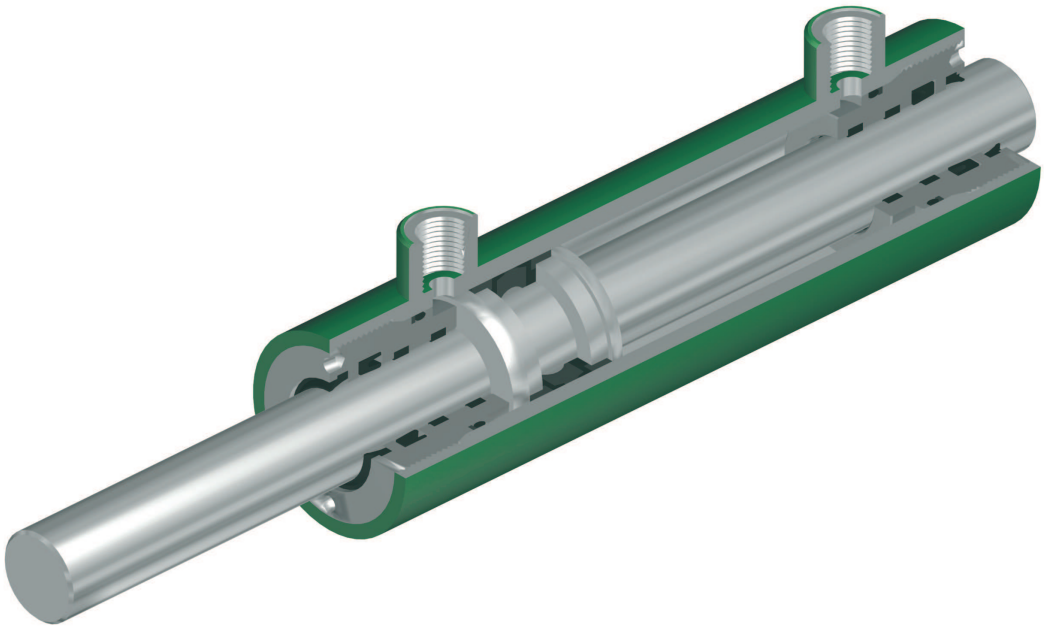


ZH1/2

Linear hydraulic motors of the ZH1/2 series

TECHNICAL DESCRIPTION - PRODUCT FUNCTION

The ZH1/2 linear hydraulic motor is the element that converts the pressure energy to the mechanical energy – to the axial power of the piston rod in both directions. They have – by their construction – no special demands for service and maintenance. It is necessary to obey the service and technical conditions for perfect and secure functionality.
The ZH1/2 is composed of the tube with precision worked inner diameter within the H8 allowance. On the tube there are welded the connection necks for inlet of the pressure oil with internal thread.
The lids for piston rod guidance with the sealing elements are screwed into the tube of cylinder cover from both sides. The piston rod is symmetric (through) and as at the previous types grinded, polished and chromed with the tolerance f7. This type of the piston rod secures constant speed and power ratio during the piston rod travel in both directions.

OPERATING CONDITIONS

The linear hydraulic motors of this kind do not require any special demands for service and maintenance.

- the mounting of LHM must be done under conditions preventing the damage of function parts and which secure the protection of inner space against penetration of impurities
- properly provide the connection of LHM to the pressure source (danger of oil pressure decrease) and the mounting of LHM into the kinematic system of the given machine/device
- the work position of LHM is optional if not otherwise specified
- radial load of the piston rod by external force or its rotations during working time are not allowed
- take care during the work to prevent the mechanical damages of the piston rod
- the hydraulic motor must not be loaded in the end positions by external force or by power of steady mass corresponding to 1.25 multiple of rated pressure
- when mounted into the machine's mechanical parts (or into some device) the possibility of swiveling of hydraulic cylinder body must be secured in transverse direction in the area of allowed swiveling of knuckle bearing
- 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

Work liquid	– hydraulic mineral oil (OH-HM 32, OH-HM 46, OH-HM 64)
Required filtration	– min. 40 μm, we recommend 25 μm
Temperature scope	– liquid -20°C ÷ +80°C
	– ambient -20°C ÷ +70°C
Climatic stability	– temperate climate WT
Rated pressure	– 20 MPa
Maximum pressure	– 25 MPa
Test pressure	– 32 MPa
Work speed	– maximum 0,5 $m \cdot s^{-1}$
The piston rod resistance value in the salt chamber pursuant to ISO 4540	– 120 hours

MARKING

Each hydraulic motor manufactured in our factory is marked with following data:

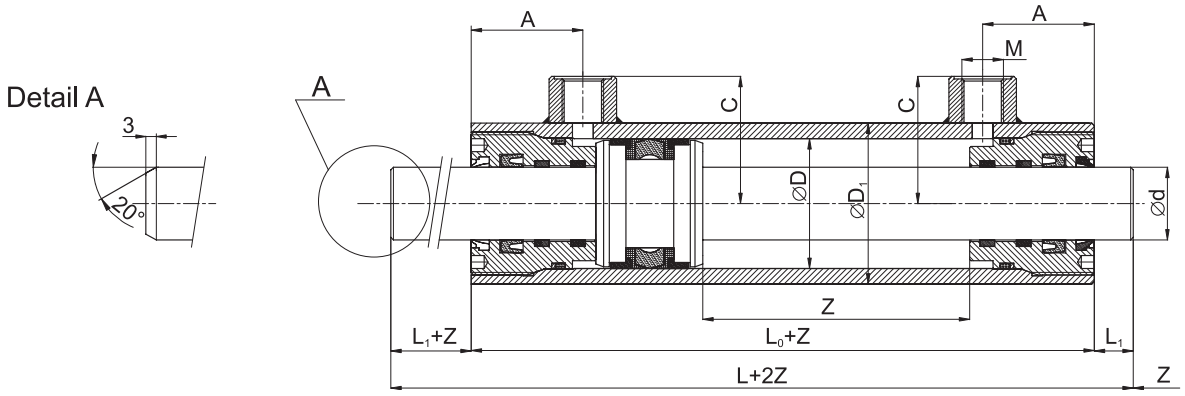
HYDRAULICS SEHRADICE
ZH1/2 D/d x Z R / K /
MAX.OPERATING PRESSURE
SERIAL NUMBER

Part of the item delivery is the accompanying documentation containing

ITEM SAFEGUARD and
QUALITY CERTIFICATE /document details see page no. 97-98/.

ZH1/2 Series

for P_{max} 25 MPa



ØD	Ød	ØD$_1$	L	L$_0$	L$_1$	M	A	C	Weight under given lift Z
32	18	42	130	110	10	12x1.5	36	39	2.07 + Z x 0.00660
32	20	42	130	110	10	12x1.5	36	39	2.08 + Z x 0.00710
40	22	50	140	120	10	16x1.5	36	44	2.51 + Z x 0.00860
40	25	50	140	120	10	16x1.5	36	44	2.61 + Z x 0.00950
45	25	55	145	125	10	16x1.5	41	45.5	3.75 + Z x 0.01002
45	28	55	145	125	10	16x1.5	41	45.5	4.15 + Z x 0.01010
50	25	62	170	140	15	16x1.5	43	49	4.86 + Z x 0.01214
50	28	62	170	140	15	16x1.5	43	49	4.91 + Z x 0.01312
55	28	70	170	140	15	16x1.5	45	53	5.62 + Z x 0.01640
55	32	70	170	140	15	16x1.5	45	53	5.74 + Z x 0.01787
60	32	75	180	150	15	16x1.5	48	55.5	7.44 + Z x 0.01880
60	36	75	180	150	15	16x1.5	48	55.5	7.61 + Z x 0.02047
63	36	78	185	155	15	16x1.5	50	57	8.47 + Z x 0.02103
63	40	78	185	155	15	16x1.5	50	57	8.64 + Z x 0.02290
65	36	80	190	160	15	22x1.5	53	58	9.96 + Z x 0.02140
65	40	80	190	160	15	22x1.5	53	58	10.32 + Z x 0.02327
70	40	85	210	170	20	22x1.5	54	60.5	13.10 + Z x 0.02420
70	45	85	210	170	20	22x1.5	54	60.5	13.17 + Z x 0.02680
75	40	90	215	175	20	22x1.5	57	63	14.24 + Z x 0.02512
75	45	90	215	175	20	22x1.5	57	63	14.68 + Z x 0.02773
80	45	95	220	180	20	22x1.5	59	65.5	17.20 + Z x 0.02866
80	50	95	220	180	20	22x1.5	59	65.5	17.68 + Z x 0.03160
90	50	105	240	190	25	22x1.5	64	70.5	21.00 + Z x 0.03344
90	55	105	240	190	25	22x1.5	64	70.5	21.40 + Z x 0.03668
100	55	120	260	210	25	27x2	73	82	31.90 + Z x 0.04578
100	63	120	260	210	25	27x2	73	82	32.90 + Z x 0.05160
110	63	130	280	220	30	27x2	78	87	42.25 + Z x 0.05406
110	70	130	280	220	30	27x2	78	87	42.80 + Z x 0.05980

Piston rod lift according to the customer's wish.
Lifts higher than maximum recommended need to be controlled for the ultimate strength.

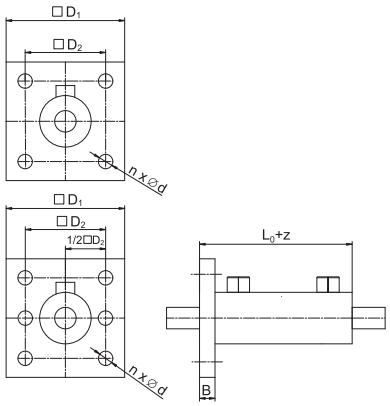
The standard end of the piston rod is referenced as ending according to detail A.

The weights are informative within scope of ± 5% in kg.

Linear hydraulic motors ZH1/2 gripping

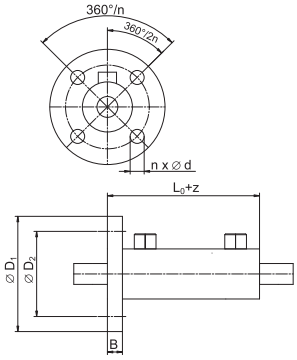
Gripping ZH1/2 – A

Cylinder	D_1	D_2	B	Ød	n	L_0
32	67	50	10	8.4	4	110
40	98	80	12	8.4	6	120
45	103	85	12	10.5	6	125
50	113	95	13	10.5	6	140
55	118	100	13	10.5	6	140
60	128	108	13	10.5	6	150
63	138	115	15	13	6	155
65	138	115	15	13	6	160
70	148	120	15	13	6	170
75	155	130	16	15	6	175
80	168	140	18	15	6	180
90	178	150	20	15	6	190
100	200	170	20	17	6	210
110	210	180	22	17	6	220



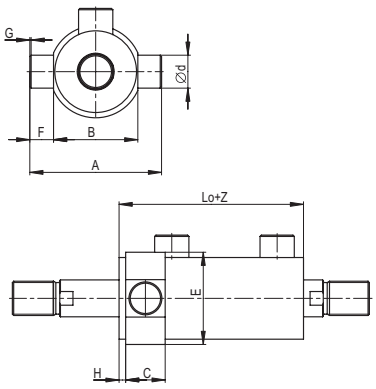
Gripping ZH1/2 – B

Cylinder	ØD_1	ØD_2	B	Ød	n	L_0
32	88	70	10	8.4	4	110
40	98	80	12	8.4	6	120
45	103	85	12	8.4	6	125
50	113	95	13	10.5	6	140
55	118	100	13	10.5	6	140
60	128	108	13	10.5	6	150
63	138	115	15	13	6	155
65	138	115	15	13	6	160
70	148	120	15	13	6	170
75	155	130	16	13	6	175
80	168	140	18	15	6	180
90	178	150	20	15	6	190
100	198	170	20	17	6	210
110	208	180	22	17	6	220



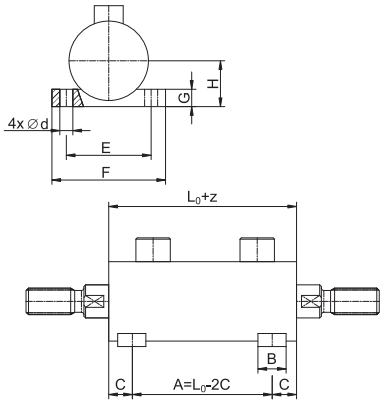
Gripping ZH1/2 – C

Cylinder	A	B h11	C	Ødf8	E	F	Gx45°	H	K	L_0
32	90	55	28	20	53	17.5	1	5	19	110
40	105	65	28	20	65	20	1	5	19	120
45	110	70	33	25	70	20	1	5	22	125
50	120	80	33	25	80	20	1	5	22	140
55	135	90	35	25	90	22.5	1	5	23	140
60	140	95	35	25	95	22.5	1	7	25	150
63	150	100	40	30	100	25	1.5	7	27	155
65	155	105	40	30	100	25	1.5	7	27	160
70	160	110	40	30	105	25	1.5	7	27	170
75	180	120	45	35	115	30	1.5	7	30	175
80	185	125	45	35	115	30	1.5	8	31	180
90	205	135	50	40	135	35	1.5	8	33	190
100	220	150	55	45	150	35	1.5	10	38	210
110	240	160	60	50	160	40	1.5	10	40	220



Gripping ZH1/2 – D

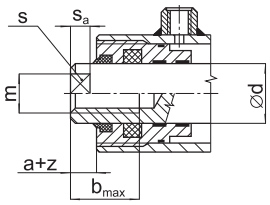
Cylinder	B h11	C	Ød	E	F	G	H	L_0
32	20	15	10.5	65	88	10	27	110
40	24	20	10.5	75	100	12	31	120
45	24	20	13	80	105	12	35	125
50	24	20	13	88	110	14	38	140
55	26	20	13	98	123	16	43	140
60	30	25	15	107	135	16	47	150
63	30	25	15	110	138	18	50	155
65	30	25	15	110	138	18	50	160
70	34	27	17	118	150	20	55	170
75	34	27	17	125	158	20	55	175
80	40	30	21	140	180	24	60	180
90	40	30	21	150	190	24	65	190
100	48	34	25	170	215	26	75	210
110	48	34	25	180	230	26	80	220



ZH1/2

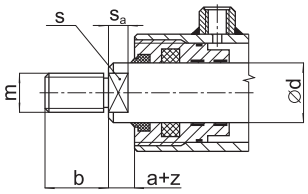
Piston rod end for hydraulic motors ZH1/2, ZH1/2T

Variant: no. 2, 3 - we recommend to design according to lifting eyes (page 75÷90)



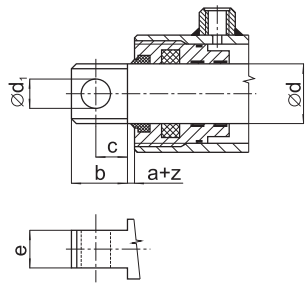
internal thread **variant 2**

Ød		20	22	25	28	32	36	40	45	50	55	63	70
m		**14x1.5**	**16x1.5**	**18x1.5**	**20x1.5**	**24x1.5**	**24x1.5**	**27x2**	**27x2**	**30x2**	**36x2**	**42x2**	**42x2**
				20x1.5			27x2		30x2	36x2	42x2		52x2
a		12	12	15	17	17	20	20	20	25	25	30	30
b_{max}		40	40	56	56	60	70	70	70	80	90	90	100
s		18	19	22	24	28	30	36	38	41	46	55	60
								32	41	46	50	60	65
Sa		8	8	10	12	12	15	15	15	18	18	20	20



external thread **variant 3**

Ød	18	20	22	25	28	32	36	40	45	50	55	63	70
m	**16x1.5**	16x1.5	16x1.5	18x1.5	20x1.5	**24x1.5**	24x1.5	27x2	27x2	30x2	36x2	**42x2**	42x2
		18x1.5	**18x1.5**	**20x1.5**	**22x1.5**		**27x2**	**30x2**	**30x2**	**36x2**	**42x2**		**52x2**
a	12	12	12	15	17	17	20	20	20	25	25	30	30
b	20	20	20	30	30	34	40	40	40	45	50	60	60
		30	30		34	40		45	45	50			
s	16	18	19	22	24	30	32	36	41	46	50	60	65
Sa	8	8	8	10	12	12	15	15	15	18	18	20	20



neck hole **variant 4**

Ød	18	20	22	25	28	32	36	40	45	50	55	63	70
Ød$_1$	10	12	12	14	15	17	20	22	26	28	30	40	50
a	6	6	8	8	8	10	10	12	12	15	15	18	18
b	25	30	35	40	45	50	60	70	80	95	100	120	135
c	15	18	22	25	29	31	36	43	50	59	64	80	85
e	13	15	16	18	20	24	26	28	32	34	38	40	46

Ød$_1$ – max. hole for p = 25 MPa

The highlighted dimensions are default.

Ordering code

For standard linear hydraulic motors
ZH1/2 a ZH1/2T Series
Acc. to the table on page 45, 49.

And for linear hydraulic motors using the construction module L_0 and another then standard piston rods ends and connection eyes ends.

[ ] – [ ] / [ ] x [ ] – [ ] – [ ] / [ ]

Cylinder cover eye marking – (in case of not employing any eye from our catalogue fill in 0 to the code) – page 75÷90.

Piston rod eye marking – (in case of not employing any eye from our catalogue fill in 0 to the code) – page 75÷90.

Piston rod end – (for single solution without rod eye the highlighted dimensions are valid. In case of not employing any eye from our catalogue fill in 0 to the code) – page 51.

Lift – due to Your actual need – it is necessary to check the maximal possible lift because of the ultimate strength – the diagram of ultimate strength can be helpful according to Euler page 93.

ZH1/2,
ZH1/2 – A,
ZH1/2 – B,
ZH1/2 – C,
ZH1/2 – D,
ZH1/2T,
ZH1/2T – A,
ZH1/2T – B,
ZH1/2T – C,
ZH1/2T – D,

Piston rod diameter

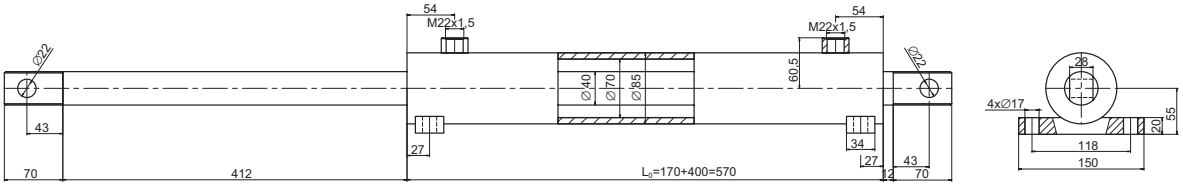
∅D	∅d	∅D_1	L
32	18	42	130
40	22	50	140

Rated diameter of cylinder

∅D	∅d	∅D_1	L
32	18	42	130
40	22	50	140

Example:

ZH1/2–D–70/40x400–4–0–0



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 ☐

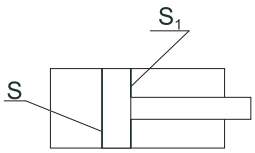
– by spring in the plunger ☐

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 ☐

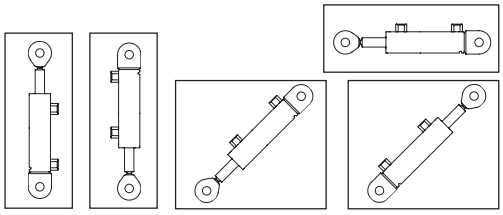
regulation on piston rod pull-out – S_1 ☐

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.