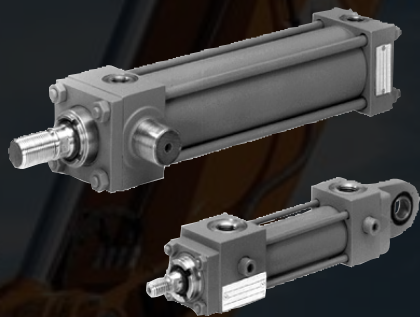




Hydraulic cylinders Tie rod design



- ▶ Series 70
- ▶ Component series 1X
- ▶ Nominal pressure 70 bar [7 MPa]

Type CD70 / CG70

Features

- ▶ 16 types of mounting
- ▶ Piston Ø (**ØAL**) 25 ... 200 mm
- ▶ Piston rod Ø (**ØMM**) 12 ... 140 mm
- ▶ Stroke length up to 3 m

Ordering code: Series CD70

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
CD	70		/	—		Z	1X	/						—			*

01	Differential cylinder	CD
02	Series	70

Types of mounting

03	Spherical bearing at the cylinder base, page 12 ... 15	B
	Fork at the cylinder base, page 16 ... 19	G ¹⁾
	Rectangular flange at the cylinder head, page 20 ... 23	C ²⁾
	Square flange at the cylinder head, page 24 ... 27	H
	Rectangular flange at the cylinder base, page 28 ... 31	D ²⁾
	Square flange at the cylinder base, page 32 ... 35	K
	Trunnion at the cylinder head, page 36 ... 39	R ¹⁾
	Trunnion in cylinder center, page 40 ... 43	E ³⁾
	Trunnion at the cylinder base, page 44 ... 47	S
	Foot mounting, page 48 ... 51	F
	Foot mounting with fitting key, page 52 ... 55	L ²⁾
	Foot mounting with seal ring sealing for subplate mounting, page 56 ... 59	M
	Tapped holes in cylinder head and base, page 60 ... 63	N
	Foot mounting on front side with fitting key, page 64 ... 67	T ^{1; 2)}
	Extended tie rod at the cylinder head, page 68 ... 71	P
	Extended tie rod at the cylinder base, page 72 ... 75	Q
04	Piston Ø (ØAL) from 25 ... 200 mm; see page 9	...
05	Piston rod Ø (ØMM) from 12 ... 140 mm; see page 9	...
06	Stroke length in mm ⁴⁾	...

Design principle

07	Head and base connected to tie rod	Z
08	Component series 11 ... 19 (unchanged installation and connection dimensions)	1X

Line connection/version

09	Flange connection with seal ring sealing; only possible with "M" type of mounting	00
	Pipe thread according to ISO 228/1	01 ¹⁰⁾
	Metric ISO thread	02 ¹⁰⁾
	Enlarged line connection; pipe thread according to ISO 228/1	13 ^{5; 10)}
	Enlarged line connection; metric ISO thread	14 ^{5; 10)}

Piston rod design

10	Hardened and hard chromium-plated	H
	Hard chromium-plated, from piston Ø ≥ 80 mm	C ⁶⁾

Piston rod end

11	Male thread	B
	Male thread	C
	Internal thread	E ⁷⁾
	Thread for swivel head	F
	With mounted swivel head CGK	T

Ordering code: Series CD70

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
CD	70		/	—		Z	1X	/						—			*

End position cushioning

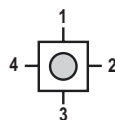
12	Without	U
	Base side	K
	Head side	S
	On both sides	D

Hydraulic fluid

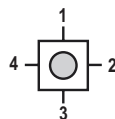
13	Seals, suitable for mineral oil according to DIN 51524 (HL, HLP)	M
	FKM seals suitable for phosphate ester (HFDR)	V

Line connection/position at head

14	Enter position; observe table on page 6!	1 ⁸⁾
	View to piston rod	2 ⁸⁾
		3 ⁸⁾
		4 ⁸⁾


Line connection/position at base

15	Enter position; observe table on page 6!	1 ⁸⁾
	View to piston rod	2 ⁸⁾
		3 ⁸⁾
		4 ⁸⁾


Seals

16	Standard version	A
	Design for low-friction operation	T
17	Enter support width extension; see page 85	...
18	Further details in the plain text ⁹⁾	*

¹⁾ Not possible with piston Ø 25 mm

²⁾ Not possible with piston Ø 200 mm

³⁾ Trunnion position freely selectable.

When ordering, always specify the "XV" dimension in the plain text in mm.

With piston Ø 25 mm, the trunnions are at the cylinder head.

⁴⁾ Observe the admissible stroke length, page 82 to 84

⁵⁾ Dimensions see page 76. Not possible with "K" type of mounting.

⁶⁾ Not possible with "E" piston rod end

⁷⁾ Not possible with piston rod Ø 12 mm

⁸⁾ All graphical representations in the data sheet show position 1

⁹⁾ Always specify the attachment of inductive proximity switches or piston rod extension "LY" in the order in the plain text

¹⁰⁾ Not possible with "M" type of mounting

Order example:

CD70B50/22-200Z1X/01HBDM1-1A

With special versions, an "X" will be inserted in the type key at the corresponding position and an SO number will be amended at the end.

Ordering code: Series CG70

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
CG	70		/	—		Z	1X	/						—			*

01	Double-acting cylinders	CG
02	Series	70

Types of mounting

03	Rectangular flange at the cylinder head, page 20 ... 23	C ²⁾
	Square flange at the cylinder head, page 24 ... 27	H
	Trunnion at the cylinder head, page 36 ... 39	R ¹⁾
	Trunnion in cylinder center, page 40 ... 43	E ³⁾
	Foot mounting, page 48 ... 51	F
	Foot mounting with fitting key, page 52 ... 55	L ²⁾
	Foot mounting with seal ring sealing for subplate mounting, page 56 ... 59	M
	Tapped holes in cylinder head and base, page 60 ... 63	N
	Extended tie rod at the cylinder head, page 68 ... 71	P
04	Piston Ø (ØAL) from 25 ... 200 mm; see page 9	...
05	Piston rod Ø (ØMM) from 12 ... 140 mm; see page 9	...
06	Stroke length in mm ⁴⁾	...

Design principle

07	Head and base connected to tie rod	Z
08	Component series 11 ... 19 (unchanged installation and connection dimensions)	1X

Line connection/version

09	Flange connection with seal ring sealing; only possible with "M" type of mounting	00
	Pipe thread according to ISO 228/1	01 ¹⁰⁾
	Metric ISO thread	02 ¹⁰⁾
	Enlarged line connection; pipe thread according to ISO 228/1	13 ^{5; 10)}
	Enlarged line connection; metric ISO thread	14 ^{5; 10)}

Piston rod design

10	Hardened and hard chromium-plated	H
	Hard chromium-plated, from piston Ø ≥ 80 mm	C ⁶⁾

Piston rod end

11	Male thread	B
	Male thread	C
	Internal thread	E ⁷⁾
	Thread for swivel head	F
	With mounted swivel head CGK	T

End position cushioning

12	Without	U
	Base side	K
	Head side	S
	On both sides	D

Hydraulic fluid

13	Seals, suitable for mineral oil according to DIN 51524 (HL, HLP)	M
	FKM seals suitable for phosphate ester (HFDR)	V

Ordering code: Series CG70

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
CG	70		/	—		Z	1X	/						—			*

Line connection/position at head

14	Enter position; observe table on page 6!		1 ⁸⁾
	View to piston rod		2 ⁸⁾
			3 ⁸⁾
			4 ⁸⁾

Line connection/position at base

15	Enter position; observe table on page 6!		1 ⁸⁾
	View to piston rod		2 ⁸⁾
			3 ⁸⁾
			4 ⁸⁾

Seals

16	Standard version	A
	Design for low-friction operation	T
17	Enter support width extension; see page 85	...
18	Further details in the plain text ⁸⁾	*

¹⁾ Not possible with piston Ø 25 mm

²⁾ Not possible with piston Ø 200 mm

³⁾ Trunnion position freely selectable.

When ordering, always specify the "XV" dimension in the plain text in mm.

With piston Ø 25 mm, the trunnions are at the cylinder head.

⁴⁾ Observe the admissible stroke length, page 82 to 84

⁵⁾ Dimensions see page 76

⁶⁾ Not possible with "E" piston rod end

⁷⁾ Not possible with piston rod Ø 12 mm

⁸⁾ All graphical representations in the data sheet show position 1

⁹⁾ Always specify the attachment of inductive proximity switches or piston rod extension "LY" in the order in the plain text

¹⁰⁾ Not possible with "M" type of mounting

Order example:

CG70C50/22-200Z1X/01HBDM1-1A

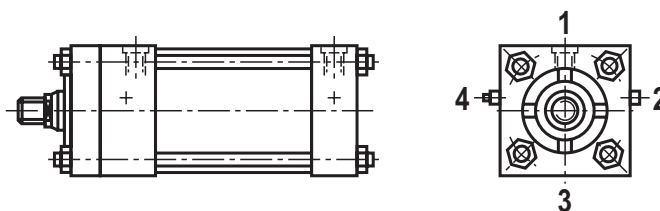
With special versions, an "X" will be inserted in the type key at the corresponding position and an SO number will be amended at the end.

Position of the line connections

By rotating the cylinder head and/or cylinder base, the position of the line connections can be varied during the assembly for most cylinder mounting types. The possibilities can be seen in the following table.

Throttle and check valve will also change their position accordingly.

With F, L, N and T types of mounting as well as at the cylinder base with G type of mounting, throttle and check valve are in position 1 when the line connection is rotated.



Types of mounting	Selectable position of the line connections															
	B	C	D	E	F	G	H	K	L	M	N	P	Q	R	S	T
at the cylinder head	1	1	1	1	1	1	1	1	1	–	1	1	1	1	1	1
	2	2	2	2	2	2	2	2	2	–	2	2	2	–	2	2
	3	3	3	3	–	3	3	3	–	3	–	3	3	3	3	–
	4	4	4	4	4	4	4	4	4	–	4	4	4	–	4	4
at the cylinder base	1	1	1	1	1	1	1	1	1	–	1	1	1	1	1	1
	2	2	2	2	2	2	2	2	2	–	2	2	2	2	–	2
	3	3	3	3	–	3	3	3	–	3	–	3	3	3	3	–
	4	4	4	4	4	4	4	4	4	–	4	4	4	4	–	4



= Position 2 and 4 not possible with:

- ▶ Piston Ø 25 to 100 mm with enlarged line connection, version 13 and 14
- ▶ Piston Ø 25, 32/22 and 32/25 with line connection, version 01 and 02
- ▶ Piston Ø 32/18, 40/25, 50/36 and 63/45 in each case with damping



= Position 2 and 4 not possible with:

- ▶ Piston Ø 25
- ▶ Piston Ø 32 to 100 mm with enlarged line connection, version 13 and 14



= Position 2 and 4 not possible with piston Ø 25



= Position 2 and 4 not possible with piston Ø 25 with enlarged line connection, version 13 and 14



= Position 2 and 4 not possible with:

- ▶ Piston Ø 25 to 200 mm with enlarged line connection, version 13 and 14
- ▶ Piston Ø 25, 32 and 40 with line connection, version 01 and 02
- ▶ Piston Ø 50/36 and 63/45 with damping



= Position 2 and 4 not possible with:

- ▶ Piston Ø 25 to 63 mm with enlarged line connection, version 13 and 14

Technical data

(For applications outside these parameters, please consult us!)

general		
Weight	kg	See page 92
Installation position		Any
Ambient temperature range	°C	-20 ... +80
Primer coat ¹⁾	µm	Min. 40

hydraulic		
Nominal pressure	bar [MPa]	70 [7]
Maximum operating pressure ²⁾ (depending on piston Ø and type of mounting)	bar [MPa]	105 [10.5]
Minimum operating pressure ³⁾ (without load)	bar [MPa]	10 [1]
Static test pressure (depending on piston Ø and type of mounting)	bar [MPa]	Admissible operating pressure x 1.3
Hydraulic fluid		See table below
Hydraulic fluid temperature range	°C	-20 ... +80
Viscosity range	mm ² /s	12 ... 380 (preferably 20 ... 100)
Maximum admissible degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)		Class 20/18/15 ⁴⁾
Stroke speed (depending on line connection)	m/s	0.5
Bleeding		By default
Tolerances see page 86		

Hydraulic fluid	Classification	Suitable sealing materials	Standards
Mineral oils	HL, HLP	NBR, FKM	DIN 51524
Phosphate ester	HFDR	FKM	ISO 12922

¹⁾ By default, hydraulic cylinders are primed with a coating (color gentian blue RAL 5010) of min. 40 µm. Other colors upon request. With hydraulic cylinders and attachment parts, the following areas are not primed or coated:

- ▶ All fit diameters to the customer side
- ▶ Sealing surfaces for line connection
- ▶ Sealing surfaces for flange connection
- ▶ Inductive proximity switches

The areas that are not painted are protected by means of a solvent-free corrosion protection agent.

²⁾ If there are extreme loads, such as high sequence cycles, the mounting elements and threaded piston rod connections must be checked for the application.

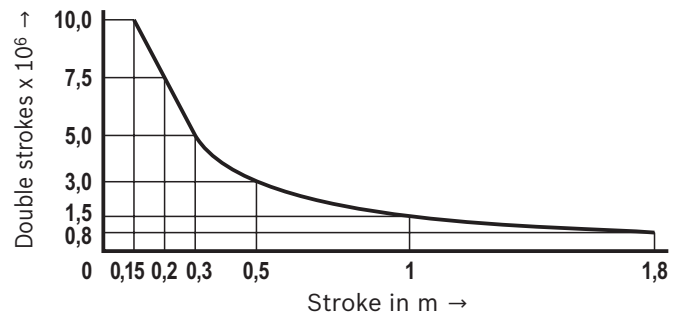
- ³⁾ A minimum operating pressure is required in order to guarantee good functioning of the hydraulic cylinder. Without load, a minimum pressure of 10 bar is recommended for differential cylinders; for lower pressures as well as double-acting cylinders, please contact us.
- ⁴⁾ The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the life cycle of the components.

Technical data

(For applications outside these parameters, please consult us!)

Life cycle:

hydraulic cylinders correspond to the reliability recommendations for industrial applications.
 ≥ 10000000 double strokes in idle continuous operation or
 3000 km piston travel at 70 % of the nominal pressure, without load on the piston rod, with a maximum velocity of 0.5 m/s, with a failure rate of less than 5 %.



Notice!

Boundary and application conditions:

- ▶ The mechanical alignment of the movement axis and thus the mounting points of hydraulic cylinder and piston rod must be ensured. Lateral forces on the guides of piston rod and piston are to be avoided. It may be necessary to consider the own weight of the hydraulic cylinder (types of mounting: B, G, R, E or S) or the piston rod.
- ▶ The admissible stroke length/kinking load of the piston rod and/or the hydraulic cylinder must be observed (see page 82 to 85).
- ▶ The maximum admissible operating pressure must be complied with in any operating state of the hydraulic cylinder. Possible pressure intensification resulting from the ratio of annulus area to piston area and possible throttling points are to be observed.
- ▶ Detrimental environmental influences, like e.g. aggressive finest particles, vapors, high temperatures, etc. as well as contaminations and deterioration of the hydraulic fluid are to be avoided.

Standards:

standard; the line connection threads are optionally designed as pipe thread according to ISO 228/1 or as metric ISO thread.

Acceptance:

Every hydraulic cylinder is tested according to standard and complying with ISO 10100: 2001.

Safety instructions:

For assembly, commissioning and maintenance of hydraulic cylinders, observe the operating instructions! Service and repair works have to be performed by personnel especially trained for this purpose. In case of damage as a consequence of assembly, maintenance or repair work not performed by , the warranty claim will be forfeited.

Check lists for hydraulic cylinders:

Hydraulic cylinders the characteristics and/or application parameters of which deviate from the values specified in the data sheet can only be offered as special version upon request. For offers, the deviations of the characteristics and/or application parameters must be described in the check lists for hydraulic cylinders.

This list does not claim to be complete. In case of questions regarding the compatibility with media or exceedance of the boundary or application conditions, please contact us.

Project planning software ICS (Interactive Catalog System)

The ICS (Interactive Catalog System) is a selection and project planning aid for hydraulic cylinders. The ICS allows designers for machines and systems to quickly and reliably find the perfect hydraulic cylinder solution through logic-guided type code enquiries. This software helps to solve design and project planning tasks more quickly and

efficiently. After having been guided through the product selection, the user quickly and reliably gets the exact technical data of the selected component as well as 2D and 3D CAD data in the correct file format for all common CAD systems.

Diameters, forces and areas

Operating pressure in bar	Piston Ø	mm	25		32			40			50		
	Piston rod Ø	mm	12	16	18	22	25	16	18	25	22	25	36
40	Force on piston side	kN	1.96		3.22			5.03			7.85		
	Force on rod side	kN	1.55	1.19	2.19	1.69	1.25	4.21	3.99	3.06	6.32	5.87	3.78
50	Force on piston side	kN	2.46		4.02			6.29			9.82		
	Force on rod side	kN	1.94	1.49	2.74	2.11	1.56	5.27	5.00	3.83	7.91	7.35	4.73
70	Force on piston side	kN	3.44		5.63			8.80			13.75		
	Force on rod side	kN	2.71	2.08	3.84	2.96	2.19	7.38	7.01	5.40	11.08	10.31	6.62
105	Force on piston side	kN	5.16		8.45			13.20			20.62		
	Force on rod side	kN	3.96	3.04	5.77	4.44	3.28	11.07	10.52	8.03	16.62	15.44	9.93
Piston area		cm ²	4.91		8.04			12.56			19.63		
Annulus area		cm ²	3.78	2.90	5.50	4.24	3.13	10.55	10.02	7.65	15.83	14.71	9.46
Area ratio		φ	1.25:1	1.6:1	1.4:1	2:1	2.5:1	1.2:1	1.25:1	1.6:1	1.25:1	1.35:1	2:1
Damping area	Force on piston side	cm ²	2.63		5.77			10.30			15.11		
	Force on rod side	cm ²	2.63	2.63	4.90	3.52	2.50	8.70	8.76	7.05	14.33	13.47	8.29
Max. available stroke length		mm	600		800			1000			1200		

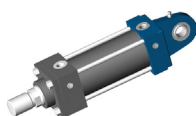
Operating pressure in bar	Piston Ø	mm	63				80			100		
	Piston rod Ø	mm	25	28	36	45	36	45	56	45	50	70
40	Force on piston side	kN	12.47				20.10			31.42		
	Force on rod side	kN	10.49	9.99	8.38	6.00	16.02	13.73	10.25	25.04	23.55	16.01
50	Force on piston side	kN	15.59				25.10			39.27		
	Force on rod side	kN	13.12	12.50	10.49	7.62	20.03	17.16	12.80	31.29	29.43	20.02
70	Force on piston side	kN	21.82				35.18			54.98		
	Force on rod side	kN	18.36	17.50	14.68	10.68	28.04	24.03	17.93	43.80	41.20	28.01
105	Force on piston side	kN	–				–			–		
	Force on rod side	kN	–	–	–	–	–	–	–	–	–	–
Piston area		cm ²	31.16				50.24			78.50		
Annulus area		cm ²	26.25	25.01	20.98	15.26	40.07	34.34	25.62	62.60	58.88	40.04
Area ratio		φ	1.2:1	1.25:1	1.4:1	2:1	1.25:1	1.4:1	2:1	1.25:1	1.35:1	2:1
Damping area	Force on piston side	cm ²	26.65				40.64			58.90		
	Force on rod side	cm ²	23.13	23.13	19.80	13.08	37.70	30.60	20.07	58.90	54.70	31.97
Max. available stroke length		mm	1400				1700			2000		

Operating pressure in bar	Piston Ø	mm	125				150				200		
	Piston rod Ø	mm	50	56	63	90	63	70	80	100	90	100	140
40	Force on piston side	kN	49.09				70.68				125.66		
	Force on rod side	kN	41.20	39.20	36.59	23.63	58.17	55.25	50.54	39.23	100.13	94.16	64.03
50	Force on piston side	kN	61.35				88.35				–		
	Force on rod side	kN	51.49	49.01	45.83	29.53	72.71	69.06	63.16	49.05	–	–	–
70	Force on piston side	kN	85.90				–				–		
	Force on rod side	kN	72.10	68.60	64.03	41.35	–	–	–	–	–	–	–
105	Force on piston side	kN	–				–				–		
	Force on rod side	kN	–	–	–	–	–	–	–	–	–	–	–
Piston area		cm ²	122.66				176.63				314.00		
Annulus area		cm ²	103.03	98.04	91.50	59.08	145.47	138.17	126.38	98.13	250.42	235.50	160.14
Area ratio		φ	1.2:1	1.25:1	1.35:1	2:1	1.2:1	1.25:1	1.4:1	1.8:1	1.25:1	1.35:1	2:1
Damping area	Force on piston side	cm ²	103.08				138.23				275.68		
	Force on rod side	cm ²	92.50	92.50	47.20	47.20	130.10	130.10	81.70	81.70	238.70	219.00	137.50
Max. available stroke length		mm	2300				2600				3000		

Overview types of mounting: Series CD70

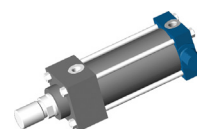
CD70 B

Page 12 ... 15



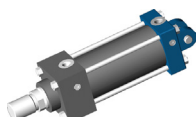
CD70 S

Page 44 ... 47



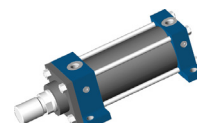
CD70 G

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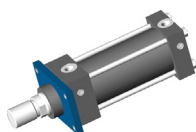
CD70 F

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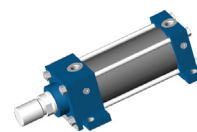
CD70 C

Page 20 ... 23



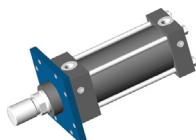
CD70 L

Page 52 ... 55



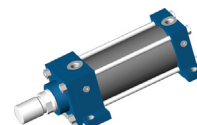
CD70 H

Page 24 ... 27



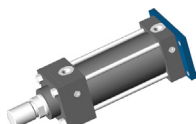
CD70 M

Page 56 ... 59



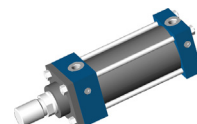
CD70 D

Page 28 ... 31



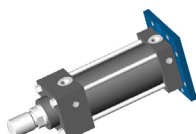
CD70 N

Page 60 ... 63



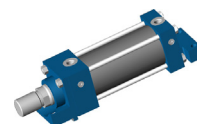
CD70 K

Page 32 ... 35



CD70 T

Page 64 ... 67



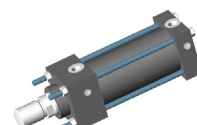
CD70 R

Page 36 ... 39



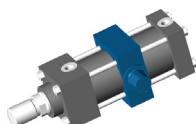
CD70 P

Page 68 ... 71



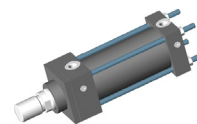
CD70 E

Page 40 ... 43



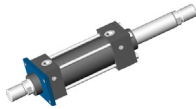
CD70 Q

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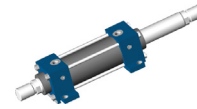


Overview types of mounting: Series CG70**CG70 C**

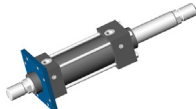
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**CG70 L**

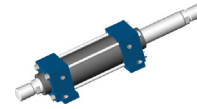
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**CG70 H**

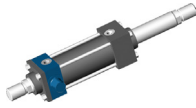
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**CG70 M**

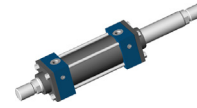
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**CG70 R**

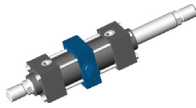
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**CG70 N**

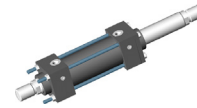
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**CG70 E**

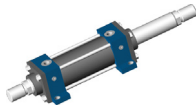
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**CG70 P**

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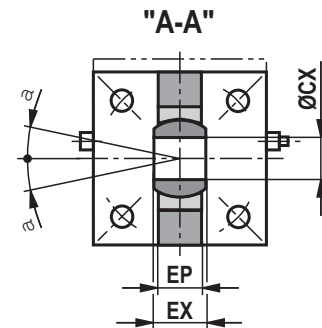
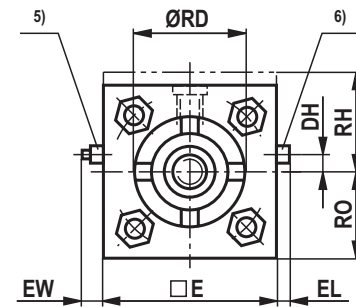
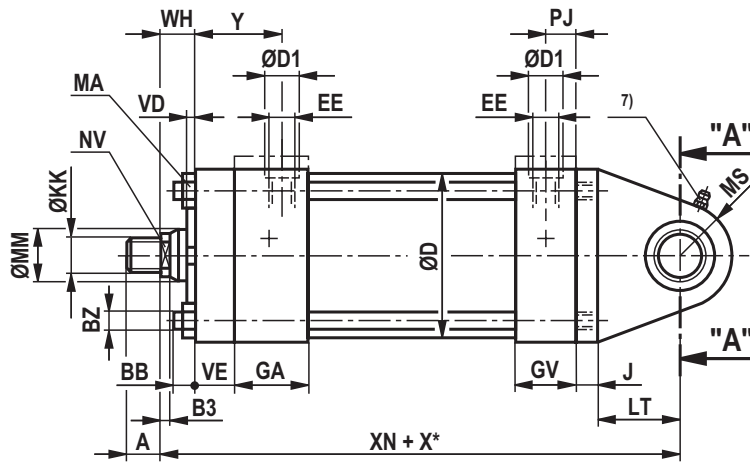
**CG70 F**

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Dimensions: Type of mounting B
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
25	12	105	M8x1.25	M10x1.5	M10	15	15
	16		M10x1.5	M12x1.5		19	
32	18	105	M10x1.5	M12x1.5	M12	19	18
	22		M16x1.5	M20x1.5		28	
	25		M20x1.5	M22x1.5			
40	16	105	M10x1.5	M12x1.5	M14	19	21
	18		M20x1.5	M22x1.5		28	
	25						
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30
	25		M20x1.5	M22x1.5		41	
	36		M26x1.5	M30x2			
63	25	70	M20x1.5	M22x1.5	M24x2	28	36
	28		M26x1.5	M30x2		41	
	36						
	45		M33x2	M39x2		51	

Dimensions: Type of mounting B
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	XN	J	LT	MS r	ØCX	RO	RH	DH
25	12	25.5	10	5.5	10	38	26	16	6.5	31	149	10	25	17	12	19	24 ¹⁾	5
	16	28.5	13															
32	18	32	14	5.5	10	38	26	16	6	38	150	10	25	19	12	22.5	35.5 ²⁾	7
	22	34	19	8				25	13		159							
	25	38	22															
40	16	28.5	13	5.5	10	38	26	16	6	46	158	10	30	20	15	25.5	38.5 ³⁾	8
	18	32	14					25	13		167							
	25	38	22					8										
50	22	38	19	8	10	38	26	25	13	56	172	10	35	25	20	31.5	44.5 ³⁾	10
	25		22					32	16		179							
	36	50	30	10														
63	25	38	22	8	10	38	26	25	13	69	180	10	40	30	20	38	51 ³⁾	15
	28	42	24					32	16		187							
	36	50.7	30	10				38	19		193							
	45	60	41	12														

ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	□E	EL max.	Y	PJ	EP	EX	α	BB	BZ	M _A Nm
		Line connection														
		01	02	01	02											
25	12	G 1/4	M14x1.5	25	25	12	38	7	33	11	9	10 _{-0.12}	10°	6	M5	5.5
	16															
32	18	G 1/4	M14x1.5	25	25	12	45	7	33	11	9	10 _{-0.12}	10°	6	M5	5.5
	22															
	25															
40	16	G 1/4	M14x1.5	25	25	9	51	4	33	11	10	12 _{-0.12}	8°	6	M5	5.5
	18															
	25															
50	22	G 1/4	M14x1.5	25	25	9	63	4	33	11	14	16 _{-0.12}	9°	8	M8	23
	25															
	36															
63	25	G 1/4	M14x1.5	25	25	6	76	1	33	11	14	16 _{-0.12}	9°	8	M8	23
	28															
	36															
	45															

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

⁴⁾ ØD1 max. 0.5 mm deep

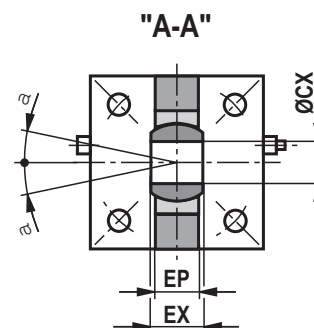
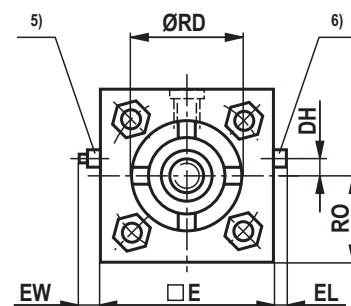
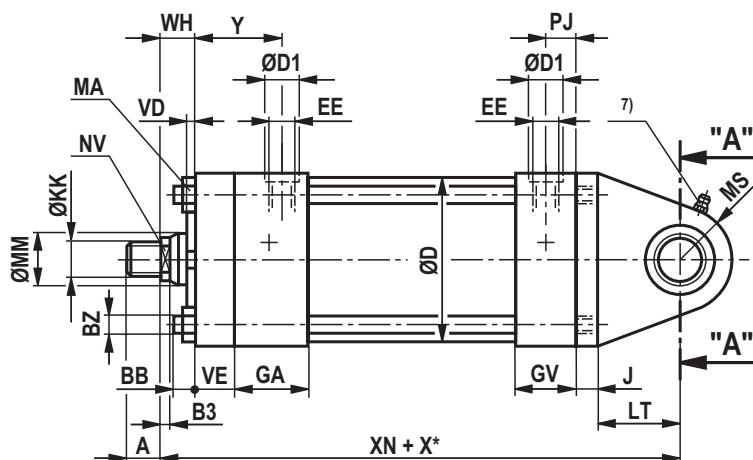
⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

⁷⁾ Lubricating nipple, cone head form A according to DIN 71412

Dimensions: Type of mounting B
 (dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting B
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	XN	J	LT	MS r	ØCX	RO	DH
80	36	50	30	10	16	45	33	25	10	86	209	15	45	35	25	47.5	15
	45	60	41	12				32	13		216						
	56	70	46	15				35			219						
100	45	60	41	12	16	45	33	32	13	106	226	15	55	42	25	57	20
	50	66.6	46	15				35			229						
	70	90	60					41	16		235						
125	50	66.6	46	15	16	45	33	35	13	135	245	15	65	55	30	70	30
	56	70									41						
	63	79.3	55														
	90	108	75														
150	63	79.3	55	15	19	51	40	38	13	160	284	20	80	70	35	82.5	35
	70	90	60														
	80	95.2	75														
	100	120	85														
200	90	108	75	15	19	51	40	38	13	215	307	25	95	80	45	108	55
	100	120	85														
	140	158	120														

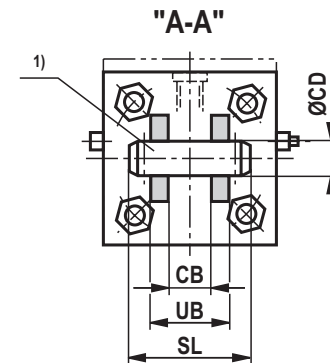
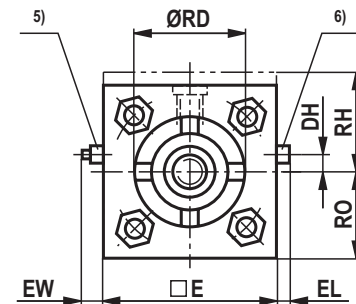
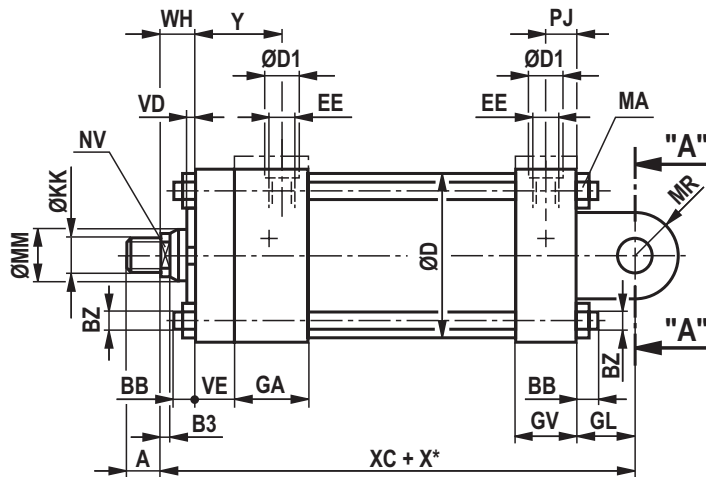
ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	□E	EL max.	Y	PJ	EP	EX	α	BB	BZ	M _A Nm
		Line connection														
		01	02	01	02											
80	36	G 1/2	M22x1.5	34	34	12	95	11	42	14.5	18	20 _{-0.18}	7°	10	M10	46
	45															
	56															
100	45	G 1/2	M22x1.5	34	34	9	114	8	42	14.5	18	20 _{-0.18}	7°	12	M12	80
	50															
	70															
125	50	G 1/2	M22x1.5	34	34	9	140	8	42	14.5	20	22 _{-0.18}	6°	13	M14	125
	56															
	63															
	90															
150	63	G 3/4	M26x1.5	42	42	16	165	12	48	18	23	25 _{-0.12}	6°	15	M16	23
	70															
	80															
	100															
200	90	G 3/4	M26x1.5	42	42	14	216	10	48	18	30	32 _{-0.12}	6°	15	M16	195
	100															
	140															

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- 4) ØD1 max. 0.5 mm deep
5) Adjustable throttle valve for the end position cushioning
6) Check valve and bleeding
7) Lubricating nipple, cone head form A according to DIN 71412

Dimensions: Type of mounting G
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
25	12	-	-	-	-	-	-
	16		-	-	-	-	-
32	18	105	M10x1.5	M12x1.5	M12	19	18
	22		M16x1.5	M20x1.5		28	
	25		M20x1.5	M22x1.5		28	
40	16	105	M10x1.5	M12x1.5	M14	19	21
	18		M10x1.5	M12x1.5		19	
	25		M20x1.5	M22x1.5		28	
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30
	25		M20x1.5	M22x1.5		28	
	36		M26x1.5	M30x2		41	
63	25	70	M20x1.5	M22x1.5	M24x2	28	36
	28		M20x1.5	M22x1.5		28	
	36		M26x1.5	M30x2		41	
	45		M33x2	M39x2		51	

Dimensions: Type of mounting G
(dimensions in mm)

ØAL	ØMM	ØRD	NV	B3	VE	GA	GV	WH	VD	ØD	GL	XC	MR r	ØCD H7 f7	RO	RH	DH		
25	12	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–		
	16																		
32	18	32	14	5.5	10	38	26	16	6	38	19	134	11	12.7	22.5	35.5 ²⁾	7		
	22	34	19	8				25	13			143							
	25	38	22																
40	16	28.5	13	5.5	10	38	26	16	6	46	19	137	12	12.7	25.5	38.5 ³⁾	8		
	18	32	14					25	13			146							
	25	38	22					8											
50	22	38	19	8	10	38	26	25	13	56	19	146	16	12.7	31.5	44.5 ³⁾	10		
	25		22					25	13			146							
	36	50	30	10				32	16			153							
63	25	38	22	8	10	38	26	25	13	69	19	149	16	12.7	38	51 ³⁾ +1.4	15		
	28	42	24					25	13			156							
	36	50.7	30	10				32	16										
	45	60	41	12				38	19			162							

ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	□E	EL max.	Y	PJ	CB +0.5	UB	SL	BB	BZ	M _A Nm
		Line connection														
		01	02	01	02											
25	12	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	16															
32	18	G 1/4	M14x1.5	25	25	12	45	7	33	11	20	40	52	6	M5	5.5
	22															
	25															
40	16	G 1/4	M14x1.5	25	25	9	51	4	33	11	20	44	56	6	M5	5.5
	18															
	25															
50	22	G 1/4	M14x1.5	25	25	9	63	4	33	11	20	44	56	8	M8	23
	25															
	36															
63	25	G 1/4	M14x1.5	25	25	6	76	1	33	11	20	44	56	8	M8	23
	28															
	36															
	45															

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Bolts and pins are included in the scope of delivery

2) Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

3) Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

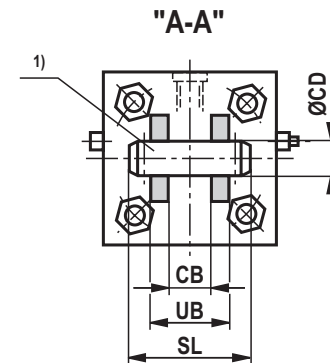
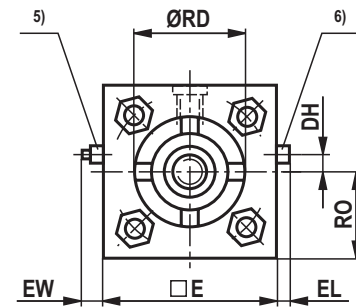
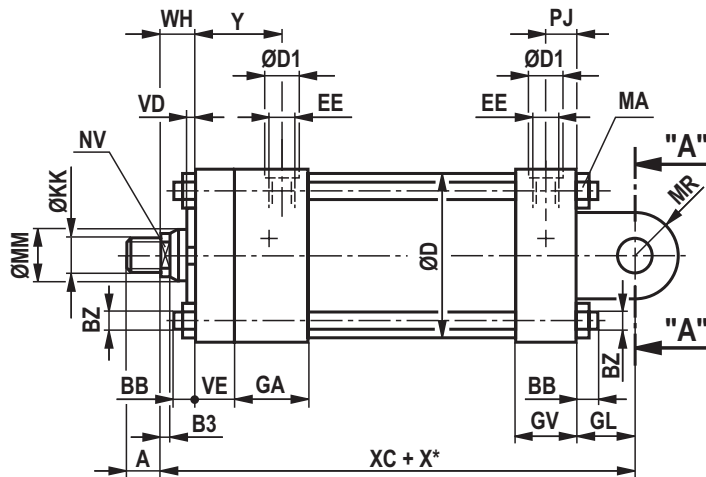
4) ØD1 max. 0.5 mm deep

5) Adjustable throttle valve for the end position cushioning

6) Check valve and bleeding

Dimensions: Type of mounting G
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting G
(dimensions in mm)

ØAL	ØMM	ØRD	NV	B3	VE	GA	GV	WH	VD	ØD	GL	XC	MR r	ØCD H7 f7	RO	DH
80	36	50	30	10	16	45	33	25	10	86	32	181	24	19.1	47.5	15
	45	60	41	12				32	13			188				
	56	70	46	15				35	191							
100	45	60	41	12	16	45	33	32	13	106	32	188	24	19.1	57	20
	50	66.6	46	15				35	191							
	70	90	60					41	16			197				
125	50	66.6	46	15	16	45	33	35	13	135	32	197	24	19.1	70	30
	56	70						41	16			203				
	63	79.3	55													
	90	108	75													
150	63	79.3	55	15	19	51	40	38	13	160	38	222	30	25.4	82.5	35
	70	90	60													
	80	95.2	75													
	100	120	85													
200	90	108	75	15	19	51	40	38	13	215	38	225	30	25.4	108	55
	100	120	85													
	140	158	120													

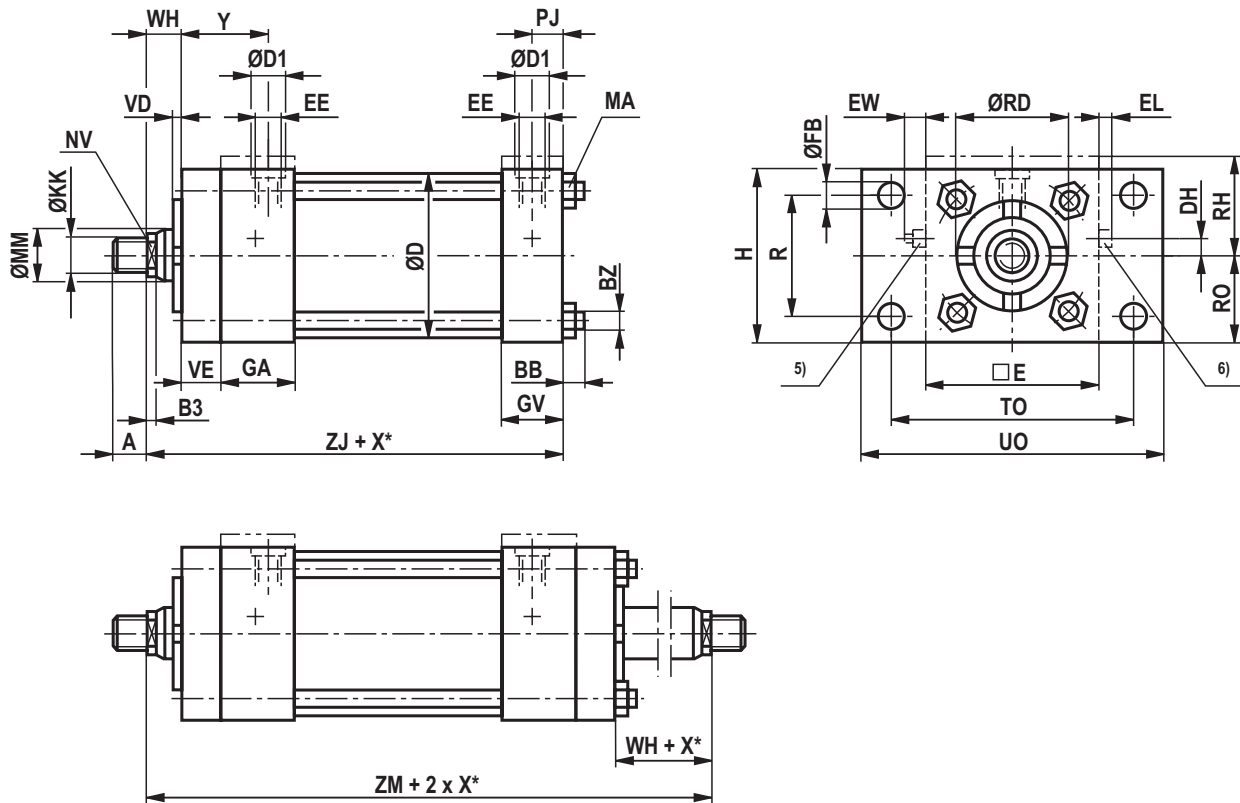
ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	□E	EL max.	Y	PJ	CB +0.5	UB	SL	BB	BZ	M _A Nm
		Line connection														
		01	02	01	02											
80	36	G 1/2	M22x1.5	34	34	12	95	11	42	14.5	33	65	77	10	M10	46
	45															
	56															
100	45	G 1/2	M22x1.5	34	34	9	114	8	42	14.5	33	65	77	12	M12	80
	50															
	70															
125	50	G 1/2	M22x1.5	34	34	9	140	8	42	14.5	33	65	77	13	M14	125
	56															
	63															
	90															
150	63	G 3/4	M26x1.5	42	42	16	140	12	48	18	40	80	92	15	M16	195
	70															
	80															
	100															
200	90	G 3/4	M26x1.5	42	42	14	216	10	48	18	40	80	92	15	M16	195
	100															
	140															

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- 1) Bolts and pins are included in the scope of delivery
- 4) ØD1 max. 0.5 mm deep
- 5) Adjustable throttle valve for the end position cushioning
- 6) Check valve and bleeding

Dimensions: Type of mounting C
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar		KK			A	
		Head side	Base side	Piston rod end				
				C, E	B	F	C, E, B	F
25	12	105	40	M8x1.25	M10x1.5	M10	15	15
	16			M10x1.5	M12x1.5		19	
32	18	105	45	M10x1.5	M12x1.5	M12	19	18
	22		25	M16x1.5	M20x1.5		28	
	25			M20x1.5	M22x1.5			
40	16	105	45	M10x1.5	M12x1.5	M14	19	21
	18		25	M20x1.5	M22x1.5		28	
	25							
50	22	105	25	M16x1.5	M20x1.5	M20x1.5	28	30
	25		M20x1.5	M22x1.5	41			
	36		15	M26x1.5			M30x2	
63	25	70	20	M20x1.5	M22x1.5	M24x2	28	36
	28		10	M26x1.5	M30x2		41	
	36			M33x2	M39x2		51	
	45							

Dimensions: Type of mounting C
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	RO	RH	DH	H	R
25	12	25.5	10	5.5	10	38	26	16	6.5	31	114	152	19	24 ¹⁾	5	38	27.5
	16	28.5	13														
32	18	32	14	5.5	10	38	26	16	6	38	115	153	22.5	35.5 ²⁾	7	45	32
	22	34	19	8				25	13		124	171					
	25	38	22														
40	16	28.5	13	5.5	10	38	26	16	6	46	118	156	25.5	38.5 ³⁾	8	51	36.5
	18	32	14					25	13		127	174					
	25	38	22	8													
50	22	38	19	8	10	38	26	25	13	56	127	174	31.5	44.5 ³⁾	10	63	46.5
	25		22					32	16		134	188					
	36	50	30	10													
63	25	38	22	8	10	38	26	25	13	69	130	177	38	51 ³⁾	15	76	55.5
	28	42	24					32	16		137	191					
	36	50.7	30	10													
	45	60	41	12				38	19		143	203					

ØAL	ØMM	EE		ØD1 4)		EW max.	□E	EL max.	Y	PJ	TO	UO	ØFB	BB	BZ	M _A Nm	X* 7) min.
		Line connection															
		01	02	01	02												
25	12	G 1/4	M14x1.5	25	25	12	38	7	33	11	51	63	6.5	6	M5	5.5	25
	16																
32	18	G 1/4	M14x1.5	25	25	12	45	7	33	11	63	80	8.5	6	M5	5.5	25
	22																
	25																
40	16	G 1/4	M14x1.5	25	25	9	51	4	33	11	70	85	8.5	6	M5	5.5	25
	18																
	25																
50	22	G 1/4	M14x1.5	25	25	9	63	4	33	11	85.5	105	9.5	8	M8	23	30
	25																
	36																
63	25	G 1/4	M14x1.5	25	25	6	76	1	33	11	98.5	115	9.5	8	M8	23	30
	28																
	36																
	45																

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

⁴⁾ ØD1 max. 0.5 mm deep

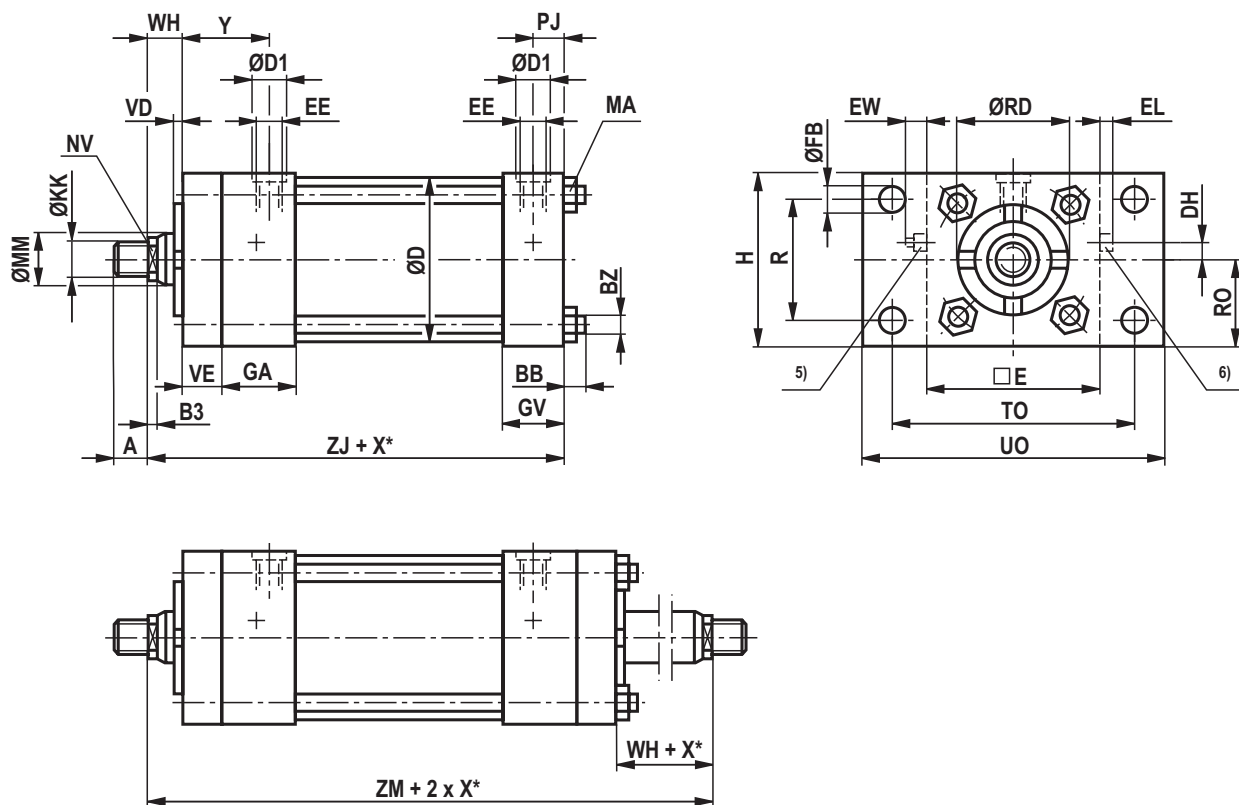
⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

⁷⁾ Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting C
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar		KK			A	
		Head side	Base side	Piston rod end			C, E, B	F
				C, E	B	F		
80	36	70	30	M26x1.5	M30x2	M30x2	41	45
	45			M33x2	M39x2		51	
	56			M39x2	M45x2		57	
100	45	70	25	M33x2	M39x2	M39x3	51	65
	50			M39x2	M45x2		57	
	70			M48x2	M56x2		76	
125	50	70	15	M39x2	M45x2	M42x3	57	65
	56			M48x2	M56x2		76	
	63		10	M48x2	M56x2		76	
	90			M64x2	M76x2		89	
150	63	50	20	M48x2	M56x2	M45x3	76	68
	70			M58x2	M68x2		89	
	80		15	M58x2	M68x2		89	
	100			M76x2	M95x2		101	
200	90	-	-	-	-	-	-	-
	100							
	140							

Dimensions: Type of mounting C
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	RO	DH	H	R
80	36	50	30	10	16	45	33	25	10	86	149	202	47.5	15	95	70
	45	60	41	12				32	13		156	216				
	56	70	46	15				35			159	222				
100	45	60	41	12	16	45	33	32	13	106	156	216	57	20	114	84.5
	50	66.6	46	15				35			159	222				
	70	90	60					41	16		165	234				
125	50	66.6	46	15	16	45	33	35	13	135	165	228	70	30	140	104
	56	70														
	63	79.3	55													
	90	108	75													
150	63	79.3	55	15	19	51	40	38	13	160	184	252	82.5	35	165	124
	70	90	60													
	80	95.2	75													
	100	120	85													
200	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	100															
	140															

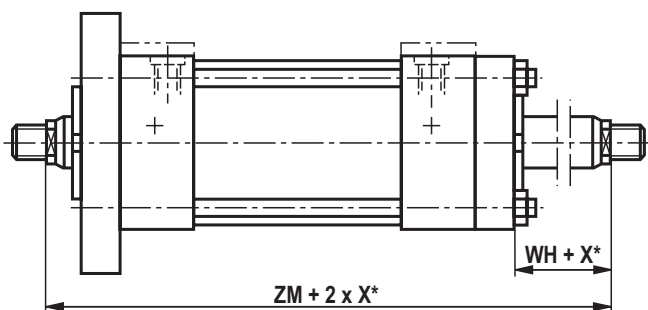
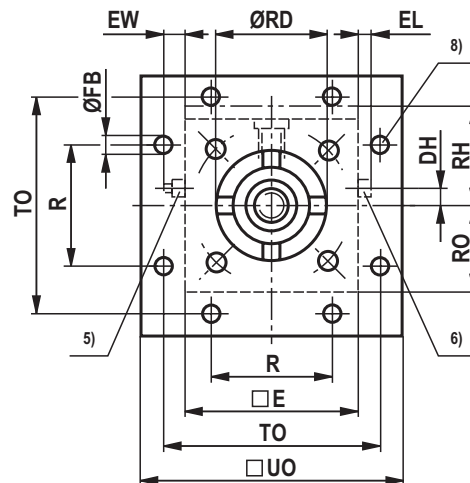
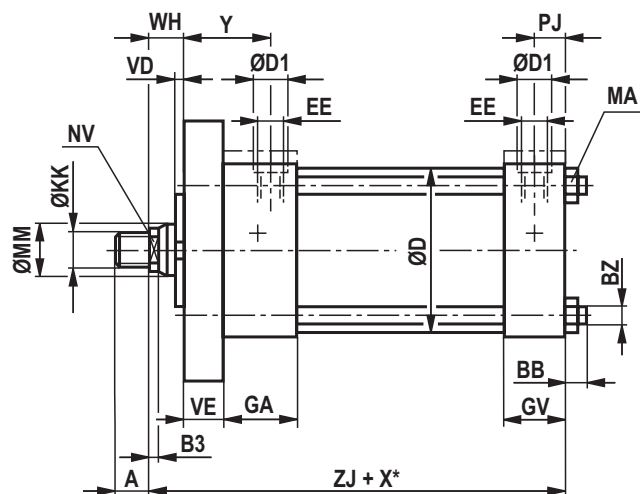
ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	□E	EL max.	Y	PJ	TO	UO	ØFB	BB	BZ	M _A Nm	X* ⁷⁾ min.
		Line connection															
		01	02	01	02												
80	36	G 1/2	M22x1.5	34	34	12	95	11	42	14.5	119	140	11	10	M10	46	30
	45																
	56																
100	45	G 1/2	M22x1.5	34	34	9	114	8	42	14.5	138	160	11	12	M12	80	45
	50																
	70																
125	50	G 1/2	M22x1.5	34	34	9	140	8	42	14.5	168	195	14	13	M14	125	55
	56																
	63																
	90																
150	63	G 3/4	M26x1.5	42	42	16	165	12	48	18	193.5	220	14	15	M16	195	75
	70																
	80																
	100																
200	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	100																
	140																

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- 4) ØD1 max. 0.5 mm deep
5) Adjustable throttle valve for the end position cushioning
6) Check valve and bleeding
7) Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting H
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A			
			Piston rod end						
			C, E	B	F	C, E, B	F		
25	12	105	M8x1.25	M10x1.5	M10	15	15		
	16		M10x1.5	M12x1.5		19			
32	18	105	M10x1.5	M12x1.5	M12	19	18		
	22		M16x1.5	M20x1.5		28			
	25		M20x1.5	M22x1.5					
40	16	105	M10x1.5	M12x1.5	M14	19	21		
	18		M20x1.5	M22x1.5		28			
	25								
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30		
	25		M20x1.5	M22x1.5		41			
	36		M26x1.5	M30x2					
63	25	70	M20x1.5	M22x1.5	M24x2	28	36		
	28		M26x1.5	M30x2		41			
	36								
	45		M33x2	M39x2		51			

Dimensions: Type of mounting H
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	RO	RH	DH	R	
25	12	25.5	10	5.5	10	38	26	16	6.5	31	114	152	19	24 ¹⁾	5	27.5	
	16	28.5	13														
32	18	32	14	5.5	10	38	26	16	6	38	115	153	22.5	35.5 ²⁾	7	32	
	22	34	19	8				25	13		124	171					
	25	38	22														
40	16	28.5	13	5.5	10	38	26	16	6	46	118	156	25.5	38.5 ³⁾	8	36.5	
	18	32	14	8							25	13					127
	25	38	22														
50	22	38	19	8	10	38	26	25	13	56	127	174	31.5	44.5 ³⁾	10	46.5	
	25		22								134	188					
	36	50	30	10				32	16								
63	25	38	22	8	10	38	26	25	13	69	130	177	38	51 ³⁾	15	55.5	
	28	42	24								137	191					
	36	50.7	30	10				32	16								143
	45	60	41	12				38	19								

ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	□E	EL max.	Y	PJ	TO	□UO	ØFB	BB	BZ	M _A Nm	X* ⁷⁾ min.
		Line connection															
		01	02	01	02												
25	12	G 1/4	M14x1.5	25	25	12	38	7	33	11	51	63	6.5	6	M5	5.5	25
	16																
32	18	G 1/4	M14x1.5	25	25	12	45	7	33	11	63	80	8.5	6	M5	5.5	25
	22																
	25																
40	16	G 1/4	M14x1.5	25	25	9	51	4	33	11	70	85	8.5	6	M5	5.5	25
	18																
	25																
50	22	G 1/4	M14x1.5	25	25	9	63	4	33	11	85.5	105	9.5	8	M8	23	30
	25																
	36																
63	25	G 1/4	M14x1.5	25	25	6	76	1	33	11	98.5	115	9.5	8	M8	23	30
	28																
	36																
	45																

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

⁴⁾ ØD1 max. 0.5 mm deep

⁵⁾ Adjustable throttle valve for the end position cushioning

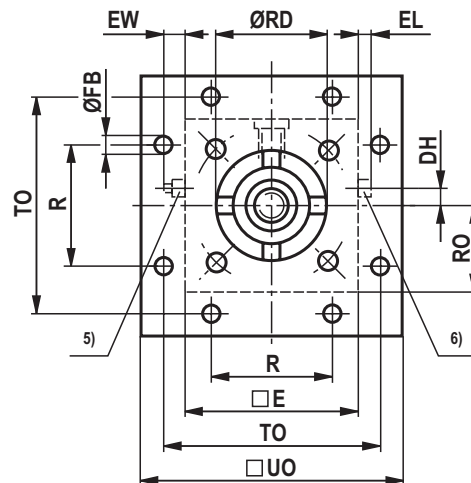
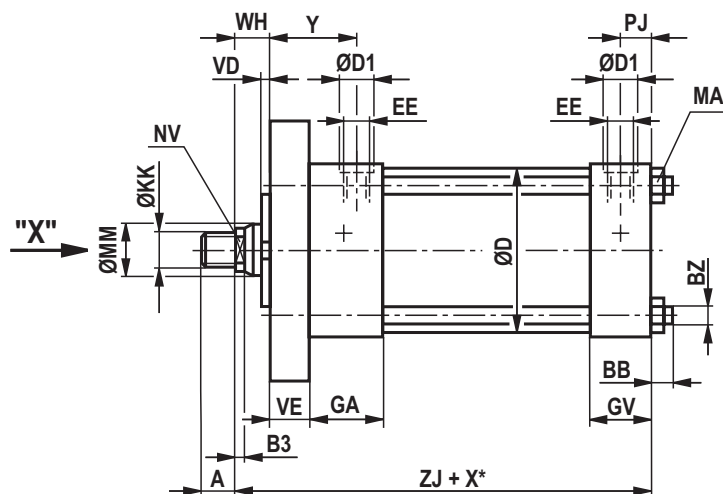
⁶⁾ Check valve and bleeding

⁷⁾ Only with piston rod end "E" with double-acting cylinders

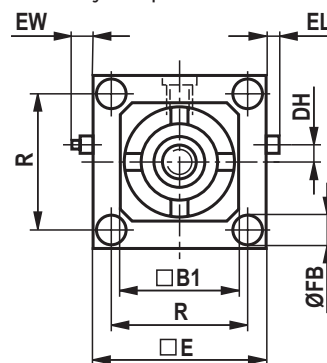
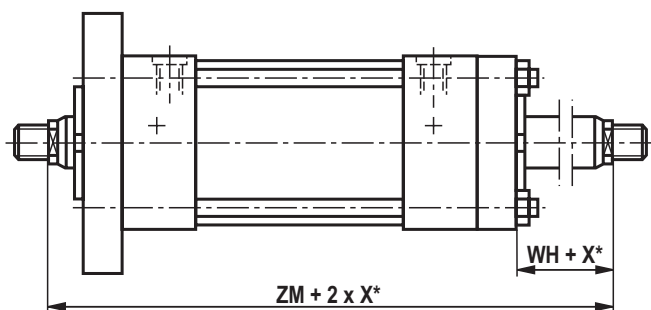
⁸⁾ 6 usable mounting bores: With raised cylinder head.
With piston Ø 32 and 40 mm with line connection 13 or 14.

Dimensions: Type of mounting H
(dimensions in mm)

Piston Ø 80 ... 200 mm



View "X" Only for piston Ø 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting H
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	RO	RH	DH	R
80	36	50	30	10	16	45	33	25	10	86	149	202	47.5	–	15	70
	45	60	41	12				32	13		156	216				
	56	70	46	15				35			159	222				
100	45	60	41	12	16	45	33	32	13	106	156	216	57	–	20	84.5
	50	66.6	46	15				35			159	222				
	70	90	60					41			16	165				
125	50	66.6	46	15	16	45	33	35	16	135	165	228	70	–	30	104
	56	70														
	63	79.3	55					41	171		240					
	90	108	75													
150	63	79.3	55	15	19	51	40	38	13	160	184	252	82.5	–	35	124
	70	90	60													
	80	95.2	75													
	100	120	85													
200	90	108	75	15	19	51	40	38	13	215	187	255	108	–	55	192.5
	100	120	85													
	140	158	120													

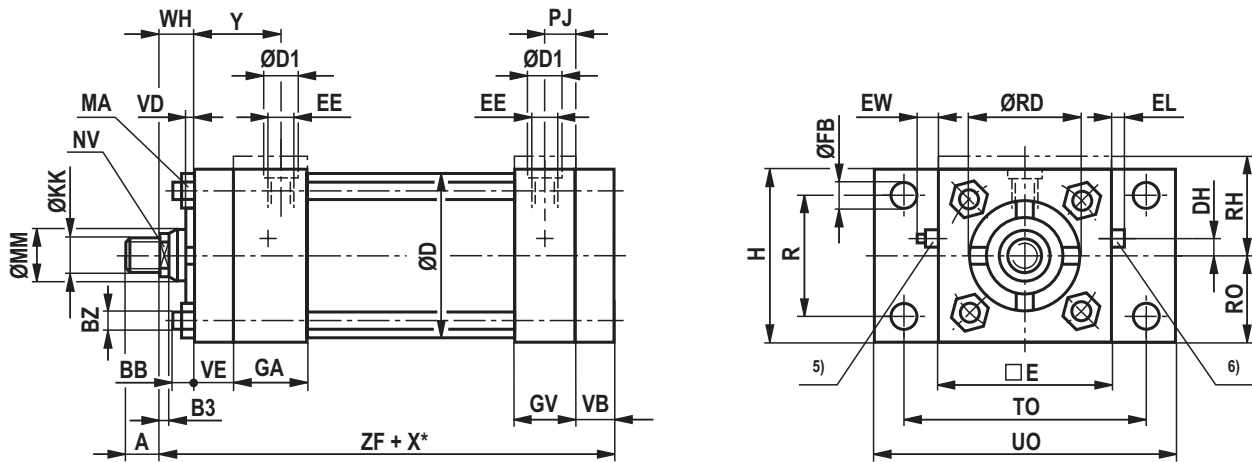
ØAL	ØMM	EE		ØD1 4)		EW max.	□E	EL max.	Y	PJ	TO	□UO	ØFB	BB	BZ	□B1	M _A Nm	X* 7) min.
		Line connection																
		01	02	01	02													
80	36	G 1/2	M22x1.5	34	34	12	95	11	42	14.5	119	140	11	10	M10	–	46	30
	45																	
	56																	
100	45	G 1/2	M22x1.5	34	34	9	114	8	42	14.5	138	160	11	12	M12	–	80	45
	50																	
	70																	
125	50	G 1/2	M22x1.5	34	34	9	140	8	42	14.5	168	195	14	13	M14	–	125	55
	56																	
	63																	
	90																	
150	63	G 3/4	M26x1.5	42	42	16	165	12	48	18	193.5	220	14	15	M16	–	195	75
	70																	
	80																	
	100																	
200	90	G 3/4	M26x1.5	42	42	14	216	10	48	18	192.5	–	17.5	15	M16	140	195	115
	100																	
	140															178		

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- 4) ØD1 max. 0.5 mm deep
5) Adjustable throttle valve for the end position cushioning
6) Check valve and bleeding
7) Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting D
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A			
			Piston rod end						
			C, E	B	F	C, E, B	F		
25	12	105	M8x1.25	M10x1.5	M10	15	15		
	16		M10x1.5	M12x1.5		19			
32	18	105	M10x1.5	M12x1.5	M12	19	18		
	22		M16x1.5	M20x1.5		28			
	25		M20x1.5	M22x1.5					
40	16	105	M10x1.5	M12x1.5	M14	19	21		
	18		M20x1.5	M22x1.5		28			
	25								
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30		
	25		M20x1.5	M22x1.5		41			
	36		M26x1.5	M30x2					
63	25	70	M20x1.5	M22x1.5	M24x2	28	36		
	28		M26x1.5	M30x2		41			
	36								
	45		M33x2	M39x2		51			

Dimensions: Type of mounting D
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	VB	ZF	RO	RH	DH	H	R	
25	12	25.5	10	5.5	10	38	26	16	6.5	31	10	124	19	24 ¹⁾	5	38	27.5	
	16	28.5	13															
32	18	32	14	5.5	10	38	26	16	6	38	10	125	22.5	35.5 ²⁾	7	45	32	
	22	34	19	8				25	13			134						
	25	38	22															
40	16	28.5	13	5.5	10	38	26	16	6	46	9	127	25.5	38.5 ³⁾	8	51	36.5	
	18	32	14					25	13			136						
	25	38	22					8										
50	22	38	19	8	10	38	26	25	13	56	9	136	31.5	44.5 ³⁾	10	63	46.5	
	25		22									143						
	36	50	30	10				32	16									
63	25	28	22	8	10	38	26	25	13	69	10	140	38	51 ³⁾	15	76	55.5	
	28	42	24									147						
	36	50.7	30					10	32			16						153
	45	60	41					12	38			19						

ØAL	ØMM	EE		ØD1 4)		EW max.	□E	EL max.	Y	PJ	TO	UO	ØFB	BB	BZ	M _A Nm
		Line connection														
		01	02	01	02											
25	12	G 1/4	M14x1.5	25	25	12	38	7	33	11	51	63	6.5	6	M5	5.5
	16															
32	18	G 1/4	M14x1.5	25	25	12	45	7	33	11	63	80	8.5	6	M5	5.5
	22															
	25															
40	16	G 1/4	M14x1.5	25	25	9	51	4	33	11	70	85	8.5	6	M5	5.5
	18															
	25															
50	22	G 1/4	M14x1.5	25	25	9	63	4	33	11	85.5	105	9.5	8	M8	23
	25															
	36															
63	25	G 1/4	M14x1.5	25	25	6	76	1	33	11	98.5	115	9.5	8	M8	23
	28															
	36															
	45															

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

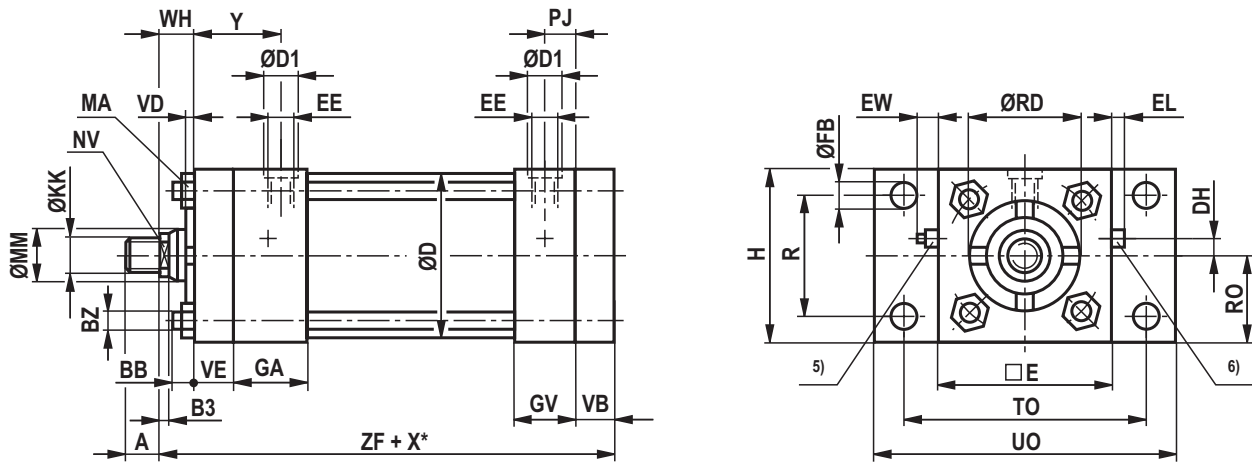
⁴⁾ ØD1 max. 0.5 mm deep

⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

Dimensions: Type of mounting D
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting D
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	VB	ZF	RO	DH	H	R						
80	36	50	30	10	16	45	33	25	10	86	16	165	47.5	15	95	70						
	45	60	41	12				32	13			172										
	56	70	46	15				35				175										
100	45	60	41	12	16	45	33	32	13	106	16	172	57	20	114	84.5						
	50	66.6	46	15				35	16			175										
	70	90	60					41				181										
125	50	66.6	46	15	16	45	33	35	13	135	16	181	70	30	140	104						
	56	70						41	16			187										
	63	79.3	55																			
	90	108	75																			
150	63	79.3	55	15	19	51	40	38	13	160	19	203	82.5	35	165	124						
	70	90	60																			
	80	95.2	75																			
	100	120	85																			
200	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-						
	100																					
	140																					

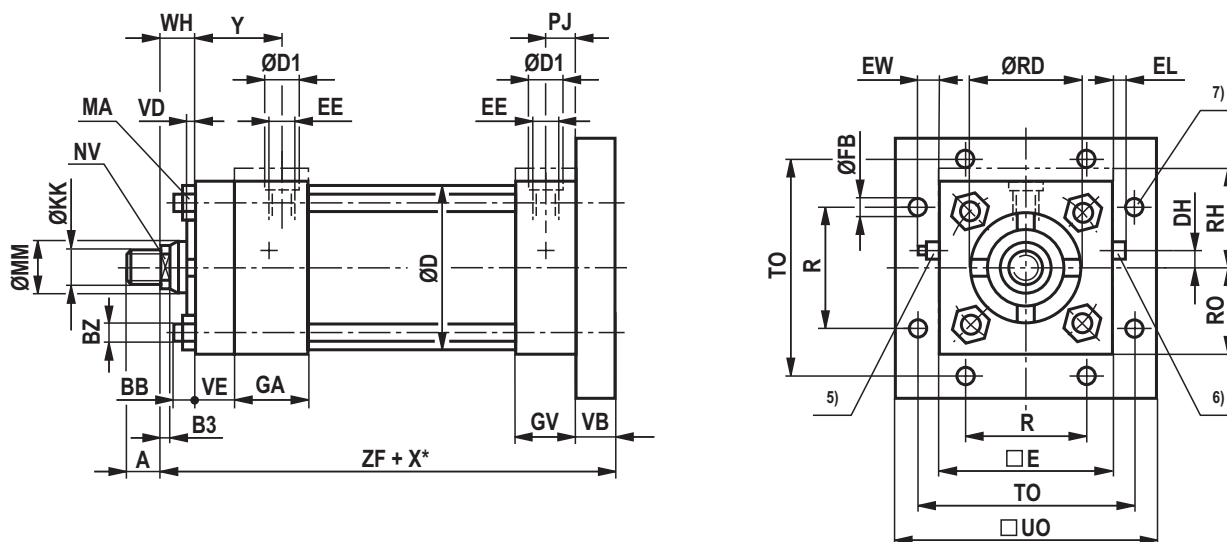
ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	□E	EL max.	Y	PJ	TO	UO	ØFB	BB	BZ	M _A Nm
		Line connection														
		01	02	01	02											
80	36	G 1/2	M22x1.5	34	34	12	95	11	42	14.5	119	140	11	10	M10	46
	45															
	56															
100	45	G 1/2	M22x1.5	34	34	9	114	8	42	14.5	138	160	11	12	M12	80
	50															
	70															
125	50	G 1/2	M22x1.5	34	34	9	140	8	42	14.5	168	195	14	13	M14	125
	56															
	63															
	90															
150	63	G 3/4	M26x1.5	42	42	16	165	12	48	18	193.5	220	14	15	M16	195
	70															
	80															
	100															
200	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	100															
	140															

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

⁴⁾ ØD1 max. 0.5 mm deep
⁵⁾ Adjustable throttle valve for the end position cushioning
⁶⁾ Check valve and bleeding

Dimensions: Type of mounting K
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A			
			Piston rod end						
			C, E	B	F	C, E, B	F		
25	12	105	M8x1.25	M10x1.5	M10	15	15		
	16		M10x1.5	M12x1.5		19			
32	18	105	M10x1.5	M12x1.5	M12	19	18		
	22		M16x1.5	M20x1.5		28			
	25		M20x1.5	M22x1.5					
40	16	105	M10x1.5	M12x1.5	M14	19	21		
	18		M20x1.5	M22x1.5		28			
	25								
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30		
	25		M20x1.5	M22x1.5		41			
	36		M26x1.5	M30x2					
63	25	70	M20x1.5	M22x1.5	M24x2	28	36		
	28		M26x1.5	M30x2		41			
	36								
	45					M33x2		M39x2	51

Dimensions: Type of mounting K
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	VB	ZF	RO	RH	DH	R
25	12	25.5	10	5.5	10	38	26	16	6.5	31	10	124	19	24 ¹⁾	5	27.5
	16	28.5	13													
32	18	32	14	5.5	10	38	26	16	6	38	10	125	22.5	35.5 ²⁾	7	32
	22	34	19	8				25	13			134				
	25	38	22													
40	16	28.5	13	5.5	10	38	26	16	6	46	9	127	25.5	38.5 ³⁾	8	36.5
	18	32	14					25	13			136				
	25	38	22	8												
50	22	38	19	8	10	38	26	25	13	56	9	136	31.5	44.5 ³⁾	10	46.5
	25		22					32	16			143				
	36	50	30	10												
63	25	38	22	8	10	38	26	25	13	69	10	140	38	51 ³⁾	15	55.5
	28	42	24					32	16			147				
	36	50.7	30	10												
	45	60	41	12				38	19			153				

ØAL	ØMM	EE		ØD1 4)		EW max.	OE	EL max.	Y	PJ	TO	OUO	ØFB	BB	BZ	MA Nm
		Line connection														
		01	02	01	02											
25	12	G 1/4	M14x1.5	25	25	12	38	7	33	11	51	63	6.5	6	M5	5.5
	16															
32	18	G 1/4	M14x1.5	25	25	12	45	7	33	11	63	80	8.5	6	M5	5.5
	22															
	25															
40	16	G 1/4	M14x1.5	25	25	9	51	4	33	11	70	85	8.5	6	M5	5.5
	18															
	25															
50	22	G 1/4	M14x1.5	25	25	9	63	4	33	11	85.5	105	9.5	8	M8	23
	25															
	36															
63	25	G 1/4	M14x1.5	25	25	6	76	1	33	11	98.5	115	9.5	8	M8	23
	28															
	36															
	45															

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

⁴⁾ ØD1 max. 0.5 mm deep

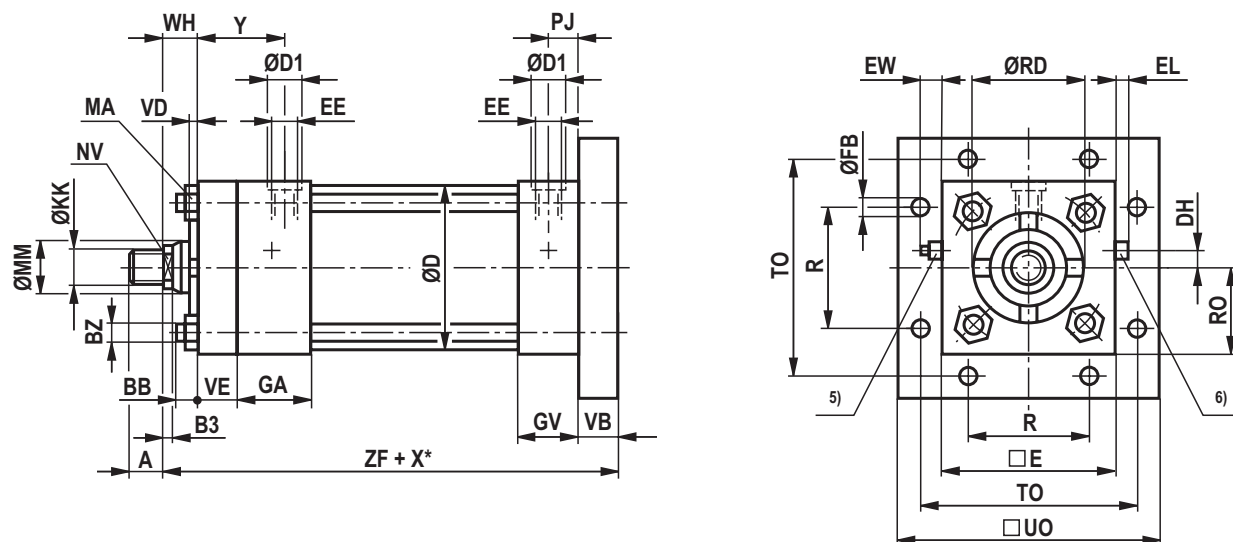
⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

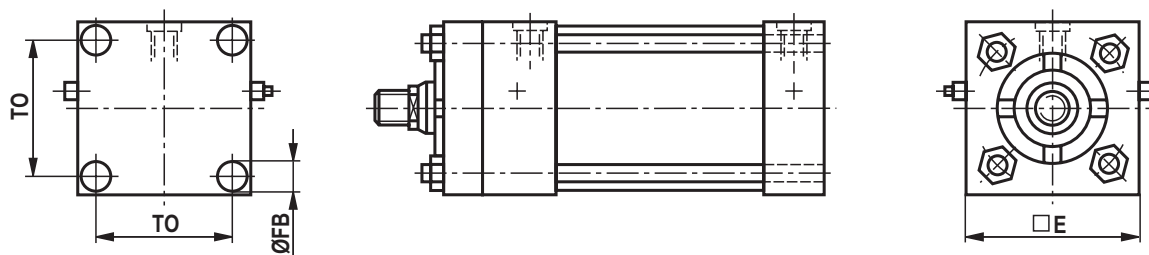
⁷⁾ 6 usable mounting bores with raised cylinder base

Dimensions: Type of mounting K
(dimensions in mm)

Piston Ø 80 ... 200 mm



Only for piston Ø 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

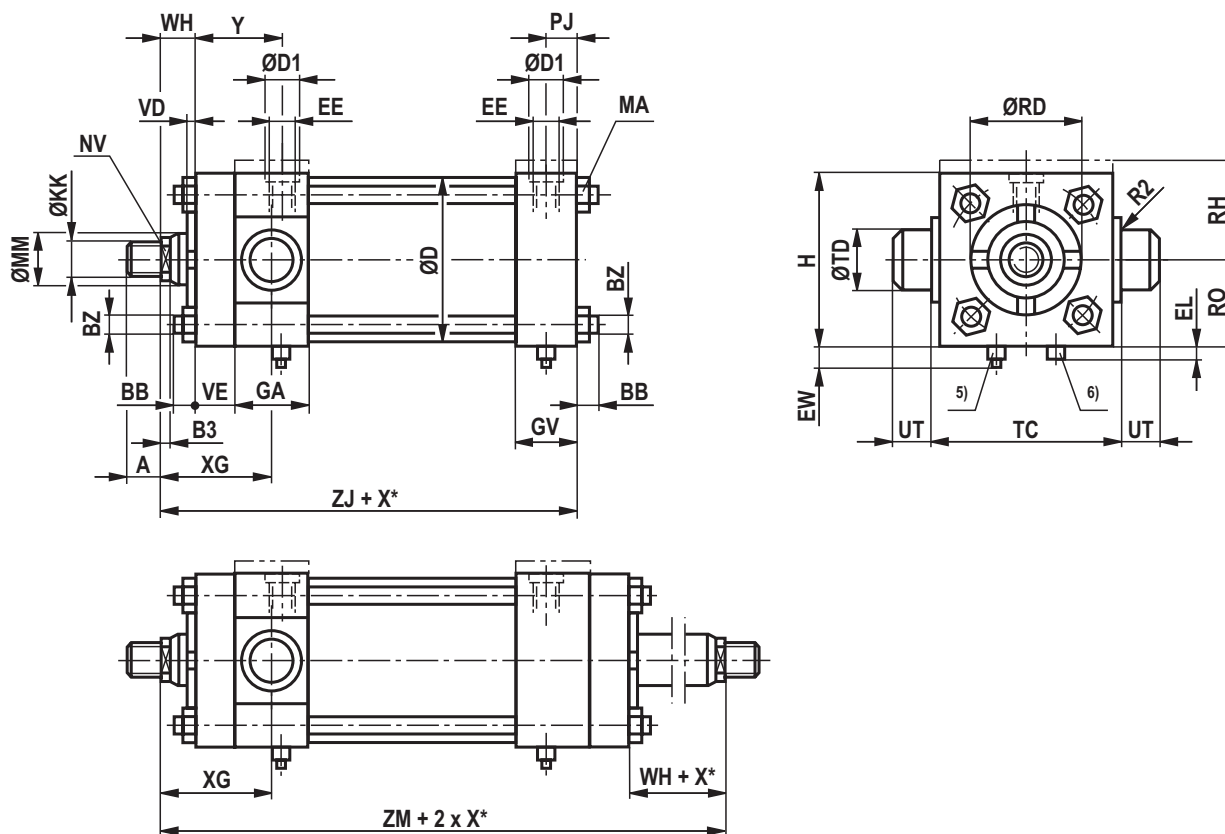
ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	VB	ZF	RO	DH	R
80	36	50	30	10	16	45	33	25	10	86	16	165	47.5	15	70
	45	60	41	12				32	13			172			
	56	70	46	15				35				175			
100	45	60	41	12	16	45	33	32	13	106	16	172	57	20	84.5
	50	66.6	46	15				35				175			
	70	90	60					41	16			181			
125	50	66.6	46	15	16	45	33	35	13	135	16	181	70	30	104
	56	70						41	16			187			
	63	79.3	55												
	90	108	75												
150	63	79.3	55	15	19	51	40	38	13	160	19	203	82.5	35	124
	70	90	60												
	80	95.2	75												
	100	120	85												
200	90	108	75	15	19	51	40	38	13	215	–	187	108	55	–
	100	120	85												
	140	158	120												

ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	□E	EL max.	Y	PJ	TO	□UO	ØFB	BB	BZ	M _A Nm
		Line connection														
		01	02	01	02											
80	36	G 1/2	M22x1.5	34	34	12	95	11	42	14.5	119	140	11	10	M10	46
	45															
	56															
100	45	G 1/2	M22x1.5	34	34	9	114	8	42	14.5	138	160	11	12	M12	80
	50															
	70															
125	50	G 1/2	M22x1.5	34	34	9	140	8	42	14.5	168	195	14	13	M14	125
	56															
	63															
	90															
150	63	G 3/4	M26x1.5	42	42	16	165	12	48	18	193.5	220	14	15	M16	195
	70															
	80															
	100															
200	90	G 3/4	M26x1.5	42	42	14	216	10	48	18	192.5	–	17.5	15	M16	195
	100															
	140															

- 4) ØD1 max. 0.5 mm deep
- 5) Adjustable throttle valve for the end position cushioning
- 6) Check valve and bleeding

Dimensions: Type of mounting R
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
25	12	-	-	-	-	-	-
	16						
32	18	105	M10x1.5	M12x1.5	M12	19	18
	22		M16x1.5	M20x1.5		28	
	25		M20x1.5	M22x1.5			
40	16	105	M10x1.5	M12x1.5	M14	19	21
	18						
	25		M20x1.5	M22x1.5		28	
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30
	25		M20x1.5	M22x1.5			
	36		M26x1.5	M30x2		41	
63	25	70	M20x1.5	M22x1.5	M24x2	28	36
	28						
	36		M26x1.5	M30x2		41	
	45		M33x2	M39x2		51	

Dimensions: Type of mounting R (dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	XG	ZJ	ZM	RO	RH	H	ØTD -0.03	
25	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	16																	
32	18	32	14	5.5	10	38	26	16	6	38	44.5	115	153	23	35.5 ¹⁾	46 _{+1.3}	25.4	
	22	34	19	8				25	13		53.5	124	171					
	25	38	22					53.5	124		171							
40	16	28.5	13	5.5	10	38	26	16	6	46	44.5	118	156	26.5	38.5 ²⁾	53 _{+1.4}	25.4	
	18	32	14					16	6		44.5	118	156					
	25	38	22					8	25		13	53.5	127					174
50	22	38	19	8	10	38	26	25	13	56	53.5	127	174	32	44.5 ²⁾	64 _{+1.4}	25.4	
	25		22					25	13		53.5	127	174					
	36	50	30					10	32		16	60.5	134					188
63	25	38	22	8	10	38	26	25	13	69	53.5	130	177	38	51 ²⁾	76 _{+1.4}	25.4	
	28	42	24					25	13		53.5	130	177					
	36	50.7	30					10	32		16	60.5	137					191
	45	60	41					12	38		19	66.5	143					203

ØAL	ØMM	EE		ØD1 ³⁾		EW max.	EL max.	Y	PJ	UT	TC -0.3	BB	BZ	M _A Nm	X* 4) min.
		Line connection													
		01	02	01	02										
25	12	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	16														
32	18	G 1/4	M14x1.5	25	25	12	7	33	11	25	45	6	M5	5.5	25
	22														
	25														
40	16	G 1/4	M14x1.5	25	25	9	4	33	11	25	51	6	M5	5.5	25
	18														
	25														
50	22	G 1/4	M14x1.5	25	25	9	4	33	11	25	63.5	8	M8	23	30
	25														
	36														
63	25	G 1/4	M14x1.5	25	25	6	1	33	11	25	76	8	M8	23	30
	28														
	36														
	45														

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

²⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

³⁾ ØD1 max. 0.5 mm deep

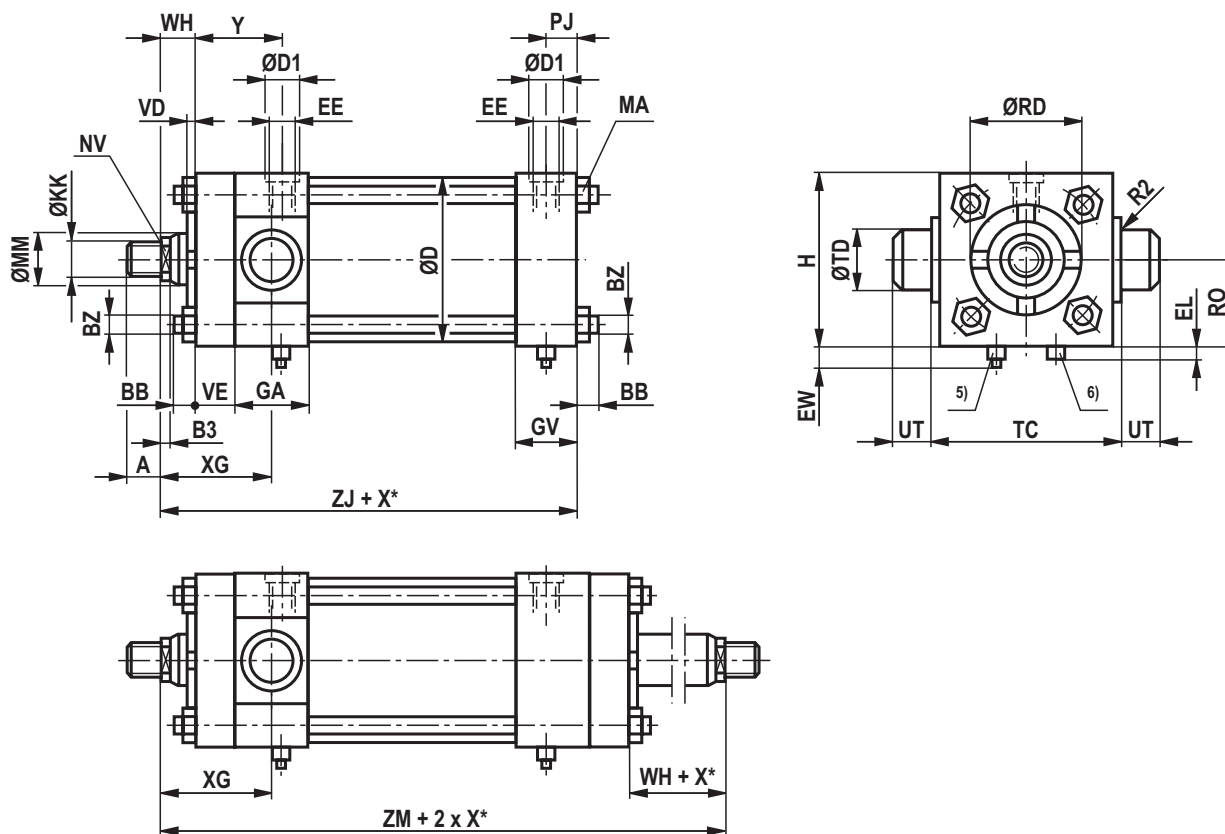
⁴⁾ Only with piston rod end "E" with double-acting cylinders

⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

Dimensions: Type of mounting R
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting R
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	XG	ZJ	ZM	RO	H	ØTD -0.03	
80	36	50	30	10	16	45	33	25	10	86	63.5	149	202	47.5	95 +1.5	25.4	
	45	60	41	12				32	13		70.5	156	216				
	56	70	46	15				35			73.5	159	222				
100	45	60	41	12	16	45	33	32	13	106	70	156	216	57	114 +1.5	25.4	
	50	66.6	46	15				35			73	159	222				
	70	90	60					41			16	79	165				234
125	50	66.6	46	15	16	45	33	35	13	135	73	165	228	70	140 +1.6	25.4	
	56	70									15	41	16				79
	63	79.3	55					15	41								16
	90	108	75														
150	63	79.3	55	15	19	51	40	38	13	160	82.5	184	252	82.5	165 +1.6	34.92	
	70	90	60														
	80	95.2	75														
	100	120	85														
200	90	108	75	15	19	51	40	38	13	215	82.5	187	255	108	216 +1.8	34.92	
	100	120	85														
	140	158	120														

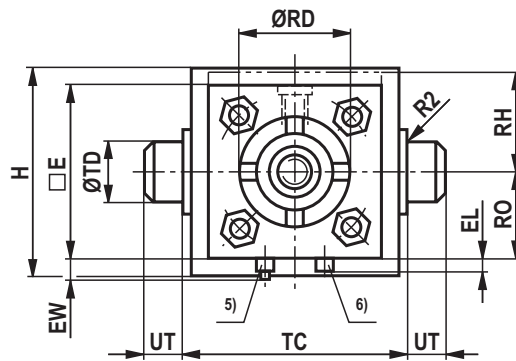
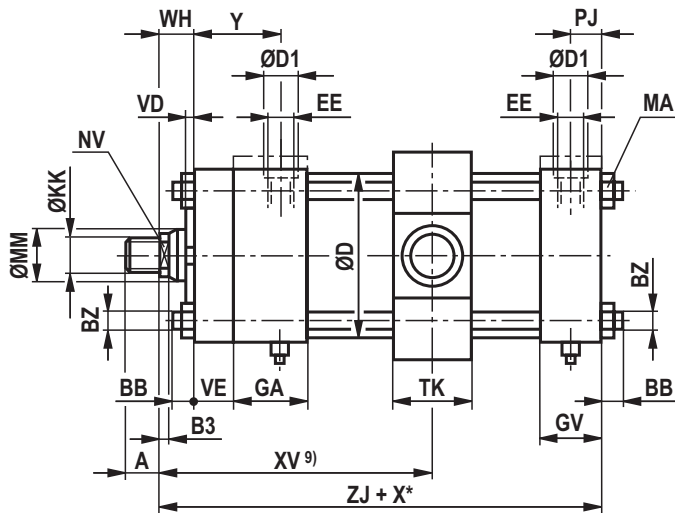
ØAL	ØMM	EE		ØD1 ³⁾		EW max.	EL max.	Y	PJ	UT	TC -0.3	BB	BZ	M _A Nm	X* ⁴⁾ min.
		Line connection													
		01	02	01	02										
80	36	G 1/2	M22x1.5	34	34	12	11	42	14.5	25	95	10	M10	46	30
	45														
	56														
100	45	G 1/2	M22x1.5	34	34	9	8	42	14.5	25	114	12	M12	80	45
	50														
	70														
125	50	G 1/2	M22x1.5	34	34	9	8	42	14.5	25	140	13	M14	125	55
	56														
	63														
	90														
150	63	G 3/4	M26x1.5	42	42	16	12	48	18	35	165	15	M16	195	75
	70														
	80														
	100														
200	90	G 3/4	M26x1.5	42	42	14	10	48	18	35	216	15	M16	195	115
	100														
	140														

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- ³⁾ ØD1 max. 0.5 mm deep
⁴⁾ Only with piston rod end "E" with double-acting cylinders
⁵⁾ Adjustable throttle valve for the end position cushioning
⁶⁾ Check valve and bleeding

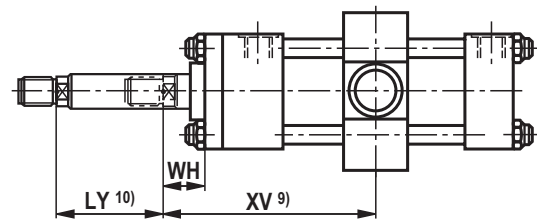
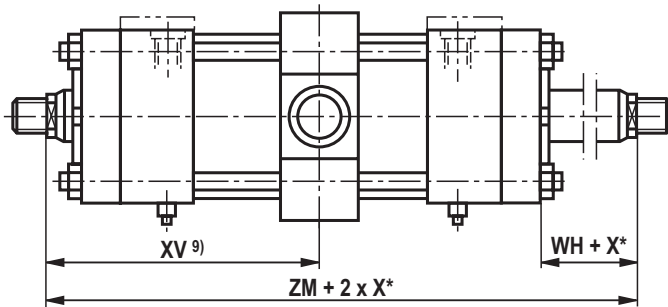
Dimensions: Type of mounting E
(dimensions in mm)

Piston Ø 25 ... 63 mm



Notice!

Dimensions for hydraulic cylinders with piston rod extension "LY" in retracted condition:



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
25	12	105	M8x1.25	M10x1.5	M10	15	15
	16		M10x1.5	M12x1.5		19	
32	18	105	M10x1.5	M12x1.5	M12	19	18
	22		M16x1.5	M20x1.5		28	
	25		M20x1.5	M22x1.5			
40	16	105	M10x1.5	M12x1.5	M14	19	21
	18		M20x1.5	M22x1.5		28	
	25						
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30
	25		M20x1.5	M22x1.5		41	
	36		M26x1.5	M30x2			
63	25	70	M20x1.5	M22x1.5	M24x2	28	36
	28		M26x1.5	M30x2		41	
	36						
	45		M33x2	M39x2		51	

Dimensions: Type of mounting E (dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	XV ⁹⁾ min.	XV ⁹⁾ max.	ZJ	ZM	TK	RO	RH	H
25 ⁵⁾	12	25.5	10	5.5	10	38	26	16	6.5	31	44.5	–	114	152	–	19	24 ¹⁾	–
	16	28.5	13															
32	18	32	14	5.5	10	38	26	16	6	38	80	73+X*	115	153	32	22.5	35.5 ²⁾	–
	22	34	19	8				25	13		89	82+X*	124	171				
	25	38	22					89	85+X*		127	174						
40	16	28.5	13	5.5	10	38	26	16	6	46	80	76+X*	118	156	32	25.5	38.5 ³⁾	65 +1.4
	18	32	14					25	13		89	85+X*	127	174				
	25	38	22					8										
50	22	38	19	8	10	38	26	25	13	56	92	82+X*	127	174	38	31.5	44.5 ³⁾	75 +1.4
	25		22					99	89+X*		134	188						
	36	50	30					10										
63	25	38	22	8	10	38	26	25	13	69	92	85+X*	130	177	38	38	51 ³⁾	90 +1.5
	28	42	24					99	92+X*		137	191						
	36	50.7	30					10	38		19	105	98+X*	143				
	45	60	41	12														

ØAL	ØMM	EE		ØD1 4)		EW max.	□E	EL max.	Y	PJ	ØTD −0.03	UT	TC −0.3	BB	BZ	M _A Nm	X* min. 7)	X* min. 8)
		Line connection																
		01	02	01	02													
25	12	G 1/4	M14x1.5	25	25	12	38	7	33	11	19.05	19	38	6	M5	5.5	–	25
	16																	
32	18	G 1/4	M14x1.5	25	25	12	45	7	33	11	25.4	25	50	6	M5	5.5	10	25
	22																	
	25																	
40	16	G 1/4	M14x1.5	25	25	9	51	4	33	11	25.4	25	63.5	6	M5	5.5	10	25
	18																	
	25																	
50	22	G 1/4	M14x1.5	25	25	9	63	4	33	11	25.4	25	76	8	M8	23	10	30
	25																	
	36																	
63	25	G 1/4	M14x1.5	25	25	6	76	1	33	11	25.4	25	89	8	M8	23	10	30
	28																	
	36																	
	45																	

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

1) Raised cylinder head and base

2) Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

3) Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

4) ØD1 max. 0.5 mm deep

5) Adjustable throttle valve for the end position cushioning

6) Check valve and bleeding

7) Except for piston rod end "E" with double-acting cylinders

8) Only with piston rod end "E" with double-acting cylinders

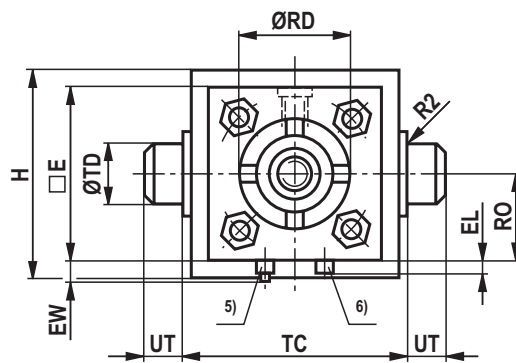
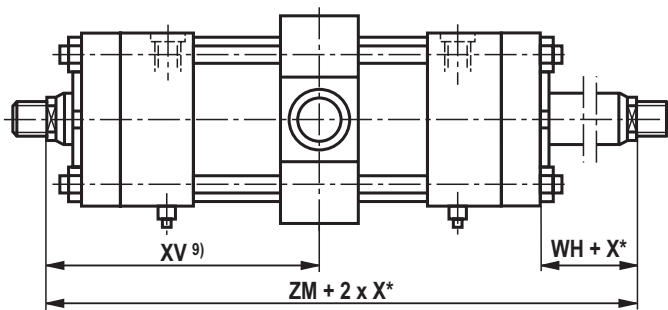
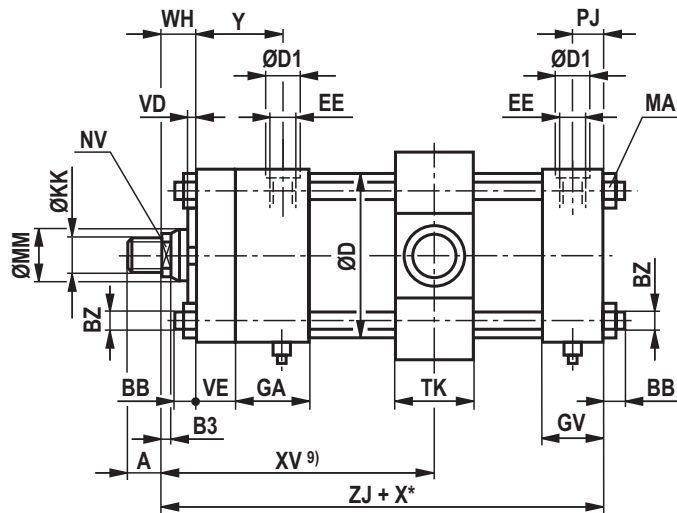
9) Trunnion position freely selectable.

When ordering, always specify the "XV" dimension in the plain text in mm. With piston Ø 25, the trunnions are at the cylinder head

10) Always specify the piston rod extension "LY" in the order in the plain text

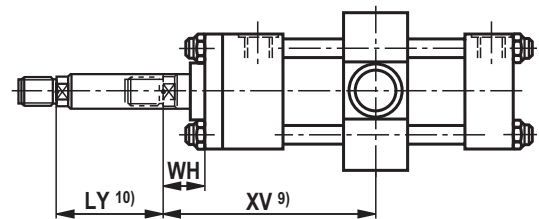
Dimensions: Type of mounting E
(dimensions in mm)

Piston Ø 80 ... 200 mm



Notice!

Dimensions for hydraulic cylinders with piston rod extension "LY" in retracted condition:



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting E
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	XV ⁹⁾ min.	XV ⁹⁾ max.	ZJ	ZM	TK	RO	H	
80	36	50	30	10	16	45	33	25	10	86	111	91+X*	149	202	50	47.5	115 +1.5	
	45	60	41	12				32	13		118	98+X*	156	216				
	56	70	46	15				35	121		101+X*	159	222					
100	45	60	41	12	16	45	33	32	13	106	118	98+X*	156	216	50	57	135 +1.6	
	50	66.6	46	15				35	41		16	121	101+X*	159				222
	70	90	60					127	107+X*		165	234						
125	50	66.6	46	15	16	45	33	35	13	135	121	107+X*	165	228	50	70	160 +1.6	
	56	70																
	63	79.3	55					41	16		127	113+X*	171	240				
	90	108	75															
150	63	79.3	55	15	19	51	40	38	13	160	140	112+X*	184	252	64	82.5	195 +1.8	
	70	90	60															
	80	95.2	75															
	100	120	85															
200	90	108	75	15	19	51	40	38	13	215	140	115+X*	187	255	64	108	250 +1.8	
	100	120	85															
	140	158	120															

ØAL	ØMM	EE		ØD1 4)		EW max.	□E	EL max.	Y	PJ	ØTD −0.03	UT	TC −0.3	BB	BZ	M _A Nm	X* min. 7)	X* min. 8)
		Line connection																
		01	02	01	02													
80	36	G 1/2	M22x1.5	34	34	12	95	11	42	15	25.4	25	114	10	M10	46	20	30
	45																	
	56																	
100	45	G 1/2	M22x1.5	34	34	9	114	8	42	15	25.4	25	133	12	M12	80	20	45
	50																	
	70																	
125	50	G 1/2	M22x1.5	34	34	9	140	8	42	15	25.4	25	159	13	M14	125	20	55
	56																	
	63																	
	90																	
150	63	G 3/4	M26x1.5	42	42	16	165	12	48	18	34.92	35	194	15	M16	195	30	75
	70																	
	80																	
	100																	
200	90	G 3/4	M26x1.5	42	42	14	216	10	48	18	34.92	35	248	15	M16	195	30	115
	100																	
	140																	

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

⁴⁾ ØD1 max. 0.5 mm deep

⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

⁷⁾ Except for piston rod end "E" with double-acting cylinders

⁸⁾ Only with piston rod end "E" with double-acting cylinders

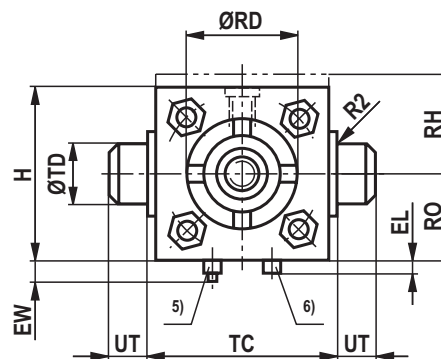
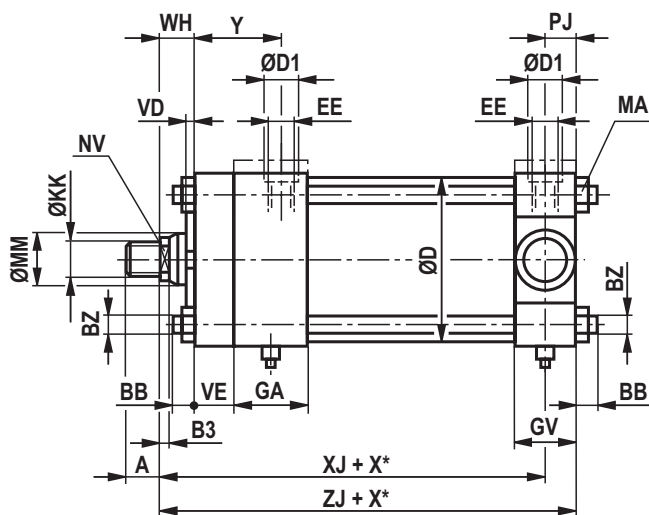
⁹⁾ Trunnion position freely selectable.

When ordering, always specify the "XV" dimension in the plain text in mm. With piston Ø 25, the trunnions are at the cylinder head.

¹⁰⁾ Always specify the piston rod extension "LY" in the order in the plain text

Dimensions: Type of mounting S
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
25	12	105	M8x1.25	M10x1.5	M10	15	15
	16		M10x1.5	M12x1.5		19	
32	18	105	M10x1.5	M12x1.5	M12	19	18
	22		M16x1.5	M20x1.5		28	
	25		M20x1.5	M22x1.5			
40	16	105	M10x1.5	M12x1.5	M14	19	21
	18		M20x1.5	M22x1.5		28	
	25						
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30
	25		M20x1.5	M22x1.5		41	
	36		M26x1.5	M30x2			
63	25	70	M20x1.5	M22x1.5	M24x2	28	36
	28		M26x1.5	M30x2		41	
	36						
	45		M33x2	M39x2		51	

Dimensions: Type of mounting S
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	XJ	ZJ	RO	RH	H
25	12	25.5	10	5.5	10	38	26	16	6.5	31	101.5	114	19	24 ¹⁾	43 _{+1.3}
	16	28.5	13												
32	18	32	14	5.5	10	38	26	16	6	38	102	115	23	35.5 ²⁾	46
	22	34	19	8				25	13		111	124			
	25	38	22												
40	16	28.5	13	5.5	10	38	26	16	6	46	105	118	26.5	38.5 ³⁾	53 _{+1.4}
	18	32	14												
	25	38	22	8											
50	22	38	19	8	10	38	26	25	13	56	114	127	32	44.5 ³⁾	64 _{+1.4}
	25		22												
	36	50	30	10											
63	25	38	22	8	10	38	26	25	13	69	117	130	38	51 ³⁾	76 _{+1.4}
	28	42	24												
	36	50.7	30	10				38	19		130	143			
	45	60	41	12											

ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	EL max.	Y	PJ	ØTD −0.03	UT	TC −0.3	BB	BZ	M _A Nm
		Line connection													
		01	02	01	02										
25	12	G 1/4	M14x1.5	25	25	12	7	33	11	19.05	19	38	6	M5	5.5
	16														
32	18	G 1/4	M14x1.5	25	25	12	7	33	11	25.4	25	45	6	M5	5.5
	22														
	25														
40	16	G 1/4	M14x1.5	25	25	9	4	33	11	25.4	25	51	6	M5	5.5
	18														
	25														
50	22	G 1/4	M14x1.5	25	25	9	4	33	11	25.4	25	63.5	8	M8	23
	25														
	36														
63	25	G 1/4	M14x1.5	25	25	6	1	33	11	25.4	25	76	8	M8	23
	28														
	36														
	45														

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

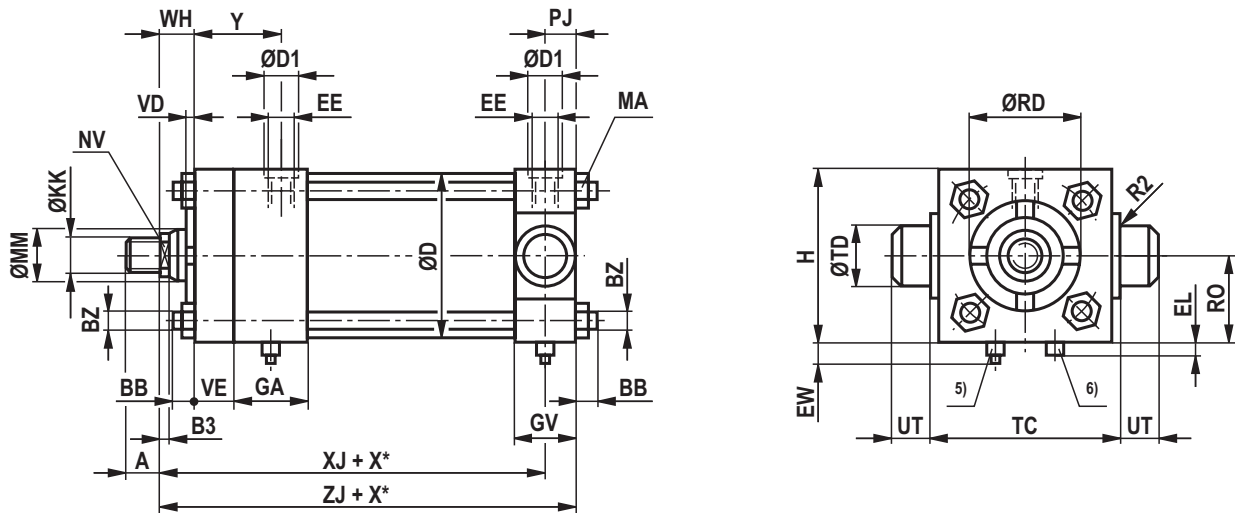
⁴⁾ ØD1 max. 0.5 mm deep

⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

Dimensions: Type of mounting S
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	90	50	M48x2	M56x2	M45x3	76	68
	63		M58x2	M68x2		89	
	70		M76x2	M95x2		101	
200	100	40	M64x2	M76x2	M52x3	89	70
	90		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting S
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	XJ	ZJ	RO	H
80	36	50	30	10	16	45	33	25	10	86	133	149	47.5	95 +1.5
	45	60	41	12				32	13		140	156		
	56	70	46	15				35			143	159		
100	45	60	41	12	16	45	33	32	13	106	140	156	57	114 +1.5
	50	66.6	46	15				35			143	159		
	70	90	60					41	16		149	165		
125	50	66.6	46	15	16	45	33	35	13	135	149.5	165	70	140 +1.6
	56	70						41	16		155.5	171		
	63	79.3	55											
	90	108	75											
150	63	79.3	55	15	19	51	40	38	13	160	165	184	82.5	165 +1.6
	70	90	60											
	80	95.2	75											
	100	120	85											
200	90	108	75	15	19	51	40	38	13	215	168	187	108	216 +1.8
	100	120	85											
	140	158	120											

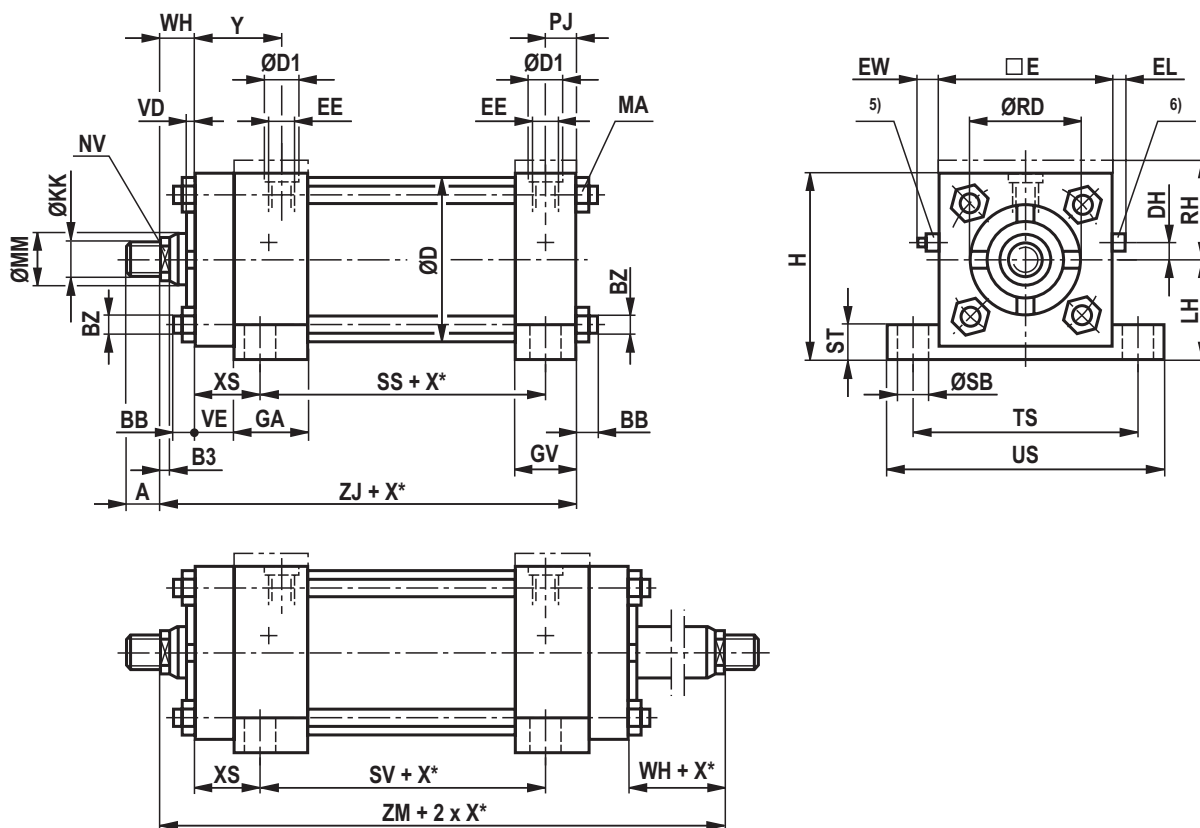
ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	EL max.	Y	PJ	ØTD -0.03	UT	TC -0.3	BB	BZ	M _A Nm
		Line connection													
		01	02	01	02										
80	36	G 1/2	M22x1.5	34	34	12	11	42	14.5	25.4	25	95	10	M10	46
	45														
	56														
100	45	G 1/2	M22x1.5	34	34	9	8	42	14.5	25.4	25	114	12	M12	80
	50														
	70														
125	50	G 1/2	M22x1.5	34	34	9	8	42	14.5	25.4	25	140	13	M14	125
	56														
	63														
	90														
150	63	G 3/4	M26x1.5	42	42	16	12	48	18	34.92	35	165	15	M16	195
	70														
	80														
	100														
200	90	G 3/4	M26x1.5	42	42	14	10	48	18	34.92	35	216	15	M16	195
	100														
	140														

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- 4) ØD1 max. 0.5 mm deep
5) Adjustable throttle valve for the end position cushioning
6) Check valve and bleeding

Dimensions: Type of mounting F
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A			
			Piston rod end						
			C, E	B	F	C, E, B	F		
25	12	105	M8x1.25	M10x1.5	M10	15	15		
	16		M10x1.5	M12x1.5		19			
32	18	105	M10x1.5	M12x1.5	M12	19	18		
	22		M16x1.5	M20x1.5		28			
	25		M20x1.5	M22x1.5					
40	16	105	M10x1.5	M12x1.5	M14	19	21		
	18		M20x1.5	M22x1.5		28			
	25								
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30		
	25		M20x1.5	M22x1.5		41			
	36		M26x1.5	M30x2					
63	25	70	M20x1.5	M22x1.5	M24x2	28	36		
	28		M26x1.5	M30x2		41			
	36								
	45		M33x2	M39x2		51			

Dimensions: Type of mounting F
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	XS	SS	SV	LH h10	RH	H	DH
25	12	25.5	10	5.5	10	38	26	16	6.5	31	114	152	17.5	73	85	19	24 ¹⁾	43 _{+1.3}	5
	16	28.5	13																
32	18	32	14	5.5	10	38	26	16	6	38	115	153	19	70	83	22.5	35.5 ²⁾	46 _{+1.3}	7
	22	34	19	8				25	13		124	171							
	25	38	22					124	171										
40	16	28.5	13	5.5	10	38	26	16	6	46	118	156	19	73	86	25.5	38.5 ³⁾	51 _{+1.4}	8
	18	32	14					25	13		127	174							
	25	38	22					8											
50	22	38	19	8	10	38	26	25	13	56	127	174	19	73	86	31.7	44.5 ³⁾	64 _{+1.4}	10
	25		22					32	16		134	188							
	36	50	30	10															
63	25	38	22	8	10	38	26	25	13	69	130	177	19	76	89	38	51 ³⁾	76 _{+1.4}	15
	28	42	24					32	16		137	191							
	36	50.7	30	10				38	19		143	203							
	45	60	41	12															

ØAL	ØMM	EE		ØD1 ⁴⁾		Y	PJ	ST	ØSB	TS	US	EW max.	CE	EL max.	BB	BZ	M _A Nm	X* ⁷⁾ min.
		Line connection																
		01	02	01	02													
25	12	G 1/4	M14x1.5	25	25	33	11	7.5	7	54	70 +1.4	12	38	7	6	M5	5.5	25
	16																	
32	18	G 1/4	M14x1.5	25	25	33	11	12	11	64	85 +1.5	12	45	7	6	M5	5.5	25
	22																	
	25																	
40	16	G 1/4	M14x1.5	25	25	33	11	12	11	70	91 +1.5	9	51	4	6	M5	5.5	25
	18																	
	25																	
50	22	G 1/4	M14x1.5	25	25	33	11	11	11	82.5	104 +1.5	9	63	4	8	M8	23	30
	25																	
	36																	
63	25	G 1/4	M14x1.5	25	25	33	11	11	11	95.5	116 +1.5	6	76	1	8	M8	23	30
	28																	
	36																	
	45																	

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

⁴⁾ ØD1 max. 0.5 mm deep

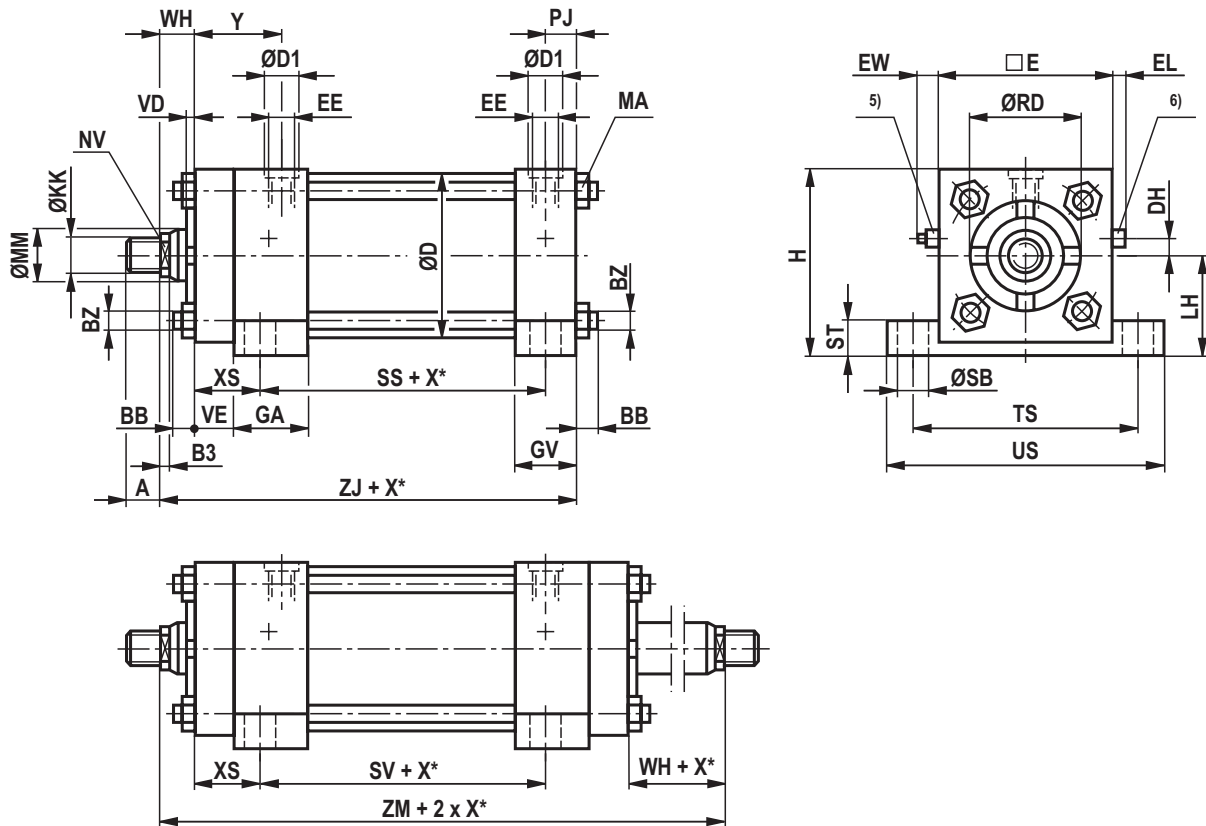
⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

⁷⁾ Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting F
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting F
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	XS	SS	SV	LH h10	H	DH
80	36	50	30	10	16	45	33	25	10	86	149	202	28.5	82.5	95	47.5	95 +1.5	15
	45	60	41	12				32	13		156	216						
	56	70	46	15				35	159		222							
100	45	60	41	12	16	45	33	32	13	106	156	216	28.5	82.5	95	57.1	114 +1.5	15
	50	66.6	46	15				35	16		159	222						
	70	90	60					41			165	234						
125	50	66.6	46	15	16	45	33	35	13	135	165	228	33.5	79.5	91	69.8	140 +1.6	30
	56	70																
	63	79.3	55															
	90	108	75															
150	63	79.3	55	15	19	51	40	38	13	160	184	252	36.5	92	103	82.5	165 +1.6	35
	70	90	60															
	80	95.2	75															
	100	120	85															
200	90	108	75	15	19	51	40	38	13	215	187	255	36.5	95	106	108	216 +1.8	55
	100	120	85															
	140	158	120															

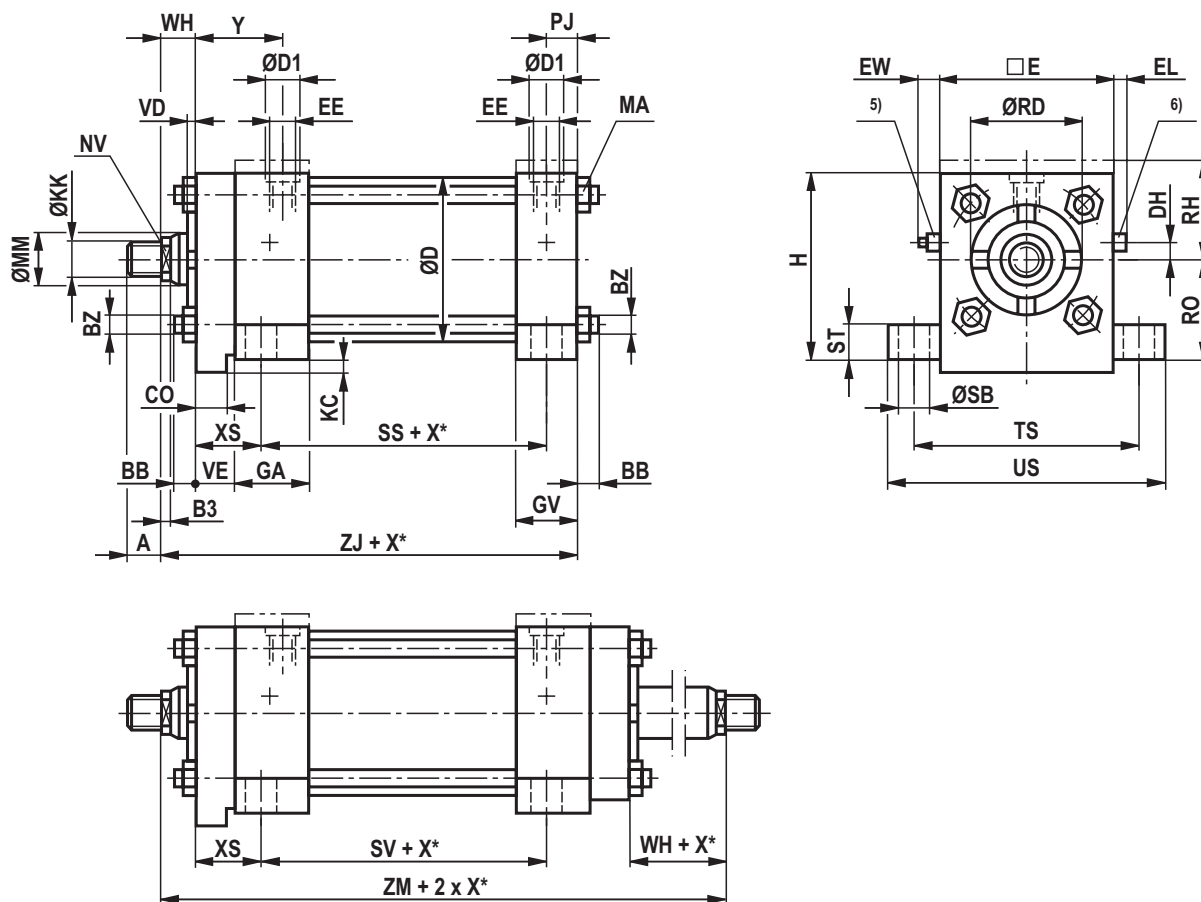
ØAL	ØMM	EE		ØD1 ⁴⁾		Y	PJ	ST	ØSB	TS	US	EW max.	□E	EL max.	BB	BZ	M _A Nm	X* ⁷⁾ min.
		Line connection																
		01	02	01	02													
80	36	G 1/2	M22x1.5	34	34	42	14.5	19	14	120.5	145 +1.6	12	95	11	10	M10	46	30
	45																	
	56																	
100	45	G 1/2	M22x1.5	34	34	42	14.5	19	14	139.5	164 +1.6	9	114	8	12	M12	80	45
	50																	
	70																	
125	50	G 1/2	M22x1.5	34	34	42	14.5	24	23	174.5	210 +1.8	9	140	8	13	M14	125	55
	56																	
	63																	
	90																	
150	63	G 3/4	M26x1.5	42	42	48	18	24	23	200	235 +1.8	16	165	12	15	M16	195	75
	70																	
	80																	
	100																	
200	90	G 3/4	M26x1.5	42	42	48	18	24	23	251	286 +1.9	14	216	10	15	M16	195	115
	100																	
	140																	

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- 4) ØD1 max. 0.5 mm deep
5) Adjustable throttle valve for the end position cushioning
6) Check valve and bleeding
7) Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting L
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A			
			Piston rod end						
			C, E	B	F	C, E, B	F		
25	12	105	M8x1.25	M10x1.5	M10	15	15		
	16		M10x1.5	M12x1.5		19			
32	18	105	M10x1.5	M12x1.5	M12	19	18		
	22		M16x1.5	M20x1.5		28			
	25		M20x1.5	M22x1.5					
40	16	105	M10x1.5	M12x1.5	M14	19	21		
	18		M20x1.5	M22x1.5		28			
	25								
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30		
	25		M20x1.5	M22x1.5		41			
	36		M26x1.5	M30x2					
63	25	70	M20x1.5	M22x1.5	M24x2	28	36		
	28		M26x1.5	M30x2		41			
	36								
	45		M33x2	M39x2		51			

Dimensions: Type of mounting L (dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	XS	SS	SV	CO -0.07	KC -0.2	RO h10	RH	H	DH	
25	12	25.5	10	5.5	10	38	26	16	6.5	31	114	152	17.5	73	85	8	5	19	24 ¹⁾	43 _{+1.3}	5	
	16	28.5	13																			
32	18	32	14	5.5	10	38	26	16	6	38	115	153	19	70	83	8	5	22.5	35.5 ²⁾	46 _{+1.3}	7	
	22	34	19																			
	25	38	22	8																		
40	16	28.5	13	5.5	10	38	26	16	6	46	118	156	19	73	86	8	5	25.5	38.5 ³⁾	51 _{+1.4}	8	
	18	32	14																			
	25	38	22					8														
50	22	38	19	8	10	38	26	25	13	56	127	174	19	73	86	8	5	31.7	44.5 ³⁾	64 _{+1.4}	10	
	25		22																			
	36	50	30					10														
63	25	38	22	8	10	38	26	25	13	69	130	177	19	76	89	8	5	38	51 ³⁾	76 _{+1.4}	15	
	28	42	24																			
	36	50.7	30					10	32		16	137										191
	45	60	41					12														

ØAL	ØMM	EE		ØD1 ⁴⁾		Y	PJ	EW max.	□E	EL max.	ST	ØSB	TS	US	BB	BZ	M _A Nm	X* ⁷⁾ min.
		Line connection																
		01	02	01	02													
25	12	G 1/4	M14x1.5	25	25	33	11	12	38	7	7.5	7	54	70 +1.4	6	M5	5.5	25
	16																	
32	18	G 1/4	M14x1.5	25	25	33	11	12	45	7	12	11	64	85 +1.5	6	M5	5.5	25
	22																	
	25																	
40	16	G 1/4	M14x1.5	25	25	33	11	9	51	4	12	11	70	91 +1.5	6	M5	5.5	25
	18																	
	25																	
50	22	G 1/4	M14x1.5	25	25	33	11	9	63	4	11	11	82.5	104 +1.5	8	M8	23	30
	25																	
	36																	
63	25	G 1/4	M14x1.5	25	25	33	11	6	76	1	11	11	95.5	116 +1.5	8	M8	23	30
	28																	
	36																	
	45																	

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

⁴⁾ ØD1 max. 0.5 mm deep

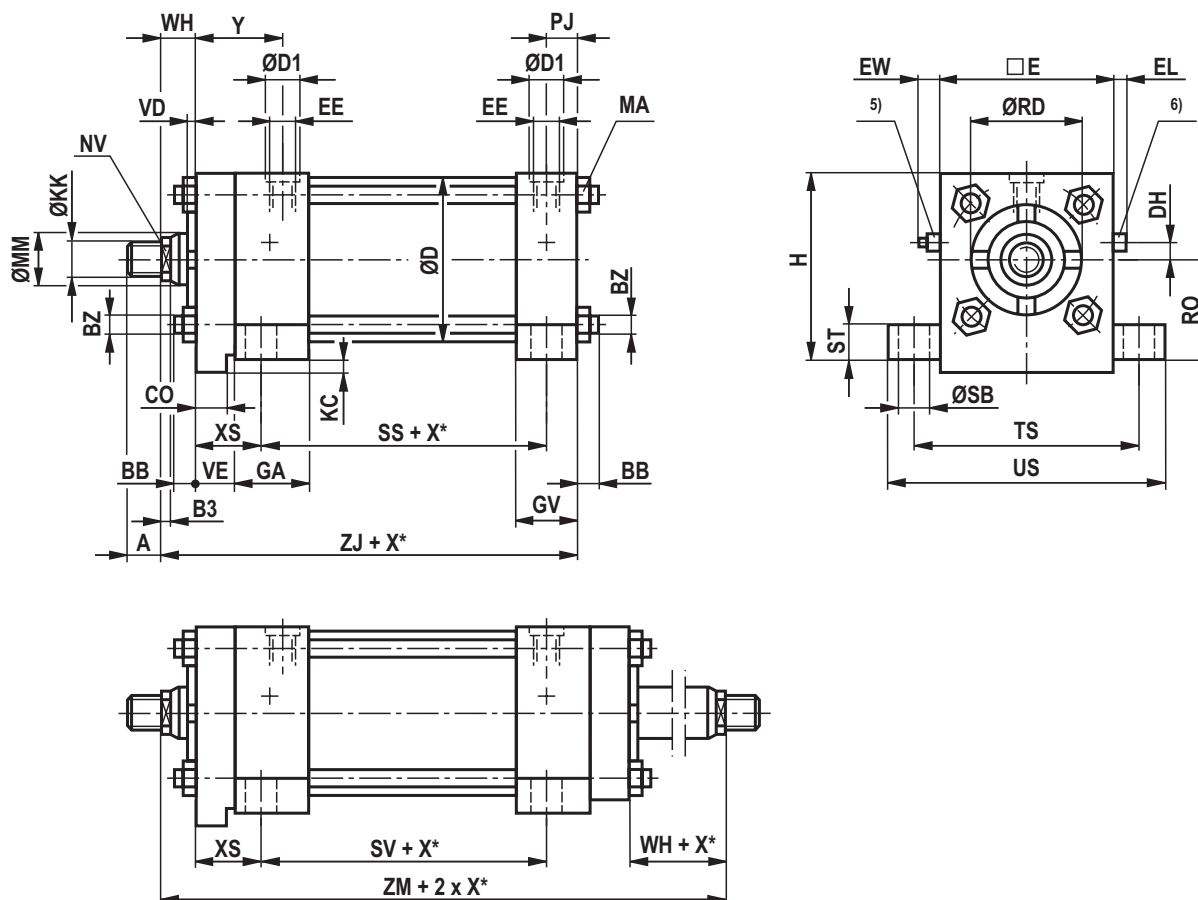
⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

⁷⁾ Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting L
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	-	-	-	-	-	-
	100		-	-	-	-	-
	140		-	-	-	-	-

Dimensions: Type of mounting L
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	XS	SS	SV	CO -0.07	KC -0.2	RO h10	H	DH
80	36	50	30	10	16	45	33	25	10	86	149	202	28.5	82.5	95	14	8	47.5	95 +1.5	15
	45	60	41	12				32	13		156	216								
	56	70	46	15				35	159		222									
100	45	60	41	12	16	45	33	32	13	106	156	216	28.5	82.5	95	14	8	57.1	114 +1.5	15
	50	66.6	46	15				35	159		222									
	70	90	60					41	16		165	234								
125	50	66.6	46	15	16	45	33	35	13	135	165	228	33.5	79.5	91	14	8	69.8	140 +1.6	30
	56	70						41	16		171	240								
	63	79.3	55																	
	90	108	75																	
150	63	79.3	55	15	19	51	40	38	13	160	184	252	36.5	92	103	18	9.5	82.5	165 +1.6	35
	70	90	60																	
	80	95.2	75																	
	100	120	85																	
200	90																			
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	140																			

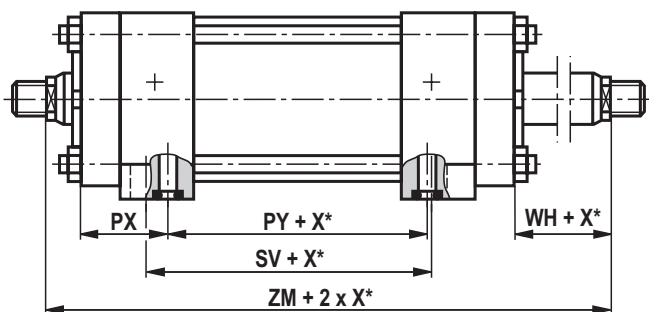
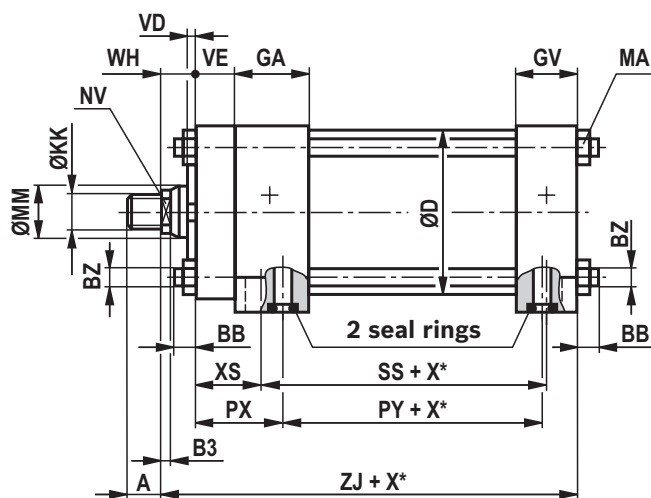
ØAL	ØMM	EE		ØD1 ⁴⁾		Y	PJ	EW max.	□E	EL max.	ST	ØSB	TS	US	BB	BZ	M _A Nm	X* ⁷⁾ min.
		Line connection																
		01	02	01	02													
80	36	G 1/2	M22x1.5	34	34	42	14.5	12	95	11	19	14	120.5	145 +1.6	10	M10	46	30
	45																	
	56																	
100	45	G 1/2	M22x1.5	34	34	42	14.5	9	114	8	19	14	139.5	164 +1.6	12	M12	80	45
	50																	
	70																	
125	50	G 1/2	M22x1.5	34	34	42	14.5	9	140	8	24	23	174.5	210 +1.8	13	M14	125	55
	56																	
	63																	
	90																	
150	63	G 3/4	M26x1.5	42	42	48	18	16	165	12	24	23	200	235 +1.8	15	M16	195	75
	70																	
	80																	
	100																	
200	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	100																	
	140																	

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- 4) ØD1 max. 0.5 mm deep
5) Adjustable throttle valve for the end position cushioning
6) Check valve and bleeding
7) Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting M
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A			
			Piston rod end						
			C, E	B	F	C, E, B	F		
25	12	105	M8x1.25	M10x1.5	M10	15	15		
	16		M10x1.5	M12x1.5		19			
32	18	105	M10x1.5	M12x1.5	M12	19	18		
	22		M16x1.5	M20x1.5		28			
	25		M20x1.5	M22x1.5					
40	16	105	M10x1.5	M12x1.5	M14	19	21		
	18		M20x1.5	M22x1.5		28			
	25								
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30		
	25		M20x1.5	M22x1.5		41			
	36		M26x1.5	M30x2					
63	25	70	M20x1.5	M22x1.5	M24x2	28	36		
	28		M26x1.5	M30x2		41			
	36								
	45		M33x2	M39x2		51			

Dimensions: Type of mounting M
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	XS	SS	SV	PX	PY	RO h10
25	12	25.5	10	5.5	10	38	26	16	6.5	31	114	152	17.5	73	85	33	54	19
	16	28.5	13															
32	18	32	14	5.5	10	38	26	16	6	38	115	153	19	70	83	33.5	54	22.5
	22	34	19	8				25	13		124	171						
	25	38	22															
40	16	28.5	13	5.5	10	38	26	16	6	46	118	156	19	73	86	35	54	25.5
	18	32	14					25	13		127	174						
	25	38	22															
50	22	38	19	8	10	38	26	25	13	56	127	174	19	73	86	35	54	31.7
	25		22					134	188									
	36	50	30	10							32	16						
63	25	38	22	8	10	38	26	25	13	69	130	177	19	76	89	35	57	38
	28	42	24					32	16		137	191						
	36	50.7	30	10														
	45	60	41	12														

ØAL	ØMM	ST	ØSB	TS	US	EW max.	□E	EL max.	ØMF	ØMD	Seal rings 2x	DH	H	BB	BZ	MA Nm	X* 1) min.
25	12	7.5	7	54	70 +1.4	12	38	7	10	17	13 x 2	5	43 +1.3	6	M5	5.5	25
	16																
32	18	12	11	64	85 +1.5	12	45	7	10	17	13 x 2	7	46 +1.3	6	M5	5.5	25
	22																
	25																
40	16	12	11	70	91 +1.5	9	51	4	12	20	16 x 2	8	51 +1.4	6	M5	5.5	25
	18																
	25																
50	22	11	11	82.5	104 +1.5	9	63	4	12	20	16 x 2	10	64 +1.4	8	M8	23	30
	25																
	36																
63	25	11	11	95.5	116 +1.5	6	76	1	12	20	16 x 2	15	76 +1.4	8	M8	23	30
	28																
	36																
	45																

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

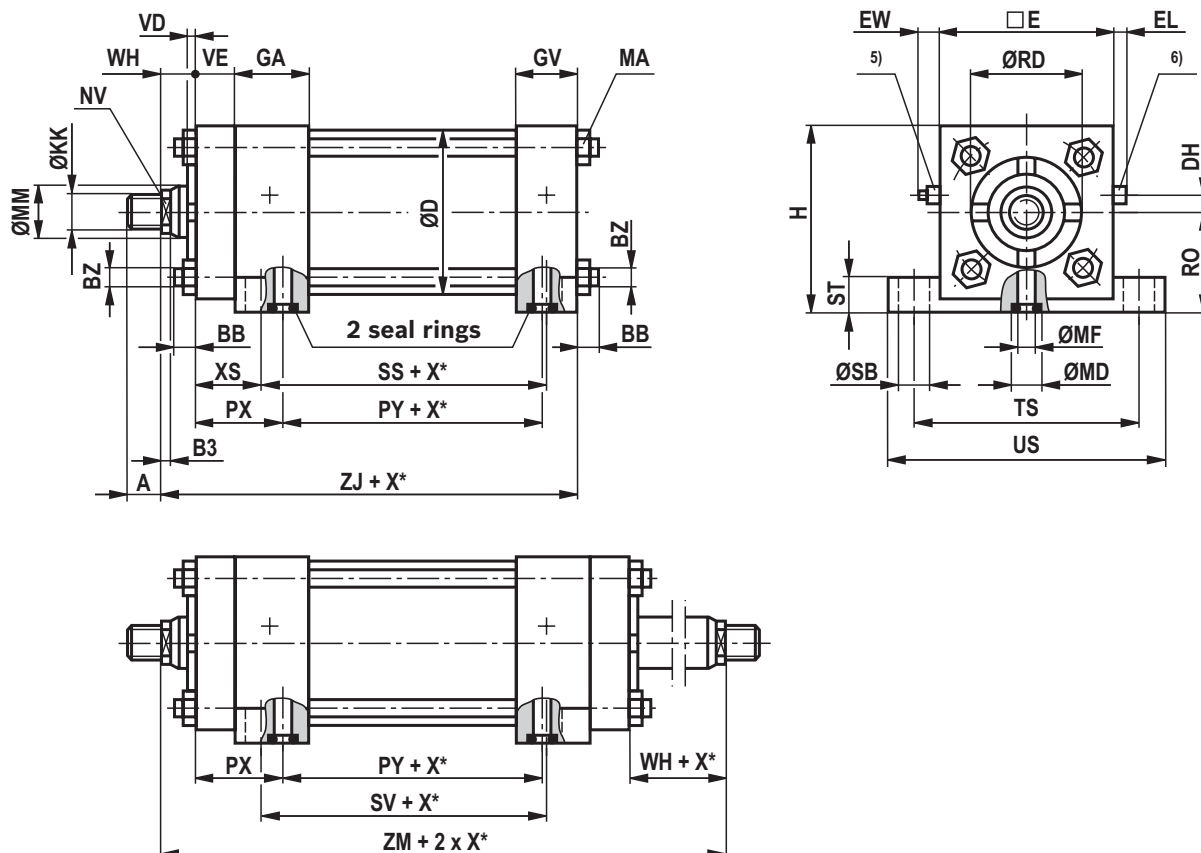
1) Only with piston rod end "E" with double-acting cylinders

5) Adjustable throttle valve for the end position cushioning

6) Check valve and bleeding

Dimensions: Type of mounting M
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting M
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	XS	SS	SV	PX	PY	RO h10
80	36	50	30	10	16	45	33	25	10	86	149	202	28.5	82.5	95	42.5	67	47.5
	45	60	41	12				32	13		156	216						
	56	70	46	15				35			159	222						
100	45	60	41	12	16	45	33	32	13	106	156	216	28.5	82.5	95	42.5	67	57.1
	50	66.6	46	15				35			159	222						
	70	90	60					41	16		165	234						
125	50	66.6	46	15	16	45	33	35	13	135	165	228	33.5	79.5	91	42.5	73	69.8
	56	70																
	63	79.3	55															
	90	108	75															
150	63	79.3	55	15	19	51	40	38	13	160	184	252	36.5	92	103	48.5	79	82.5
	70	90	60															
	80	95.2	75															
	100	120	85															
200	90	108	75	15	19	51	40	38	13	215	187	255	36.5	95	106	48.5	82	108
	100	120	85															
	140	158	120															

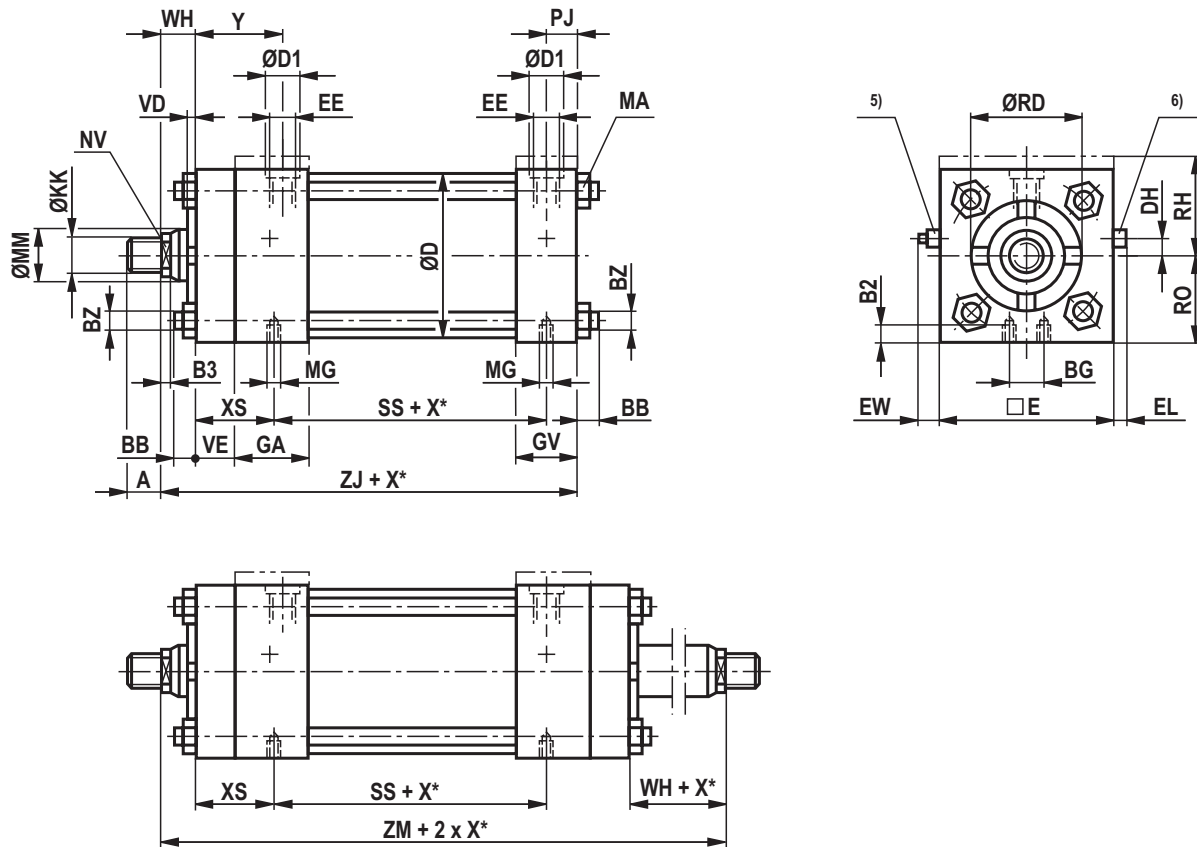
ØAL	ØMM	ST	ØSB	TS	US	EW max.	□E	EL max.	ØMF	ØMD	Seal rings 2x	DH	H	BB	BZ	MA Nm	X* 1) min.
80	36	19	14	120.5	145 +1.6	12	95	11	16	24	19 x 2.5	15	95 +1.5	10	M10	46	30
	45																
	56																
100	45	19	14	139.5	164 +1.6	9	114	8	16	24	19 x 2.5	15	114 +1.5	12	M12	80	45
	50																
	70																
125	50	24	23	174.5	210 +1.8	9	140	8	16	24	19 x 2.5	30	140 +1.6	13	M14	125	55
	56																
	63																
	90																
150	63	24	23	200	235 +1.8	16	165	12	22	30	25 x 2.5	35	165 +1.6	15	M16	195	75
	70																
	80																
	100																
200	90	24	23	251	286 +1.9	14	216	10	22	30	25 x 2.5	55	216 +1.8	15	M16	195	115
	100																
	140																

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- 1) Only with piston rod end "E" with double-acting cylinders
5) Adjustable throttle valve for the end position cushioning
6) Check valve and bleeding

Dimensions: Type of mounting N
 (dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A			
			Piston rod end						
			C, E	B	F	C, E, B	F		
25	12	105	M8x1.25	M10x1.5	M10	15	15		
	16		M10x1.5	M12x1.5		19			
32	18	105	M10x1.5	M12x1.5	M12	19	18		
	22		M16x1.5	M20x1.5		28			
	25		M20x1.5	M22x1.5					
40	16	105	M10x1.5	M12x1.5	M14	19	21		
	18		M20x1.5	M22x1.5		28			
	25								
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30		
	25		M20x1.5	M22x1.5		41			
	36		M26x1.5	M30x2					
63	25	70	M20x1.5	M22x1.5	M24x2	28	36		
	28		M26x1.5	M30x2		41			
	36								
	45		M33x2	M39x2		51			

Dimensions: Type of mounting N (dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	XS	SS	RO h10	RH	DH
25	12	25.5	10	5.5	10	38	26	16	6.5	31	114	152	33	54	19	24 ¹⁾	5
	16	28.5	13														
32	18	32	14	5.5	10	38	26	16	6	38	115	153	33.5	54	22.5	35.5 ²⁾	7
	22	34	19	8				25	13		124	171					
	25	38	22														
40	16	28.5	13	5.5	10	38	26	16	6	46	118	156	33.5	57	25.5	38.5 ³⁾	8
	18	32	14					8	25		13	127					
	25	38	22														
50	22	38	19	8	10	38	26	25	13	56	127	174	33.5	57	31.5	44.5 ³⁾	10
	25		22														
	36	50	30	10				32	16		134	188					
63	25	38	22	8	10	38	26	25	13	69	130	177	33.5	60.5	38	51 ³⁾	15
	28	42	24														
	36	50.7	30	10				32	16		137	191					
	45	60	41	12				38	19		143	203					

ØAL	ØMM	EE		ØD1 4)		EW max.	□E	EL max.	Y	PJ	MG	B2	BG	BB	BZ	M _A Nm	X* 7) min.
		Line connection															
		01	02	01	02												
25	12	G 1/4	M14x1.5	25	25	12	38	7	33	11	M5	6	13.5	6	M5	5.5	25
	16																
32	18	G 1/4	M14x1.5	25	25	12	45	7	33	11	M6	9	14.5	6	M5	5.5	25
	22											7					
	25																
40	16	G 1/4	M14x1.5	25	25	9	51	4	33	11	M6	9	15.5	6	M5	5.5	25
	18											6					
	25																
50	22	G 1/4	M14x1.5	25	25	9	63	4	33	11	M8	12	22	8	M8	23	30
	25											8					
	36																
63	25	G 1/4	M14x1.5	25	25	6	76	1	33	11	M10	15	31	8	M8	23	30
	28											16					
	36											9					
	45																

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

⁴⁾ ØD1 max. 0.5 mm deep

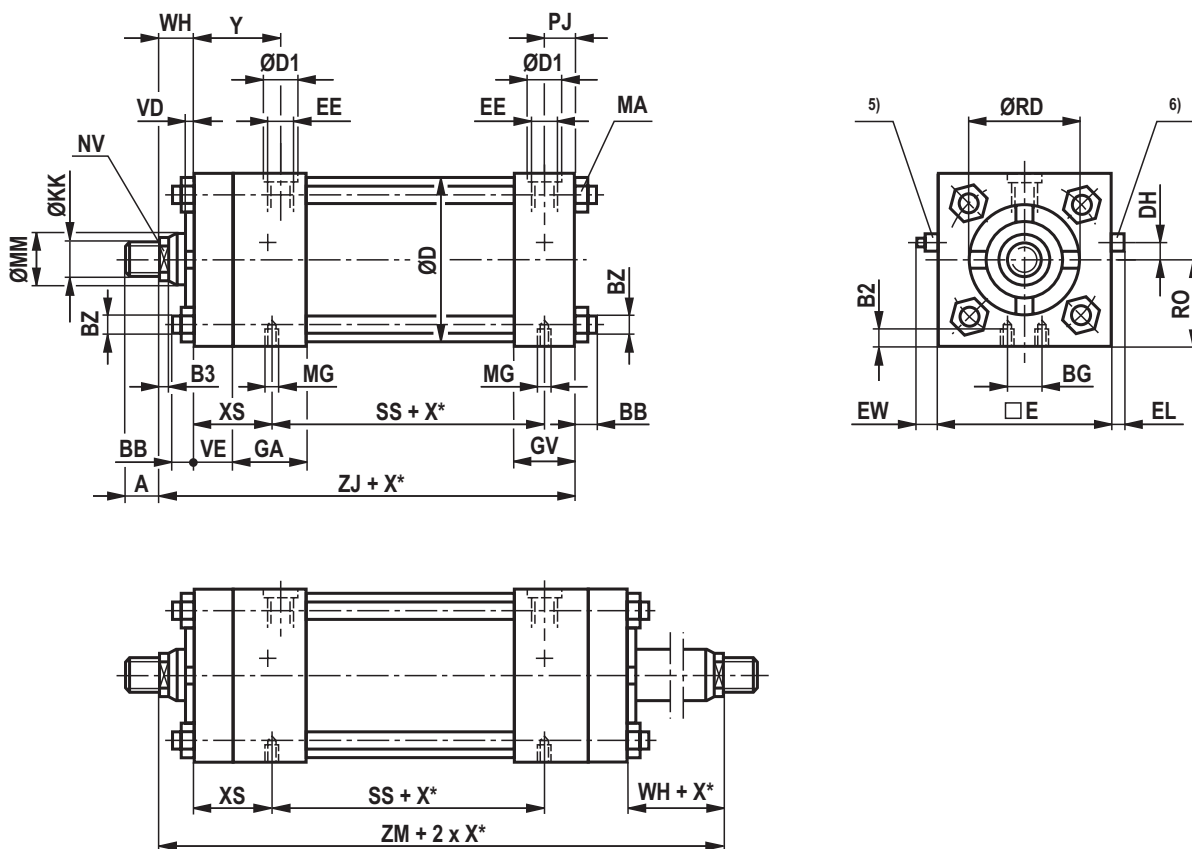
⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

⁷⁾ Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting N
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting N
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	XS	SS	RO h10	DH
80	36	50	30	10	16	45	33	25	10	86	149	202	42.5	67	47.5	15
	45	60	41	12				32	13		156	216				
	56	70	46	15				35			159	222				
100	45	60	41	12	16	45	33	32	13	106	156	216	42.5	67	57	20
	50	66.6	46	15				35			159	222				
	70	90	60					41	16		165	234				
125	50	66.6	46	15	16	45	33	35	13	135	165	228	42.5	73	70	30
	56	70						41	16		171	240				
	63	79.3	55													
	90	108	75													
150	63	79.3	55	15	19	51	40	38	13	160	184	252	48.5	79	82.5	35
	70	90	60													
	80	95.2	75													
	100	120	85													
200	90	108	75	15	19	51	40	38	13	215	187	255	48.5	82	108	55
	100	120	85													
	140	158	120													

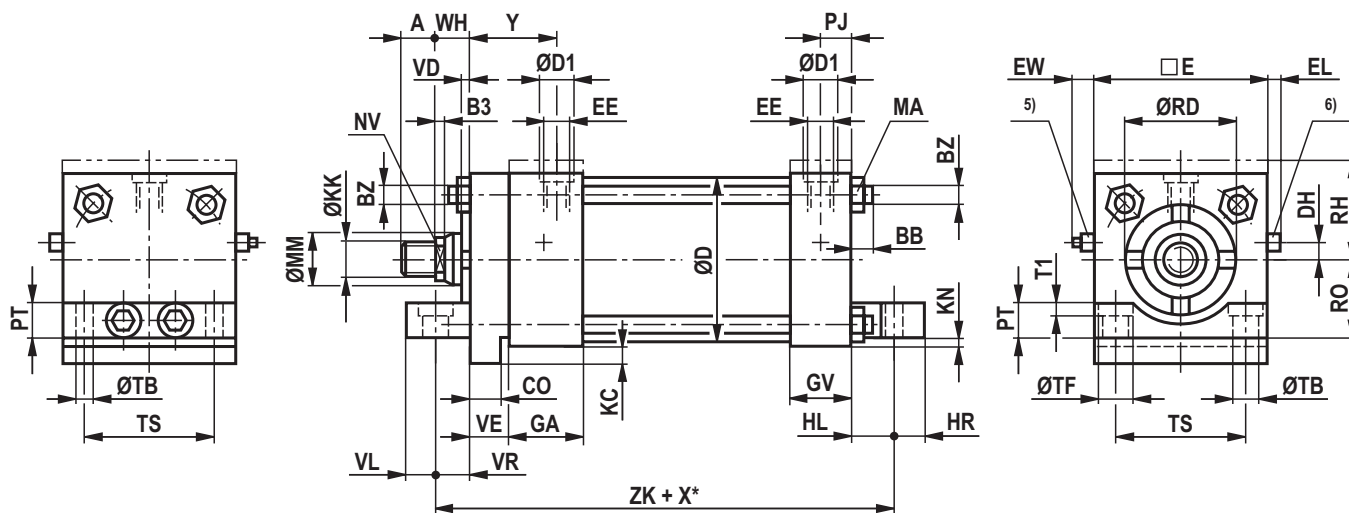
ØAL	ØMM	EE		ØD1 ⁴⁾		EW max.	□E	EL max.	Y	PJ	MG	B2	BG	BB	BZ	M _A Nm	X* ⁷⁾ min.
		Line connection															
		01	02	01	02												
80	36	G 1/2	M22x1.5	34	34	12	95	11	42	14.5	M12	20	38	10	M10	46	30
	45											13					
	56																
100	45	G 1/2	M22x1.5	34	34	9	114	8	42	14.5	M12	25	52	12	M12	80	45
	50											20					
	70											15					
125	50	G 1/2	M22x1.5	34	34	9	140	8	42	14.5	M16	25	66	13	M14	125	55
	56																
	63											19					
	90																
150	63	G 3/4	M26x1.5	42	42	16	165	12	48	18	M20	35	80	15	M16	195	75
	70																
	80											30					
	100											25					
200	90	G 3/4	M26x1.5	42	42	14	216	10	48	18	M20	40	114.5	15	M16	195	115
	100																
	140											28					

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- 4) ØD1 max. 0.5 mm deep
5) Adjustable throttle valve for the end position cushioning
6) Check valve and bleeding
7) Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting T
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
25	12	-	-	-	-	-	-
	16						
32	18	105	M10x1.5	M12x1.5	M12	19	18
	22		M16x1.5	M20x1.5		28	
	25		M20x1.5	M22x1.5			
40	16	105	M10x1.5	M12x1.5	M14	19	21
	18						
	25		M20x1.5	M22x1.5		28	
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30
	25		M20x1.5	M22x1.5			
	36		M26x1.5	M30x2		41	
63	25	70	M20x1.5	M22x1.5	M24x2	28	36
	28						
	36		M26x1.5	M30x2		41	
	45		M33x2	M39x2		51	

Dimensions: Type of mounting T
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZK	RO -0.2	RH	DH	EW max.	DE max.	EL max.	VL	VR	CO -0.07	KC -0.2			
25	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
	16																							
32	18	32	14	5.5	10	38	26	16	6	38	137	22.5	35.5 ¹⁾	7	12	45	7	7	19	8	5			
	22	34	19	8				25	13															
	25	38	22																					
40	16	28.5	13	5.5	10	38	26	16	6	46	140	25.5	38.5 ²⁾	8	9	51	4	6.5	19.5	8	5			
	18	32	14					25	13															
	25	38	22					8																
50	22	38	19	8	10	38	26	25	13	56	149	31.7	44.5 ²⁾	10	9	63	4	7.5	23.5	8	5			
	25		22					25	13															
	36	50	30	10				32	16															
63	25	38	22	8	10	38	26	25	13	69	159	38	51 ²⁾	15	6	76	1	8	27	8	5			
	28	42	24					32	16															
	36	50.7	30					10	38													19		
	45	60	41					12																

ØAL	ØMM	EE		ØD1 ³⁾		Y	PJ	HL	HR	KN -0.4	PT	TS	T1	ØTF	ØTB	BB	BZ	M _A Nm
		Line connection																
		01	02	01	02													
25	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	16																	
32	18	G 1/4	M14x1.5	25	25	33	11	19	7	0.2	11	33	2	11	6.6	6	M5	5.5
	22																	
	25																	
40	16	G 1/4	M14x1.5	25	25	33	11	18.5	7.5	0.2	14	36.5	5	14	9	6	M5	5.5
	18																	
	25																	
50	22	G 1/4	M14x1.5	25	25	33	11	23.5	7.5	0.2	19	46.5	5	14	9.5	8	M8	23
	25																	
	36																	
63	25	G 1/4	M14x1.5	25	25	33	11	27	8	0.2	22	55.5	4.5	14	9.5	8	M8	23
	28																	
	36																	
	45																	

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

²⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

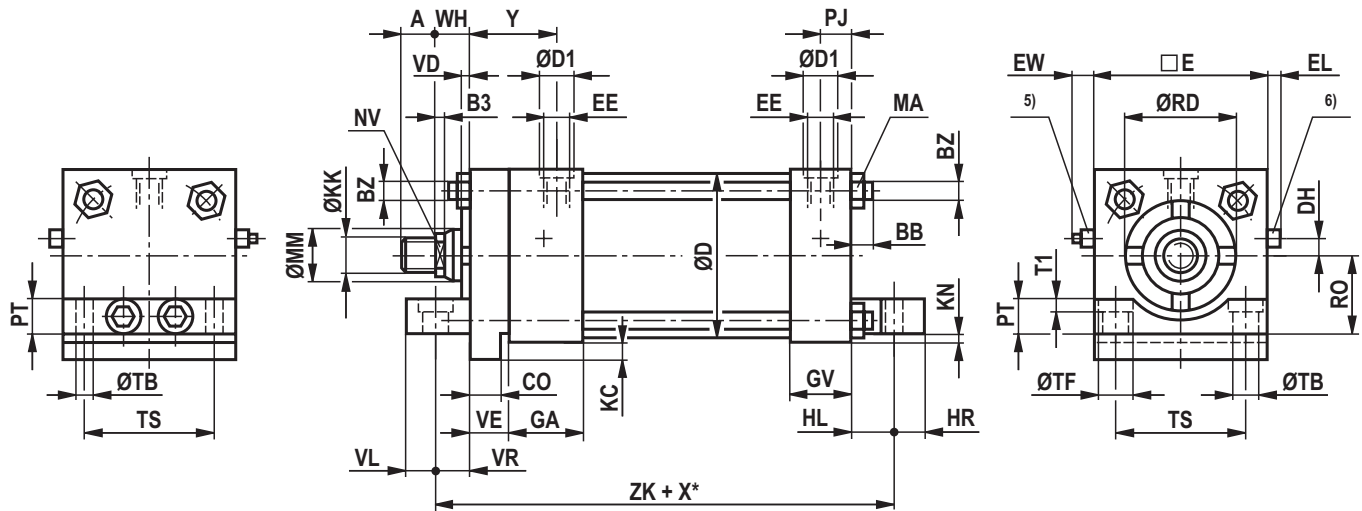
³⁾ ØD1 max. 0.5 mm deep

⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

Dimensions: Type of mounting T
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	-	-	-	-	-	-
	100		-	-	-	-	-
	140		-	-	-	-	-

Dimensions: Type of mounting T
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZK	RO -0.2	DH	EW max.	DE max.	EL max.	VL	VR	CO -0.07	KC -0.2
80	36	50	30	10	16	45	33	25	10	86	168	47.5	15	12	95	11	10	22	14	8
	45	60	41	12				32	13											
	56	70	46	15				35												
100	45	60	41	12	16	45	33	32	13	106	174.5	57.1	20	9	114	8	11	26	14	8
	50	66.6	46	15				35												
	70	90	60					41	16											
125	50	66.6	46	15	16	45	33	35	13	135	184	69.8	30	9	140	8	13	27	14	8
	56	70																		
	63	79.3	55					41	16											
	90	108	75																	
150	63	79.3	55	15	19	51	40	38	13	160	197	82.5	35	16	165	12	14.5	25.5	18	9.5
	70	90	60																	
	80	95.2	75																	
	100	120	85																	
200	90																			
	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	140																			

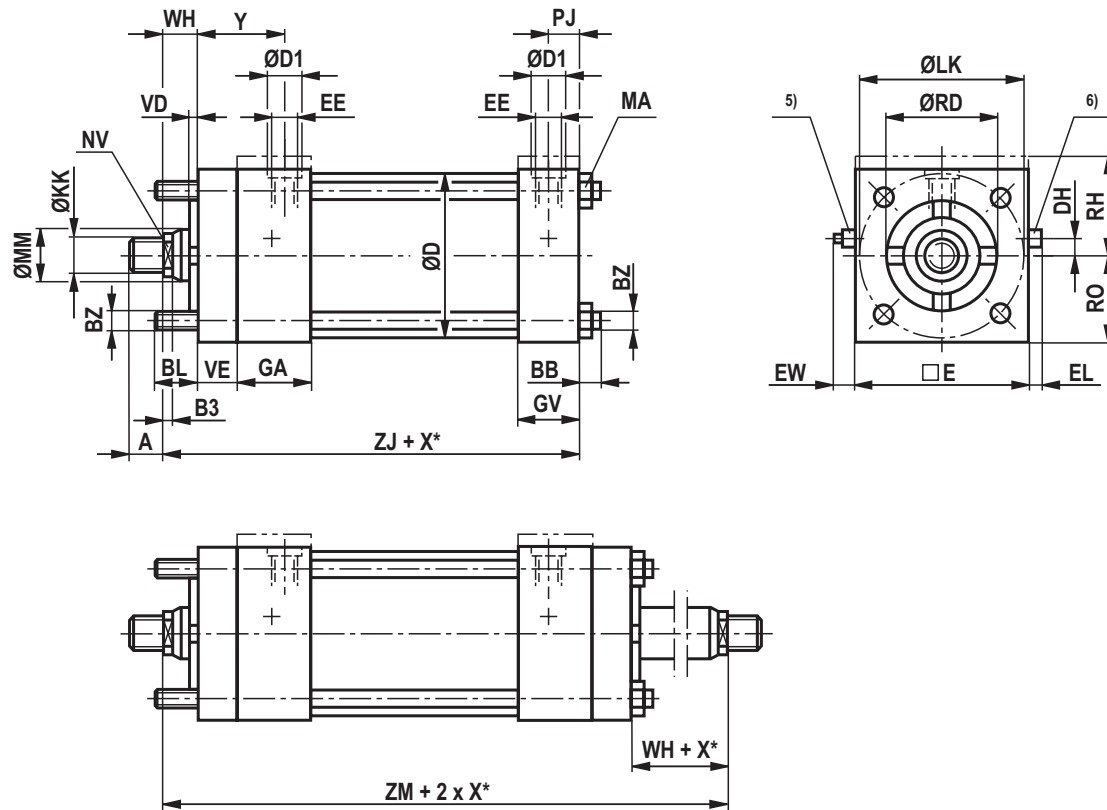
ØAL	ØMM	EE		ØD1 ³⁾		Y	PJ	HL	HR	KN -0.4	PT	TS	T1	ØTF	ØTB	BB	BZ	M _A Nm
		Line connection																
		01	02	01	02													
80	36	G 1/2	M22x1.5	34	34	42	14.5	22	10	0.2	25	70	5	18	11	10	M10	46
	45																	
	56																	
100	45	G 1/2	M22x1.5	34	34	42	14.5	24.5	12.5	0.2	32	84.5	5	18	11	12	M12	80
	50																	
	70																	
125	50	G 1/2	M22x1.5	34	34	42	14.5	27	13	0.2	38	104	6	20	14	13	M14	125
	56																	
	63																	
	90																	
150	63	G 3/4	M26x1.5	42	42	48	18	25.5	14.5	0.2	40	124	-	-	14	15	M16	195
	70																	
	80																	
	100																	
200	90	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	100																	
	140																	

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

³⁾ ØD1 max. 0.5 mm deep
⁵⁾ Adjustable throttle valve for the end position cushioning
⁶⁾ Check valve and bleeding

Dimensions: Type of mounting P
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A			
			Piston rod end						
			C, E	B	F	C, E, B	F		
25	12	105	M8x1.25	M10x1.5	M10	15	15		
	16		M10x1.5	M12x1.5		19			
32	18	105	M10x1.5	M12x1.5	M12	19	18		
	22		M16x1.5	M20x1.5		28			
	25		M20x1.5	M22x1.5					
40	16	105	M10x1.5	M12x1.5	M14	19	21		
	18		M20x1.5	M22x1.5		28			
	25								
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30		
	25		M20x1.5	M22x1.5		41			
	36		M26x1.5	M30x2					
63	25	70	M20x1.5	M22x1.5	M24x2	28	36		
	28		M26x1.5	M30x2		41			
	36								
	45		M33x2	M39x2		51			

Dimensions: Type of mounting P
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	RO	RH	DH	EW max.	OE	EL max.
25	12	25.5	10	5.5	10	38	26	16	6.5	31	114	152	19	24 ¹⁾	5	12	38	7
	16	28.5	13															
32	18	32	14	5.5	10	38	26	16	6	38	115	153	22.5	35.5 ²⁾	7	12	45	7
	22	34	19	25				13	124		171							
	25	38	22															
40	16	28.5	13	5.5	10	38	26	16	6	46	118	156	25.5	38.5 ³⁾	8	9	51	4
	18	32	14					25	13		127	174						
	25	38	22															
50	22	38	19	8	10	38	26	25	13	56	127	174	31.5	44.5 ³⁾	10	9	63	4
	25		22					32	16		134	188						
	36	50	30															
63	25	38	22	8	10	38	26	25	13	69	130	177	38	51 ³⁾	15	6	76	1
	28	42	24					32	16		137	191						
	36	50.7	30															
	45	60	41					12	38		19	143						

ØAL	ØMM	EE		ØD1 ⁴⁾		Y	PJ	ØLK	BL	BB	BZ	M _A Nm	X* ⁷⁾ min.
		Line connection											
		01	02	01	02								
25	12	G 1/4	M14x1.5	25	25	33	11	39	20	6	M5	5.5	25
	16												
32	18	G 1/4	M14x1.5	25	25	33	11	46.5	20	6	M5	5.5	25
	22												
	25												
40	16	G 1/4	M14x1.5	25	25	33	11	51.5	25	6	M5	5.5	25
	18												
	25												
50	22	G 1/4	M14x1.5	25	25	33	11	66	28	8	M8	23	30
	25												
	36												
63	25	G 1/4	M14x1.5	25	25	33	11	78.5	28	8	M8	23	30
	28												
	36												
	45												

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

⁴⁾ ØD1 max. 0.5 mm deep

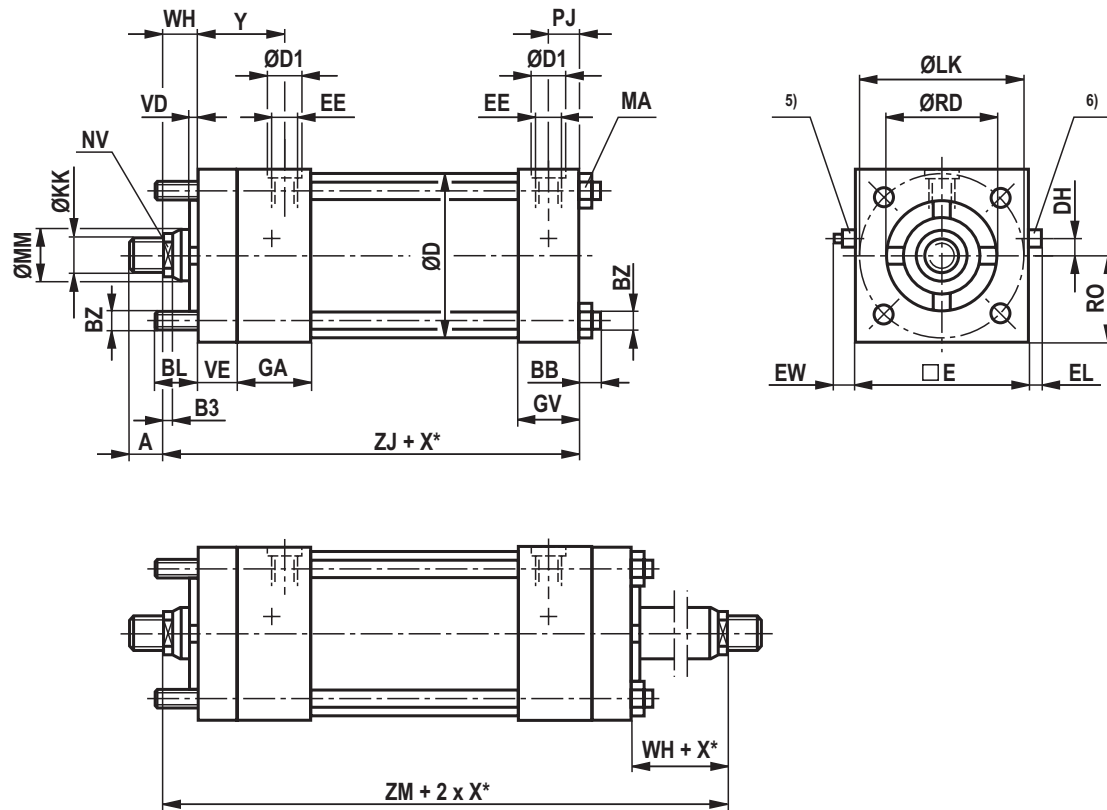
⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

⁷⁾ Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting P
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	63	50	M48x2	M56x2	M45x3	76	68
	70		M58x2	M68x2		89	
	80		M76x2	M95x2		101	
200	90	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting P
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	ZM	RO	DH	EW max.	DE	EL max.
80	36	50	30	10	16	45	33	25	10	86	149	202	47.5	15	12	95	11
	45	60	41	12				32	13		156	216					
	56	70	46	15				35	159		222						
100	45	60	41	12	16	45	33	32	13	106	156	216	57	20	9	114	8
	50	66.6	46	15				35	16		159	222					
	70	90	60					41	16		165	234					
125	50	66.6	46	15	16	45	33	35	13	135	165	228	70	30	9	140	8
	56	70						41	16		171	240					
	63	79.3	55														
	90	108	75														
150	63	79.3	55	15	19	51	40	38	13	160	184	252	82.5	35	16	165	12
	70	90	60														
	80	95.2	75														
	100	120	85														
200	90	108	75	15	19	51	40	38	13	215	187	255	108	55	14	216	10
	100	120	85														
	140	158	120														

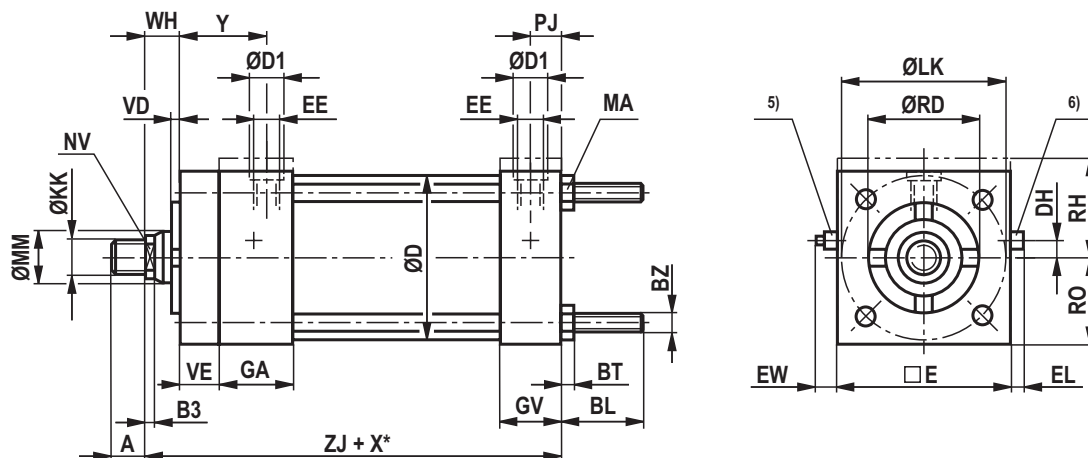
ØAL	ØMM	EE		ØD1 ⁴⁾		Y	PJ	ØLK	BL	BB	BZ	M _A Nm	X* ⁷⁾ min.
		Line connection											
		01	02	01	02								
80	36	G 1/2	M22x1.5	34	34	42	14.5	99	35	10	M10	46	30
	45												
	56												
100	45	G 1/2	M22x1.5	34	34	42	14.5	119.5	35	12	M12	80	45
	50												
	70												
125	50	G 1/2	M22x1.5	34	34	42	14.5	150	45	13	M14	125	55
	56												
	63												
	90												
150	63	G 3/4	M26x1.5	42	42	48	18	177	45	15	M16	195	75
	70												
	80												
	100												
200	90	G 3/4	M26x1.5	42	42	48	18	232	58	15	M16	195	115
	100												
	140												

ØAL = Piston Ø
ØMM = Piston rod Ø
X* = Stroke length

- 4) ØD1 max. 0.5 mm deep
5) Adjustable throttle valve for the end position cushioning
6) Check valve and bleeding
7) Only with piston rod end "E" with double-acting cylinders

Dimensions: Type of mounting Q
(dimensions in mm)

Piston Ø 25 ... 63 mm



ØAL	ØMM	Operating pressure in bar	KK			A			
			Piston rod end						
			C, E	B	F	C, E, B	F		
25	12	105	M8x1.25	M10x1.5	M10	15	15		
	16		M10x1.5	M12x1.5		19			
32	18	105	M10x1.5	M12x1.5	M12	19	18		
	22		M16x1.5	M20x1.5		28			
	25		M20x1.5	M22x1.5					
40	16	105	M10x1.5	M12x1.5	M14	19	21		
	18		M20x1.5	M22x1.5		28			
	25								
50	22	105	M16x1.5	M20x1.5	M20x1.5	28	30		
	25		M20x1.5	M22x1.5		41			
	36		M26x1.5	M30x2					
63	25	70	M20x1.5	M22x1.5	M24x2	28	36		
	28		M26x1.5	M30x2		41			
	36								
	45		M33x2	M39x2		51			

Dimensions: Type of mounting Q
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	RO	RH	DH	EW max.	OE	EL max.
25	12	25.5	10	5.5	10	38	26	16	6.5	31	114	19	24 ¹⁾	5	12	38	7
	16	28.5	13														
32	18	32	14	5.5	10	38	26	16	6	38	115	22.5	35.5 ²⁾	7	12	45	7
	22	34	19	8				25	13		124						
	25	38	22														
40	16	28.5	13	5.5	10	38	26	16	6	46	118	25.5	38.5 ³⁾	8	9	51	4
	18	32	14					8	25		13		127				
	25	38	22														
50	22	38	19	8	10	38	26	25	13	56	127	31.5	44.5 ³⁾	10	9	63	4
	25		22					32	16		134						
	36	50	30	10													
63	25	38	22	8	10	38	26	25	13	69	130	38	51 ³⁾	15	6	76	1
	28	42	24					32	16		137						
	36	50.7	30	10							38		19				
	45	60	41	12													

ØAL	ØMM	EE		ØD1 ⁴⁾		Y	PJ	ØLK	BL	BT	BZ	M _A Nm
		Line connection										
		01	02	01	02							
25	12	G 1/4	M14x1.5	25	25	33	11	39	20	4	M5	5.5
	16											
32	18	G 1/4	M14x1.5	25	25	33	11	46.5	20	4	M5	5.5
	22											
	25											
40	16	G 1/4	M14x1.5	25	25	33	11	51.5	25	4	M5	5.5
	18											
	25											
50	22	G 1/4	M14x1.5	25	25	33	11	66	28	6.5	M8	23
	25											
	36											
63	25	G 1/4	M14x1.5	25	25	33	11	78.5	28	6.5	M8	23
	28											
	36											
	45											

ØAL = Piston Ø

ØMM = Piston rod Ø

X* = Stroke length

¹⁾ Raised cylinder head and base

²⁾ Raised cylinder head except for Ø 32/18 with end position cushioning "U" or "K"

³⁾ Raised cylinder head for: Ø 40/25; Ø 50/36 and Ø 63/45 with end position cushioning "D" or "S"

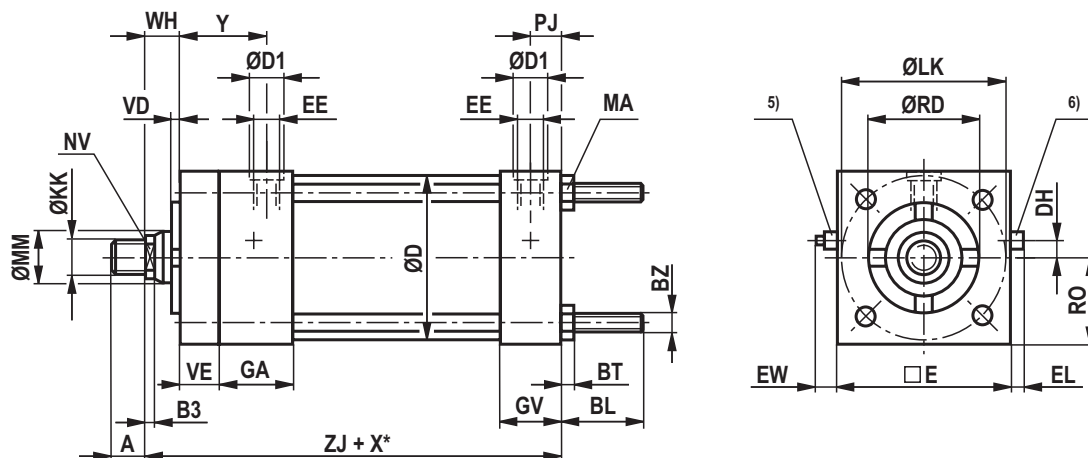
⁴⁾ ØD1 max. 0.5 mm deep

⁵⁾ Adjustable throttle valve for the end position cushioning

⁶⁾ Check valve and bleeding

Dimensions: Type of mounting Q
(dimensions in mm)

Piston Ø 80 ... 200 mm



ØAL	ØMM	Operating pressure in bar	KK			A	
			Piston rod end				
			C, E	B	F	C, E, B	F
80	36	70	M26x1.5	M30x2	M30x2	41	45
	45		M33x2	M39x2		51	
	56		M39x2	M45x2		57	
100	45	70	M33x2	M39x2	M39x3	51	65
	50		M39x2	M45x2		57	
	70		M48x2	M56x2		76	
125	50	70	M39x2	M45x2	M42x3	57	65
	56		M48x2	M56x2		76	
	63		M64x2	M76x2		89	
150	90	50	M48x2	M56x2	M45x3	76	68
	63		M58x2	M68x2		89	
	70		M76x2	M95x2		101	
200	80	40	M64x2	M76x2	M52x3	89	70
	100		M76x2	M95x2		101	
	140		M100x2	M130x2		140	

Dimensions: Type of mounting Q
(dimensions in mm)

ØAL	ØMM	ØRD f7	NV	B3	VE	GA	GV	WH	VD	ØD	ZJ	RO	DH	EW max.	QE	EL max.		
80	36	50	30	10	16	45	33	25	10	86	149	47.5	15	12	95	11		
	45	60	41	12				32	13		156							
	56	70	46	15				35	159									
100	45	60	41	12	16	45	33	32	13	106	156	57	20	9	114	8		
	50	66.6	46	15				35	16		159							
	70	90	60					41	16		165							
125	50	66.6	46	15	16	45	33	35	13	135	165	70	30	9	140	8		
	56	70						15	16		13						16	171
	63	79.3	55															
	90	108	75															
150	63	79.3	55	15	19	51	40	38	13	160	184	82.5	35	16	165	12		
	70	90	60															
	80	95.2	75															
	100	120	85															
200	90	108	75	15	19	51	40	38	13	215	187	108	55	14	216	10		
	100	120	85															
	140	158	120															

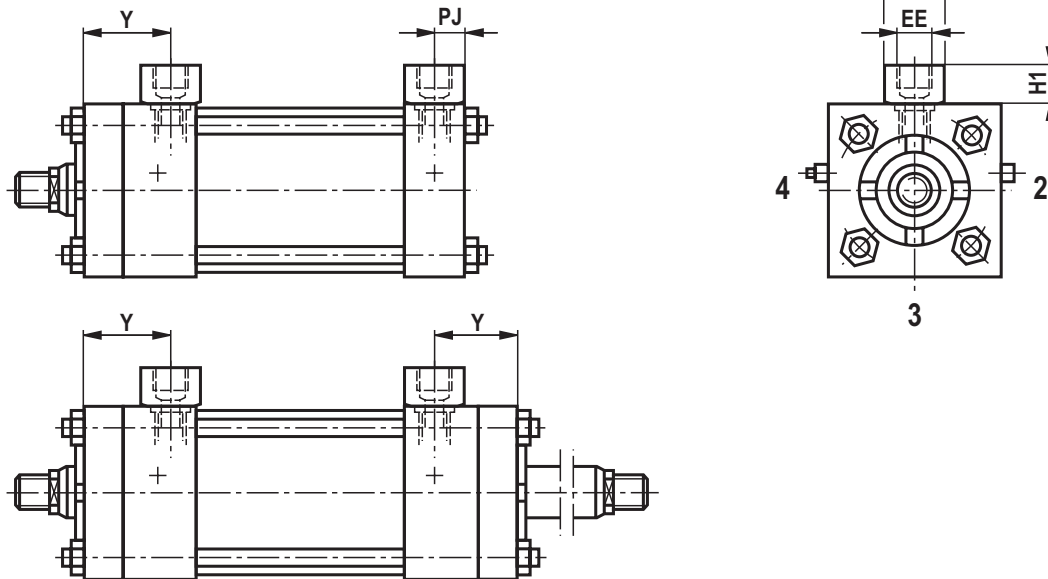
ØAL	ØMM	EE		ØD1 ⁴⁾		Y	PJ	ØLK	BL	BT	BZ	M _A Nm
		Line connection										
		01	02	01	02							
80	36	G 1/2	M22x1.5	34	34	42	14.5	99	35	8	M10	46
	45											
	56											
100	45	G 1/2	M22x1.5	34	34	42	14.5	119.5	35	10	M12	80
	50											
	70											
125	50	G 1/2	M22x1.5	34	34	42	14.5	150	45	11	M14	125
	56											
	63											
	90											
150	63	G 3/4	M26x1.5	42	42	48	18	177	45	13	M16	195
	70											
	80											
	100											
200	90	G 3/4	M26x1.5	42	42	48	18	232	58	13	M16	195
	100											
	140											

ØAL = Piston Ø
 ØMM = Piston rod Ø
 X* = Stroke length

⁴⁾ ØD1 max. 0.5 mm deep
⁵⁾ Adjustable throttle valve for the end position cushioning
⁶⁾ Check valve and bleeding

Enlarged line connection 13 and 14

(dimensions in mm)



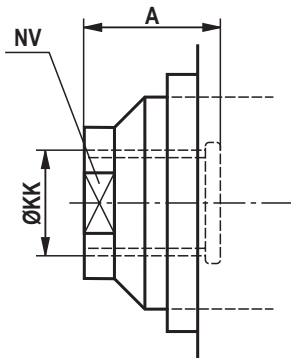
ØAL	EE Line connection		Y	PJ	SW	H1
	13	14				
25	G 3/8	M16 x 1.5	33	11	27	20
32	G 3/8	M16 x 1.5	33	11	27	20
40	G 3/8	M16 x 1.5	33	11	27	20
50	G 3/8	M16 x 1.5	33	11	27	20
63	G 3/8	M16 x 1.5	33	11	27	20
80	G 3/4	M26 x 1.5	42	14.5	41	29
100	G 3/4	M26 x 1.5	42	14.5	41	29
125	G 3/4	M26 x 1.5	42	14.5	41	29
150	G 1	M33 x 2	48	18	46	33
200	G 1	M33 x 2	48	18	46	33

ØAL = Piston Ø

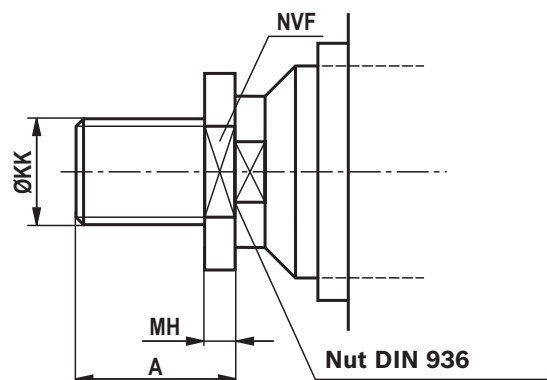
Piston rod ends "E" and "F"

(dimensions in mm)

Piston rod end "E"



Piston rod end "F"



ØAL	ØMM	KK		A		NV	NVF	MH			
		Piston rod end									
		E	F	E	F						
25	12	M8x1.25	M10	15	15	10	17	6			
	16	M10x1.5		19		13					
32	18	M10x1.5	M12	19	18	14	19	7			
	22	M16x1.5		28		19					
	25	M20x1.5				22					
40	16	M10x1.5	M14	19	21	13	22	8			
	18					14					
	25	M20x1.5		28		22					
50	22	M16x1.5	M20x1.5	28	30	19	30	9			
	25	M20x1.5				22					
	36	M26x1.5		41		30					
63	25	M20x1.5	M24x2	28	36	22	36	10			
	28					30					
	36	M26x1.5		41							
	45	M33x2		51		41					
80	36	M26x1.5	M30x2	41	45	30	46	12			
	45	M33x2		51		41					
	56	M39x2		57		46					
100	45	M33x2	M39x3	51	65	41	60	16			
	50	M39x2		57		46					
	70	M48x2		76		60					
125	50	M39x2	M42x3	57	65	46	65	16			
	56					55					
	63	M48x2		76							
	90	M64x2		89		75					
150	63	M48x2	M45x3	76	68	55	70	18			
	70					60					
	80	M58x2		89		75					
	100	M76x2		101		85					
200	90	M64x2	M52x3	89	70	75	80	20			
	100	M76x2		101		85					
	140	M100x2		140		120					

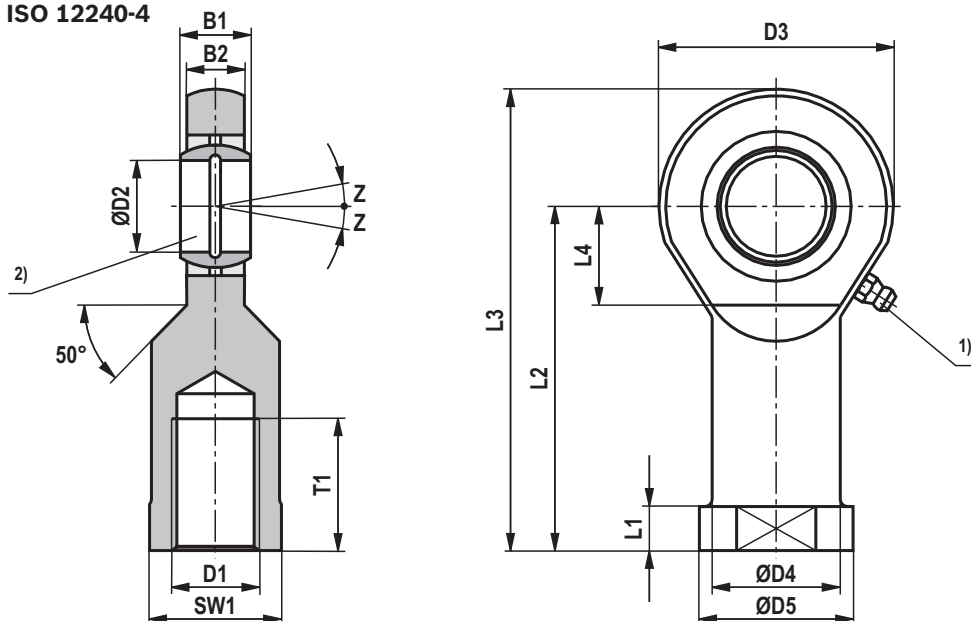
ØAL = Piston Ø

ØMM = Piston rod Ø

Dimensions: Swivel head CGK

(dimensions in mm)

ISO 12240-4



Notice!

Geometry and dimensions may differ depending on the manufacturer. In case of combination with other mounting elements, the usability must be checked.

ØAL	Type		B1 -0.12	B2	D1	ØD2 h5	D3 max.	ØD4 max.	ØD5 max.
25	CGK 10 ³⁾		9	7	M10	10	30	16	20
32	CGK 12 ³⁾		10	8	M12	12	35	19	23
40	CGK 15 ⁴⁾		12	10	M14	15	41	22	27
50	CGK 20 ⁴⁾		16	13	M20x1.5	20	54	28	36
63	CGK 25		20	17	M24x2	25	65	35	44
80	CGK 30		22	19	M30x2	30	75	42	52
100	CGK 40		28	23	M39x3	40	94	52	67
125	CGK 45		32	27	M42x3	45	104	58	72
150	CGK 50		35	30	M45x3	50	114	62	77
200	CGK 60		44	38	M52x3	60	137	70	90

ØAL	Type	L1	L2	L3 max.	L4 min.	T1 min.	SW1 ⁵⁾	Z ⁵⁾	m kg	C ₀ ⁶⁾ kN	F _{adm} ⁷⁾ kN
25	CGK 10 ³⁾	6.5	43	60	13	15	15 / 16	12° – 15°	0.07	17.6	5.8
32	CGK 12 ³⁾	7	50	69	17	18	19	10° – 11°	0.1	24.5	8.1
40	CGK 15 ⁴⁾	8	61	83	19	21	22	8° – 12°	0.16	36	11.9
50	CGK 20 ⁴⁾	10	77	106	24	30	30 / 32	9°	0.34	60	19.8
63	CGK 25	12	94	128	30	36	36	7°	0.6	83	27.4
80	CGK 30	15	110	149	34	45	41 / 46	6°	0.9	110	36.3
100	CGK 40	18	142	191	46	65	55	7°	2.0	180	59.4
125	CGK 45	20	145	199	50	65	60 / 65	7°	2.7	240	79.2
150	CGK 50	20	160	219	58	68	65 / 70	6°	3.5	290	95.7
200	CGK 60	20	175	246	73	70	75	6°	5.6	450	148.5

ØAL = Piston Ø

1) Lubricating nipple, cone head form A according to DIN 71412

2) Bolt Ø m6 required

3) Cannot be re-lubricated

4) Can be re-lubricated via lubricating hole in housing

5) Dimensions may differ depending on the manufacturer

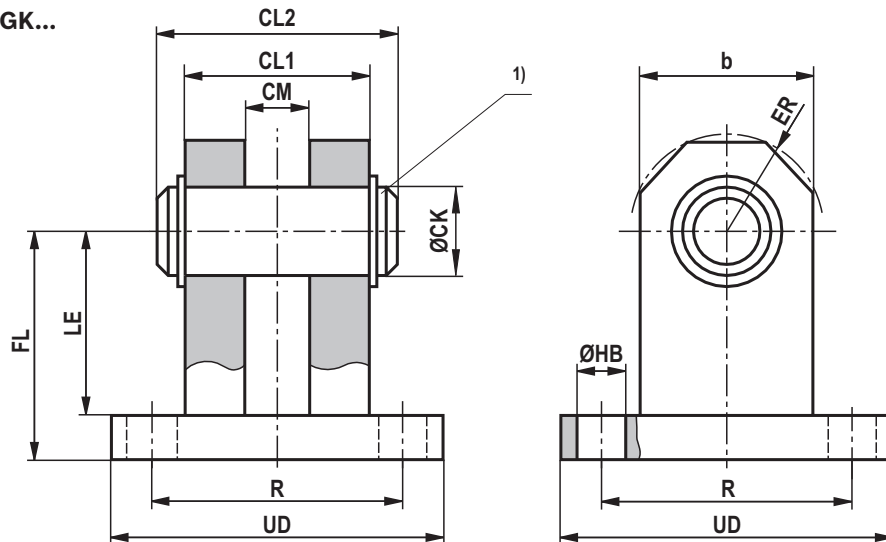
6) C₀ = Static load rating of the swivel head

7) F_{adm} = Maximum admissible load on the swivel head during oscillatory or alternating loads

Dimensions: Clevis bracket CLCC

(dimensions in mm)

Suitable for swivel head
type CGK...



Notice!

Geometry and dimensions may differ depending on the manufacturer. In case of combination with other mounting elements, the usability must be checked.

ØAL = Piston Ø

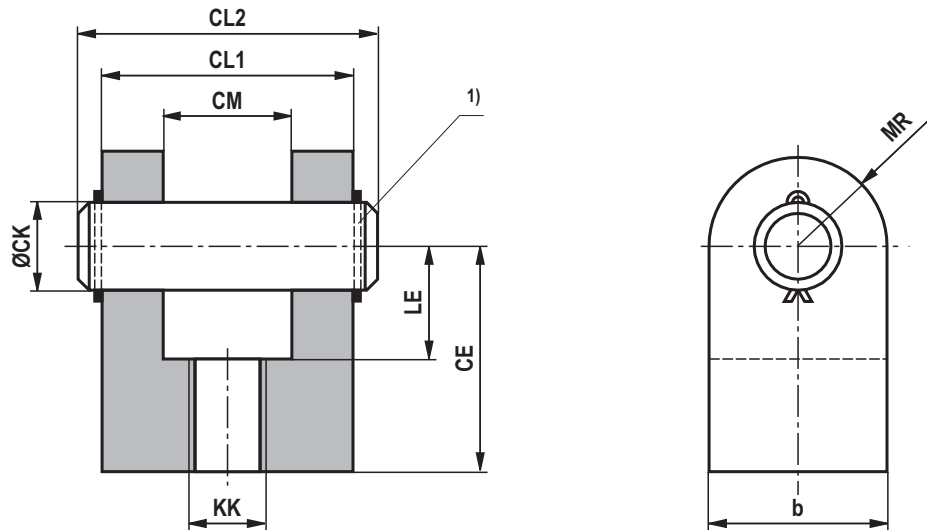
- 1) Bolt Ø m6 required
(bolt and bolt lock are included in the scope of delivery)
- 2) When mounted on the piston rod with CGK...
- 3) When mounted on the cylinder base (mounting type "B")

ØAL ²⁾	ØAL ³⁾	Type	ØCK H9 ¹⁾	CL1 h16	CL2 max.	CM A12	FL js12
25	—	CLCC 10	10	25	37	9	35
32	25	CLCC 12	12	25	37	10	35
	32						
40	40	CLCC 15	15	35	48	12	45
50	50	CLCC 20	20	50	64	16	58
	63						
63	80	CLCC 25	25	60	74	20	75
	100						
80	125	CLCC 30	30	60	74	22	75
—	150	CLCC 35	35	70	93	25	90
100	—	CLCC 40	40	70	93	28	90
125	200	CLCC 45	45	110	133	32	125
150	—	CLCC 50	50	110	133	35	125
200	—	CLCC 60	60	125	148	44	155

ØAL ²⁾	ØAL ³⁾	Type	ØHB H13	ER max.	LE min.	UD max.	R js14	b max.	m kg
25	—	CLCC 10	5.5	13	25	45	33	24	0.3
32	25	CLCC 12	5.5	13	25	45	33	24	0.3
	32								
40	40	CLCC 15	11	17	35	75	50	32	0.8
50	50	CLCC 20	13.5	22	42	90	65	40	1.8
	63								
63	80	CLCC 25	13.5	25	59	95	70	45	2.5
	100								
80	125	CLCC 30	13.5	25	59	95	70	45	2.5
—	150	CLCC 35	17.5	35	68	130	95	65	6.0
100	—	CLCC 40	17.5	35	68	130	95	65	6.0
125	200	CLCC 45	26	46	100	180	135	85	15.0
150	—	CLCC 50	26	46	100	180	135	85	15.0
200	—	CLCC 60	33	66	125	225	170	125	28.0

Dimensions: Fork clevis CCKA

(dimensions in mm)



ØMM	Type ²⁾		ØCK H7 ¹⁾	CL1 h16	CL2 max.	CM A12	CE js12	KK	LE min.	MR max.	b max.	m kg
16	CCKA 10		12.7	44	56	20	38	M10x1.5	19	13	26	0.2
18												
22	CCKA 16		19.1	65	77	32.5	54	M16x1.5	26	19	38	1.0
25	CCKA 20		19.1	65	77	32.5	54	M20x1.5	26	19	38	1.0
28												
36	CCKA 26		25.43	77	92	39	75	M26x1.5	34	26	52	2.4
45	CCKA 33		34.95	100	118	51.5	95	M33x2	45	35	70	4.5
50	CCKA 39		44.48	127	147	65	114	M39x2	57	45	90	8.5
56												
63	CCKA 48		50.83	127	147	65	140	M48x2	64	50	100	13.0
70												
80	CCKA 58		63.5	154	176	78	165	M58x2	76	65	130	23.0
90	CCKA 64		76.23	154	176	78	172	M64x2	83	70	140	25.0

ØMM = Piston rod Ø

¹⁾ Bolt Øf7 required

(bolt and bolt lock are included in the scope of delivery)

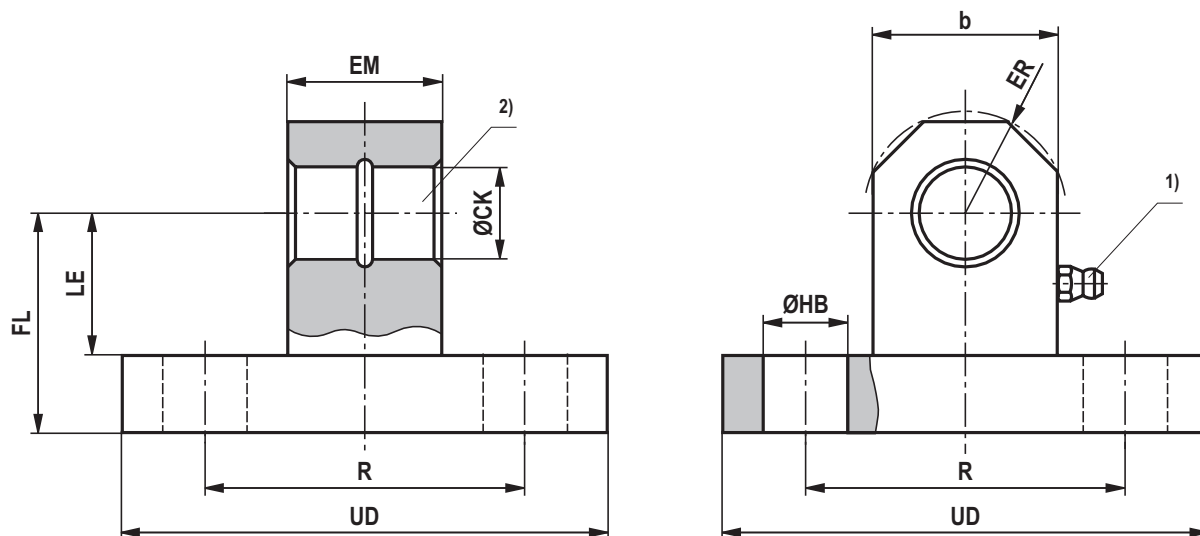
²⁾ Only possible with piston rod end "C".

Notice!

Geometry and dimensions may differ depending on the manufacturer. In case of combination with other mounting elements, the usability must be checked.

Dimensions: Eye bearing block CLEA

(dimensions in mm)



ØAL ³⁾	ØMM ⁴⁾	Type	ØCK H7 2)	EM h13	FL js12	ØHB H13	ER max.	LE min.	UD max.	R js14	b	m kg
32	16	CLEA 10	12.7	20	28.5	11	13	18.5	63	41.5	24	0.4
40												
50	18	CLEA 20	19.1	32.5	47.5	13.5	22	31.5	89	65	40	1.6
63												
80	22	CLEA 26	25.43	39	57	17.5	30	38	114	82.5	55	2.3
100	25											
125	28	CLEA 33	34.95	51.5	76	17.5	41	54	127	97	75	5.8
—	45	CLEA 39	44.48	65	79.5	22	49	57	165	126	90	10.0
—	56											
—	63	CLEA 48	50.83	65	89	26	56	64	190	145.5	105	14.0
—	70											
—	80	CLEA 58	63.53	78	101.5	30	69	77	216	167	130	21.0
—	90	CLEA 64	76.23	78	108	33	77	83	242	190.5	145	26.0

ØAL = Piston Ø

ØMM = Piston rod Ø

1) Lubricating nipple, cone head form A according to DIN 71412

2) Suitable for fork clevis type CCKA...

3) When mounted on the cylinder base (type of mounting "G")

4) When mounted on the piston rod with CCKA...

Notice!

Geometry and dimensions may differ depending on the manufacturer. In case of combination with other mounting elements, the usability must be checked.

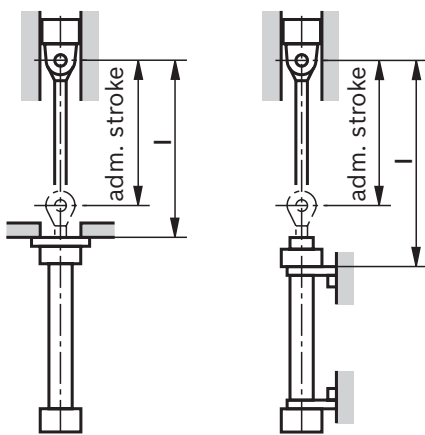
Admissible stroke lengths

ØAL in mm	ØMM in mm	Types of mounting: C, F, H, L, M, N, P, T				Types of mounting: D, K, Q			
		Operating pressure in bar				Operating pressure in bar			
		40	50	70	105	40	50	70	105
		Maximum admissible stroke in mm				Maximum admissible stroke in mm			
25	12	600	600	530	425	460	410	330	250
	16	600	600	600	600	600	600	600	520
32	18	800	800	800	800	580	500	420	325
	22	800	800	800	800	800	760	630	500
	25	800	800	800	800	800	800	800	745
40	16	805	715	585	465	350	300	240	175
	18	1000	920	770	610	450	390	320	250
	25	1000	1000	1000	1000	900	780	635	500
50	22	1200	1090	900	720	540	460	360	280
	25	1200	1200	1200	965	765	670	550	430
	36	1200	1200	1200	1200	1200	1200	1110	890
63	25	1255	1115	920	–	570	500	405	–
	28	1400	1400	1130	–	700	610	490	–
	36	1400	1400	1400	–	1310	1160	960	–
	45	1400	1400	1400	–	1400	1400	1390	–
80	36	1700	1700	1545	–	910	800	630	–
	45	1700	1700	1700	–	1620	1435	1190	–
	56	1700	1700	1700	–	1700	1700	1670	–
100	45	2000	2000	1930	–	1170	1020	820	–
	50	2000	2000	2000	–	1580	1395	1155	–
	70	2000	2000	2000	–	2000	2000	2000	–
125	50	2300	2300	2300	–	1220	1075	885	–
	56	2300	2300	2300	–	1470	1290	1140	–
	63	2300	2300	2300	–	2035	1805	1500	–
	90	2300	2300	2300	–	2300	2300	2300	–
150	63	2600	2600	–	–	1670	1465	–	–
	70	2600	2600	–	–	1890	1680	–	–
	80	2600	2600	–	–	2600	2470	–	–
	100	2600	2600	–	–	2600	2600	–	–
200	90	3000	–	–	–	2380	–	–	–
	100	3000	–	–	–	3000	–	–	–
	140	3000	–	–	–	3000	–	–	–

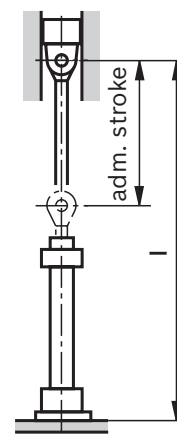
ØAL = Piston Ø

ØMM = Piston rod Ø

$$s_K = l \cdot \sqrt{\frac{1}{2}}$$



$$s_K = l \cdot \sqrt{\frac{1}{2}}$$



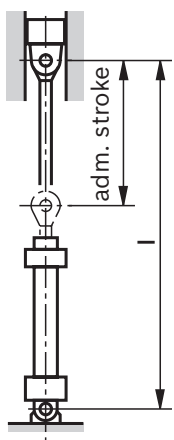
Admissible stroke lengths

ØAL in mm	ØMM in mm	Types of mounting: B, G, S				Type of mounting: E (Position: Trunnion in cylinder center)			
		Operating pressure in bar				Operating pressure in bar			
		40	50	70	105	40	50	70	105
		Maximum admissible stroke in mm				Maximum admissible stroke in mm			
25	12	175	145	110	70	460	410	330	250
	16	390	340	275	200	600	600	600	520
32	18	390	340	300	200	580	500	420	325
	22	600	550	450	335	800	760	630	500
	25	800	745	615	480	800	800	800	690
40	16	200	165	120	80	320	275	215	160
	18	240	220	190	100	450	390	320	250
	25	600	550	450	335	900	780	635	500
50	22	375	300	245	170	540	460	360	280
	25	480	420	335	250	700	615	500	390
	36	1200	1000	820	700	1200	1200	1110	890
63	25	345	295	225	–	520	450	360	–
	28	500	410	340	–	700	610	490	–
	36	860	755	615	–	1205	1065	880	–
	45	1400	1250	1000	–	1400	1400	1390	–
80	36	680	580	420	–	680	580	420	–
	45	1070	940	765	–	1495	1325	1095	–
	56	1700	1500	1250	–	1700	1500	1250	–
100	45	800	740	600	–	800	740	600	–
	50	1030	900	730	–	1450	1275	1055	–
	70	2000	1900	1600	–	2000	1900	1600	–
125	50	775	670	535	–	1120	985	805	–
	56	1050	880	750	–	1050	880	750	–
	63	1345	1185	965	–	1880	1665	1375	–
	90	2300	2300	2200	–	2300	2300	2200	–
150	63	1065	925	–	–	1525	1340	–	–
	70	1350	1220	–	–	1350	1220	–	–
	80	1855	1635	–	–	2580	2285	–	–
	100	2600	2600	–	–	2600	2600	–	–
200	90	1750	–	–	–	1750	–	–	–
	100	2175	–	–	–	3000	–	–	–
	140	3000	–	–	–	3000	–	–	–

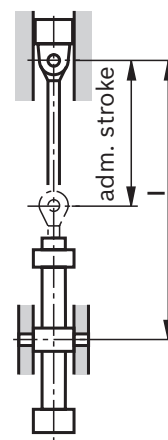
ØAL = Piston Ø

ØMM = Piston rod Ø

$$s_K = l$$



$$s_K = l$$



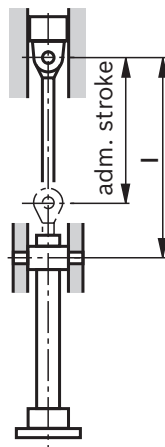
Admissible stroke lengths

ØAL in mm	ØMM in mm	Type of mounting: R			
		Operating pressure in bar			
		40	50	70	105
		Maximum admissible stroke in mm			
25	12	–	–	–	–
	16	–	–	–	–
32	18	800	800	670	520
	22	800	800	800	800
	25	800	800	800	800
40	16	510	445	355	270
	18	720	625	510	400
	25	1000	1000	1000	800
50	22	865	735	575	450
	25	1085	955	785	615
	36	1200	1200	1200	1200
63	25	810	710	575	–
	28	1120	975	785	–
	36	1400	1400	1355	–
	45	1400	1400	1400	–
80	36	1455	1280	1010	–
	45	1700	1700	1675	–
	56	1700	1700	1700	–
100	45	1870	1630	1310	–
	50	2000	1955	1620	–
	70	2000	2000	2000	–
125	50	1720	1515	1245	–
	56	2300	2065	1680	–
	63	2300	2300	2105	–
	90	2300	2300	2300	–
150	63	2330	2055	–	–
	70	2600	2600	–	–
	80	2600	2600	–	–
	100	2600	2600	–	–
200	90	3000	–	–	–
	100	3000	–	–	–
	140	3000	–	–	–

ØAL = Piston Ø

ØMM = Piston rod Ø

$$s_K = l$$



Kinking calculation

The kinking calculation is usually performed according to Euler as the piston rods are in most cases to be regarded as slim rods.

$$\text{Kinking load } K = \frac{\pi^2 \cdot E \cdot J}{s_K^2} \text{ in N}$$

i.e. with this load, the rod kinks!

$$\text{Maximum operating load } F = \frac{K}{S} \text{ in N}$$

s_K = Free kinking length in mm

E = Module of elasticity in N/mm² = $2.1 \cdot 10^5$ for steel

J = Moment of inertia in mm⁴ for circular cross-section

$$= \frac{d^4 \cdot \pi}{64} = 0.0491 \cdot d^4$$

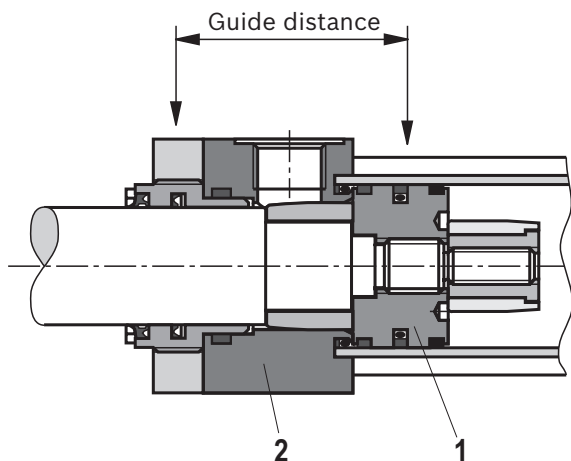
S = Safety (3.5)

Support width extension

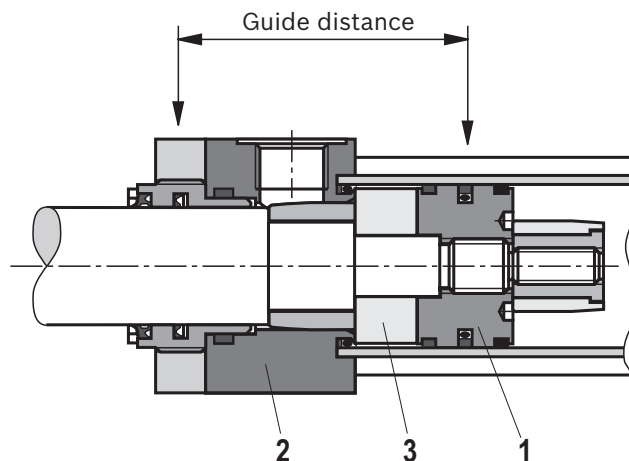
With long strokes and pressure load, a support width extension is recommended in order to reduce the bearing load with extended piston rod. With this extension,

a spacer sleeve (3) is inserted between piston (1) and cylinder head (2). This spacer sleeve extends the lever arm and thus reduces the bearing load.

Without support width extension



With support width extension



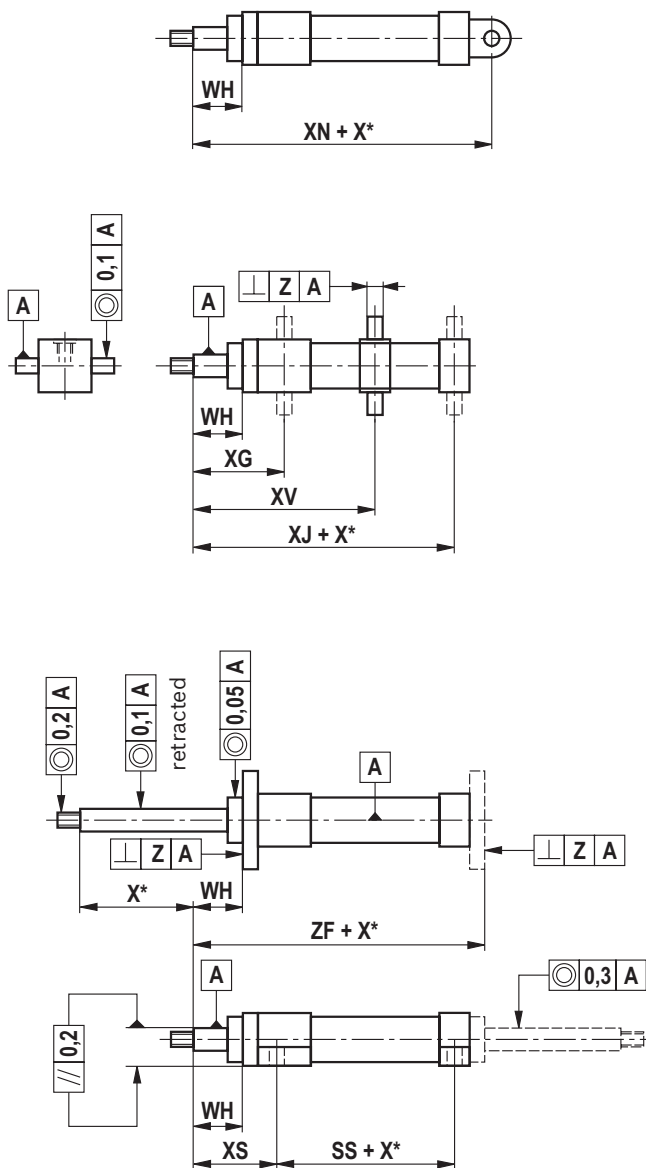
Type of mounting	Ordering code for support width extension in mm for all piston Ø							
	–	25	50	75	100	125	150	175
	Stroke length in mm							
B, G, S	up to 500	501 to 625	626 to 750	751 to 875	876 to 1000	1001 to 1125	1126 to 1250	1251 to 3000
C, F, H, L	up to 1425	1426 to 1785	1786 to 2150	2151 to 2500	2501 to 2860	2861 to 3000	–	–
D, E, K, Q	up to 665	666 to 835	836 to 1000	1001 to 1165	1166 to 1335	1336 to 1500	1501 to 1665	1666 to 3000
R	up to 1000	1001 to 1250	1251 to 1500	1501 to 1750	1751 to 2000	2001 to 2250	2251 to 2500	2501 to 3000
M, N, P, T	up to 1425	1426 to 1785	1786 to 2150	2151 to 2500	2501 to 2860	2861 to 3000	–	–

Installation length of the hydraulic cylinder with support width extension:

Installation length according to the unit dimensions + support width extension

(The trunnion position with type of mounting E and R will not be changed.)

Installation lengths and position tolerances



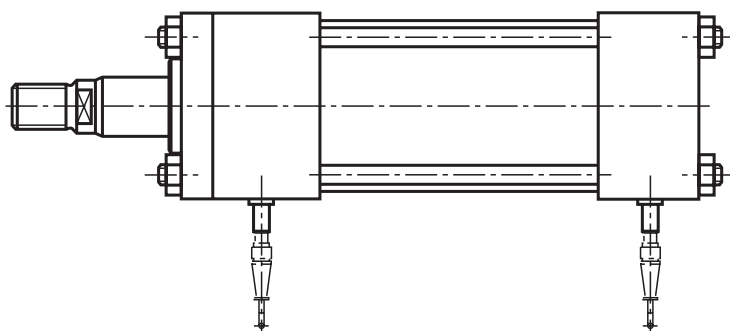
Stroke length in mm	up to 1250	1251 to 2000	2001 to 3000
Stroke tolerance in mm	+1	+1	+1
	-1.5	-2	-3
WH	±2	±2	+3
			-2
ZF	±1	±1.5	±2
XS	±2	±2	+3
			-2
SS	±1.25	+1.5	+1.5
		-2	-3
XG	±2	±2	+3
			-2
XV	±2	±2	±2
XJ	±2	±2	±2
XN	±1.25	±2	±2
Z	0.1 / 100		

When ordering, always specify the "XV" dimension in the plain text (observe XV_{min} and XV_{max})

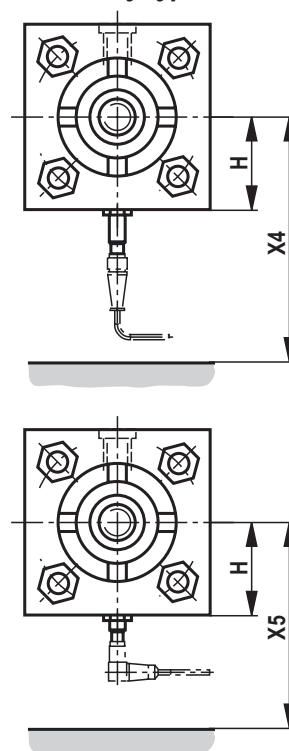
X^* = Stroke length

Inductive proximity switch

(When ordering, please specify in the plain text)



Assembly types



Mating connector with 5 m cable

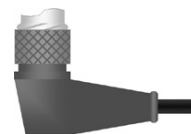
(Mating connector is **not** included in the scope of delivery, must be ordered separately)



Mating connector, angled with 5 m cable

(position of the cable outlet cannot be defined)

(Mating connector is **not** included in the scope of delivery, must be ordered separately)



ØAL in mm	ØMM in mm	H	X4	X5
40	16	42.5	172	127
	18			
	25			
50	22	44.5	175	130
	25			
	36	48		
63	25	51	180	135
	28			
	36	53		
80	36	73.5	185	140
	45			
	56			

ØAL = Piston Ø

ØMM = Piston rod Ø

ØAL in mm	ØMM in mm	H	X4	X5
100	45	57	195	150
	50			
	70	83		
125	50	70	205	160
	56			
	63	–		
	90	96		
150	63	82.5	230	185
	70			
	80			
	100			
200	90	108	245	200
	100			
	140			

Notice!

- Installation position: 180° opposite to the line connections
- Line connection: Enlarged line connections are only possible after consultation

- Type of mounting: With F, L, M, N and T types of mounting, the installation 180° opposite to the line connection is not possible
- Types of mounting and unit dimensions, see page 12 to 75

Proximity switch

Inductive proximity switches are used as reliable end position control for hydraulic cylinders. They are an important element for the safe and exact monitoring of safety equipment, locks and/or other machine functions in their end position by means of the output of signals. The proximity switch which is high-pressure resistant up to 500 bar

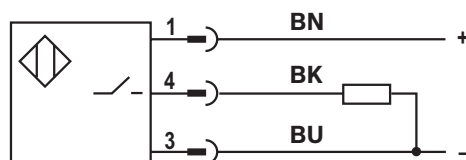
works in a contactless manner. Thus, it is wear-free. The proximity switch has been set at the factory. The switching distance must not be adjusted. The lock nut of the proximity switch is marked at the factory using sealing wax. On versions with proximity switch, the hydraulic cylinders are equipped with proximity switches.

Technical data

(For applications outside these parameters, please consult us!)

Function type		PNP normally open contact
Admissible pressure	bar	500
Operating voltage	V DC	10 ... 30
Including residual ripple	%	≤ 15
Voltage drop	V	≤ 1.5
Rated operating voltage	V DC	24
Rated operating current	mA	200
Idle current	mA	≤ 8
Residual current	μA	≤ 10
Repetition accuracy	%	≤ 5
Hysteresis	%	≤ 15
Ambient temperature range	°C	-25 ... +80
Temperature drift	%	≤ 10
Switching frequency	Hz	1000
Protection class	Active area	IP 68
	Proximity switch	IP 67
Housing material		Material no. 1.4104

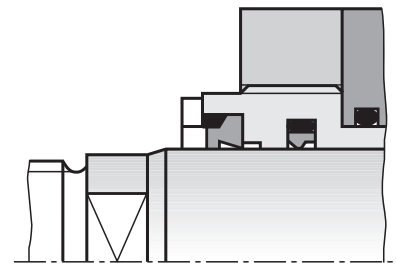
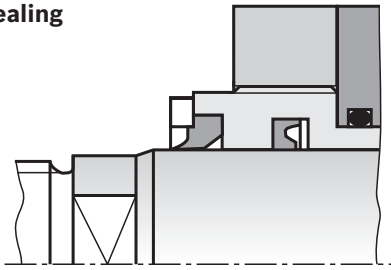
Pin assignment



BN brown
 BK black
 BU blue

Seals (standard versions)

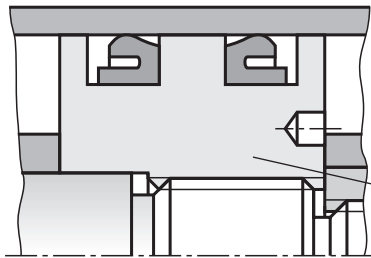
Piston rod sealing



Design with piston Ø 32/25

Design with piston rod Ø 50, 63 and 80 mm

Piston sealing

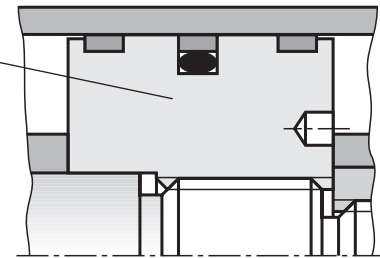


Version "A"

Lip rings for leakage oil-free operation under static conditions

Version "T"

Sliding ring for low-friction operation



End position cushioning

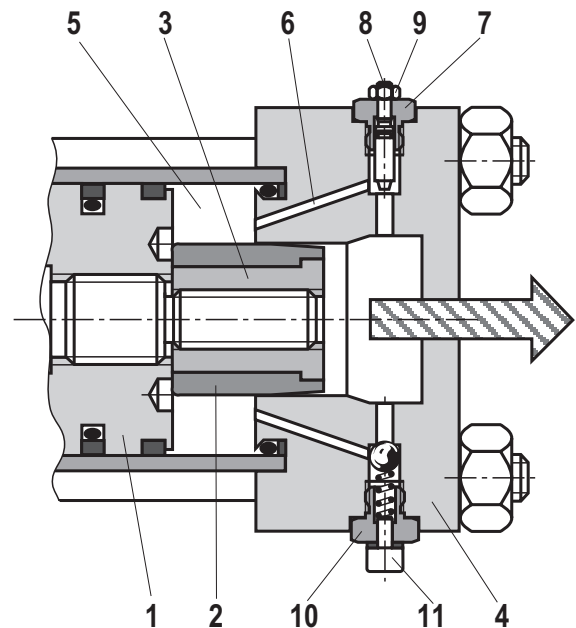
End position cushioning at the cylinder base.

The piston (1) is screwed directly to the piston rod, the damping bush (2) by means of a threaded bushing (3). By retracting the conical damping bush into the bore of the cylinder base (4), the cross-section for the liquid discharged from the piston chamber (5) is reduced until it equals zero. The liquid from the piston chamber (5) can only be discharged via the bore (6) and the adjustable throttle valve (7). At the throttle valve (7), the damping effect is regulated. The smaller the flow cross-section, the larger the effect of the end position cushioning.

Adjustable throttle valve for the end position cushioning

The throttle valve version prevents the throttle bolt (8) from being screwed out when the end position cushioning is adjusted.

The set end position cushioning is secured by the lock nut (9).



Check valve with bleed screw

The check valve (10) serves as extension aid from the end position. In this way, the throttling point is evaded during the extension. The hydraulic cylinder is bled via the bleed screw (11).

In hydraulic cylinders without end position cushioning, this bleed screw is fitted by default.

Throttle valve and check valve are designed as installation kits and can be interchanged.

Braking force calculation

The end position cushioning must ensure controlled deceleration (braking) of the stroke velocity in both end positions.

In this connection, all effective energies must not exceed the maximum damping capacity.

In the damping which works according to the fluid flow throttling principle the energy to be braked is converted into heat.

Braking force calculation

The braking force of a hydraulic cylinder in case of horizontal installation is calculated as follows:

Extension movement:

$$F_B = m \cdot a + A_K \cdot p$$

Retraction movement:

$$F_B = m \cdot a + A_R \cdot p$$

v = Stroke velocity in m/s

s = Damping length in m

A_K = Piston area in cm²

A_R = Annulus area in cm²

p = System pressure in N/cm²

F_B = Braking force in N

m = Moved weight in kg

a = Deceleration in m/s²

$$a = \frac{v^2}{2 \cdot s}$$

$$1 \text{ bar} \sim 10 \text{ N/cm}^2$$

With vertical stroke movements of the hydraulic cylinder, you must add or subtract the weight (consisting of load, piston and piston rod) to or from the braking force F_B according to the movement direction.

In this calculation, the cylinder's own friction has been neglected.

Calculation of the average damping pressure

Normally, the nominal pressure of the hydraulic cylinder must not be exceeded by the average damping pressure.

$$p_D = \frac{F_B}{A_D}$$

p_D = Average damping pressure in N/cm²

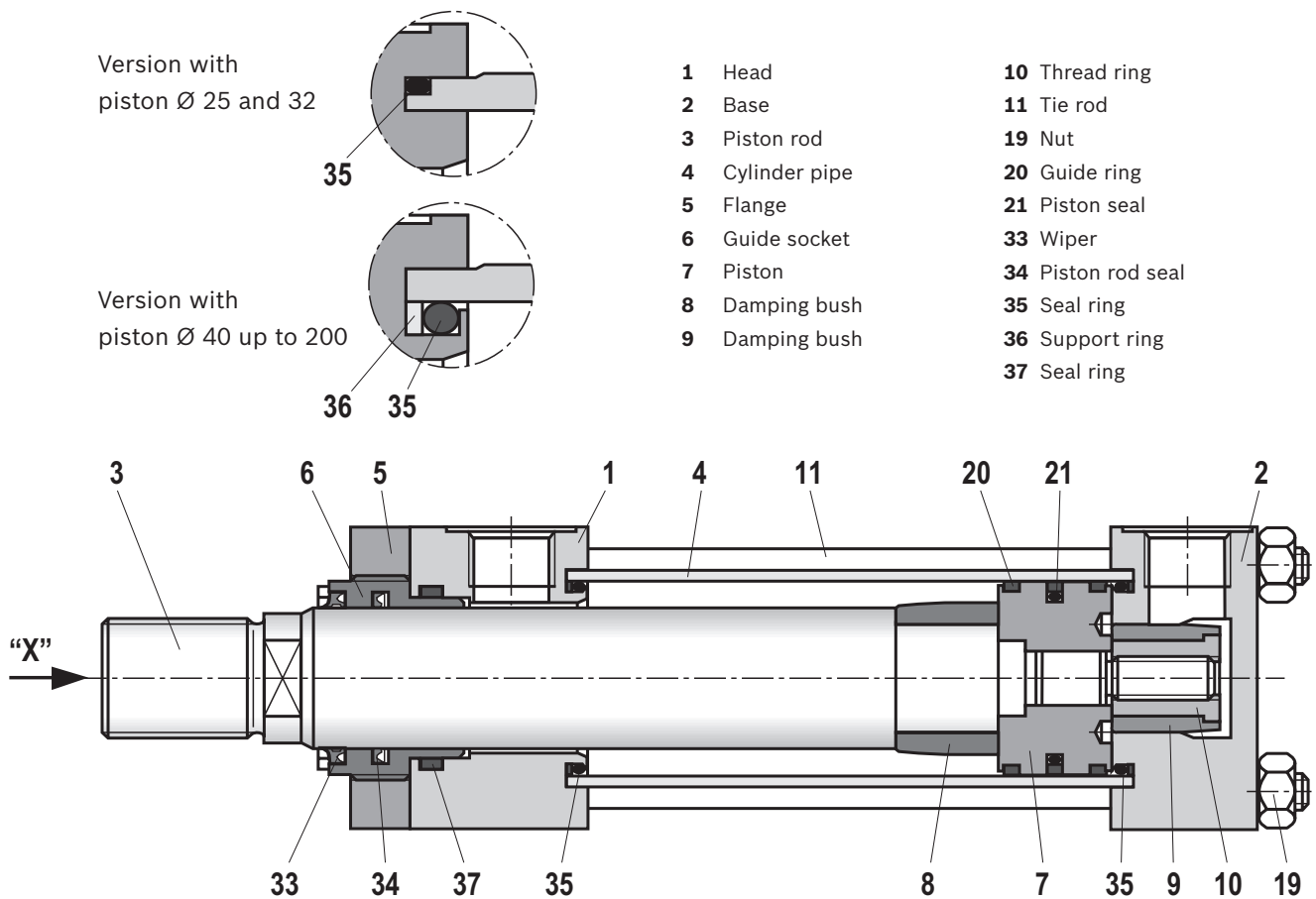
F_B = Braking force in N

A_D = Effective damping area in cm²

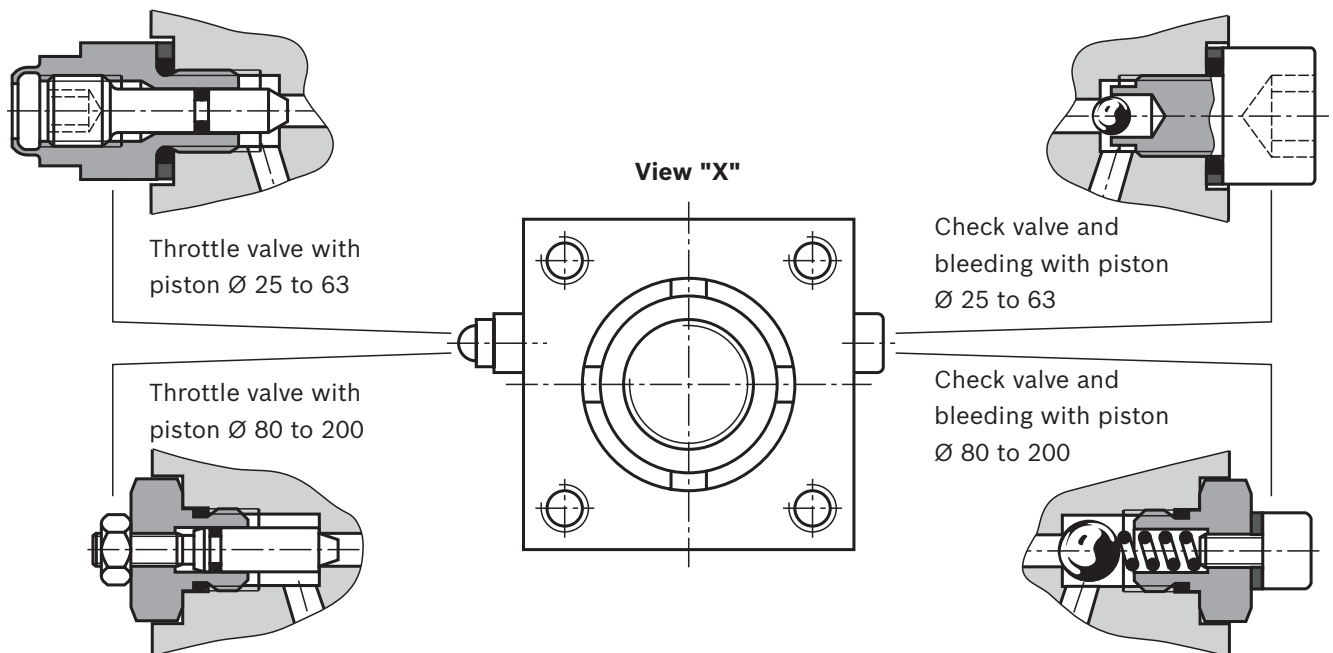
$$1 \text{ bar} \sim 10 \text{ N/cm}^2$$

If the calculation results in an excessive value, the damping length has to be enlarged or the system pressure reduced.

Spare parts drawing



Throttle and check valve in cylinder head and cylinder base



Ordering spare parts:

- For individual components, specify the denomination and item no. from the spare parts drawing with complete type designation of the hydraulic cylinder.
- For seal kits, specify the complete type designation of the hydraulic cylinder.

Weight

ØAL mm		25		32			40			50		
ØMM mm		12	16	18	22	25	16	18	25	22	25	36
Weight per 100 mm stroke in kg	Differential cylinders	0.3	0.37	0.5	0.6	0.7	0.55	0.6	0.8	0.9	1.0	1.3
	Double-acting cylinders	0.4	0.52	0.7	0.9	1.0	0.75	0.8	1.2	1.2	1.3	2.1
Type of mounting		CD	CG	CD	CG		CD	CG		CD	CG	
Weight with 0 stroke in kg	B	1.2	–	1.9	–		2.4	–		4.0	–	
	G	–	–	1.7	–		2.2	–		3.7	–	
	E	1.2	1.5	2.2	2.5		2.9	3.5		4.5	6.0	
	H	1.2	1.5	1.9	2.4		2.5	3.0		4.0	5.3	
	K, D	1.4	–	2.2	–		2.7	–		4.5	–	
	C, F, L, M, R, S, T	1.1	1.4	1.8	2.3		2.3	2.8		3.7	5.0	
	N, P, Q	1.1	1.4	1.5	2.0		2.0	2.6		3.4	4.7	

ØAL mm		63				80			100		
ØMM mm		25	28	36	45	36	45	56	45	50	70
Weight per 100 mm stroke in kg	Differential cylinders	1.1	1.2	1.5	1.9	1.7	2.2	2.8	2.4	2.7	4.1
	Double-acting cylinders	1.5	1.6	2.1	3.0	2.5	3.4	4.7	3.6	4.3	7.1
Type of mounting		CD		CG		CD		CG	CD		CG
Weight with 0 stroke in kg	B	5.9		–		10.8		–	16.2		–
	G	5.5		–		10.0		–	15.2		–
	E	6.7		8.5		12.4		16.2	25.3		31.4
	H	5.9		8.0		10.7		14.4	15.3		21.7
	K, D	6.5		–		11.8		–	17.6		–
	C, F, L, M, R, S, T	5.5		7.6		9.9		13.7	14.9		21.4
	N, P, Q	5.2		7.3		9.2		12.9	13.5		20.0

ØAL mm		125				150				200		
ØMM mm		50	56	63	90	63	70	80	100	90	100	140
Weight per 100 mm stroke in kg	Differential cylinders	3.5	3.9	4.4	7.9	5.1	5.6	6.6	8.7	9.5	10.7	17.7
	Double-acting cylinders	5.4	5.8	6.9	12.0	7.6	8.6	10.6	14.8	14.5	16.9	29.8
Type of mounting		CD		CG		CD		CG		CD		CG
Weight with 0 stroke in kg	B	26.7		–		40.7		–		75.4		–
	G	25.5		–		39.0		–		72.0		–
	E	29.3		40.1		47.1		62.1		84.8		111.1
	H	26.9		37.7		40.7		55.7		68.2		94.5
	K, D	29.3		–		44.8		–		70.4		–
	C, F, L, M, R, S, T	25.2		36.0		38.5		53.5		71.6		98.0
	N, P, Q	24.1		34.9		37.2		52.2		70.7		97.0

ØAL = Piston Ø
ØMM = Piston rod Ø

CD = Differential cylinder
CG = Double-acting cylinder