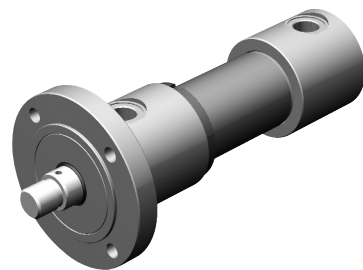


KRACHT



Hydraulic Cylinder

CNL

Single and Double-Acting

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Description

- Piston Ø 40-100 mm
- Modern seals and guide elements
- Simple replacement of wear parts through rugged screw system
- Subsequent retrofitting and revaluation possible through unit construction system
- Rod screw thread, non-toleranced dimension, position and size of the connections etc, can be implemented according to customer preference

Available with:

- Adjustable stroke-end damping
- Electronic proximity switches for end of stroke signals
- Electronic stroke measuring system available on application
- Water cooling for applications in high ambient temperatures
- Other versions available on request

Hydraulic cylinders of the type series CNL are designed as a pure bolted construction. Cylinder heads and base consist of St 52-3.

For the cylinder tubes, "seamless precision steel tubes", in accordance with DIN 2391, are used and a high-strength steel is used for the milled, polished and hard-chromium-plated piston rods. The piston and piston rod are sealed with compact seals. According to service conditions, the cylinder can be equipped completely with FKM seals.

The venting is carried out in the normal case via the line connections. On request with header and base-sided ventilation bolts. In case of cylinders with end-position cushioning pressure the venting is fitted as standard. All cylinder sizes can also be equipped with an adjustable end-position cushioning pressure at both ends, when the operation conditions require it.

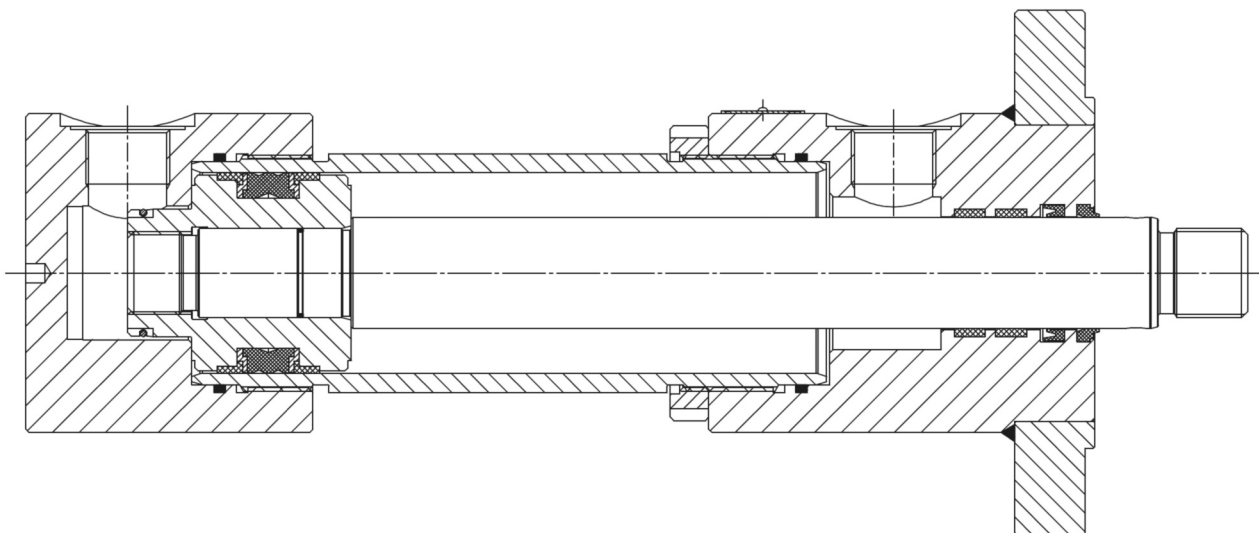
CNL hydraulic cylinders are available with the following features:

Double-acting with the piston rod on one side (the so-called differential cylinder), or with piston rods on both sides.

If the piston rod returns, under the action of external forces, e. g. due to its own weight, or return spring-pressure, the differential cylinder can also be used as a single – acting push or pull cylinder, or as a plunger cylinder, i. e. compression cylinder with through-bored piston.

With installation of the cylinders, it is to be ensured that no radial forces act on the piston rod. Deformations lead to the destruction of the cylinder within a short time.

For the fixing of the cylinders, bolts of the Quality Class 8.8 or 10.9 are to be used.



Characteristics

Nominal pressure	200 bar
------------------	---------

General characteristics

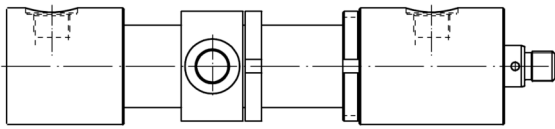
Type	piston rod cylinder – threaded version		
Variants	Page 6		
Line connection	Whitworth pipe thread in accordance with DIN 2353		
Connection size	Page 12 ... 16		
Dimensions	Page 12 ... 16		
Weight	Page 17		
Mounting position	optional		
Ambient temperature			
with standard seals	$\vartheta_{u \min}$	=	-20 °C
	$\vartheta_{u \max}$	=	80 °C
with FKM seals	$\vartheta_{u \min}$	=	-20 °C
	$\vartheta_{u \max}$	=	180 °C
Max. stroke	CNL 40, 50	=	3000 mm
	CNL 63-100	=	4000 mm
Stroke graduation	in mm		

Hydraulic characteristics

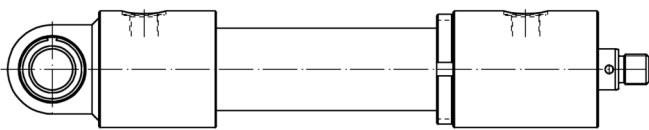
Working pressure			
Piston side	p_1	=	0 ... 200 bar
Pole side	p_3	=	0 ... 200 bar
Pressure medium temperature			
With standard seals	$\vartheta_{m \min}$	=	-20 °C
	$\vartheta_{m \max}$	=	80 °C
With FKM seals	$\vartheta_{m \min}$	=	-20 °C
	$\vartheta_{m \max}$	=	180 °C
Viscosity range	ν_{\min}	=	2,8 mm ² /s
	ν_{\max}	=	380 mm ² /s
Permissible stroke speed	v	=	0 ... 0,5 m/s
Pressure medium	Mineral oil in accordance with DIN 51524 / 25 Low-inflammable hydraulic fluids on request		

Other hydraulic characteristics on request

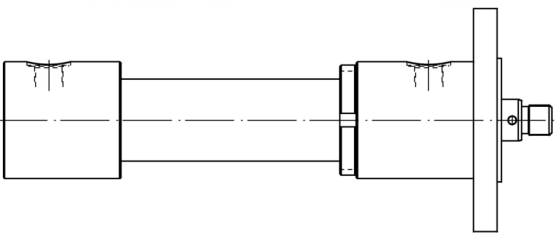
Variants



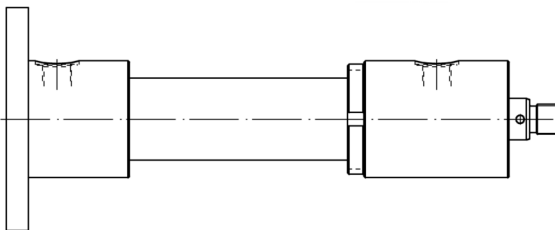
Trunnion mounting on cylinder tube



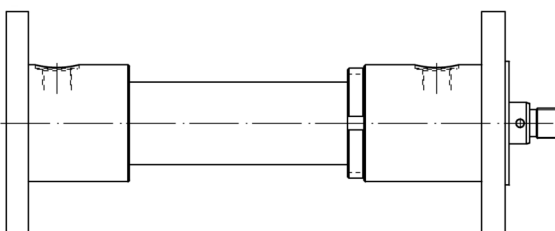
Universal joint or bearing bush on base of cylinder



Flange on the cylinder head



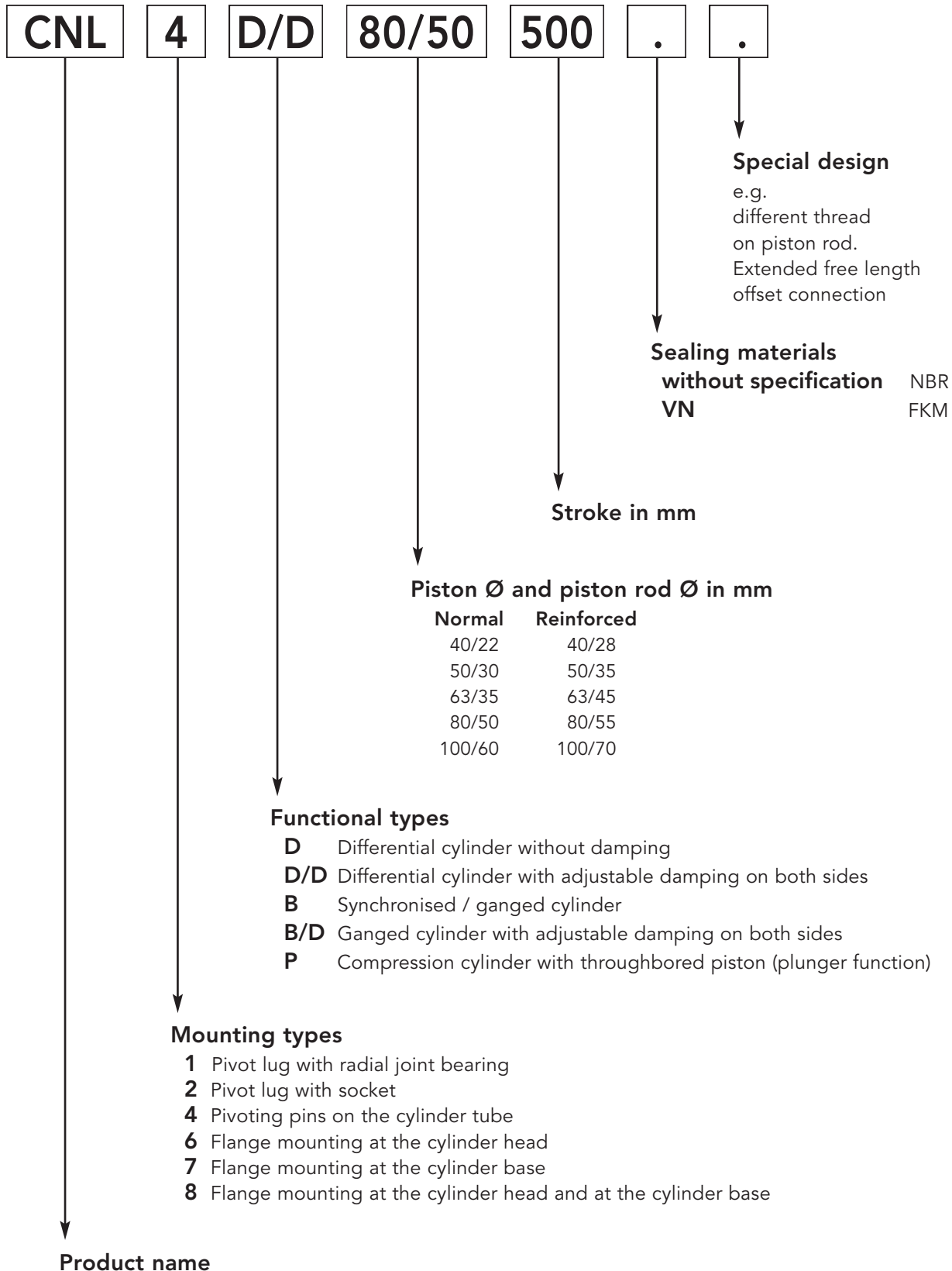
Flange on cylinder base



Flange on the cylinder head and base

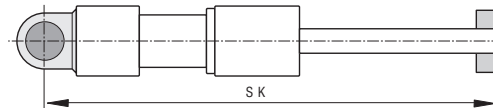
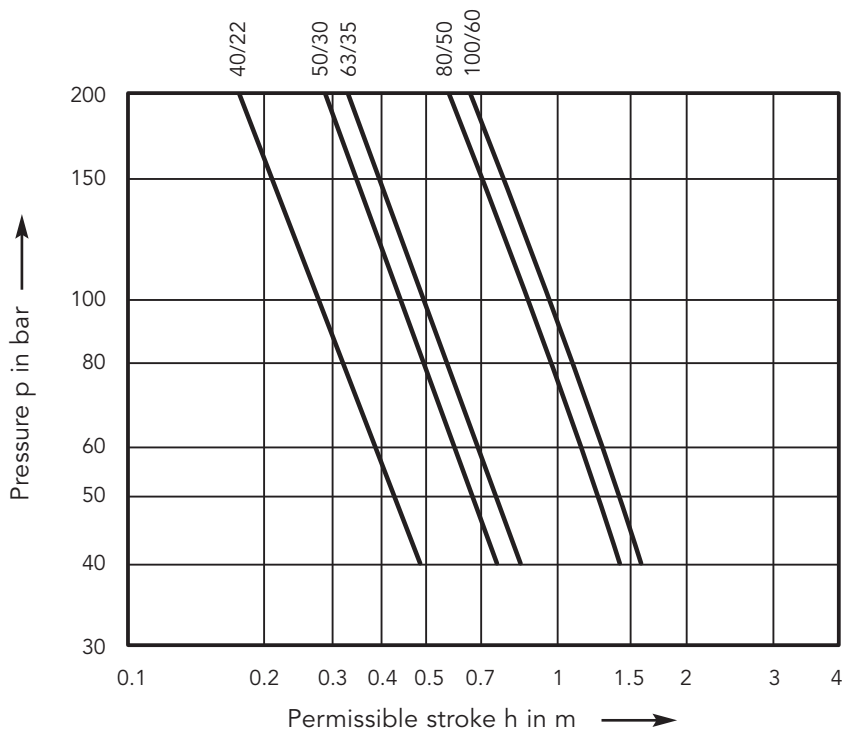
Type key

Example

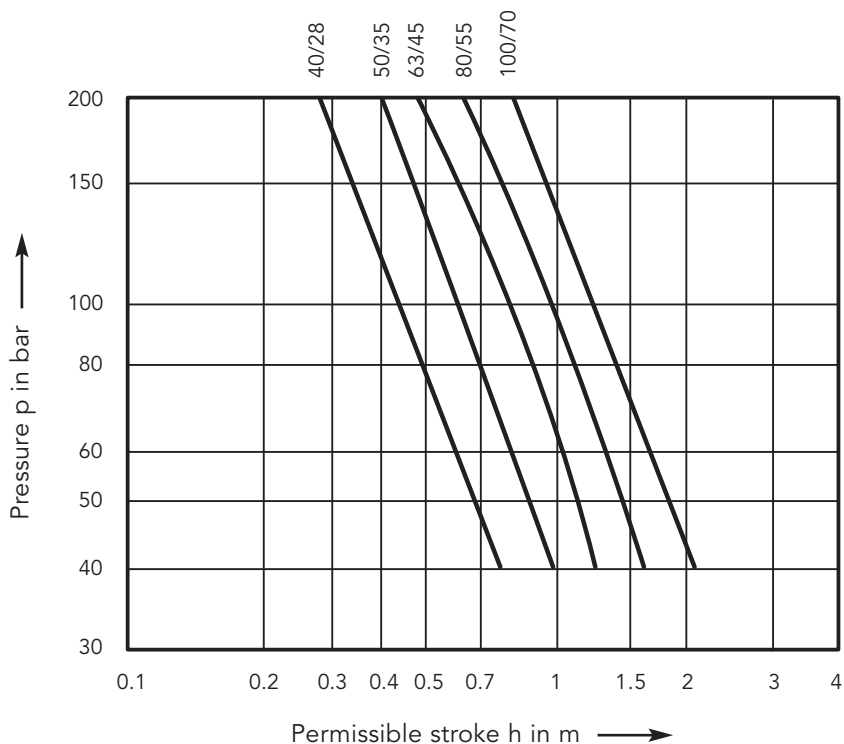


p-h-characteristics mounting 1 + 2

p = f (h) with normal piston rod



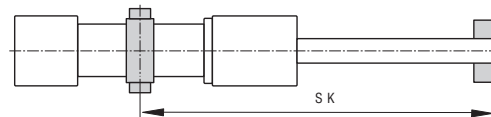
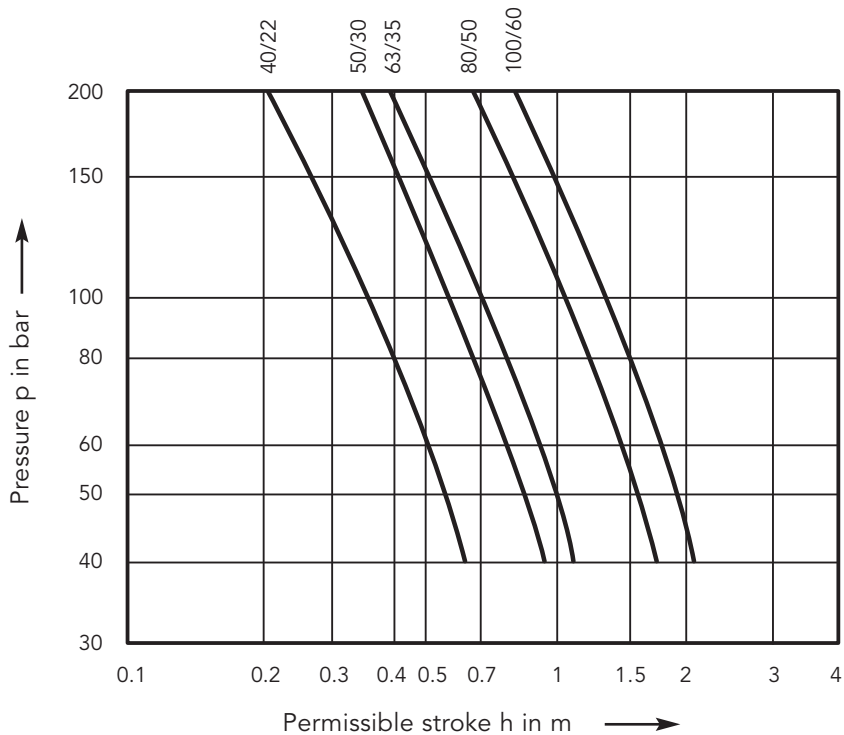
p = f (h) with reinforced piston rod



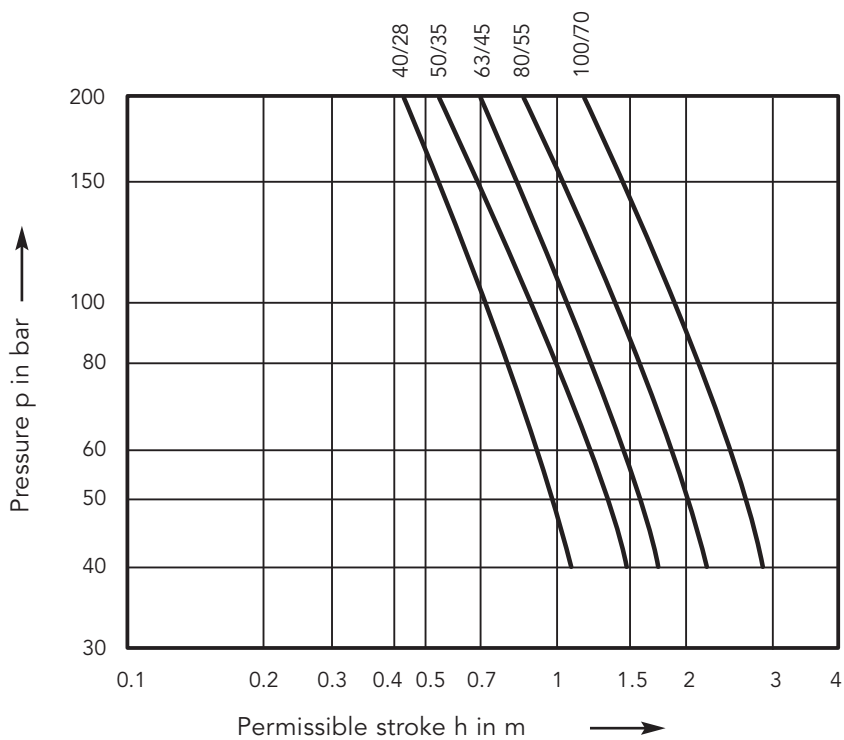
The characteristic curves include a safety factor $v = 3.5$ against buckling.

p-h-characteristics mounting 4

p = f (h) with normal piston rod

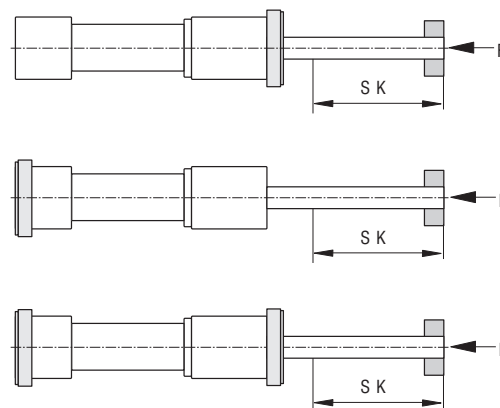
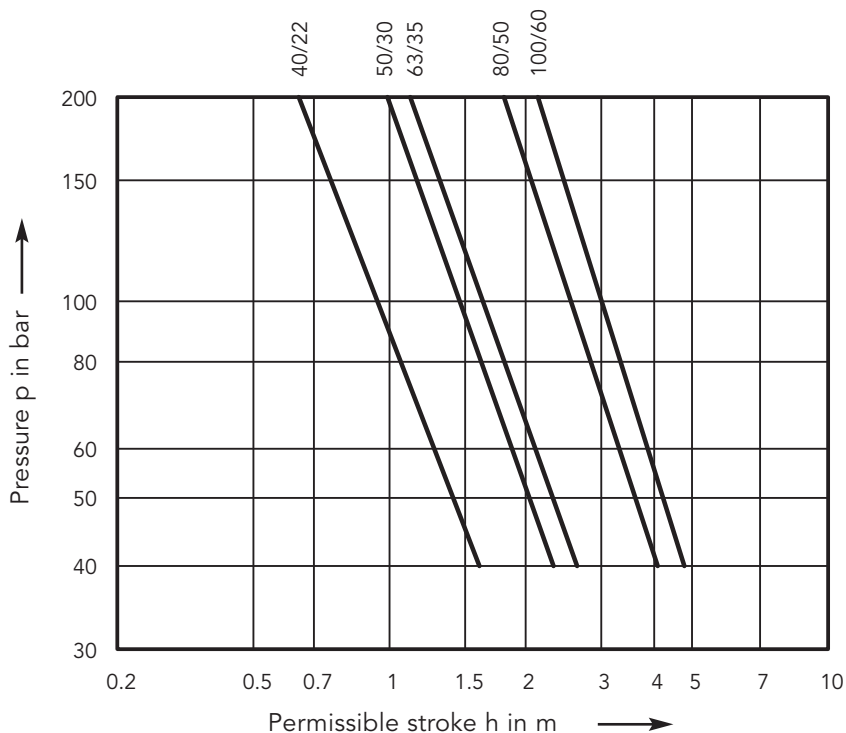


p = f (h) with reinforced piston rod

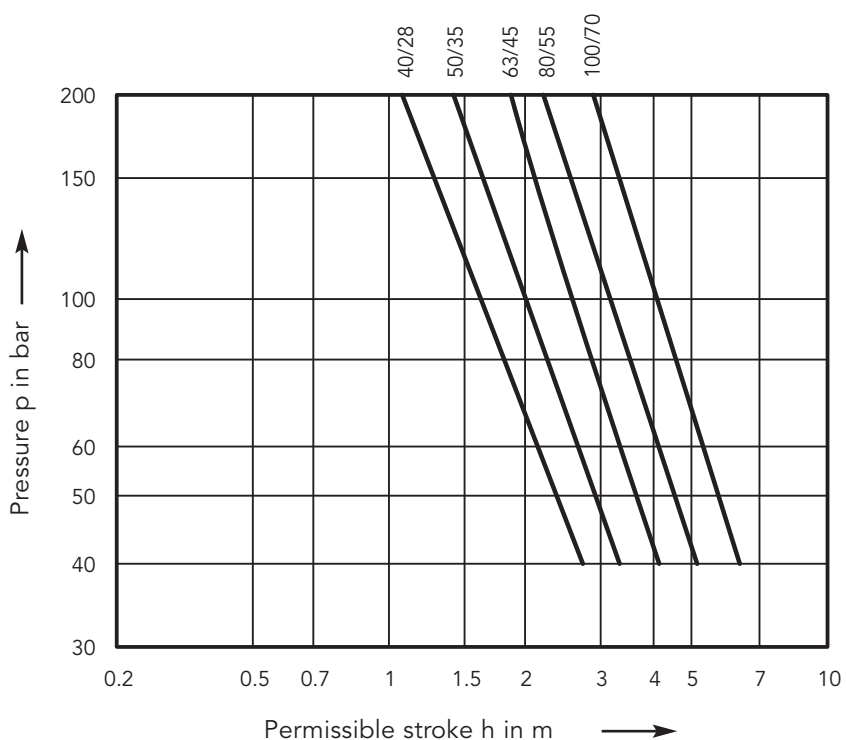


pp-h-characteristics mounting 6, 7, 8

$p = f(h)$ with normal piston rod



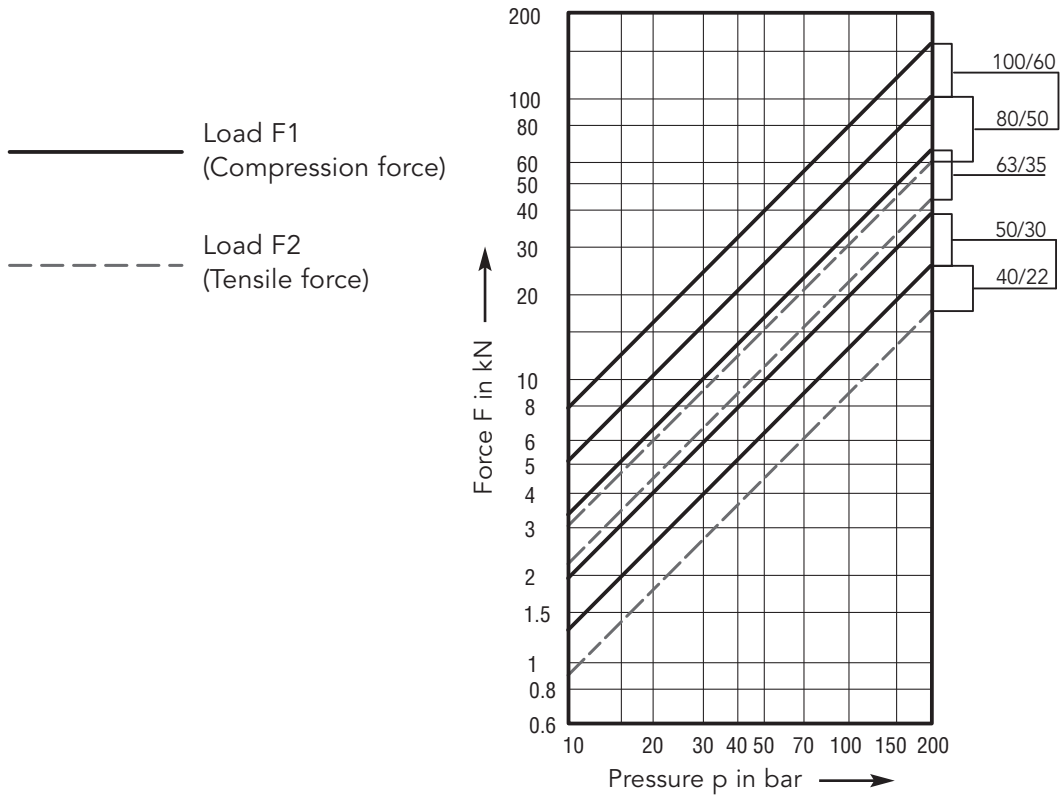
$p = f(h)$ with reinforced piston rod



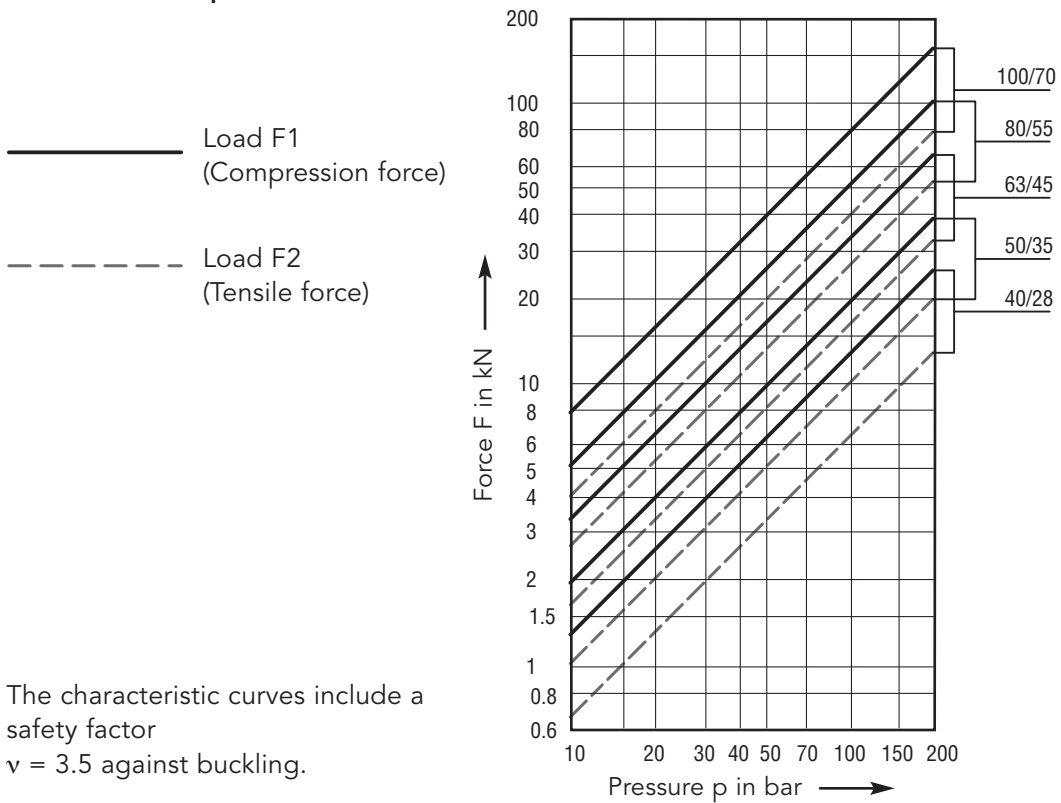
The characteristic curves include a safety factor $v = 3.5$ against buckling.

Loading Characteristics

with normal piston rod



with reinforced piston rod

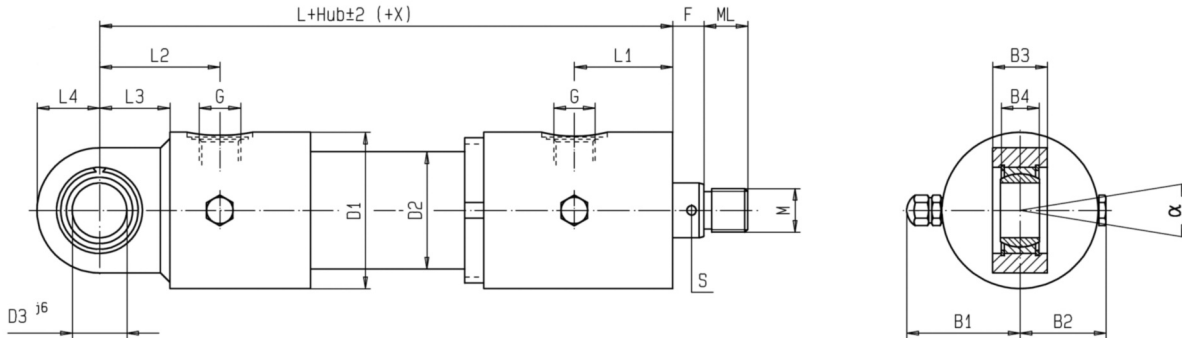


The characteristic curves include a safety factor $\nu = 3.5$ against buckling.

Dimensions 1 + 2

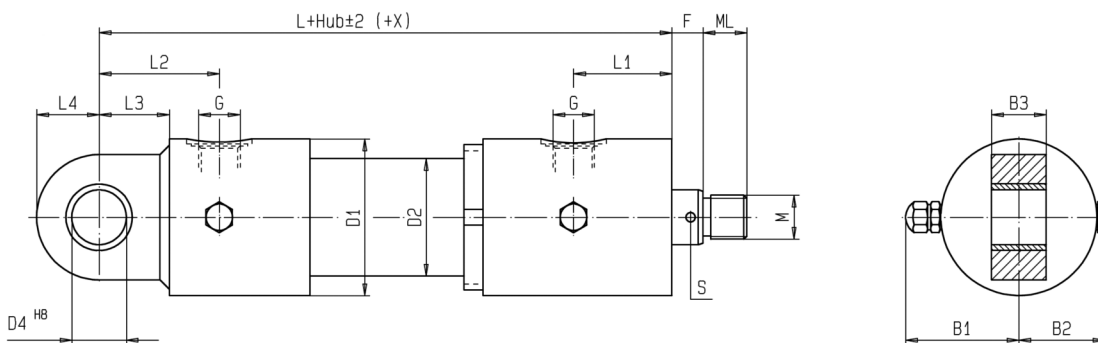
Mounting 1

Universal joint on cylinder base



Mounting 2

Bearing bush on cylinder base



Type	B1	B2	B3	B4	D1	D2	D3	D4	F	G	L	L1	L2	L3	L4	M	MH	ML	S	α
CNL- 40	58	43	30	20	70	50	25	25	15	G 1/2	173	43	65	33	30	M 16x1,5	40	16	4,5	14°
CNL- 50	65	51	30	22	85	60	30	30	15	G 1/2	195	53	68	35	33	M 22x1,5	50	22	6	12°
CNL- 63	73	58	35	25	100	75	35	35	20	G 3/4	230	63	77	45	40	M 28x1,5	45	28	6	12°
CNL- 80	83	68	45	28	120	95	40	40	20	G 3/4	260	68	102	55	50	M 35x1,5	50	35	8	14°
CNL-100	101	81	55	35	145	115	50	50	25	G 1	305	80	106	65	60	M 45x1,5	60	45	8	12°

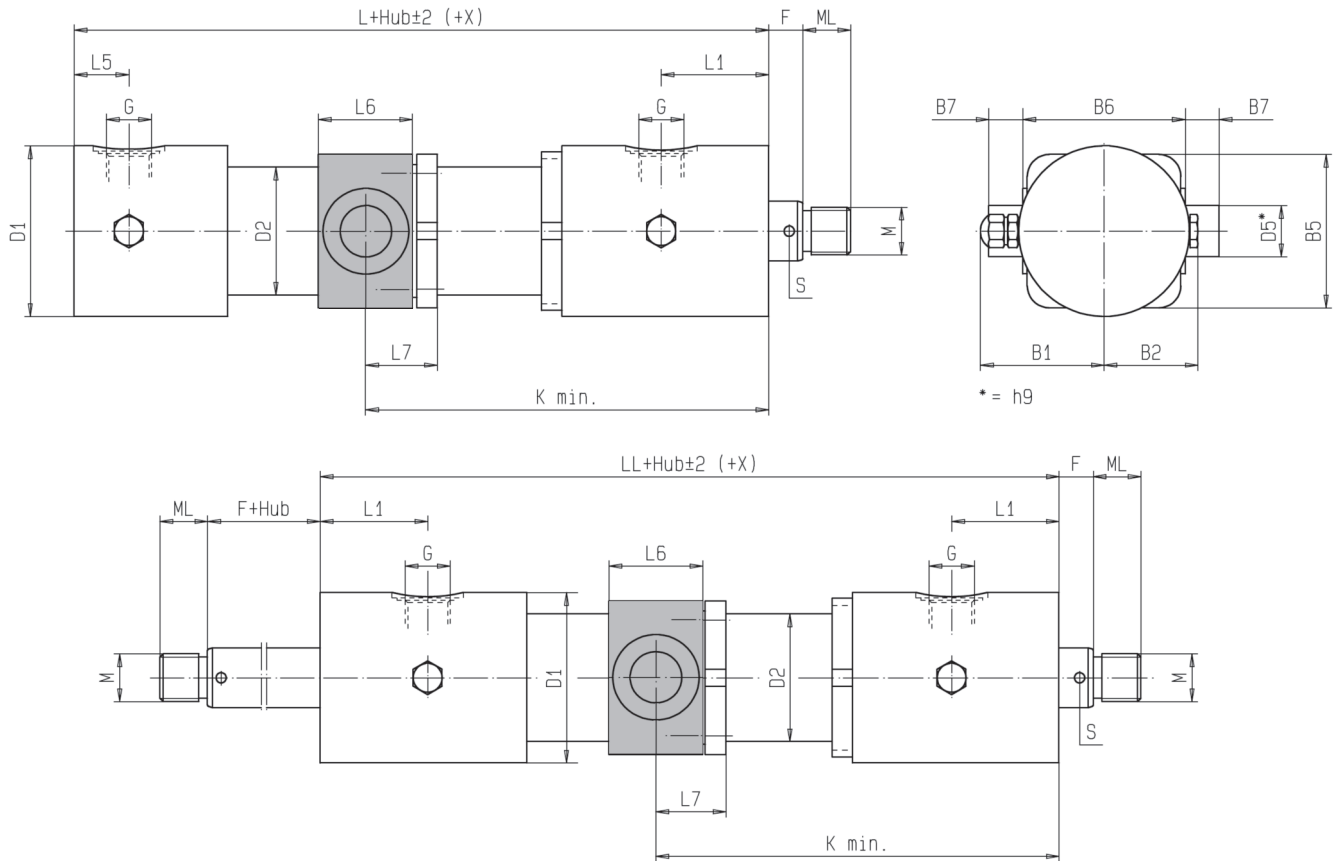
Remark

- B1 + B2 only in case of cylinders with stroke-end damping
- B2 only in case of optional venting
- MH (minimum stroke) determines the shortest installation dimension (L + lift ± T).
- Cylinders with a stroke below the indicated minimum stroke have similar installation dimensions.

Dimensions 4

Mounting 4

Trunnion flange on cylinder tube



Type	B1	B2	B5	B6	B7	D1	D2	D5	F	G	K _{min}	L	L1	L5	L6	L7	LL	M	MH	ML	S
CNL- 40	58	43	70	75	15	70	50	20	15	G 1/2	130	140	43	32	35	28	151	M 16x1,5	90	16	4,5
CNL- 50	65	51	80	85	20	85	60	25	15	G 1/2	155	160	53	33	40	32	180	M 22x1,5	110	22	6
CNL- 63	73	58	90	95	20	100	75	30	20	G 3/4	175	185	63	32	50	37	216	M 28x1,5	115	28	6
CNL- 80	83	68	110	115	25	120	95	40	20	G 3/4	188	205	68	47	55	40	226	M 35x1,5	128	35	8
CNL-100	101	81	135	140	35	145	115	50	25	G 1	225	240	80	41	65	48	279	M 45x1,5	145	45	8

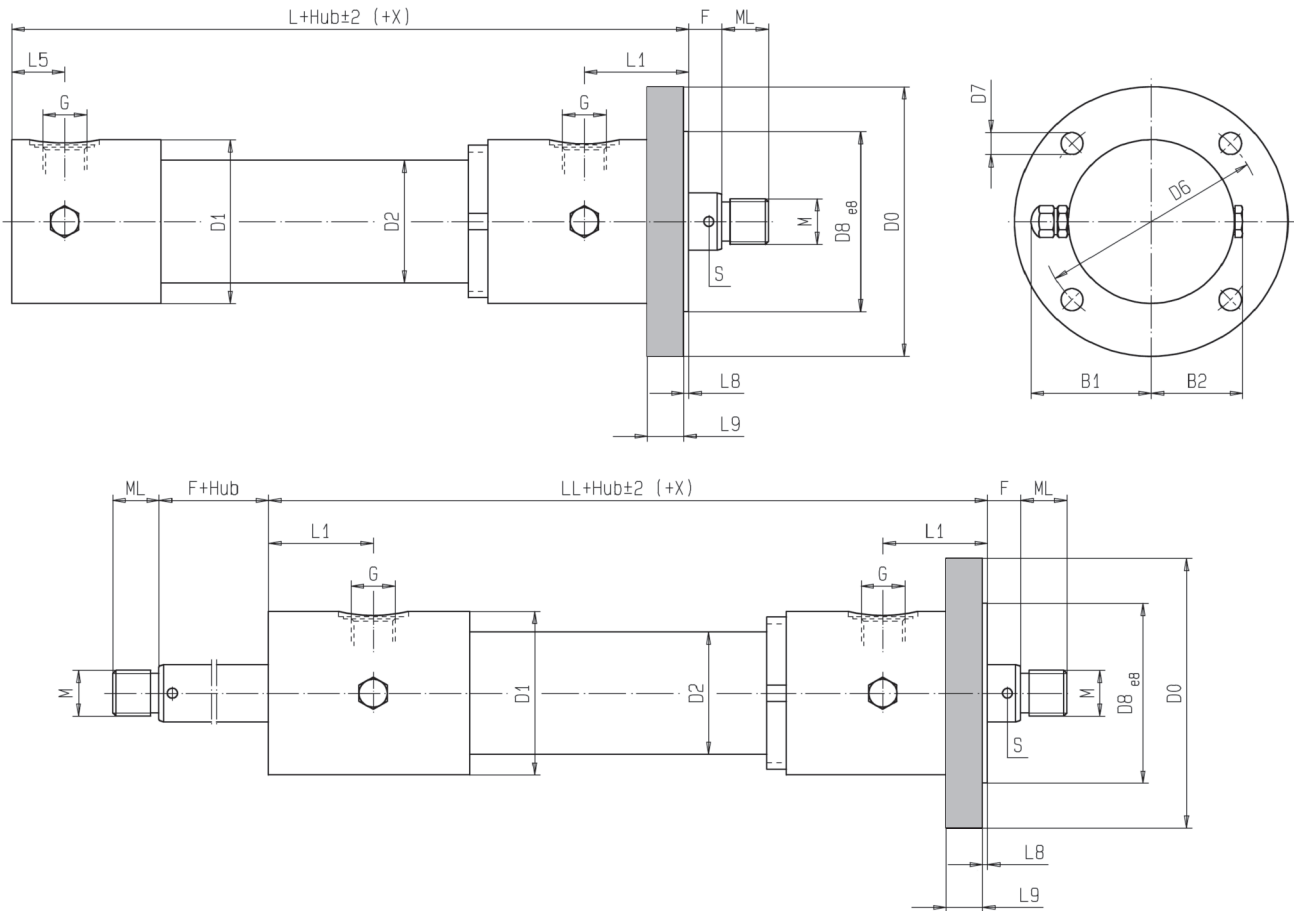
Remark

- B1 + B2 only in case of cylinders with stroke-end damping
- B2 only in case of optional venting
- MH (minimum stroke) determines the shortest installation dimension (L + lift ± T).
- Cylinders with a stroke below the indicated minimum stroke have similar installation dimensions

Dimensions 6

Mounting 6

Flange on the cylinder head



Type	B1	B2	D0	D1	D2	D6	D7	D8	F	G	L	L1	L5	L8	L9	LL	M	MH	ML	S
CNL- 40	58	43	130	70	50	105	11	80	15	G 1/2	140	43	32	3	15	151	M 16x1,5	40	16	4,5
CNL- 50	65	51	150	85	60	120	14	95	15	G 1/2	160	53	33	3	17	180	M 22x1,5	50	22	6
CNL- 63	73	58	165	100	75	135	14	110	20	G 3/4	185	63	32	3	22	216	M 28x1,5	45	28	6
CNL- 80	83	68	205	120	95	168	18	135	20	G 3/4	205	68	47	3	27	226	M 35x1,5	50	35	8
CNL-100	101	81	250	145	115	205	23	165	25	G 1	240	80	41	5	30	279	M 45x1,5	60	45	8

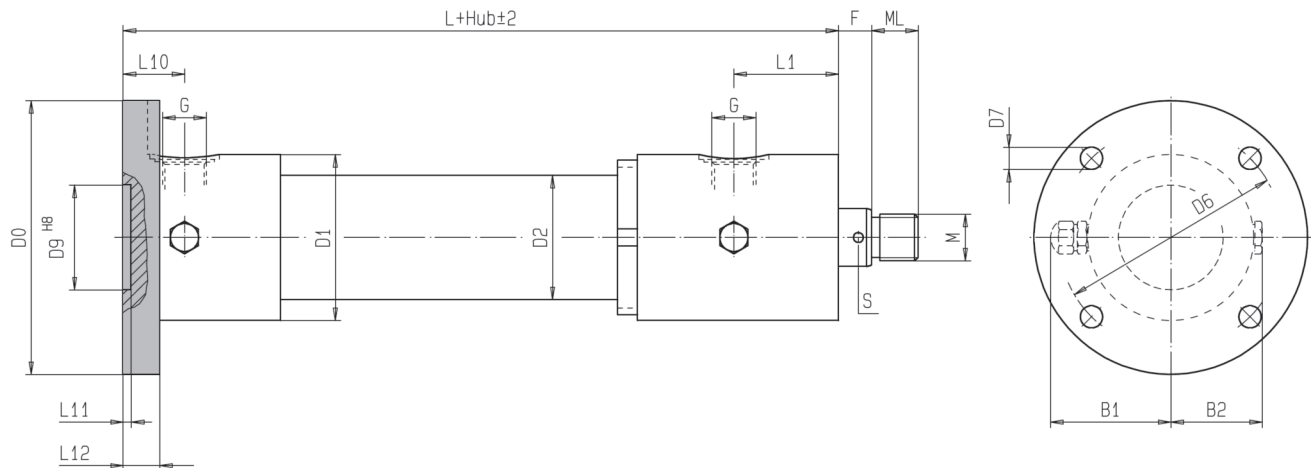
Remark

- B1 + B2 only in case of cylinders with stroke-end damping
- B2 only in case of optional venting
- MH (minimum stroke) determines the shortest installation dimension (L + lift ± T).
- Cylinders with a stroke below the indicated minimum stroke have similar installation dimensions.

Dimensions 7

Mounting 7

Flange on cylinder base



Type	B1	B2	D0	D1	D2	D6	D7	D9	F	G	L	L1	L10	L11	L12	M	MH	ML	S
CNL- 40	58	43	130	70	50	105	11	47	15	G 1/2	145	43	37	5	15	M 16x1,5	40	16	4,5
CNL- 50	65	51	150	85	60	120	14	55	15	G 1/2	165	53	38	5	17	M 22x1,5	50	22	6
CNL- 63	73	58	165	100	75	135	14	63	20	G 3/4	190	63	37	5	22	M 28x1,5	45	28	6
CNL- 80	83	68	205	120	95	168	18	80	20	G 3/4	210	68	52	5	27	M 35x1,5	50	35	8
CNL-100	101	81	250	145	115	205	23	100	25	G 1	250	80	51	10	30	M 45x1,5	60	45	8

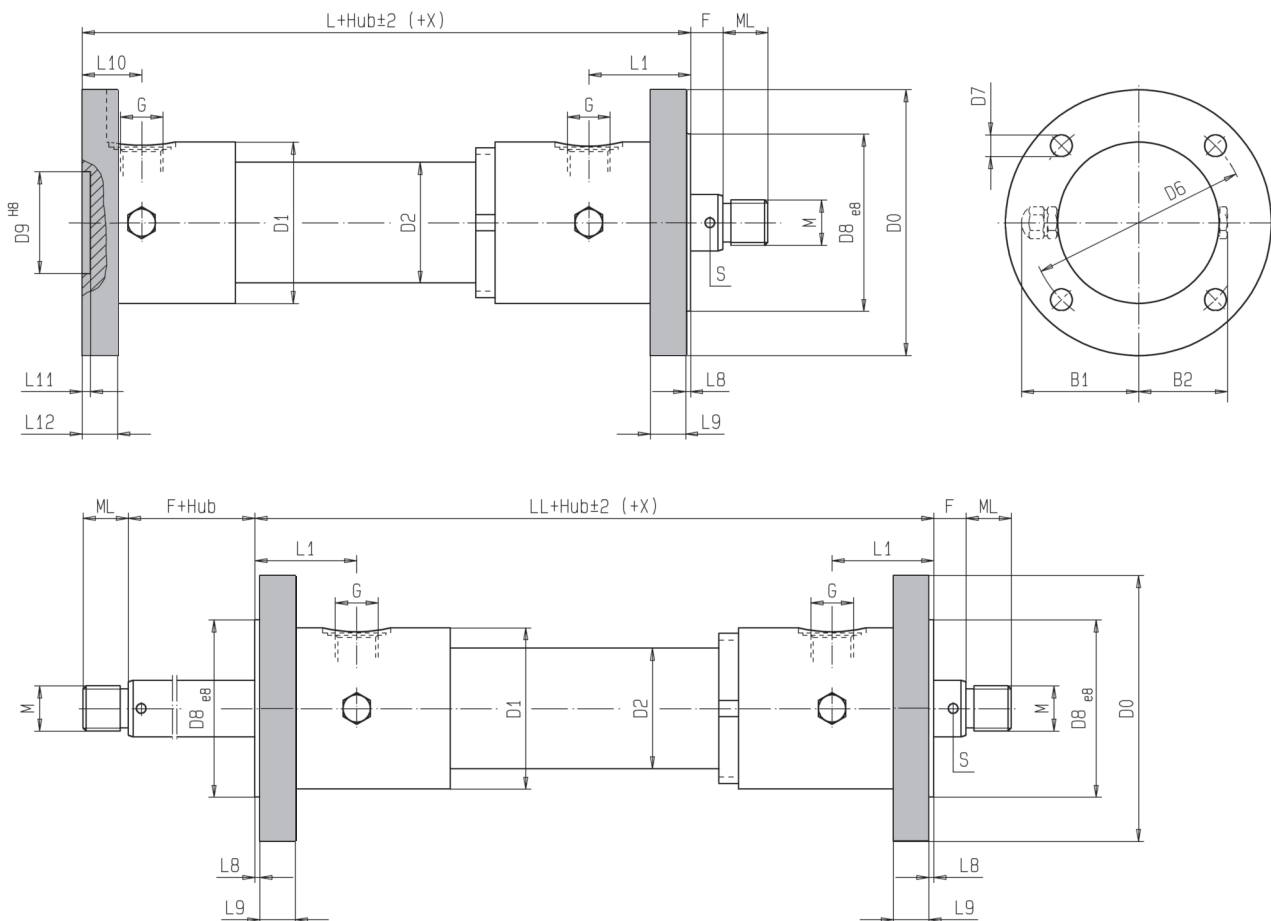
Remark

- B1 + B2 only in case of cylinders with stroke-end damping
- B2 only in case of optional venting
- MH (minimum stroke) determines the shortest installation dimension (L + lift ± T).
- Cylinders with a stroke below the indicated minimum stroke have similar installation dimensions.

Dimensions 8

Mounting 8

Flange on cylinder head and base



Type	B1	B2	D0	D1	D2	D6	D7	D8	D9	F	G	L	L1	L8	L9	L10	L11	L12	LL	M	MH	ML	S
CNL- 40	58	43	130	70	50	105	11	80	47	15	G 1/2	145	43	3	15	37	5	15	151	M 16x1,5	40	16	4,5
CNL- 50	65	51	150	85	60	120	14	95	55	15	G 1/2	165	53	3	17	38	5	17	180	M 22x1,5	50	22	6
CNL- 63	73	58	165	100	75	135	14	110	63	20	G 3/4	190	63	3	22	37	5	22	216	M 28x1,5	45	28	6
CNL- 80	83	68	205	120	95	168	18	135	80	20	G 3/4	210	68	3	27	52	5	27	226	M 35x1,5	50	35	8
CNL-100	101	81	250	145	115	205	23	165	100	25	G 1	250	80	5	30	51	10	30	279	M 45x1,5	60	45	8

Remark

- B1 + B2 only in case of cylinders with stroke-end damping
- B2 only in case of optional venting
- MH (minimum stroke) determines the shortest installation dimension (L + lift ± T).
- Cylinders with a stroke below the indicated minimum stroke have similar installation dimensions

Weights

Version D + D/D

Type	Basic weight in kg for mounting ...				Weight per mm stroke in kg with rod diameter ...			
	1 + 2	4	6 + 7	8	Ø	Weight	Ø	Weight
CNL- 40	5,6	6,5	6,4	7,0	22	0,009	28	0,011
CNL- 50	8,8	10,2	10,2	10,9	30	0,013	35	0,015
CNL- 63	15,0	16,2	17,0	18,5	35	0,016	45	0,023
CNL- 80	23,2	25,6	26,7	29,2	50	0,032	55	0,035
CNL-100	41,5	46,5	50,6	53,7	60	0,042	70	0,052

Version B + B/D

Type	Basic weight in kg for mounting ...			Weight per mm stroke in kg with rod diameter ...			
	4	6	8	Ø	Weight	Ø	Weight
CNL- 40	7,2	7,2	8,8	22	0,012	28	0,013
CNL- 50	12,1	12,0	14,2	30	0,018	35	0,019
CNL- 63	19,5	20,0	23,5	35	0,025	45	0,029
CNL- 80	33,5	34,5	38,0	50	0,047	55	0,050
CNL-100	56,3	56,4	65,7	60	0,064	70	0,072

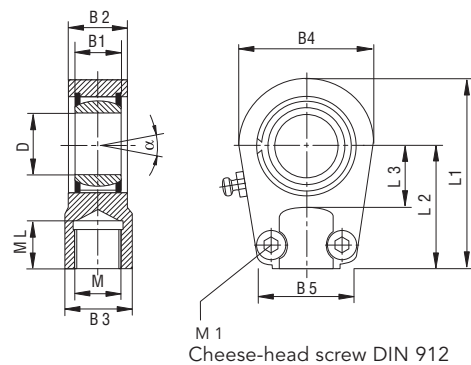
Swivel fittings

Installation information

The swivel fittings should not lie on the front side on the piston rod, because otherwise the danger of break-off exists for the piston-rod screw thread by jamming as a result of cylinder screw.

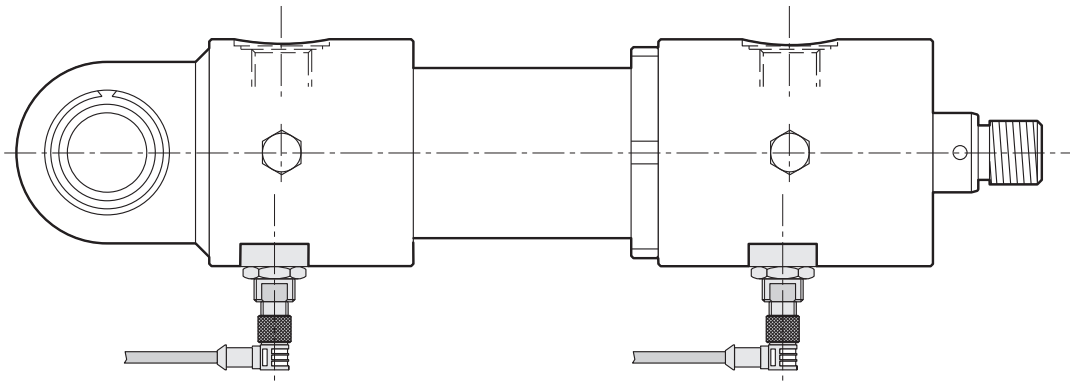
Order reference

The swivel fittings are to be ordered separately.



Swivel fittings	B1	B2	B3	B4	B5	D	L1	L2	L3	M	M1	ML	α	Weight in kg
GLK- 40 B	20	23	25	56	41	25	78	50	25	M 16 x 1,5	M 8	17	14°	0,5
GLK- 50 B	22	28	32	64	46	30	92	60	30	M 22 x 1,5	M 8	23	12°	0,75
GLK- 63 B	25	30	40	78	58	35	109	70	38	M 28 x 1,5	M 10	29	12°	1,2
GLK- 80 B	28	35	49	94	66	40	132	85	45	M 35 x 1,5	M 10	36	14°	2,0
GLK-100 B	35	40	61	116	88	50	163	105	55	M 45 x 1,5	M 12	46	12°	3,8

Type Series CNL-E with electronic proximity switches



Description

Electronic proximity switches are employed instead of mechanical limit switches if reliable and exact end-position signals make this necessary.

The signals are suitable for the activation of all commercially normal PLC controls, as well as relays.

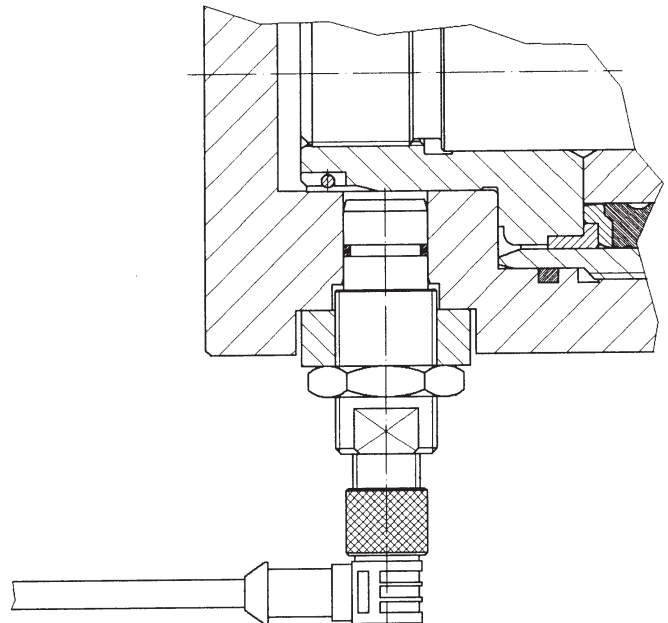
Characteristics

- Reliable end-position signal output
- Resistant against extreme environmental stresses
- Suitable for connection to PC controls
- Integrated short-circuit protection
- Switching contact-free and without touching, therefore no wear parts in the switching system

Note

Detailed descriptions of the proximity switch on request.

Built-in proximity switch



Product portfolio

Gear Pumps

Gear pumps for lubricating oil supply equipment, low pressure filling and feed systems, dosing and mixing systems.

Mobile Hydraulics

Single and multistage high pressure gear pumps, hydraulic motors and valves for construction machinery, vehicle-mounted machines.

Flow Measurement

Gear, turbine and screw type flow meters and electronics for volume and flow metering technology in hydraulics, processing and laquering technology.

Industrial Hydraulics / Test Bench Construction

Cetop directional control and proportional valves, hydraulic cylinders, pressure, quantity and stop valves for pipe and slab construction, hydraulic accessories for industrial hydraulics (mobile and stationary use).
Technology Test benches / Fluid Test benches.



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