The Drive & Control Company

Rexroth
Bosch Group

Prefill valve

Type SFA

RE 20485
Edition: 2012-09
Replaces: 04.08

H6714

- Size 25 ... 80
- Component series 1X
- Maximum operating pressure 350 bar

Features

- Pilot operated check valve
- For threaded connection (size 25 and 32)
- For flange connection according to ISO 6162-1 (from size 40)
- For direct attachment to the working cylinder
- With and without pre-decompression, optional
- Integrated high-pressure connection

Contents

Ordering code

01	02	03	04	05		06		07		08	09
SFA					**–**		**/**	**M**	**/**	**01**	*****

01	Prefill valve	**SFA**
02	Size 25	**25**
	Size 32	**32**
	Size 40	**40**
	Size 50	**50**
	Size 63	**63**
	Size 80	**80**

Type of connection (connection A)

03	Threaded connection (only size 25 and 32)	**G**
	Flange connection (from size 40)	**F**
04	**Without** tank bore	**no code**
	With tank bore (from size 32)	**T**
05	**With** pre-decompression (from size 32)	**1**
	Without pre-decompression	**0**
06	Component series 10 ... 19 (10 ... 19: Unchanged installation and connection dimensions)	**1X**

Seal material

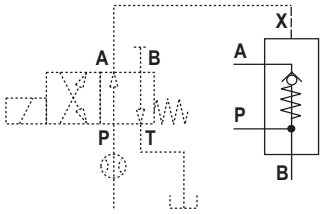
07	NBR seals	**M**
	Attention: Observe compatibility of seals with hydraulic fluid used! (Other seals upon request)	

Connection version

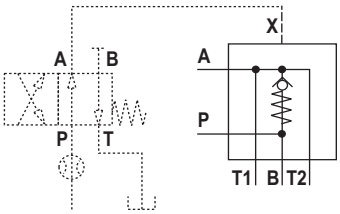
08	Threaded holes with pipe thread according to DIN 3852 part 2	**01**
09	Further details in the plain text	

Symbols

Type SFA... (from size 25)



Type SFA...T... (from size 32)



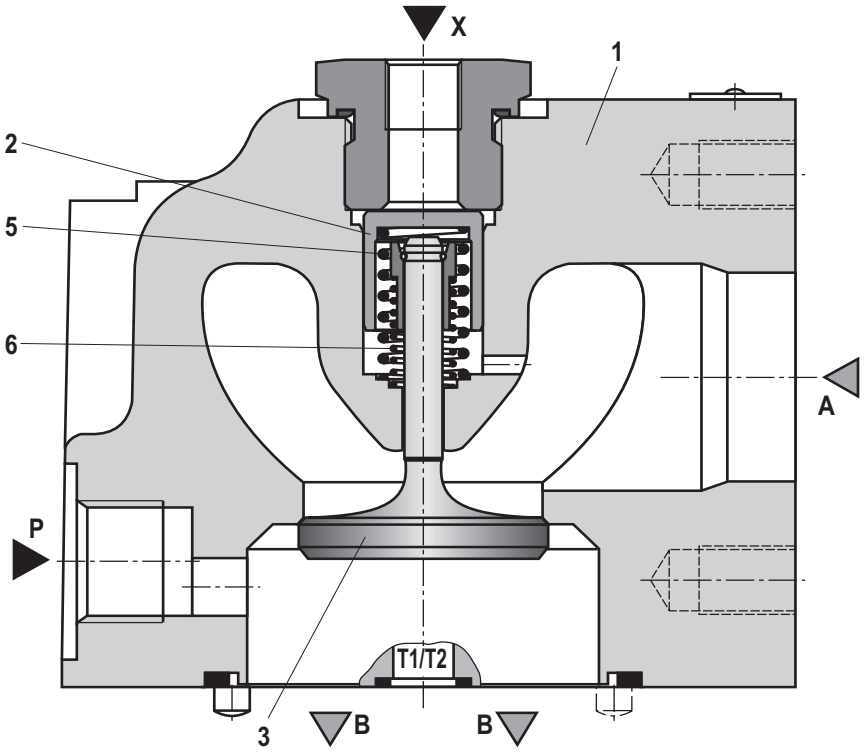
☞ **Notice!**
Possible circuit with directional valve and nozzle in channel P for one individual prefill valve.
For the parallel connection of prefill valves, the nozzle is to be individually provided for every control line!

Bosch Rexroth AG, RE 20485, edition: 2012-09

Function, sections: without pre-decompression

Valves of type SFA are pilot operated check valves. They are used for the leakage-free isolation of pressurized working circuits (e. g. pressing cylinders). Due to their aerodynamic design and the relatively little closing force of the compression spring (6) at the main poppet, they are particularly suitable for the pulling function and for filling e.g. the main cylinder at presses during the fast closing movement. The integrated pressure connection P allows for the high pressure build-up in the pressing cylinder!
The valves basically comprise of a housing (1), control spool (2), main poppet (3), pilot poppet (4) and the compression springs (5) and (6).

In channel P of the directional valve, a nozzle insert is to be provided. The nozzle diameter is to be designed according to the prefill valve size (see below).
The valve allows for free flow from A to B. In the opposite direction, the main poppet (3) is held on the seat by the compression spring (6) and the pressure available at port B. The pressure at the control port X pushes the control spool (2) downwards, against the compression spring (5), and pushes the main poppet (3) off the seat. Now, the valve can also be flown through in the opposite direction.



Type SFA..GT0-1X/M/01 (without pre-decompression)

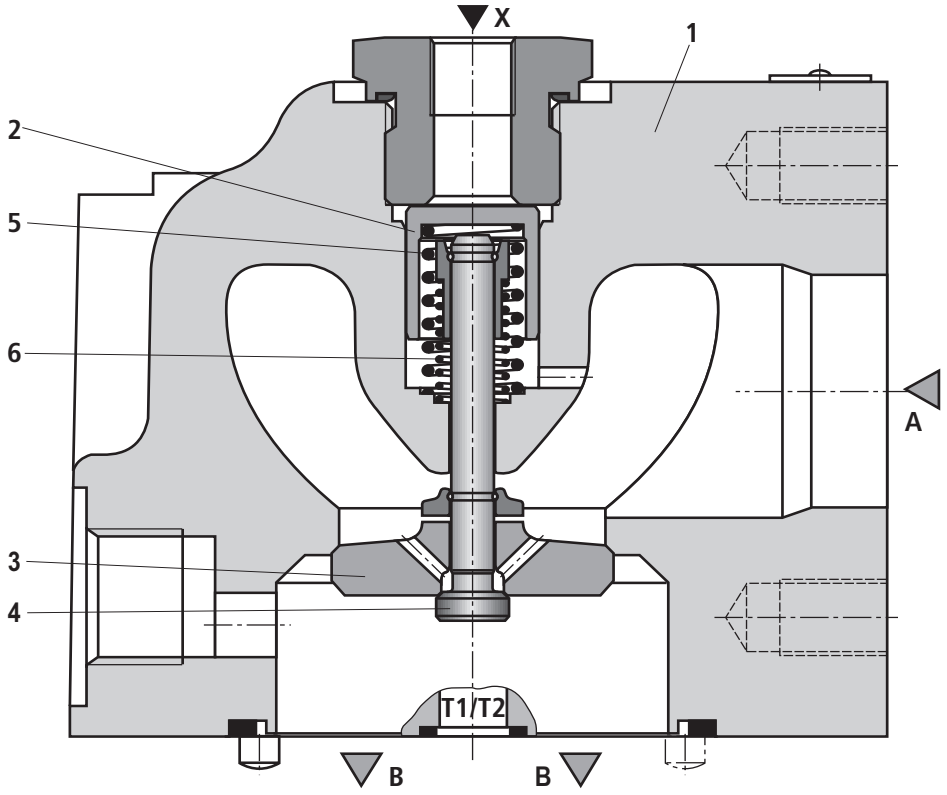
Nozzle insert [1]	
Size	Nozzle Ø in mm
25	0.8
32	0.8
40	0.8
50	0.8
63	0.8
80	1.0

[1] Not included in the scope of delivery

RE 20485, edition: 2012-09, **Bosch Rexroth AG**

Function, sections: with pre-decompression

The function of this version basically corresponds to the version without pre-decompression.
In case of pressure at the control port X, the control spool (2) only opens the pilot poppet (4) first. This guarantees shock-free decompression of the compressed hydraulic fluid.



Type SFA..FT1-1X/M/01 (with pre-decompression)

Nozzle insert [1]	
Size	Nozzle Ø in mm
25	0.8
32	0.8
40	0.8
50	0.8
63	0.8
80	1.0

[1] Not included in the scope of delivery

Bosch Rexroth AG, RE 20485, edition: 2012-09

Technical data

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

general							
Size			25	32	40	50	63	80
Weight		kg	approx. 4.5	approx. 6	approx. 7	approx. 10.5	approx. 16	approx. 23
Installation position			any					
Ambient temperature range		°C	–30 ... +80					

hydraulic			
Maximum operating pressure	– Port B, P	bar	350
	– Port X	bar	150
	– Port A	bar	16
Cracking pressure [1]		bar	~0.12
Maximum flow		l/min	see cases of application page 11
Hydraulic fluid			see table below
Hydraulic fluid temperature range (at the valve working ports)		°C	–30 ... +80
Viscosity range		mm²/s	10 ... 800
Maximum permitted degree of contamination of the hydraulic fluid - cleanliness class according to ISO 4406 (c)			Class 20/18/15 [2]

Hydraulic fluid		**Classification**	**Suitable sealing materials**	**Standards**
Mineral oils and related hydrocarbons		HL, HLP, HVLP	NBR, FKM [3]	DIN 51524
Bio-degradable	– insoluble in water	HETG	NBR, FKM [3]	VDMA 24568
		HEES	FKM [3]	
	– soluble in water	HEPG	FKM [3]	VDMA 24568
Flame-resistant	– water-free	HFDU, HFDR	FKM [3]	ISO 12922
		HFC	NBR	ISO 12922

☞ **Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- **Flame-resistant and bio-degradable:** There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.)!

1) Pressure differential at the main poppet for overcoming the spring force

2) 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.
For the selection of the filters see www.boschrexroth.com/filter.

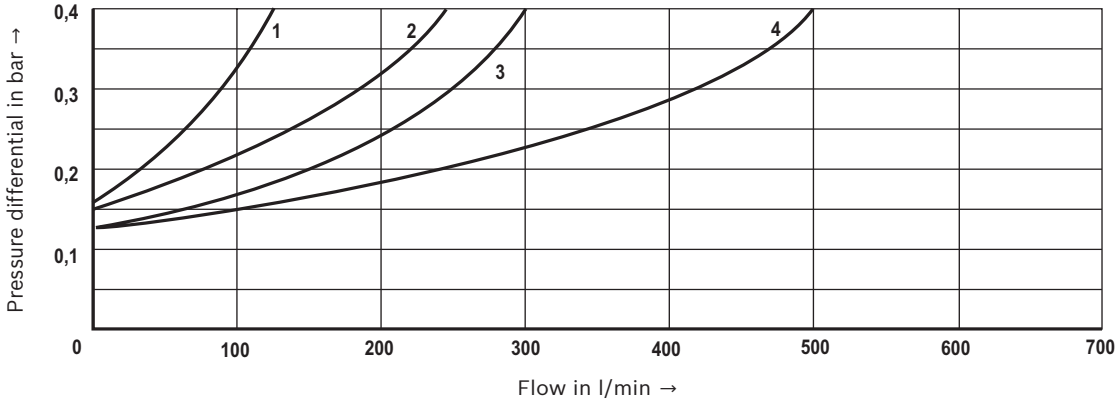
3) Upon request

Characteristic curves

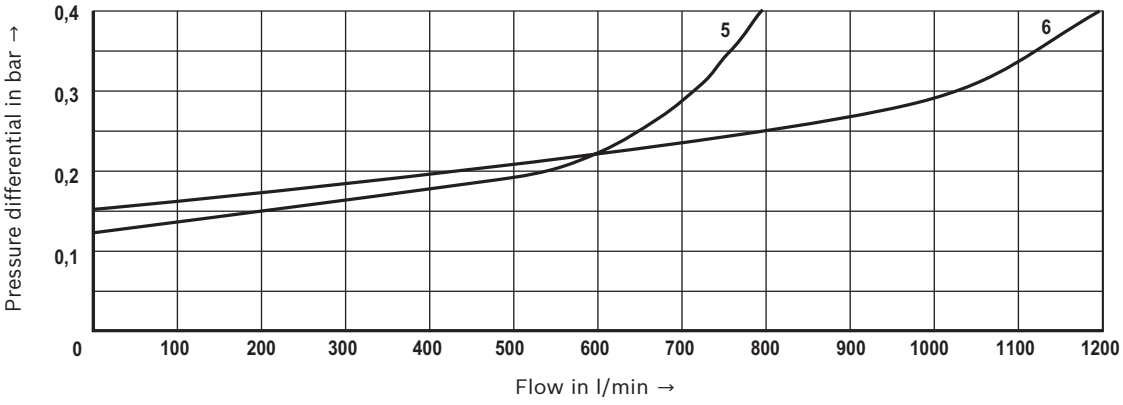
(measured with HLP46, ϑ_{Oil} = 40 ± 5 °C)

Pressure differential ***Δp*** between ports A and B against the flow q_V in case of flow in suction direction A to B.

Size 25 ... 50



Size 63 and 80



1 Size 25
2 Size 32
3 Size 40
4 Size 50
5 Size 63
6 Size 80

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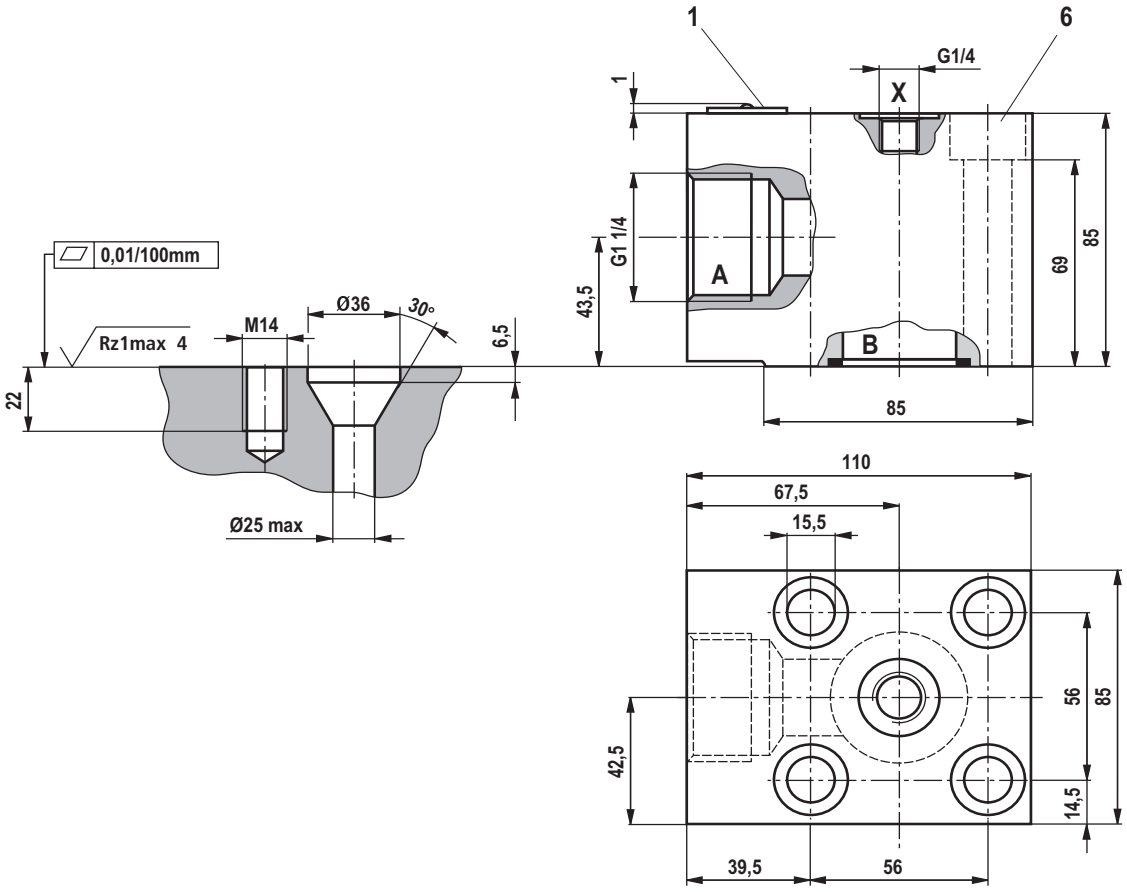
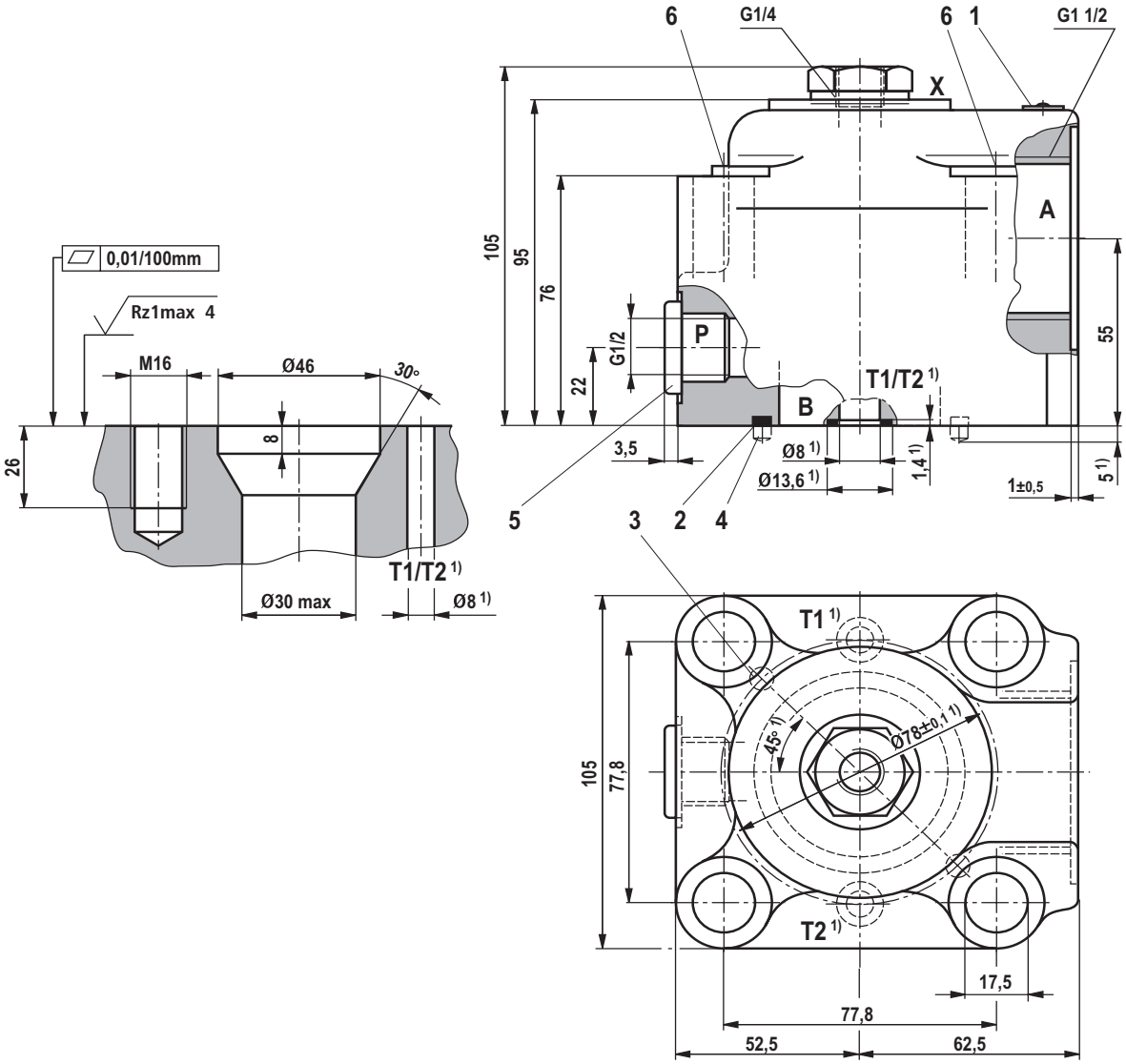
Unit dimensions: Threaded connection (only size 25)
(dimensions in mm)



1 Name plate
6 4 valve mounting bores

Valve mounting screws see page 10.

Unit dimensions: Threaded connection (only size 32)
(dimensions in mm)



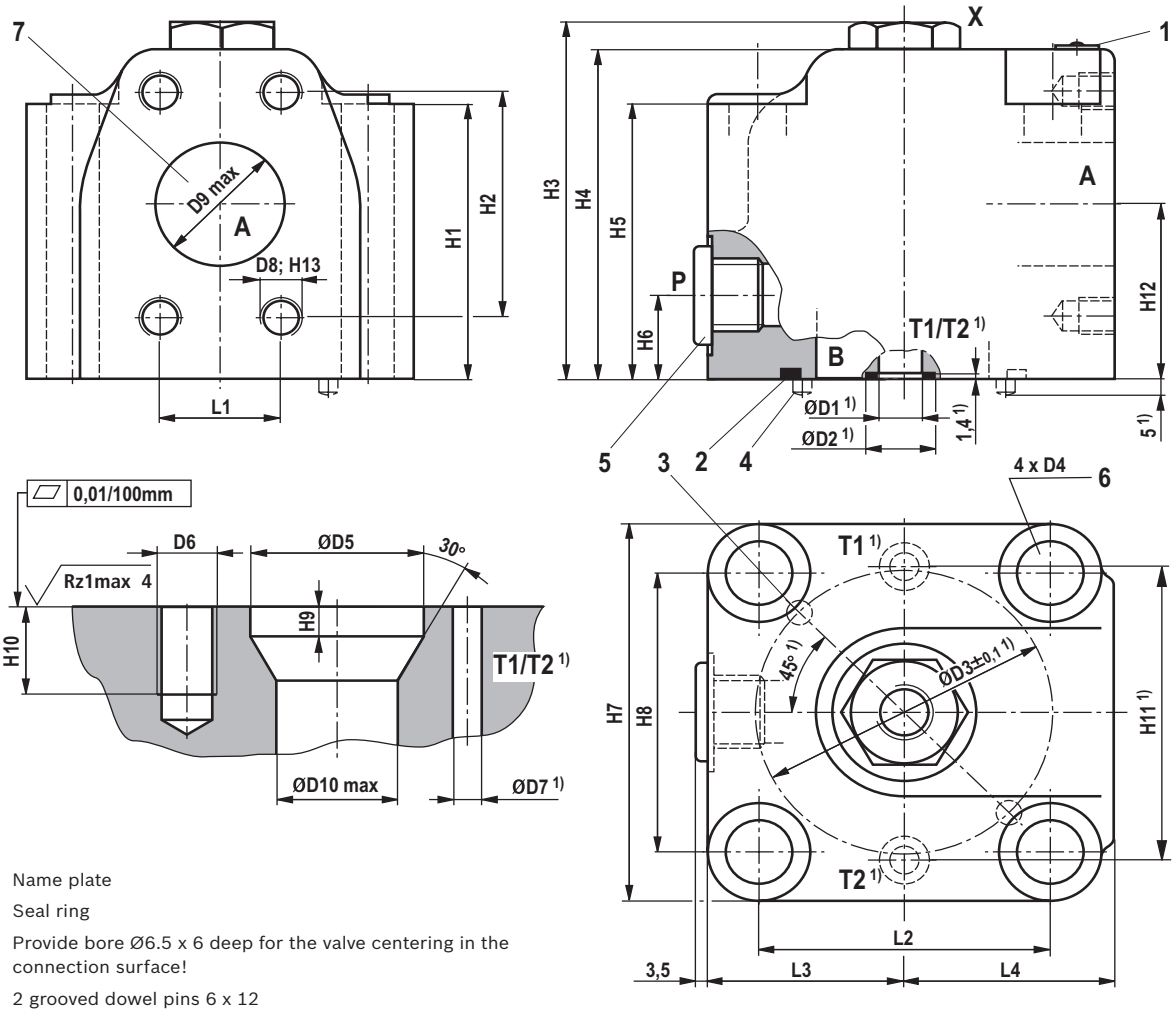
1 Name plate
2 Seal ring
3 Provide bore Ø6.5 x 6 deep for the valve centering in the connection surface!
4 2 grooved dowel pins 6 x 12
5 Plug screw
6 4 valve mounting bores

1) Only version "T"

Valve mounting screws see page 10.

Bosch Rexroth AG, RE 20485, edition: 2012-09

Unit dimensions: Flange connections (size 40 ... size 80)
(dimensions in mm)



1 Name plate
2 Seal ring
3 Provide bore Ø6.5 x 6 deep for the valve centering in the connection surface!
4 2 grooved dowel pins 6 x 12
5 Plug screw (only version "T")
6 4 valve mounting bores
7 Flange connection according to ISO 6162-1

Valve mounting screws and connections see page 10.

1) Only version "T"

Size	L1±0.2	L2	L3	L4	ØD1	ØD2	ØD3±0.1	ØD4	ØD5	D6	ØD7	D8	D9 max	ØD10 max
40	35.7	88.4±0.2	58	62	10	15.7	90	17.5	58	M16	10	M12	38	40
50	42.9	102.5±0.2	70	72	13	19	104	22	71	M20	13	M12	51	50
63	50.8	113.15±0.2	80	82	13	19	120	26	90	M24	13	M12	64	63
80	61.9	134+0.3	92	95	13	19	140	30	107	M27	13	M16	76	78.5

Size	H1	H2±0.2	H3	H4	H5	H6	H7	H8	H9	H10	H11±0.1	H12	H13
40	85	69.9	109	102	85	22	116	88.4±0.2	10	26	92	54	18
50	101	77.8	132	124	101	22	141	102.5±0.2	12	32	108	66	18
63	125	88.9	152	144	125	30	160	113.15±0.2	14	38	130	83	18
80	140	106.4	170	158	140	30	185	134+0.3	16	43	150	90	21

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Valve mounting screws and connections

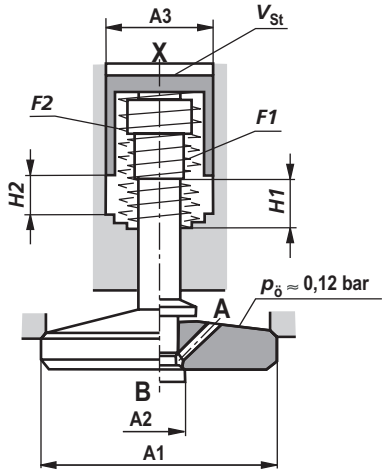
Valve mounting screws (separate order)
For reasons of stability, exclusively use the following valve mounting screws:

4 hexagon socket head cap screws ISO 4762 - 10.9
or DIN 912 - 10.9
Friction coefficient μ_{total} = 0.09 ... 0.14

Size	Valve mounting screws			Connections		
	Dimension	Tightening torque M_A in Nm (±4 %)				
		Hexagon socket head cap screws ISO 4762 - 10.9	Hexagon socket head cap screws DIN 912 - 10.9	A	P	X
25	M14 x 90	170	–	G1 1/4	–	G1/4
32	M16 x 100	280	–	G1 1/2	G1/2	G1/4
40	M16 x 110	280	–	DN38 [1]	G1/2	G1/4
50	M20 x 130	560	–	DN51 [1]	G1/2	G1/4
63	M24 x 160	960	–	DN64 [1]	G3/4	G1/4
80	M27 x 180	–	1400	DN76 [1]	G3/4	G1/2

[1] According to ISO 6162-1

Poppet geometry and determination of the minimum pilot pressure



without pre-decompression | **with** pre-decompression

A1 = Effective area of the main poppet
A2 = Effective area of the pilot poppet
A3 = Effective area of the control spool
H1 = Stroke of the main poppet
H2 = Stroke of the control spool
F1 = Spring force of the valve spring
F2 = Spring force of the control spool compression spring
V_{st} = Pilot volume for opening the valve
$p_{Ö}$ = Cracking pressure (pressure differential at the main poppet for overcoming the spring force ***F1***)
p_{St} = Pilot pressure at port X
p_B = System pressure at port B

$$\text{Unchecking ratio} = \frac{\text{Pilot pressure } p_{St}}{\text{System pressure } p_B}$$

Size	*A1* in cm²	*A2* [1] in cm²	*A3* in cm²	*H1* in mm	*H2* in mm	*F1* in N	*F2* in N	V_{st} in cm³	Unchecking ratio [2] in bar	Unchecking ratio [3] in bar
25	5.31	–	1.33	6.2	5	6 ... 14	38 ... 70	0.66	4.0	–
32	8.04	0.5	2.01	8.5	6.5	9 ... 22	58 ... 109	1.30	4.0	0.3
40	13.52	0.78	3.14	10	7	14 ... 29	93 ... 162	2.20	4.3	0.3
50	21.24	1.13	4.71	12.5	9	23 ... 49	149 ... 261	4.20	4.5	0.3
63	32.67	1.77	7.07	14.5	11	35 ... 63	206 ... 348	7.80	4.6	0.3
80	49.02	2.54	10.18	17	13	57 ... 127	310 ... 579	13.20	4.8	0.3

[1] Is omitted for version "without pre-decompression" (SFA...**0**...)
[2] Without pre-decompression
[3] With pre-decompression

Example: Type SFA**32**...G**0**; p_B = 30 bar
p_{St} = 4.0 x 30 bar = 120 bar

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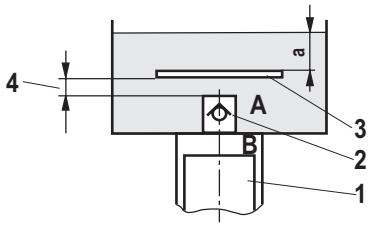
Flow in l/min (A to B) for the different cases of application

Size	25	32	40	50	63	80
Case of application 1	125	200	300	500	800	1200
Case of application 2	90	170	250	400	650	1000
Case of application 3	60	140	220	360	560	900
Case of application 4	40	100	150	240	380	620
Case of application 5	20	70	110	170	280	450

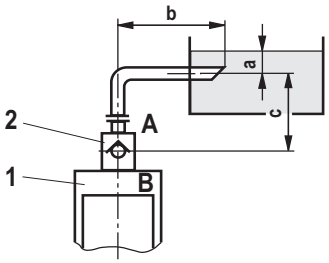
☞ **Notice!**
An underdimensioned prefill valve and/or an underdimensioned line leads to gas leaks from the hydraulic fluid with corresponding consequences and often to long-term damage at the cylinder seals.

Cases of application

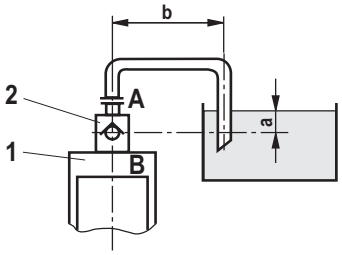
Case of application 1



Case of application 2

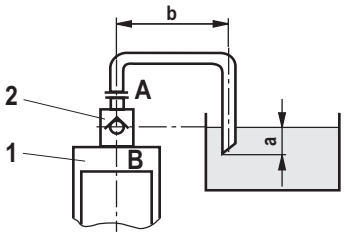


Case of application 3

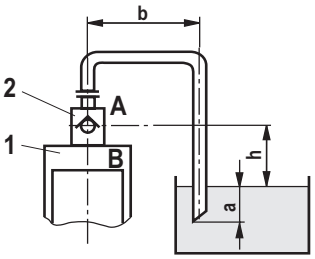


Size of the filling tank at
least 1.5 x cylinder content

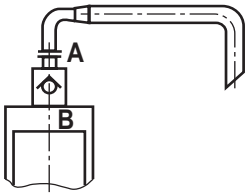
Case of application 4



Case of application 5



Information on case of application 2 to 5



For limit areas, please ask us.
It is often enough, to select a pipeline which is one size larger.

1 Cylinder
2 Prefill valve
3 This sheet is not included in the scope of delivery. With smaller tank dimensions and minimum hydraulic fluid level (a), it prevents the formation of tunnels.
4 Observe the supply cross-section – differs depending on the size!

a Min. 300 mm with extended cylinder
b Max. 1000 mm with the specified maximum flows
c ≥ 500 mm
h ~300 mm to max. 500 mm

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