	100	M80x3	M42x2	G11/4	467	95	140	250	85	50	90	265	190	366	400	100	80	280	49	2	299	216,20 + Z x 0,1270
160	110	M80x3	M42x2	G11/4	467	95	140	250	85	50	100	265	190	366	400	100	80	280	49	2	299	216,90 + Z x 0,1390
180	110	M90x3	M42x2	G11/4	505	106	155	257	95	55	*	292	210	391	438	110	90	320	49	2	324	291,00 + Z x 0,1460
180	125	M90x3	M42x2	G11/4	505	106	155	257	95	55	*	292	210	391	438	110	90	320	49	2	324	291,70 + Z x 0,1680
200	125	M100x3	M42x2	G11/4	550	112	161	294	101	61	*	306	245	450	494	125	100	335	49	2	394	355,30 + Z x 0,1830
200	140	M100x3	M42x2	G11/4	550	112	161	294	101	61	*	306	245	450	494	125	100	335	49	2	394	353,00 + Z x 0,2170
250	160	M125x4	M60x2	G11/2	652	125	198	347	113	71	*	400	300	526	565	160	125	425	70	2,5	439	727,00 + Z x 0,3260
250	180	M125x4	M60x2	G11/2	652	125	198	347	113	71	*	400	300	526	565	160	125	425	70	2,5	439	728,40 + Z x 0,3680
320	200	M160x4	M60x2	G11/2	764	160	226	414	136	88	*	490	395	604	673	200	160	530	70	2,5	513	1259,00 + Z x 0,5100
320	220	M160x4	M60x2	G11/2	764	160	226	414	136	88	*	490	395	604	673	200	160	530	70	2,5	513	1268,00 + Z x 0,5600

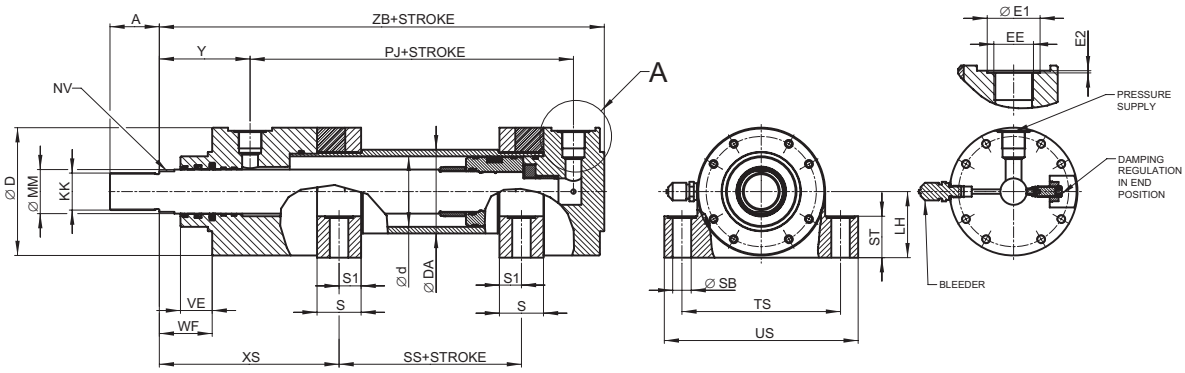
* Piston rod with openings for hook spanner.



Weights specified are informative, ± 5%, specified in KGs
Custom piston rod stroke, for larger strokes check for ultimate resistance required.
Strokes lower than minimum are supplied with cylinder external fitting with minimum stroke (internal stroke limitation)

MS2 - foot mounting

for P_{max} 25 MPa

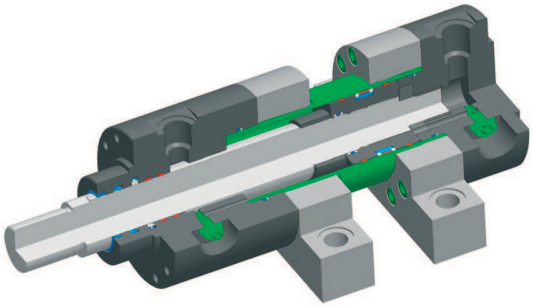


∅d	∅ MM	KK 6g	EE_M (Metric)	EE_G (Pipe)	ZB	A	Y	PJ	WF	VE	NV	∅D	∅ DA	∅ SB	TS	US	ST	LH	S1	S	SS_{min}	XS	∅ E1	E2	STRO-KE min.	Stroke weight Z (kg)
50	32	M27x2	M22x1,5	G1/2	244	36	90	130	47	29	30	102	62	11	130	155	37	55	17,5	35	72,5	176	29	1	75,5	17,58 + Z x 0,0145
50	36	M27x2	M22x1,5	G1/2	244	36	90	130	47	29	32	102	62	11	130	155	37	55	17,5	35	72,5	176	29	1	75,5	17,61 + Z x 0,0161
63	40	M33x2	M27x2	G3/4	274	45	99	141	53	32	36	120	78	13,5	150	180	42	65	20	40	98	189	36	1,5	96	25,60 + Z x 0,023
63	45	M33x2	M27x2	G3/4	274	45	99	141	53	32	41	120	78	13,5	150	180	42	65	20	40	98	189	36	1,5	96	25,73 + Z x 0,0255
80	50	M42x2	M27x2	G3/4	305	56	103	167	60	36	46	145	95	17,5	180	220	47	75	25	50	116	204	36	1,5	109	42,75 + Z x 0,0320
80	56	M42x2	M27x2	G3/4	305	56	103	167	60	36	50	145	95	17,5	180	220	47	75	25	50	116	204	36	1,5	109	42,86 + Z x 0,0350
100	63	M48x2	M33x2	G1	340	63	110	185	68	41	60	170	120	22	210	255	57	90	30	60	131	198	43	1,5	103	62,33 + Z x 0,0500
100	70	M48x2	M33x2	G1	340	63	110	185	68	41	65	170	120	22	210	255	57	90	30	60	131	198	43	1,5	103	62,30 + Z x 0,0572
125	80	M64x3	M33x2	G1	396	85	131	209	76	45	70	206	150	26	255	305	67	105	35	70	166	236	43	1,5	141	110,80 + Z x 0,0816
125	90	M64x3	M33x2	G1	396	85	131	209	76	45	80	206	150	26	255	305	67	105	35	70	166	236	43	1,5	141	111,05 + Z x 0,0925
140	90	M72x3	M42x2	G11/4	430	90	131	234	76	48	80	231	170	30	290	350	72	115	42,5	85	191	253,5	49	2	171	151,12 + Z x 0,1000
140	100	M72x3	M42x2	G11/4	430	90	131	234	76	48	90	231	170	30	290	350	72	115	42,5	85	191	253,5	49	2	171	156,50 + Z x 0,1190
160	100	M80x3	M42x2	G11/4	467	95	140	250	85	50	90	265	190	33	330	400	77	135	52,5	105	226	273,5	49	2	226	234,70 + Z x 0,1270
160	110	M80x3	M42x2	G11/4	467	95	140	250	85	50	100	265	190	33	330	400	77	135	52,5	105	226	273,5	49	2	226	235,40 + Z x 0,1390
180	110	M90x3	M42x2	G11/4	505	106	155	257	95	55	*	292	210	40	360	440	92	150	57,5	115	251	248,5	49	2	251	307,40 + Z x 0,1460
180	125	M90x3	M42x2	G11/4	505	106	155	257	95	55	*	292	210	40	360	440	92	150	57,5	115	251	248,5	49	2	251	308,10 + Z x 0,1680
200	125	M100x3	M42x2	G11/4	550	112	161	294	101	61	*	306	245	40	385	465	97	160	62,5	125	275	323,5	49	2	281	372,20 + Z x 0,1830
200	140	M100x3	M42x2	G11/4	550	112	161	294	101	61	*	306	245	40	385	465	97	160	62,5	125	275	323,5	49	2	281	371,70 + Z x 0,2170
250	160	M125x4	M60x2	G11/2	652	125	198	347	113	71	*	400	300	50	500	620	120	220	75	150	320	387	70	2,5	326	774,90 + Z x 0,3260
250	180	M125x4	M60x2	G11/2	652	125	198	347	113	71	*	400	300	50	500	620	120	220	75	150	320	387	70	2,5	326	776,30 + Z x 0,3680
320	200	M160x4	M60x2	G11/2	764	160	226	414	136	88	*	490	395	56	600	730	160	260	90	180	389	456	70	2,5	415	1351,00 + Z x 0,5100
320	220	M160x4	M60x2	G11/2	764	160	226	414	136	88	*	490	395	56	600	730	160	260	90	180	389	456	70	2,5	415	1354,00 + Z x 0,5600

* Piston rod with openings for hook spanner.

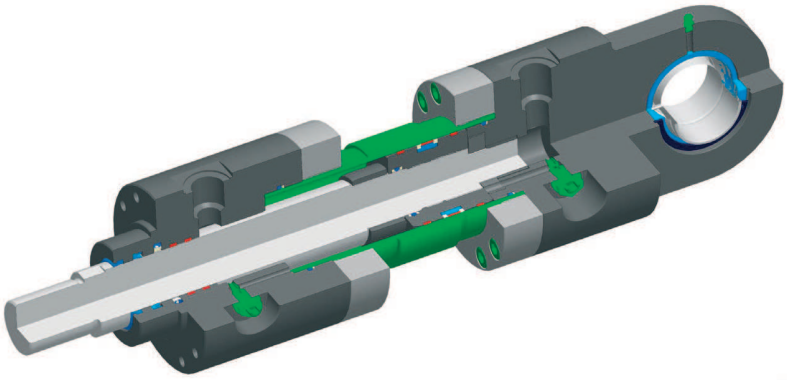
*for particular dimension **SS+Stroke = Z+SS_{min} - $Stroke_{min}$**

Example:
For nominal ∅**d** = 50 mm and stroke **Z** = 500 mm
SS+Stroke= 500 + 72,5 - 75,5 = 497 mm



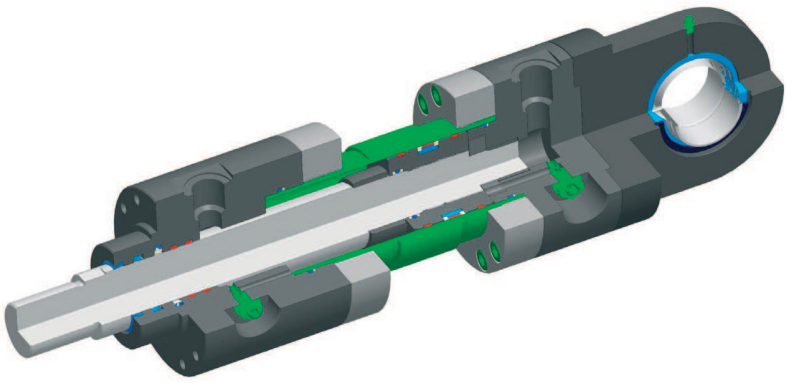
Weights specified are informative, ± 5%, specified in KGs
Custom piston rod stroke, for larger strokes check for ultimate resistance required.
Strokes lower than minimum are supplied with cylinder external fitting with minimum stroke (internal stroke limitation)

MS2



FIXED LOOP - friction bearing (MP3)

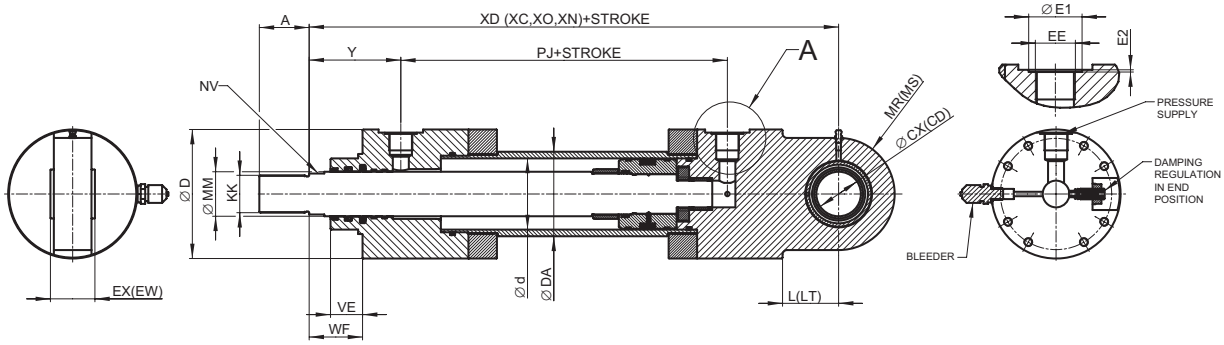
FIXED LOOP - spherical bearing (MP5)



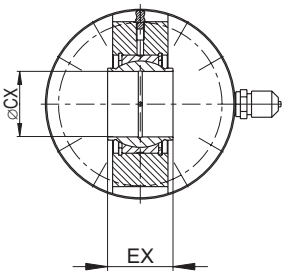
CYLINDER LOOP - adjustable (MP6)
possibility to rotate the loop in respect to the inlet screw-coupling position

MP3, MP5, MP6 - cylinder fixed loop

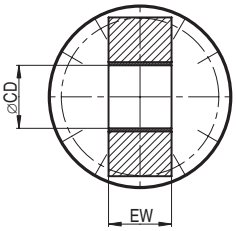
for P_{max} 25 MPa



MP5, MP6



MP3



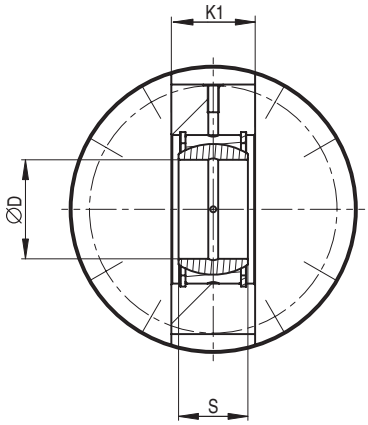
Ød	Ø MM	KK 6g	EE_M (Metric)	EE_G (Pipe)	XD (XC, XO, XN)	A	Y	PJ	WF	VE	NV	ØD	Ø DA	L(LT)	MR (MS)	EW (EX) h12	CX (CD) H9	ØE1	E2	STROKE min.	Stroke weight Z (kg)
50	32	M27x2	M22x1,5	G1/2	305	36	90	130	47	29	30	102	62	40	40	32	32	29	1	60	13,98 + Z x 0,0145
50	36	M27x2	M22x1,5	G1/2	305	36	90	130	47	29	32	102	62	40	40	32	32	29	1	60	14,01 + Z x 0,0161
63	40	M33x2	M27x2	G3/4	348	45	99	141	53	32	36	120	78	50	50	40	40	36	1,5	72	22,80 + Z x 0,023
63	45	M33x2	M27x2	G3/4	348	45	99	141	53	32	41	120	78	50	50	40	40	36	1,5	72	22,93 + Z x 0,0255
80	50	M42x2	M27x2	G3/4	395	56	103	167	60	36	46	145	95	63	63	50	50	36	1,5	72	37,80 + Z x 0,0320
80	56	M42x2	M27x2	G3/4	395	56	103	167	60	36	50	145	95	63	63	50	50	36	1,5	72	37,92 + Z x 0,0350
100	63	M48x2	M33x2	G1	442	63	110	185	68	41	60	170	120	71	71	63	63	43	1,5	74	57,45 + Z x 0,0500
100	70	M48x2	M33x2	G1	442	63	110	185	68	41	65	170	120	71	71	63	63	43	1,5	74	57,42 + Z x 0,0572
125	80	M64x3	M33x2	G1	520	85	131	209	76	45	70	206	150	90	90	80	80	43	1,5	100	100,60 + Z x 0,0816
125	90	M64x3	M33x2	G1	520	85	131	209	76	45	80	206	150	90	90	80	80	43	1,5	100	100,85 + Z x 0,0925
140	90	M72x3	M42x2	G11/4	580	90	131	234	76	48	80	231	170	113	105	90	90	49	2	110	135,02 + Z x 0,1000
140	100	M72x3	M42x2	G11/4	580	90	131	234	76	48	90	231	170	113	105	90	90	49	2	110	140,40 + Z x 0,1190
160	100	M80x3	M42x2	G11/4	617	95	140	250	85	50	90	265	190	112	112	100	100	49	2	135	196,10 + Z x 0,1270
160	110	M80x3	M42x2	G11/4	617	95	140	250	85	50	100	265	190	112	112	100	100	49	2	135	196,80 + Z x 0,1390
180	110	M90x3	M42x2	G11/4	690	106	155	257	95	55	*	292	210	135	135	110	110	49	2	150	264,00 + Z x 0,1460
180	125	M90x3	M42x2	G11/4	690	106	155	257	95	55	*	292	210	135	135	110	110	49	2	150	264,70 + Z x 0,1680
200	125	M100x3	M42x2	G11/4	756	112	161	294	101	61	*	306	245	160	145	125	125	49	2	180	329,50 + Z x 0,1830
200	140	M100x3	M42x2	G11/4	756	112	161	294	101	61	*	306	245	160	145	125	125	49	2	180	327,20 + Z x 0,2170
250	160	M125x4	M60x2	G11/2	903	125	198	347	113	71	*	400	300	200	190	160	160	70	2,5	195	661,30 + Z x 0,3260
250	180	M125x4	M60x2	G11/2	903	125	198	347	113	71	*	400	300	200	190	160	160	70	2,5	195	662,70 + Z x 0,3680
320	200	M160x4	M60x2	G11/2	1080	160	226	414	136	88	*	490	395	250	230	200	200	70	2,5	275	1195,00 + Z x 0,5100
320	220	M160x4	M60x2	G11/2	1080	160	226	414	136	88	*	490	395	250	250	200	200	70	2,5	275	1198,00 + Z x 0,5600

* Piston rod with openings for hook spanner.

Weights specified are informative, ± 5%, specified in KGs
Custom piston rod stroke, for larger strokes check for ultimate resistance required.
Strokes lower than minimum are supplied with cylinder external fitting with minimum stroke (internal stroke limitation)

Cylinder loop with standard hinge bearing HYDRAULICS

EYES ISO 6022



MP6H

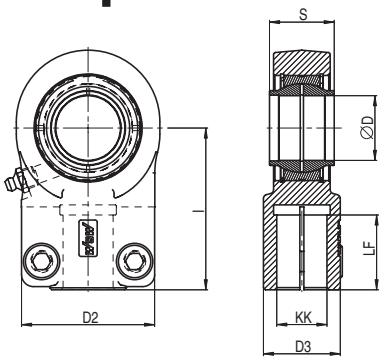
MP5H

Piston rod loop hydraulics standard

Ød	ØD	K1	S	LOOP SPECIFICATION
50	35	28	25	GE35ES
63	40	33	28	GE40ES
80	50	40	35	GE50ES
100	60	50	44	GE60ES
125	80	67	55	GE80ES
140	90	72	60	GE90ES
160	100	85	70	GE100ES
180	110	88	70	GE110ES
200	120	103	85	GE120ES
250	160	130	105	GE160ES
320	200	162	130	GE200ES

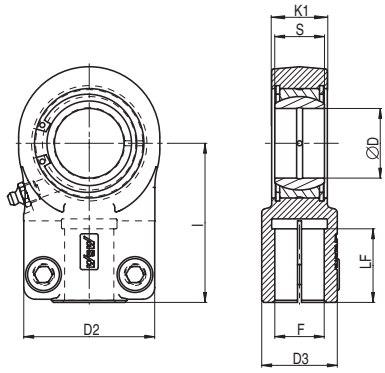
EYES ISO 6022

Piston rod loops



Piston rod loop according to ISO 6982

Ød	KK	CX	EX	I	LF	D2	D3	LOOP SPECIFICATION	HINGE SPECIFICATION
50	M27x2	32	32	80	37	66	38	WAPR32CE	GEEW32ES
63	M33x2	40	40	97	46	80	47	WAPR40CE	GEEW40ES
80	M42x2	50	50	120	57	96	58	WAPR50CE	GEEW50ES
100	M48x2	63	63	140	64	114	70	WAPR63CE	GEEW63ES
125	M64x3	80	80	180	86	148	90	WAPR80CE	GEEW80ES
140	M72x3	90	90	195	91	160	100	WAPR90CE	GEEW90ES
160	M80x3	100	100	210	96	178	110	WAPR100CE	GEEW100ES
180	M90x3	110	110	235	106	190	125	WAPR110CE	GEEW110ES
200	M100x3	125	125	260	113	200	135	WAPR125CE	GEEW125ES
250	M125x4	160	160	310	126	250	165	WAPR160CE	GEEW160ES
320	M160x4	200	200	390	161	320	215	WAPR200CE	GEEW200ES



Piston rod loop with standard hinge bearing HYDRAULICS

Ød	F	ØD	K1	S	I	LF	D2	D3	LOOP SPECIFICATION	HINGE SPECIFICATION
50	M27x2	35	28	25	80	37	66	38	WAPR32CE	GE35ES
63	M33x2	40	33	32	97	46	80	47	WAPR40CE	GE40ES
80	M42x2	50	40	35	120	57	96	58	WAPR50CE	GE50ES
100	M58x1.5	60	50	44	130	59	120	75	WAPR60U	GE60ES
125	M64x3	80	67	55	180	86	148	90	WAPR80CE	GE80ES
140	M72x3	90	72	60	195	91	160	100	WAPR90CE	GE90ES
160	M80x3	100	85	70	210	96	178	110	WAPR100CE	GE100ES
180	M90x3	110	88	70	235	106	190	125	WAPR110CE	GE110ES
200	M100x3	120	103	85	260	113	200	135	WAPR125CE	GE120ES
250	M125x4	160	130	105	310	126	250	165	WAPR160CE	GE160ES
320	M160x4	200	162	130	390	161	320	215	WAPR200CE	GE200ES

CUSTOMER'S FORM

Company ____ ID ____

Contact person ____ tel/fax/e-mail ____

Linear hydraulic motor: piston diameter / rod diameter / lift

Plunger – without guided piston ☐ – with piston rod pull-out end stop in cylinder ☐

– with guided piston ☐ – without end stop (with piston rod pull-out end stop on the construction) ☐

–piston rod return movement – mechanically – by external force ☐

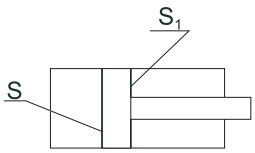
– by spring in the plunger ☐

Single acting linear hydraulic motor – it is exactly double acting linear hydraulic motor where the pressure oil is in one chamber only – the second one is filled with air.

Double acting linear hydraulic motor ☐

Double acting linear hydraulic motor – with continuous piston rod ☐

– damping at end positions – no ☐ – yes ☐



without regulation ☐

regulation of both positions ☐

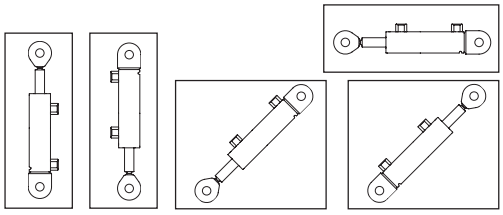
regulation on piston rod pull-out – S_1 ☐

regulation on piston rod pull-in – S ☐

Operating parameters

Pressure min. S_1		MPa	Piston rod pull-out speed		m/s
Pressure min. S		MPa	Piston rod pull-in speed		m/s
Operating pressure S_1		MPa	Oil temperature		°C
Operating pressure S		MPa	Ambient temperature		°C
Pressure max. S_1		MPa	Working medium		
Pressure max. S		MPa			
Pressure peak S_1		MPa			
Pressure peak S		MPa			

Working position of the hydraulic motor



Operating conditions

Type of device ____

Function of the hydraulic motor ____

Work intensity ____ (cycles/hour, min, sec, ...)

Provoz | occasional | one-working | two-working | three-working | continual |

Operating environment

Weather conditions ☐ Dust ☐ Clear ☐ Water ☐ chem. corrosive ☐ Other ☐

Hydraulic motor drawing

Technical parameters of used materials

Commonly used types

CYLINDER COVER

- the tube welded and calibrated within the inner diameter allowance H9 - Rm = 570 MPa - DIN 2393
- the tube cold-drawed and rolled or honed within the inner diameter allowance H8 - Rm = 570 MPa - DIN 2391

BAR

- 20MnV6 - bar with a chrome layer 20-30 µm - Rm = 500 MPa
- 42CrMo4V - bar with a chrome layer 20-30 µm - Rm = 900 MPa
- HIPERCHOM 200 - material 20MnV6 - bar with a chrome layer c. 50 µm - Rm = 500 MPa - resistance in soil chamber 200 hours to defined damage
- NiCr 350 - material 20MnV6 - common bar with a chrome and nickel layers - Rm = 500 MPa - resistance in soil chamber 350 hours to defined damage
- Ck 45 or C50 - surface-hardened bar with a chrome layer 20-30 µm - Rm = 500 MPa
- 42CrMo4V - IH - surface-hardened bar with a chrome layer 20-30 µm - Rm = 900 MPa
- stainless steel rod with hardened chrome surface finish 20-30 µm

HYDRAULIC MOTORS TESTS

Each LHM manufactured in Hydraulics company is tested before delivery to the customer via final inspection. It is separated to several levels:

- visual check
- check of construction and integration dimensions
- leak test (done on test stend using the pressure mineral oil HM32)

Inspection methodology is based on: ČSN 11 9008
ČSN 11 9372
ČSN 11 9373, resp. ISO 10 100

SURFACE FINISH

In common order the surface adjustment is the final operation. As a standard it is done by painting with base synthetic colour S 2035 hue 0840 / red-brown/.
There are many ways of the surface adjustment:

- with other colour with other hue
- galvanization – zinc deposition
  – nickel plating
- with nitride
- without surface adjustment – pure metal

GUARANTEE

Our products - linear hydraulic motors - are subject to warranty under the commercial code. During the warranty period, the manufacturer shall, free of charge, without any undue delays remedy all functional defects, which shall be duly claimed and which were not due to incorrect usage of the product or failure to adhere to technical conditions.
The warranty period is 12 months from the date of sale.
We must also keep an eye on the life cycle of the LHM. It is determined according to ČSN 11 9372 to minimum of 10^6 cycles (lifts) for hydraulic motor lift to 500 mm, or 1000 km of course under given parameters.
In some cases it is possible to determine different warranty conditions.