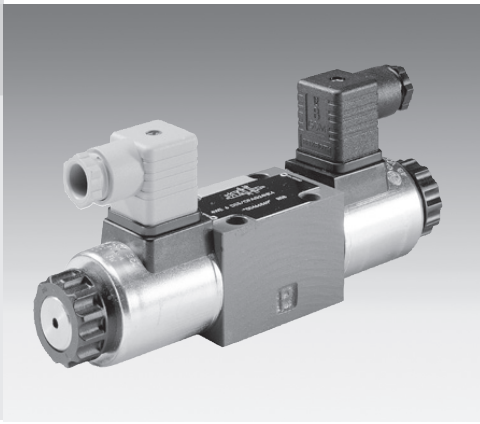
Rexroth
Bosch Group

4/3, 4/2 and 3/2 directional valves with wet pin DC or AC solenoids

RA 23178/04.04 **1**/12
Replaces 08.99

Model WE 6 ../.E



Nominal size 6
Series 6X
Maximum operating pressure 350 bar (5100 PSI)
Maximum flow 80 L/min (21 GPM) – DC
Maximum flow 60 L/min (16 GPM) – AC

List of contents

Features

- Direct solenoid operated directional spool valve, high performance version
- Porting pattern to DIN 24340 form A, **without** locating pin hole (standard); NFPA T3.5.1 MR1 and ANSI B93.7 D03
- Porting pattern to ISO 4401, **with** locating pin hole, (ordering code .../**60** at the end of the valve type code); NFPA T3.5.1 MR1 and ANSI B93.7 D03
- For subplates see catalogue sheet RE 45052 (separate order)
- Wet pin DC or AC solenoids with removable coil
- Solenoid coil can be rotated through 90°
- It is not necessary to open the pressure tight chamber when changing the coil
- Electrical connections either as individual or central connections
- Hand override, optional
- Soft switching version, see RE 23183
- Inductive limit switch (contact or inductive), see RE 24830

Ordering details

	WE	6		6X	/	E			/			*

3 service ports = **3**
4 service ports = **4**

Series 6 = **6**

Symbol e.g. C, E, EA, EB etc.
for possible designs see page 3

Series 60 to 69 = **6X**
(60 to 69: unchanged installation
and connection dimensions)

Spring return = **No code**
Without spring return = **O**
Without spring return with detent = **OF**

High power solenoid = **E**
Wet pin (oil immersed) with removable coil

24 V DC = **G24**
230 V AC 50/60 Hz = **W230**
205 V DC = **G205** [1]
For the ordering details of other voltages
and frequencies see page 6

With protected hand override (standard) = **N9**
With hand override = **N**
Without hand override = **No code**

AC supply voltage (permissible voltage tolerance ± 10%)	**Nominal voltage of DC solenoids when used with an AC supply**	**Ordering details**
110 V – 50/60 Hz	96 V	**G96**
230 V – 50/60 Hz	205 V	**G205**

Further in clear text

No code = **Without** locating pin hole
/60 5) = **With** locating pin hole

No code = NBR-seals
V = FKM-seals
(other seals on request)

⚠ Attention!
The compatibility of the seals and pressure fluid has to be taken into account!

No code = Without cartridge throttle
B08 = Throttle Ø 0.8 mm (0.031 in.)
B10 = Throttle Ø 1.0 mm (0.039 in.)
B12 = Throttle Ø 1.2 mm (0.047 in.)
Used where the flow > than the performance limit of the valve, active in the P linel

Electrical connections [2]
Individual connetions
K4 [3] **=** **Without** plug-in connector with component plug DIN EN 175 301-803
Central connections
DA = Terminal box with 2-1/2" NPT conduit conn.
DAL = Terminal box with two 1/2" NPT conduit connections and light(s)
ANSI B 93.55 M plug-in type connectors (without femal end)
DK23 = Terminal box with 3-pin conn. (single solenoid)
DK25 = Terminal box with 5-pin conn. (dbl. solenoid)
DK23L = Terminal w/ 3-pin conn. & light(s) (sgl. sol.)
DK25L = Terminal w/ 5-pin conn. & light(s) (dbl. sol.)
DK...L2 = Terminal box w/surge suppression [4]

[1] When connecting to an AC supply a DC solenoid **must** be used which is controlled via a rectifier (see table on the left).
With an individual connection a large plug-in connectorwith built-in rectifier can be used (separate order).

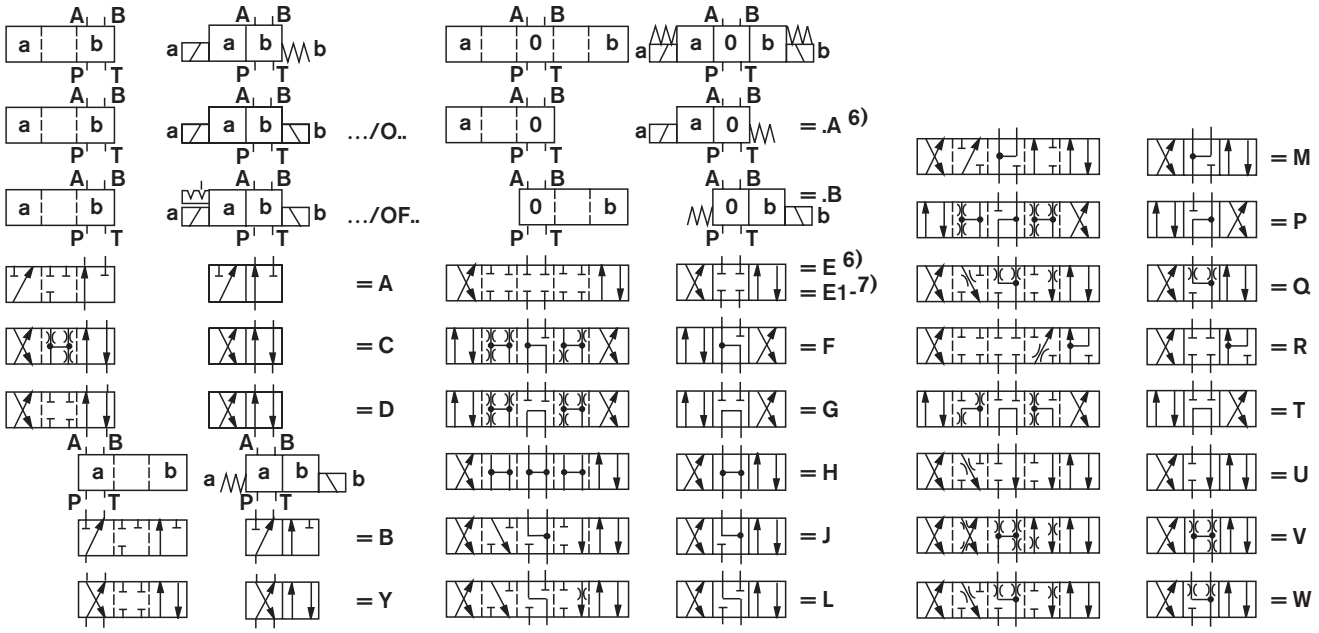
[2] Also available with M12 x 1 plug connection (only version „...G24...“), ordering details and plug-in connector see RE 08010

[3] Plug-in connectors must be ordered separately (see page 4).

[4] Angled plug-in connector Mat. No. **R900005538** (separate order)

[5] Locating pin 3 x 8 DIN EN ISO 8752, Mat. No. **R900005694** (separate order)

Symbols



[6] **Example**: Spool E with switched position "a"ordering code ..**EA**..

[7] Symbol E1-: P – A/B pre-opening, **Attention: Take pressure intensification with differential cylinders into account!**

Standard types

Type	Material number
4WE 6 J6X/EG12N9K4	**R900567496**
3WE 6 A6X/EG24N9K4	**R900561180**
3WE 6 B6X/EG24N9K4	**R900561270**
4WE 6 C6X/EG24N9K4	**R900561272**
4WE 6 C6X/OFEG24N9K4	**R900564107**
4WE 6 D6X/EG24N9K4	**R900561274**
4WE 6 D6X/0FEG24N9K4	**R900567512**
4WE 6 E6X/EG24N9K4	**R900561278**
4WE 6 EA6X/EG24N9K4	**R900561280**
4WE 6 EB6X/EG24N9K4	**R900561281**
4WE 6 G6X/EG24N9K4	**R900561282**
4WE 6 H6X/EG24N9K4	**R900561286**
4WE 6 HA6X/EG24N9K4	**R900549534**
4WE 6 J6X/EG24N9K4	**R900561288**
4WE 6 M6X/EG24N9K4	**R900577475**
4WE 6 Q6X/EG24N9K4	**R900561292**
4WE 6 R6X/EG24N9K4	**R900571012**
4WE 6 T6X/EG24N9K4	**R900934414**
4WE 6 U6X/EG24N9K4	**R900572785**
4WE 6 W6X/EG24N9K4	**R900568233**
4WE 6 Y6X/EG24N9K4	**R900561276**

Type	Material number
4WE 6 D6X/EW110N9K4	**R900551704**
4WE 6 D6X/OFEW110N9K4	**R900552321**
4WE 6 E6X/EW110N9K4	**R900558641**
4WE 6 J6X/EW110N9K4	**R900551703**
3WE 6 A6X/EW230N9K4	**R900915672**
4WE 6 C6X/EW230N9K4	**R900913132**
4WE 6 D6X/EW230N9K4	**R900909559**
4WE 6 D6X/OFEW230N9K4	**R900915095**
4WE 6 E6X/EW230N9K4	**R900912492**
4WE 6 H6X/EW230N9K4	**R900912494**
4WE 6 J6X/EW230N9K4	**R900911762**
4WE 6 Y6X/EW230N9K4	**R900909415**

Function, section

Type WE directional valves are solenoid operated directional spool valves. They control the start, stop and direction of flow.

Essentially the directional control valves consist of housing (1), one or two solenoids (2), the control spool (3), and one or two return springs (4).

In the de-energised condition the control spool (3) is held in the neutral or initial position by means of return springs (4) (except for impulse spools). The control spool (3) is operated via wet pin solenoids (2).

To guarantee satisfactory operation care should be taken to ensure that the solenoid pressure chamber is filled with oil.

The force of the solenoids (2) acts via the plunger (5) on the control spool (3) and pushes this from its neutral position into the required end position. This permits flow from P to A and B to T or P to B and A to T.

When solenoid (2) is de-energised, the control spool (3) is returned to its neutral position by means of the return springs (4).

An optional hand override (6), allows movement of the control spool (3) without energising the solenoid.

Type 4WE 6.. 6X/O.. (only possible for symbols A, C and D)

This version is for directional control valves with two switched positions and two solenoids without detent. There is no definable switched position when the solenoids are de-energised.

Type 4WE 6.. 6X/OF.. (impulse spool, only for symbols A, C and D)

This version is for directional control valves with two switched positions, two solenoids and a detent. Both swtiched positions are thus fixed alternately and there is no need to continually energise the solenoid.

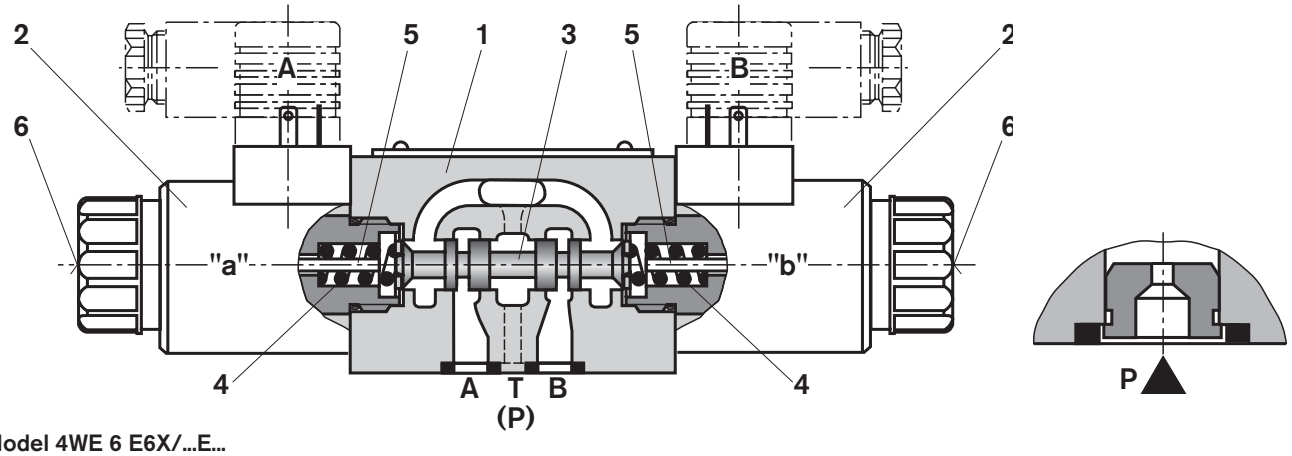
Note:

Pressure peaks in the tank line to two or more valves can, with valves with detents, lead to unintended spool movements! It is therefore, recommended that a separate tank line is used or that a check valve is fitted into the tank line.

Cartridge throttle (type 4WE 6..6X/…/**B**..)

If, due to particular operating conditions during the switching sequences, flows can occur which are larger that the valve performance curves allow, then it is necessary to fit a cartridge throttle.

This is inserted in the P channel of the directional control valve.



Model 4WE 6 E6X/...E...

Technical data (for applications outside these parameters, please consult us!)

General			
Installation			Optional
Ambient temperature		°C (°F)	–30 to +50 (–22 to +122) – NBR seals –20 to +50 (–4 to +122) – FKM seals
Weight	Valve with 1 solenoid	kg (lbs.)	1.45 (3.2)
	Valve with 2 solenoids	kg (lbs.)	1.95 (4.3)
Hydraulic			
Max. operating pressure	Ports A, B, P	bar (PSI)	350 (5100)
	Ports T	bar (PSI)	210 (3050) – DC; 160 (2320) – AC With symbols A and B, port T must be used as a drain port if the operating pressure is above the permitted tank pressure.
Max. flow		L/min (GPM)	80 (21) – DC; 60 (15.8) – AC
Flow cross-section (switched position 0)	For symbol Q	mm^2 (in^2)	Approx. 6% of the nominal cross-section
	For symbol W	mm^2 (in^2)	Approx. 3% of the nominal cross-section
Pressure fluid			Mineral oil (HL, HLP) to DIN 51524 [1]; Fast bio-degradable pressure fluids to VDMA 24568 (also see RE 90221); HETG (rape seed oil) [1]; HEPG (polyglycols) [2]; HEES (synthetic ester) [2]; Other pressure fluids on request
Pressure fluid temperature range		°C °F)	–30 to +80 (–22 to +176) – NBR seals –20 to +80 (–4 to +176) – FKM seals
iscosity range		mm^2/s (SUS)	2.8 to 500 (35 to 2320)
ISO code cleanliness class			Maximum permissible degree of contamination of fluid to ISO 4406 (c) class 20/18/15 [3]

Electrical				
Voltage type			DC	AC 50/60 Hz
Available voltages [4] (for ordering details of AC solenoids see below)		V	12, 24, 96, 205	110, 230
Voltage tolerance (nominal voltage)		%	± 10	± 10
Power consumption		W	30	–
Holding power		VA	–	50
Switch-on power		VA	–	220
Duty			Continuous	Continuous
Switching time to ISO 6403	ON	ms	25 to 45	10 to 20
	OFF	ms	10 to 2	15 to 40
Switching frequencies		Cycles/h	UP to 15000	UP to 7200
Protection to DIN EN 60529 [5]			IP 65	IP 65
Max. coil temperature [6]		°C (°F)	150 (302)	180 (356)

[1] Suitable for NBR and FKM seals

[2] Only suitable for FKM seals

[3] Adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, increases the service life of components.
For the selection of filters, see data sheets: RE 50070, RE 50076 and RE 50081.

[4] Other voltages on request

[5] With fitted and locked plug-in connector

[6] Due to the occuring surface temperatures of the solenoid coils, the European standards EN563 and EN982 must be taken into account!

Note:

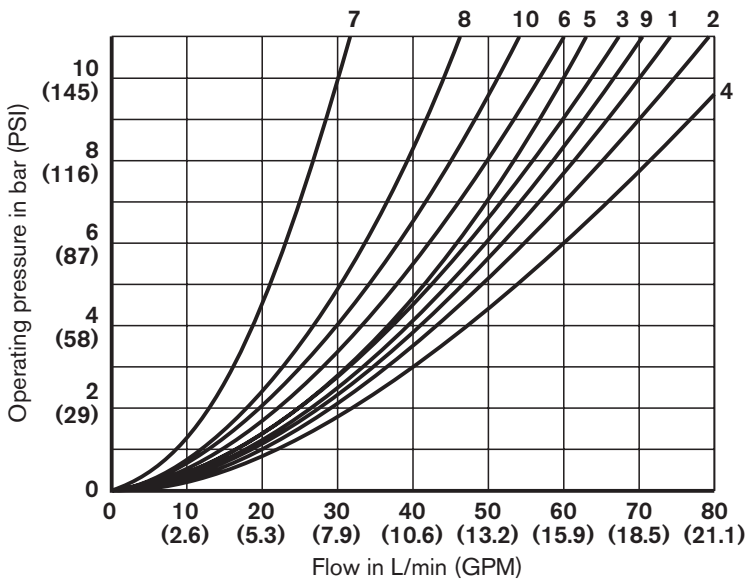
AC solenoids may be used for 2 or 3 types of supply; e.g. solenoid type **W110** for: 110 V, 50 Hz; 110 V, 60 Hz; 120 V, 60 Hz

Ordering details	
W110	110 V, 50 Hz 110 V, 60 Hz 120 V, 60 Hz
W230	230 V, 50 Hz 230 V, 60 Hz

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

Characteristic curves – measured with HLP46, $\vartheta_{oil} = 40\ °C \pm 5\ °C$ (104 °F ± 41 °F)

Δp-q_V-characteristic curves



7 Symbol “R” in switched position B – A

8 Symbol “G” and “T” in mid position P – T

9 Symbol “H” in mid position P – T

Symbols	Flow direction			
	P – A	P – B	A – T	B – T
A; B	3	3	–	–
C	1	1	3	1
D; Y	5	5	3	3
E	3	3	1	1
F	1	3	1	1
T	10	10	9	9
H	2	4	2	2
J; Q	1	1	2	1
L	3	3	4	9
M	2	4	3	3
P	3	1	1	1
R	5	5	4	–
V	1	2	1	1
W	1	1	2	2
U	3	3	9	4
G	6	6	9	9

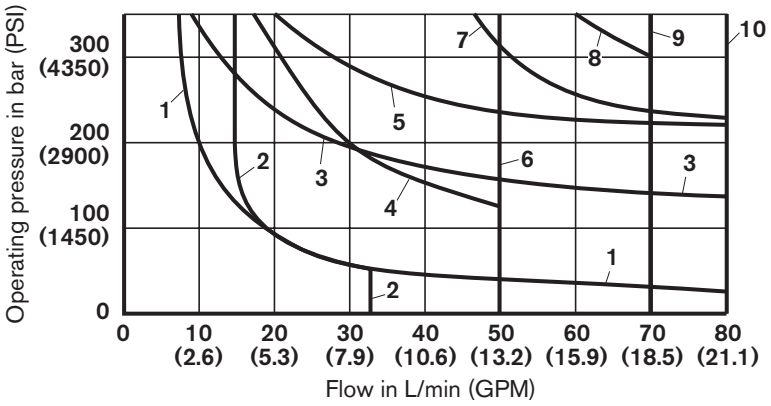
Performance limits – measured with HLP46, $\vartheta_{oil} = 40\ °C \pm 5\ °C$ (104 °F ± 41°F)

⚠ Attention!

The given switching power limits are for applications with two flow directions (e.g. from P to A and simultaneous return flow from B to T).

Due to the flow forces active within the valves the permissible switching power limit may be significantly less if there is only one direction of flow (e.g. from P to A and port B blocked)! (Please consult us for applications of this kind.)

The switching power limits were measured with the solenoids at operating temperature, 10% under voltage and without tank back pressure.



DC solenoid	
Characteristic curve	**Solenoid voltage**
1 to 10	12; 24; 48; 96; 125; 205 V

(for other voltages, see pages 9)

DC solenoid	
Characteristic curve	**Symbol**
1	A; B[1)]
2	V
3	A; B
4	F; P
5	J
6	G; H; T
7	A/O; A/OF; L; U
8	C; D; Y
9	M
10	E; E1–[2)]; R[3)]; C/O; C/OF D/O; D/OF; Q; W

[1)] With hand override

[2)] P – A/B pre-opening

[3)] Return flow from actuator to tank

Performance limits – measured with HLP46, ϑ_{oil} = 40 °C ± 5 °C (104 °F ± 41 °F)

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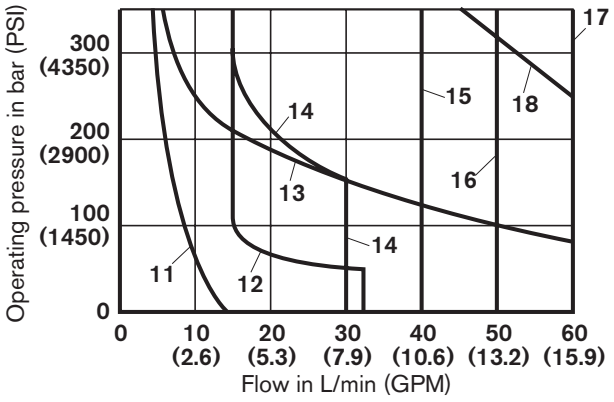
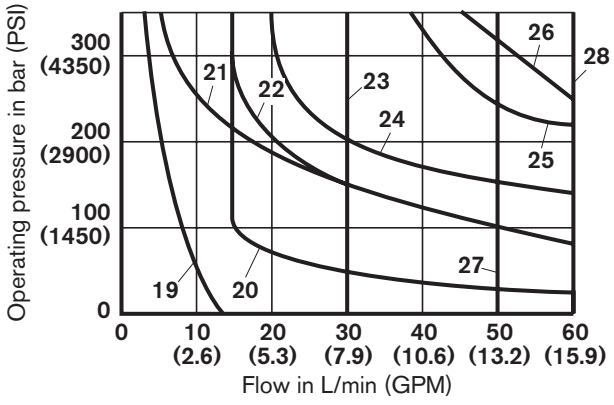


AC solenoid		
Characteristic curve	Solenoid voltage	
11 to 18	W110	110 V; 50 Hz
		120 V; 60 Hz
	W230	230 V; 50 Hz

(other voltages on request)

AC solenoid – 50 Hz	
Characteristic curve	**Symbol**
11	A; B1)
12	V
13	A; B
14	F; P
15	G; T
16	H
17	A/O; A/OF; C/O; C/OF D/O; D/OF; E; E1–2); J; L; M; Q; R3); U; W
18	C; D; Y

1) With hand override
2) P – A/B pre-opening
3) Return flow from actuator to tank



AC solenoid		
Characteristic curve	**Solenoid voltage**	
19 to 28	W110	110 V; 60 Hz
	W230	230 V; 60 Hz

(other voltages on request)

AC solenoid – **60Hz**	
Characteristic curve	Symbol
19	A; B1)
20	V
21	A; B
22	F; P
23	G; T
24	J; L; U
25	A/O; A/OF; Q; W
26	C; D; Y
27	H
28	C/O; C/OF; D/O; D/OF; E E1–2); M; R3)

1) With hand override
2) P – A/B pre-opening
3) Return flow from actuator to tank

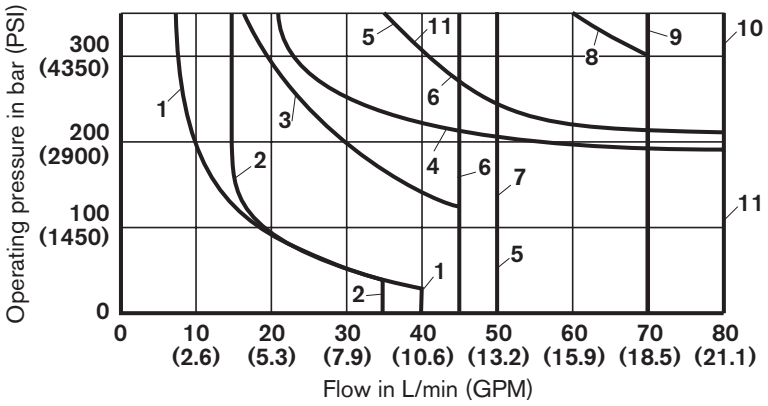
Performance limits – measured with HLP46, ϑ_{oil} = 40 °C ± 5 °C (104 °F ± 41 °F)

⚠ Attention!

The given switching power limits are for applications with two flow directions (e.g. from P to A and simultaneous return flow from B to T).

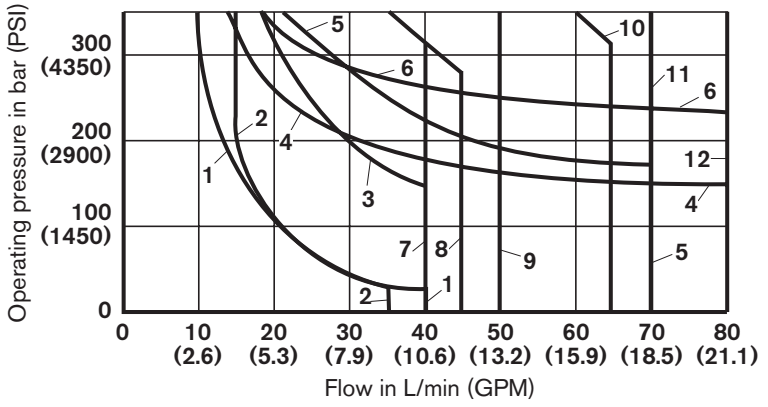
Due to the flow forces active within the valves the permissible switching power limit may be significantly less if there is only one direction of flow (e.g. from P to A and port B blocked)! (Please consult us for applications of this kind.)

The switching power limits were measured with the solenoids at operating temperature, 10% under voltage and without tank back pressure.



DC solenoid	
Characteristic curve	Solenoid voltage
1 to 11	110; 180 V

DC solenoid	
Characteristic curve	Symbol
1	A; B
2	V
3	F; P
4	J; L; U
5	G
6	T
7	H
8	D; C
9	M
10	C/O; C/OF; D/O; D/OF; E; E1–; R, Q; W
11	A/O; A/OF

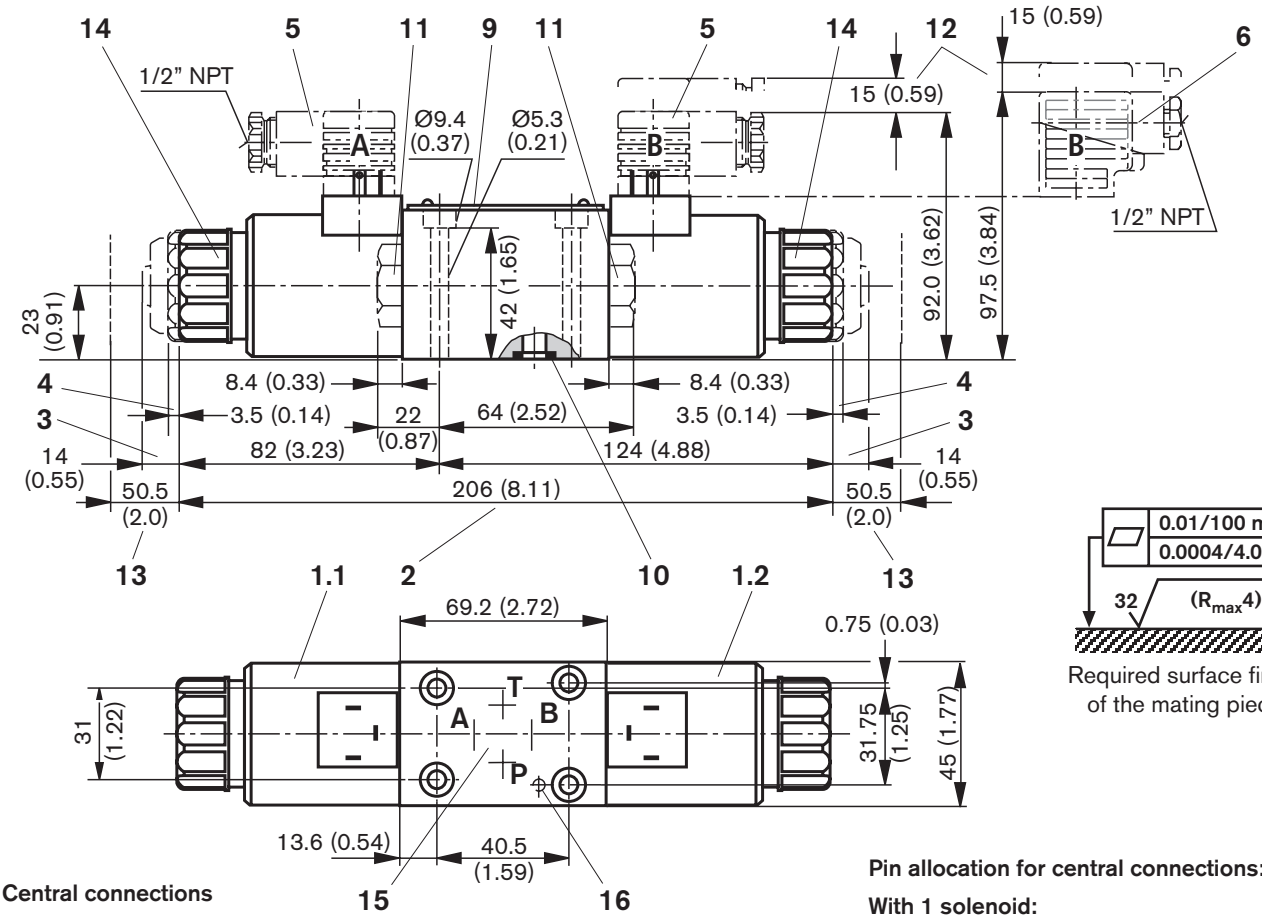


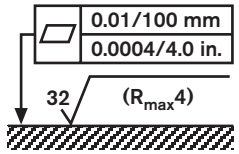
DC solenoid	
Characteristic curve	Solenoid voltage
1 to 12	42; 80; 220 V

DC solenoid	
Characteristic curve	Symbol
1	A; B
2	V
3	F; P
4	J; L; U
5	A/O; A/OF
6	E
7	T
8	G
9	H
10	D; C
11	M
12	C/O; C/OF; D/O; D/OF; E1–; R, Q; W

Unit dimensions: valve with a DC solenoid – dimensions in millimeters (inches)

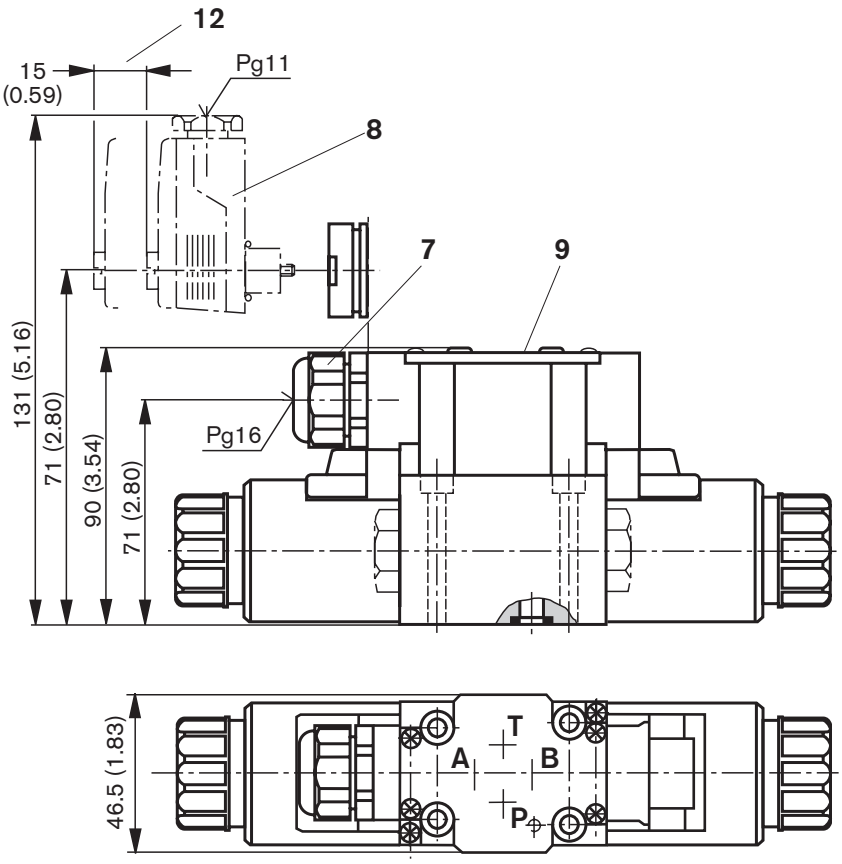
Individual connections





Required surface finish of the mating piece

Central connections



Pin allocation for central connections:

With 1 solenoid:

Solenoid always to termainals 1 and 2 Earth to terminal ⏚ PE

With 2 solenoids:

Solenoid "a" to terminals 1 and 2
solenoid "b" to terminals 3 and 4
Earth to terminal ⏚ PE

1.1 Solenoid "a" (plug-in connector color grey)

1.2 Solenoid "b" (plug-in connector color black)

2 Dim. for solenoid **with protected** hand override "**N9**" (standard) – The hand override can only be actuated up to a tank pressure of approx. 50 bar (725 PSI).

Avoid damage to hand override pin bore!

3 Dim. for solenoid **with** hand override "**N**"

4 Dim. for solenoid **without** hand override

5 Plug-in connector **without** circuitry [1)]

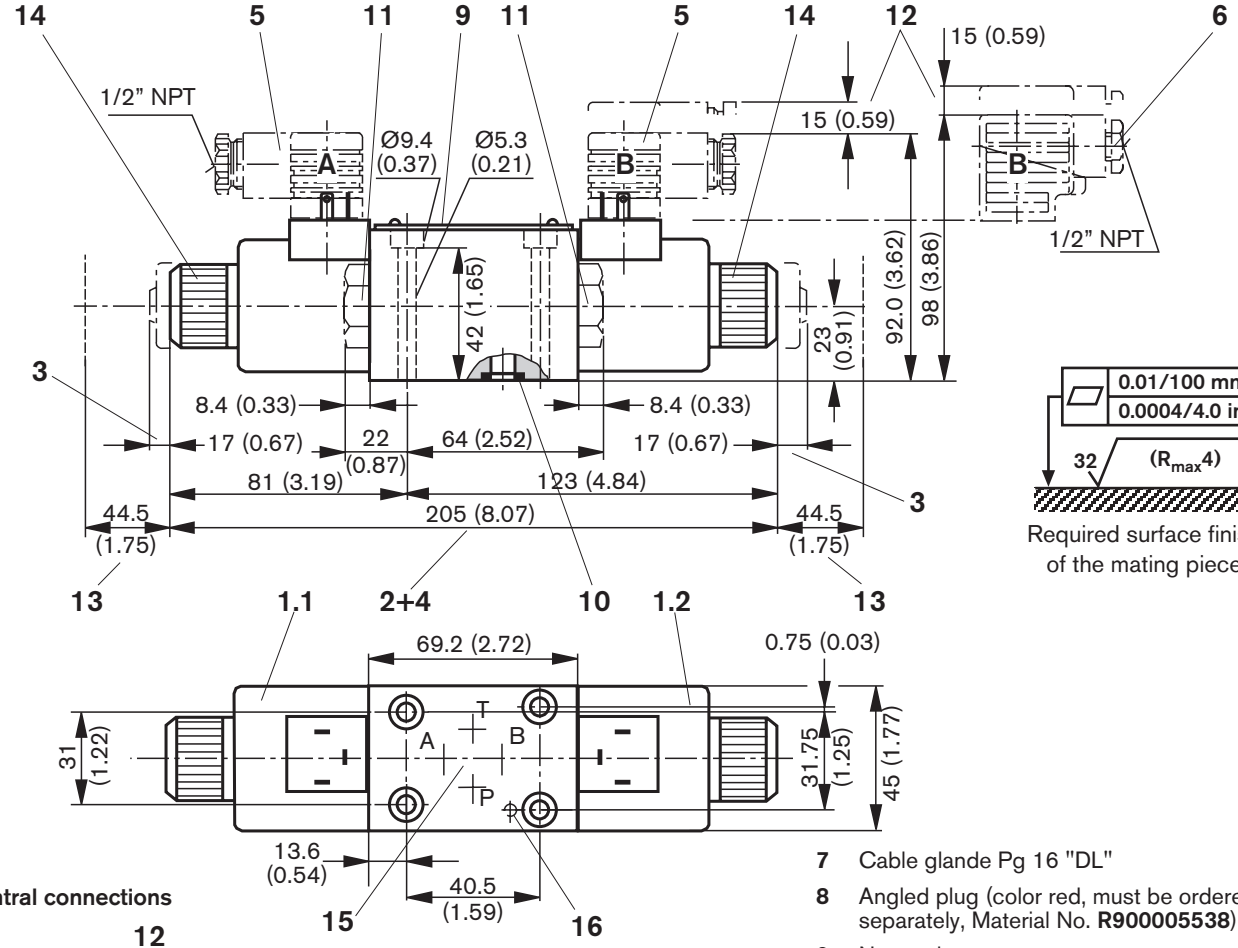
6 Plug-in connector **with** circuitry [1)]

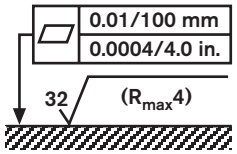
[1)] Must be ordered separately, see page 4

Item no. explanation continued on page 11

Unit dimensions: valve with a AC solenoid – dimension in millimeters (inches)

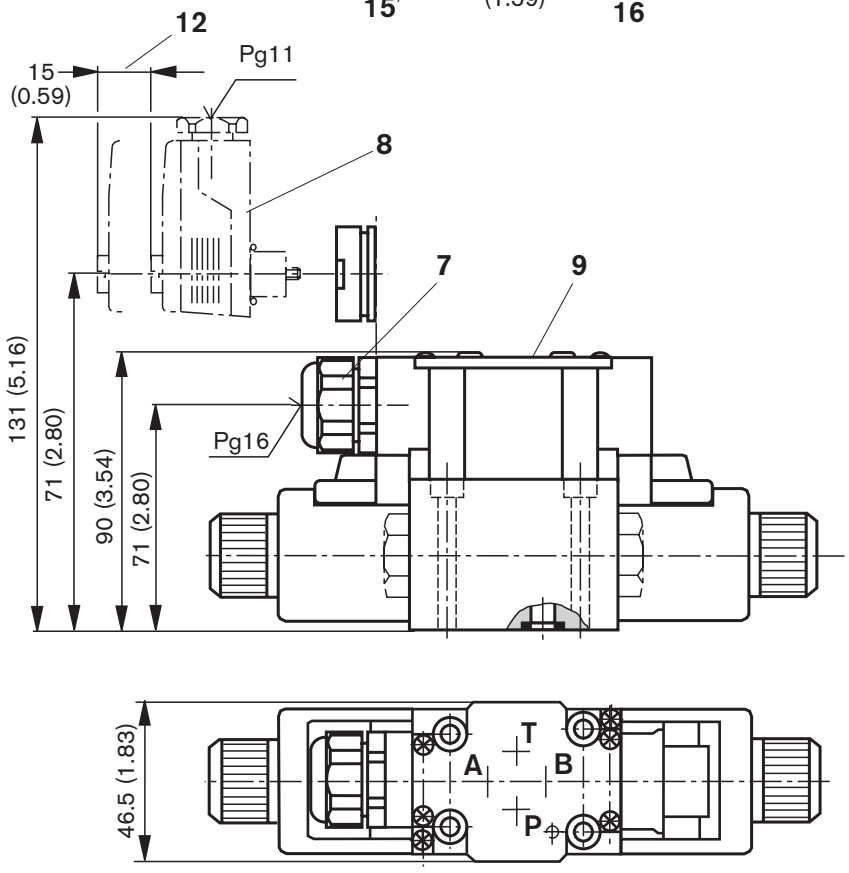
Individual connections





Required surface finish of the mating piece

Central connections



7 Cable glande Pg 16 "DL"

8 Angled plug (color red, must be ordered separately, Material No. **R900005538**)

9 Name plate

10 Same sealing rings for ports A, B, P. T

11 Plug for valves with one solenoid

12 Space required to remove the plug-in connector

13 Space required to remove the coil

14 Securing nut, tightening torque $M_A = 4$ Nm (2.95 lb-ft)

15 Porting pattern to DIN 24340 form A, **without** locating pin hole

16 Porting pattern to ISO 4401 **with** locating pin hole

Subplates

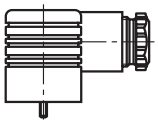
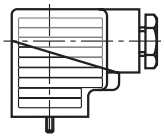
(**without** locating pin hole)	G 341/01(/12), G 1/4 (SAE-4; 7/16-20) G 342/01(/12), G 3/8 (SAE-6; 9/16-18) G 502/01(/12), G 1/2 (SAE-8; 3/4-16)
(**with** locating pin hole)	G 341/60, G 1/4 G 342/60, G 3/8 G 502/60, G 1/2

to catalog sheet RE 45052 and

Valve fixing screws

4 screws DIN EN ISO 4762 – M5 x 50 - 10.9
(10 -24 UNC x 2");
Surface coating to DIN EN ISO 10683 aflZn - 240h - L
(friction value 0.09–0.14 to VDA 235-102)
must be ordered separately.
$M_A = 7$ Nm (5.16 lb-ft), tighten using a torque wrench with an accuracy of ± 10 %.
Note: The tightening torque relates to the maximum operating pressure.

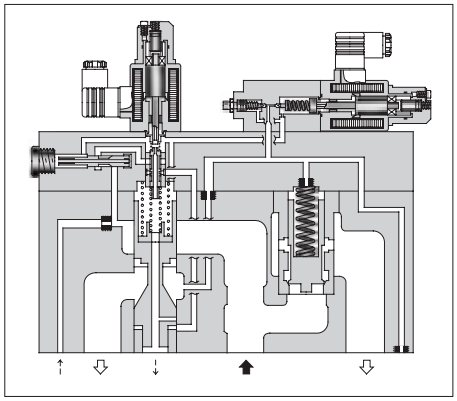
Plug-in connectors to DIN EN 175 301-803 for component plug "K4"

For further plug-in connectors see RE 08006					
		Material No.			
Valve side	Color	Without circuitry	With indicator light 12 … 240 V	With rectifier 12 … 240 V	With indicator light and Z-diode protective circuit 24 V
a	grey	**R901017010**	–	–	–
b	black	**R901017011**	–	–	–
a/b	black	–	**R901017022**	**R901017025**	**R901017026**

Bosch Rexroth Corp.
Industrial Hydraulics
2315 City Line Road
Bethlehem, PA 18017-2131
USA
Telephone (610) 684-8300
Facsimile (610) 694-8467
www.boschrexroth-us.com

High Flow Series Proportional Electro-Hydraulic Flow Control and Relief Valves

This flow control and relief valve is an energy-saving valve that supplies the minimum pressure and flow necessary for actuator drive.
For the High Flow Series, double maximum flow rate [03 size: 125→250 L/min (33.03→66.05 U.S.GPM), 06 size: 250→500 L/min (66.05→132.1 U.S.GPM), 10 size: 500→1000 L/min (132.1→264.2 U.S.GPM)] enables a smaller valve size than conventional products; compact-sized devices can be provided.



Specifications

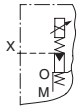
Description \ Model No.			EFBG-03 -250-∗-∗-51∗	EFBG-06 -500-∗-∗-51∗	EFBG-10 -1000-∗-∗-51∗
Max. Operating Pressure MPa (PSI)			24.5 (3550)	24.5 (3550)	24.5 (3550)
Max. Flow L/min (U.S.GPM)			250 (66)	500 (132)	1000 (264)
Metred Flow Adjustment Range L/min (U.S.GPM)			2.5-250 (.66-66)	5-500 (1.32-132)	10-1000 (2.64-264)
Min. Pilot Pressure MPa (PSI)			1.5 (220)	1.5 (220)	1.5 (220)
Pilot Flow L/min (U.S.GPM)		at Normal	1 (.26)	1 (.26)	4.5 (1.19)
		at Transition	4 (1.06)	6 (1.59)	10.0 (2.64)
Flow Controls	Rated Currnt		830 mA	780 mA	830 mA
	Coil Resistance		10 Ω	10 Ω	10 Ω
	Differential Pressure MPa (PSI)		0.8 (115)	0.9 (130)	1.2 (174)
	Hysteresis		3% or less	3% or less	3% or less
	Repeatability		1% or less	1% or less	1% or less
Pressure Controls ★1	Pres. Adj. Range MPa (PSI) ★2		C: 1.6-15.7 (230-2275) H: 1.8-24.5 (260-3550)	C: 1.5-15.7 (220-2275) H: 1.5-24.5 (220-3550)	C: 1.1-15.7 (160-2275) H: 1.1-24.5 (160-3550)
	Rated Current		C: 850 mA H: 870 mA	C: 800 mA H: 900 mA	C: 900 mA H: 950 mA
	Coil Resistance		10 Ω	10 Ω	10 Ω
	Hysteresis		3% or less	3% or less	3% or less
	Repeatability		1% or less	1% or less	1% or less
Approx. Mass kg (lbs.)			Refer to page 735 to 737		

★1. The specifications for pressure controls are applied to models with proportional pilot relief valve. (Ex. EFBG-03-250-C-∗-51)
★2. The maximum pressure adjustment range of the valves without proportional pilot relief valves is 24.5 MPa (3550 PSI).

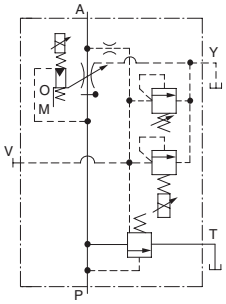
Graphic Symbols

With Proportional Pilot Relief Valve

External Pilot

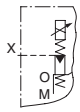


Internal Pilot

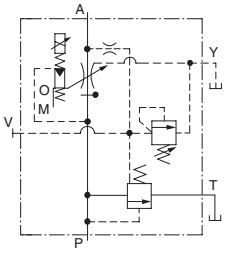


Without Proportional Pilot Relief Valve

External Pilot



Internal Pilot



Model Number Designation

F-	EFB	G	-03	-250	-C	-E	-51	✻
Special Seals	Series Number	Type of Mounting	Valve Size	Max. Metred Flow L/min (U.S.GPM)	Proportional Pilot Relief Valve Pressure Adj. Range	Pilot Connection	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	**EFB**: Proportional Electro-Hydraulic Flow Control and Relief Valve	**G**: Sub-plate Mounting	**03**	**250**: 250 (66)	**C, H**: See Specifications	**None**: Internal Pilot	**51**	Refer to ★
			06	**500**: 500 (132)	**None**: Without Proportional Pilot Relief Valve	**E**: External Pilot	**51**	
			10	**1000**: 1000 (264)			**51**	

★ Design Standards: None ..... Japanese Standard "JIS" and European Design Standard
90 ..... N. American Design Standard

Attachment

Mounting Bolts

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Std. "JIS" and European Design Std.	N. American Design Std.	
EFBG-03	M12 × 120 Lg.	1/2-13 UNC × 4-3/4 Lg.	4
EFBG-06	M16 × 120 Lg.	5/8-11 UNC × 4-3/4 Lg.	4
EFBG-10	M20 × 150 Lg.	3/4-10 UNC × 6 Lg.	4

Applicable Power Amplifiers

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see page 767, 771).

Model Numbers	Power Amplifier Model Numbers	
	For Flow Control	For Pres. Control
EFBG-03-250(-E)-51/5190 EFBG-06-500(-E)-51/5190 EFBG-10-1000(-E)-51/5190	AME-D-10-✻-20 AMN-D-10 (For DC power supply)	—
EFBG-03-250-C/H(-E)-51/5190 EFBG-06-500-C/H(-E)-51/5190 EFBG-10-1000-C/H(-E)-51/5190	AME-D2-1010-11	

Instructions

Drain Back Pressure

Check that the drain back pressure dose not exceed 0.2 MPa (29 PSI).

When Relief Valve Passing Flow Rate is Low in Pressure Control State

To avoid preselected pressure instability, use a passing flow rate of 15 L/min (4.0 U.S.GPM) or higher.
Further, check that the tank-line back pressure dose not exceed 0.5 MPa (70 PSI).

Safety Valve Pressure Setting

The pressure of the safety valve is preset at the value equal to the upper limit of the pressure adjustment range plus 2 MPa (290 PSI). Please adjust the pressure of the valve so preset to meet the pressure to be used actually.
To lower the pressure setting, turn the safety valve pressure adjustment screw anti-clockwise. After adjustment, be sure to tighten the lock nut.

Interchangeability in installation with conventional valves (10Ω-10Ω Series)

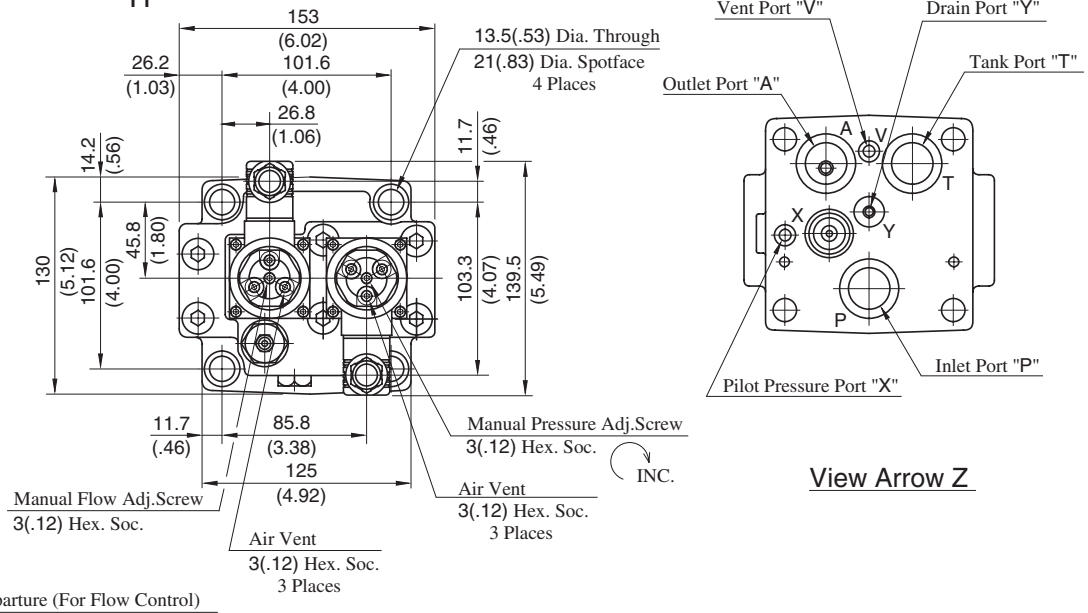
- EFBG-03

There is no interchangeability in installation.

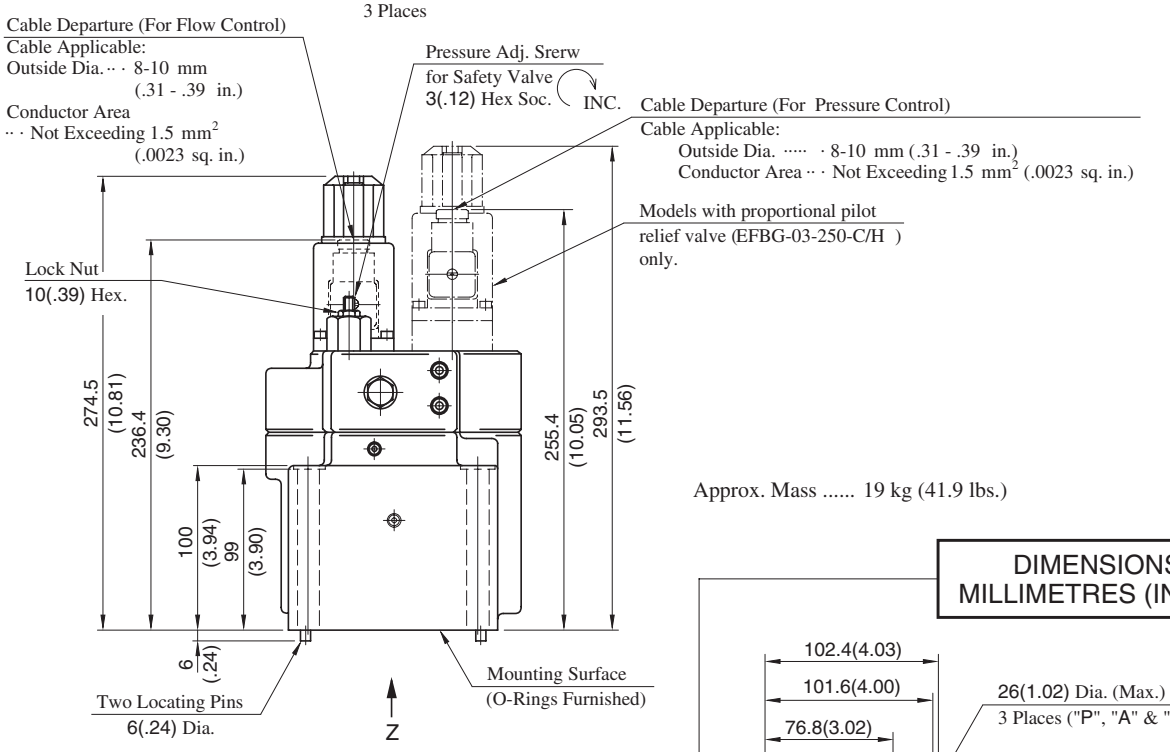
- EFBG-06/10

A product in the high-flow series can be mounted on the conventional mounting surface but no conventional product can be mounted on the mounting surface of the high-flow series.

EFBG-03-250-$\frac{C}{H}$(-E)-51/5190, EFBG-03-250 (-E)-51/5190

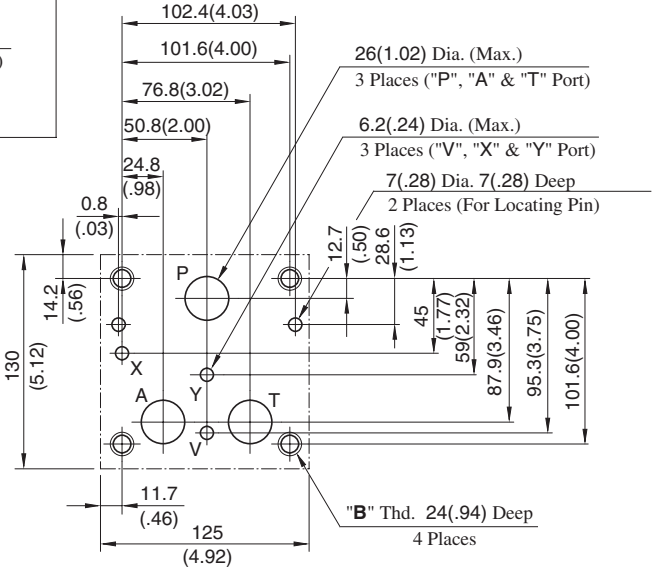


View Arrow Z



Approx. Mass ..... 19 kg (41.9 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

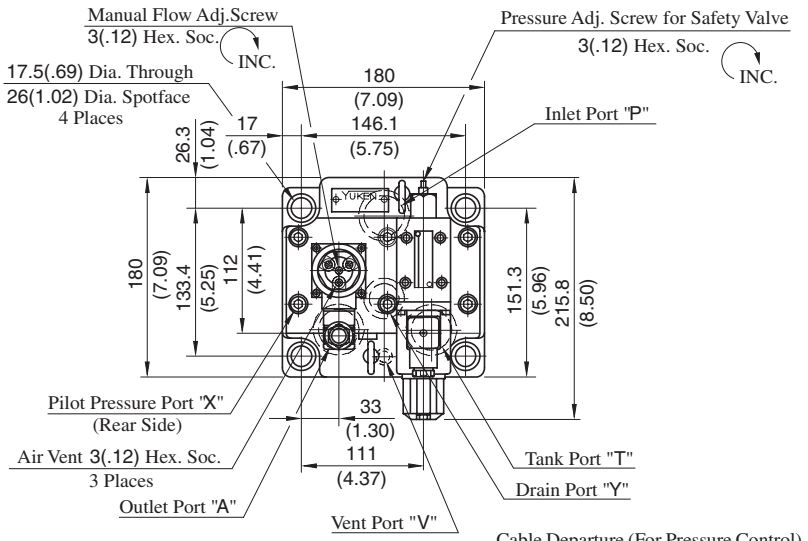


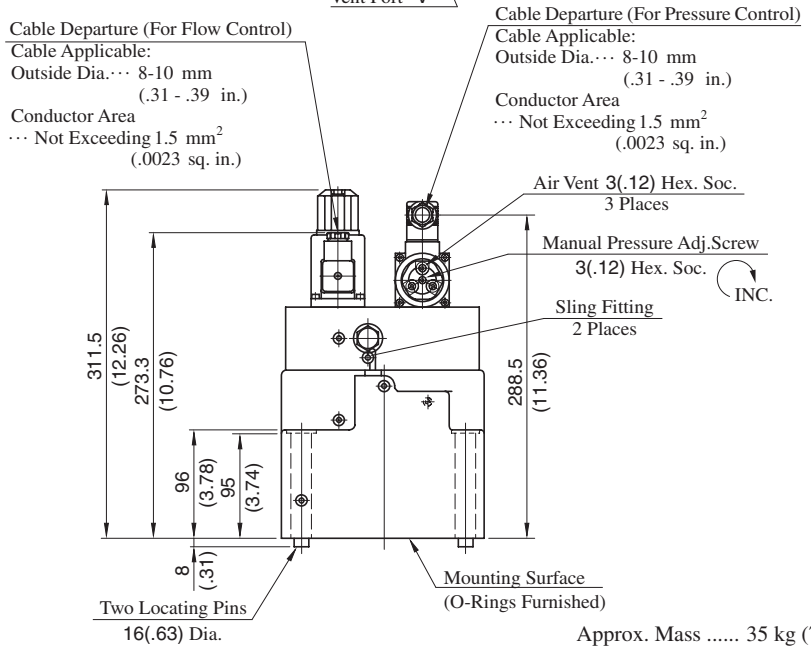
Dimensions of valve mounting surface

Prepare a mounting surface as shown to the right.
Also finish it finely.

Model Numbers	"B" Thd.
EFBG-03-250-∗-∗-51	M12
EFBG-03-250-∗-∗-5190	1/2-13 UNC

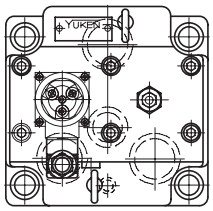
Models with Proportional Pilot Relief Valve
EFBG-06-500-$^{C}_{H}$(-E)-51/5190

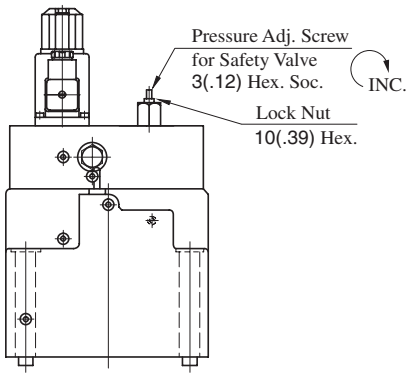




Approx. Mass ..... 35 kg (77.2 lbs.)

Models without Proportional Pilot Relief Valve
EFBG-06-500(-E)-51/5190





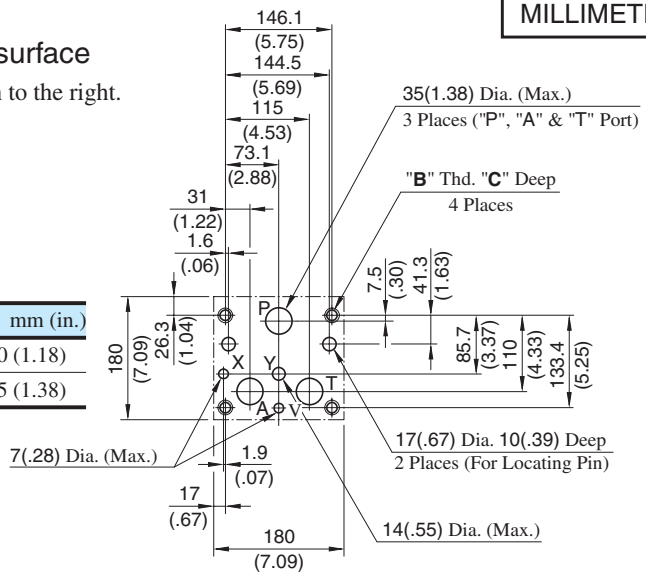
- For other dimensions, please refer to the models with Proportional Pilot Relief Valve.

Approx. Mass ..... 33 kg (72.8 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

Dimensions of valve mounting surface

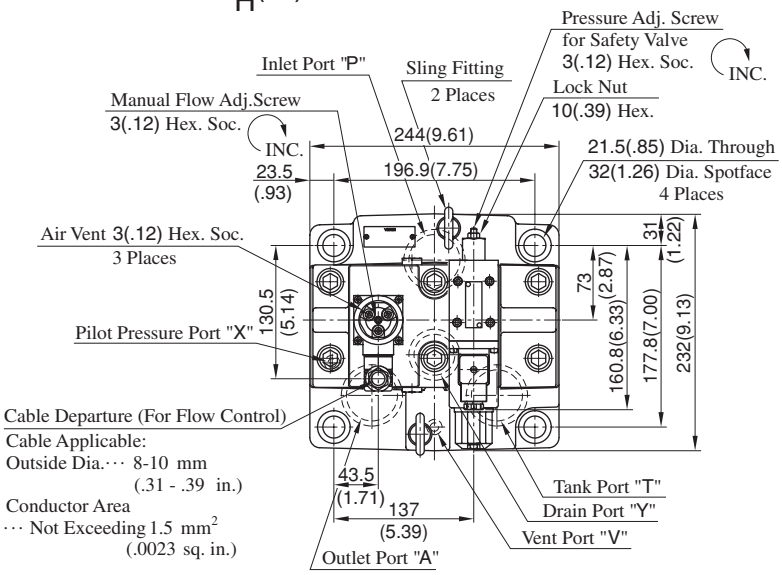
Prepare a mounting surface as shown to the right.
Also finish it finely.

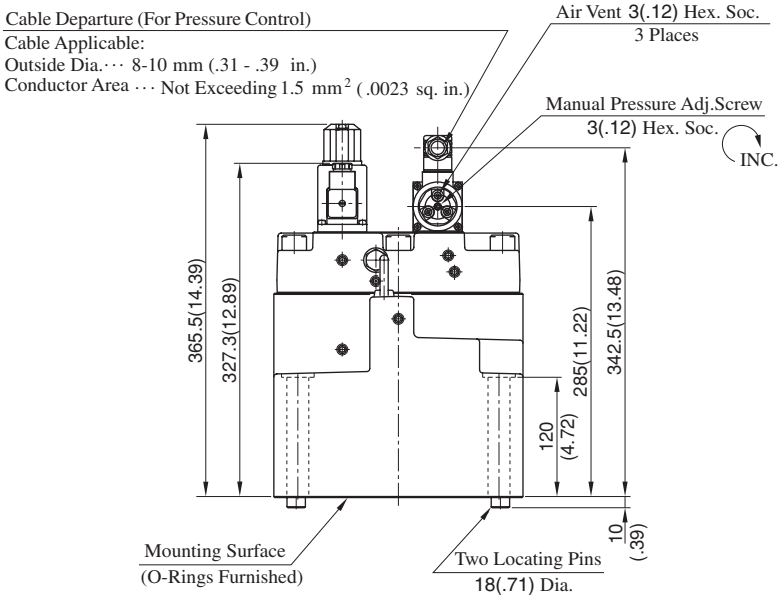


Model Numbers	"B" Thd.	C mm (in.)
EFBG-06-500-∗-∗-51	M16	30 (1.18)
EFBG-06-500-∗-∗-5190	5/8-11 UNC	35 (1.38)

Models with Proportional Pilot Relief Valve

EFBG-10-1000-$^{C}_{H}$(-E)-51/5190

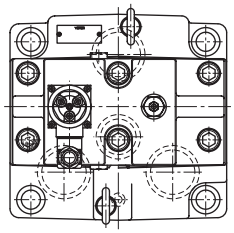


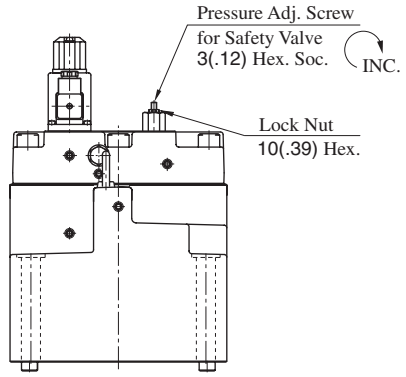


Approx. Mass ..... 76 kg (167.6 lbs.)

Models without Proportional Pilot Relief Valve

EFBG-10-1000(-E)-51/5190





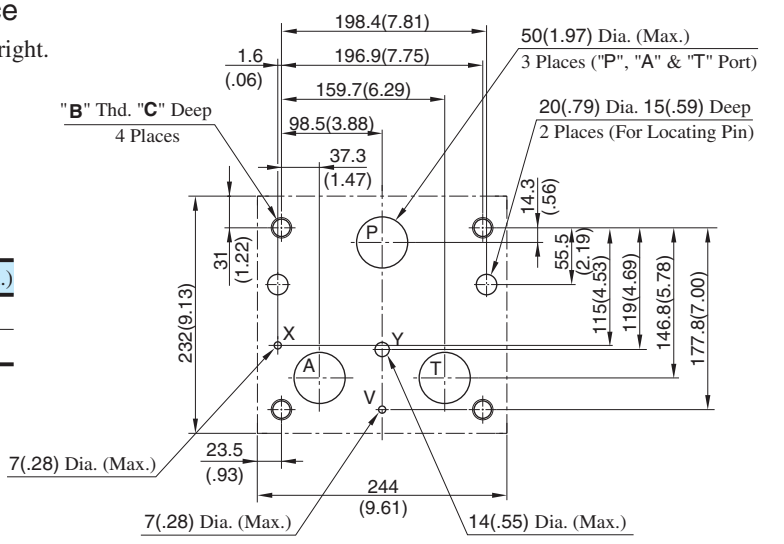
- For other dimensions, please refer to the models with Proportional Pilot Relief Valve.

Approx. Mass ..... 74 kg (163.1 lbs.)

DIMENSIONS IN MILLIMETRES (INCHES)

Dimensions of valve mounting surface

Prepare a mounting surface as shown to the right. Also finish it finely.



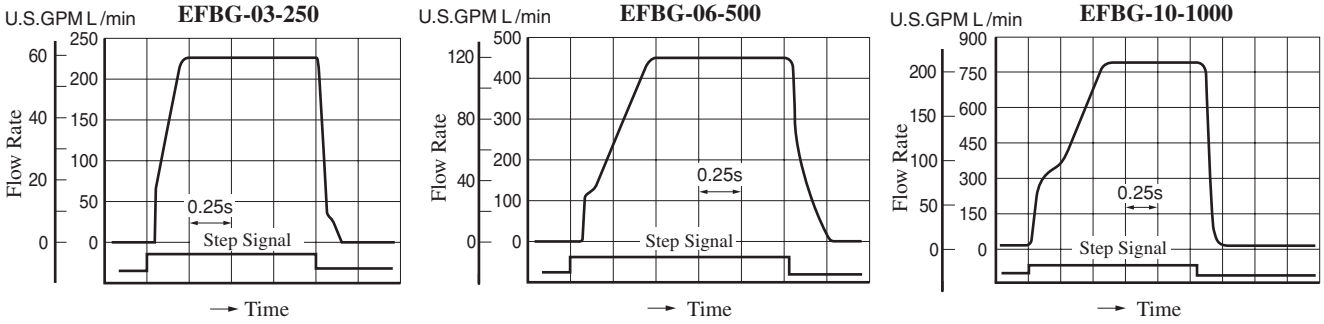
Model Numbers	"B" Thd.	C mm (in.)
EFBG-10-1000-∗-∗-51	M20	32 (1.26)
EFBG-10-1000-∗-∗-5190	3/4-10 UNC	35 (1.38)

Step Response

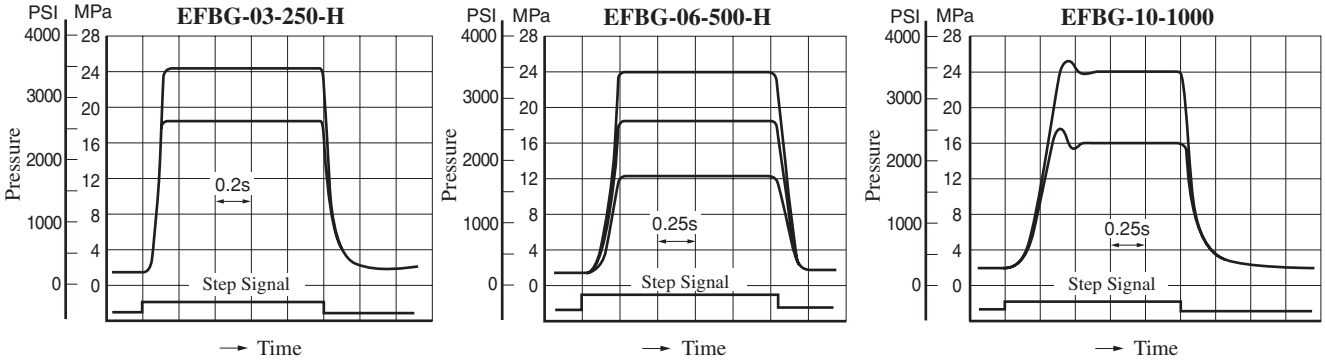
Viscosity: 30mm²/s (141 SSU)

These characteristics have been obtained by measuring on each valve. Therefore , they may vary according to a hydraulic circuit to be used.

Flow Controls

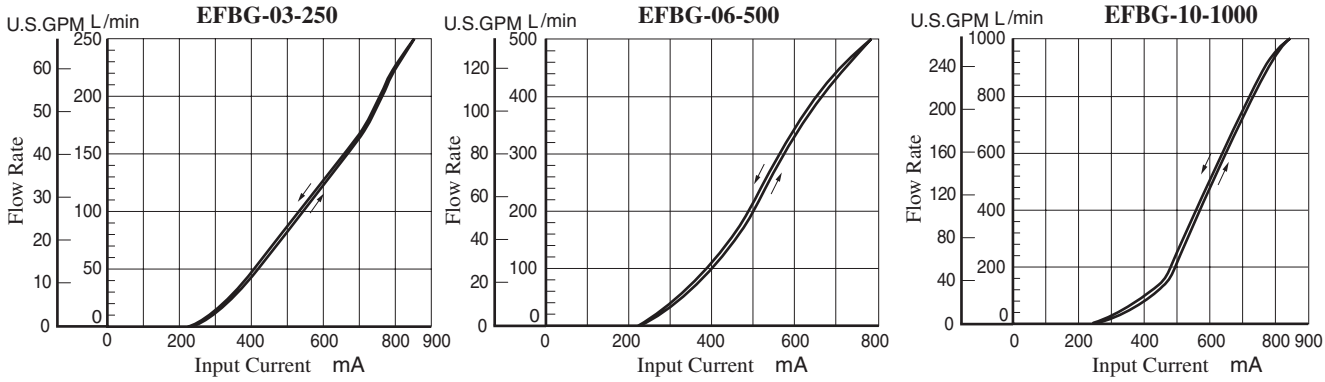


Pressure Controls



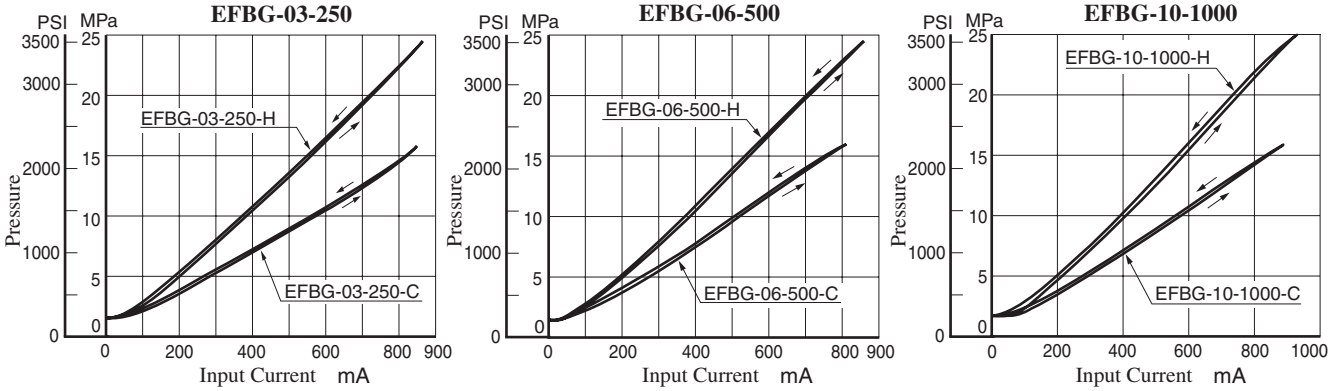
Input Current vs. Flow

Viscosity: 30mm²/s (141 SSU)



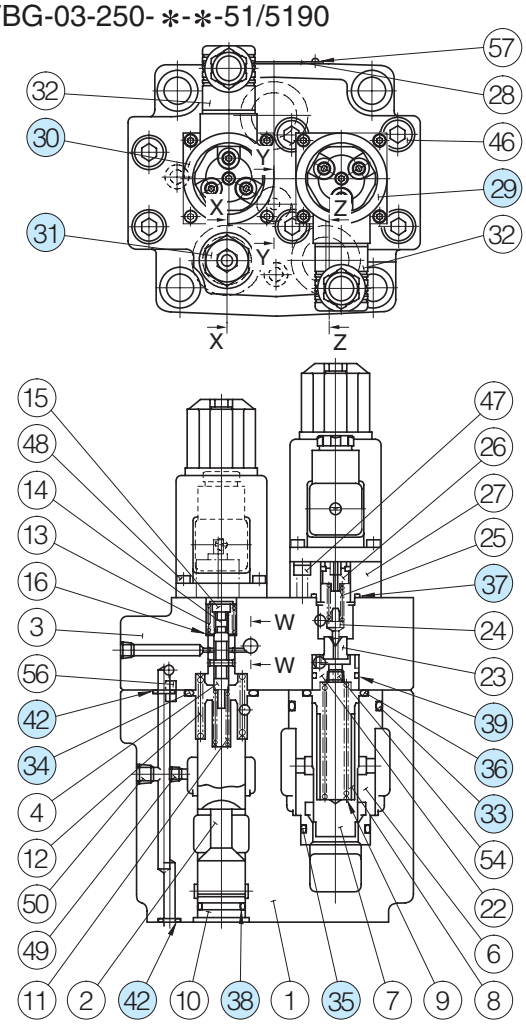
Input Current vs. Pressure

Viscosity: 30mm²/s (141 SSU)

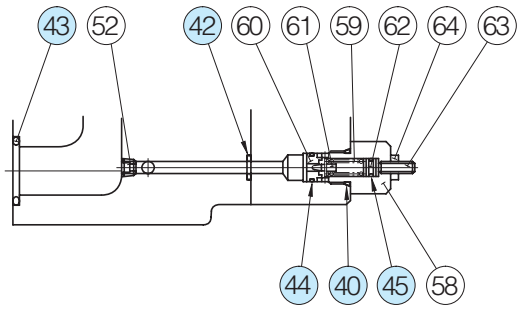


List of Seals, Solenoid Ass'y and Safety Valve

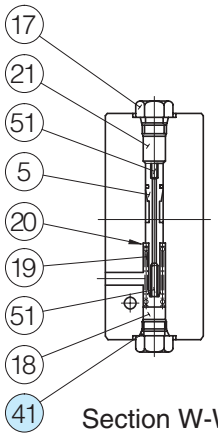
EFBG-03-250- ∗-∗-51/5190



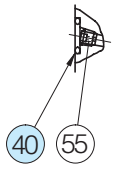
Detail of Safety Valve
(Item 31)



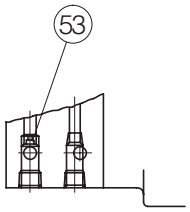
Section X-X



Section W-W



Section Y-Y



Section Z-Z

List of Seals

Item	Name of Parts	Part Numbers	Qty.
33	O-Ring	SO-NB-P42	1
34	O-Ring	SO-NB-P32	1
35	O-Ring	SO-NB-P30	1
36	O-Ring	SO-NB-P28	1
37	O-Ring	SO-NB-P22	1★
38	O-Ring	SO-NB-P21	1
39	O-Ring	SO-NB-P20	1★
40	O-Ring	SO-NB-P14	2
41	O-Ring	SO-NB-P11	2
42	O-Ring	SO-NB-P9	6
43	O-Ring	SO-NB-G30	3
44	O-Ring	SO-NB-A013	1
45	O-Ring	SO-NA-P6	1

★ O-rings, item 37 and 39, are used only with the proportional pilot relief valve (EFBG-03-250-C/H).

Note: When ordering seals, please specify the seal lit number from the table right.
In addition to the above o-rings, seals for solenoid ass'y are included in the seal kit.
For the detail of seals for solenoid ass'y seals, see page 674.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFBG-03-250-51∗	KS-EFBG-03-250-51
EFBG-03-250-C/H-51∗	KS-EFBG-03-250-C-51

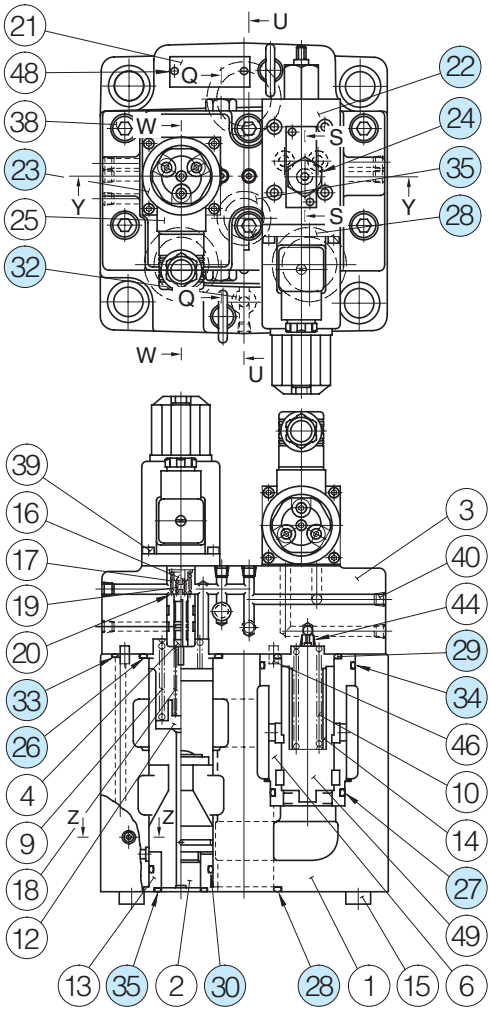
Solenoid Ass'y and Safety Valve

Valve Model Numbers	㉙ Solenoid Ass'y Model No.	㉚ Solenoid Ass'y Model No.	㉛ Safety Valve Model No.
EFBG-03-250-C/H(-E)-51/5190	E318-Y06M1-04-61	E318-Y06M1-28-61	SB1094-2002
EFBG-03-250(-E)-51/5190	——		

Note: The connector assembly GDM-211-B-11 (Item 32) is not included in the solenoid assembly.

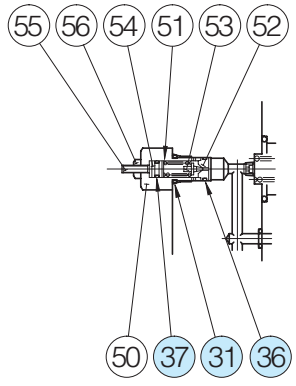
List of Seals, Pilot Valves, Solenoid Ass'y and Safety Valve

EFBG-06-500-∗-∗-51/5190

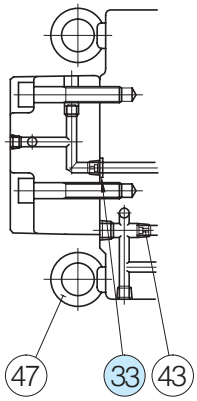


Detail of SafetyValve (Item 24)

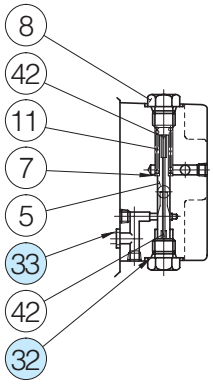
Models Without Pilot Relief Valve : EFBG-06-500(-E)



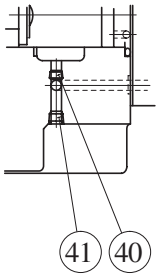
Section S-S



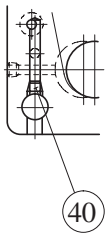
Section U-U



Section Q-Q



Section W-W



Section Z-Z

List of Seals

Item	Name of Parts	Part Numbers	Qty.
26	O-Ring	SO-NB-P46	1
27	O-Ring	SO-NB-P42	1
28	O-Ring	SO-NB-P40	3
29	O-Ring	SO-NB-P36	1
30	O-Ring	SO-NB-P34	1
31	O-Ring	SO-NB-P14	1★
32	O-Ring	SO-NB-P11	4
33	O-Ring	SO-NB-P9	4
34	O-Ring	SO-NB-G55	1
35	O-Ring	SO-NB-G30	2
36	O-Ring	SO-NB-AO13	1★
37	O-Ring	SO-NA-P6	1★

★ O-rings, item 31, 36 and 37, are used only without the proportional pilot relief valve [(EFBG-06-500(-E)].

Note: When ordering seals, please specify the seal lit number from the table right.
In addition to the above o-rings, seals for pilot valve and solenoid ass'y are included in the seal kit.
For the detail of the pilot valve and solenoid ass'y seals, see page 674.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFBG-06-500-51∗	KS-EFBG-06-500-51
EFBG-06-500-C/H-51∗	KS-EFBG-06-500-C-51

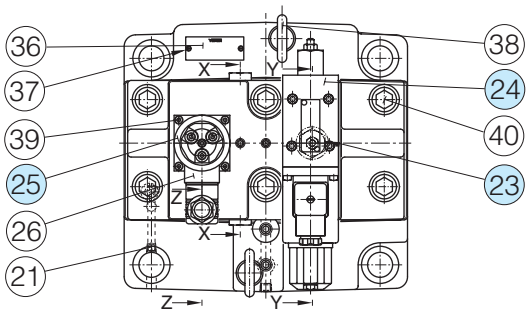
Pilot Valve, Solenoid Ass'y and Sefety Valve

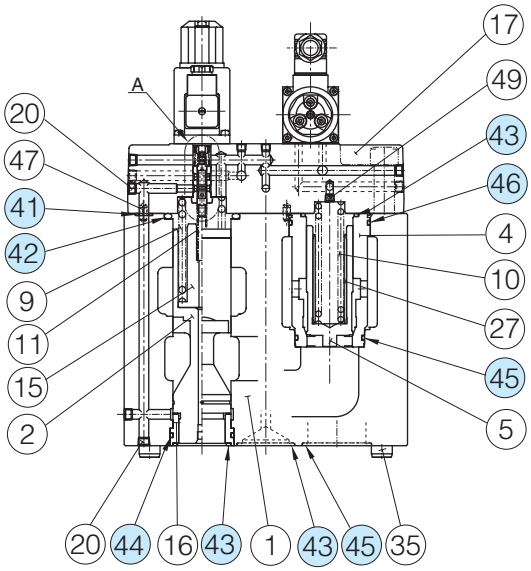
Valve Model Numbers	㉒ Pilot Valve Model Numbers	㉓ Solenoid Ass'y Model No.	㉔ Safety Valve Model No.
EFBG-06-500-C(-E)-51/5190	EDG-01V-C-1-PNT11-5103	E318-Y06M1-28-61	——
EFBG-06-500-H(-E)-51/5190	EDG-01V-H-1-PNT11-5103		——
EFBG-06-500(-E)-51/5190	——		SB1094-2002

Note: The connector assembly GDM-211-B-11 (Item 25) is not included in the solenoid assembly.

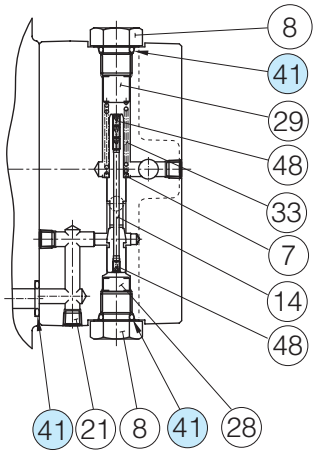
List of Seals, Pilot Valves, Solenoid Ass'y and Safety Valve

EFBG-10-1000-∗-∗-51/5190

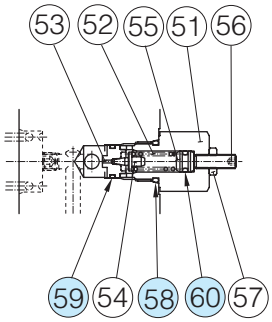




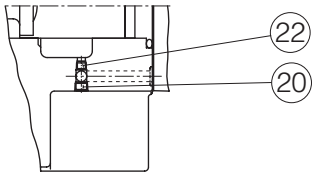
Detail of Safety Valve (Item 23)
Models Without Pilot Relief Valve : EFBG-10-1000(-E)



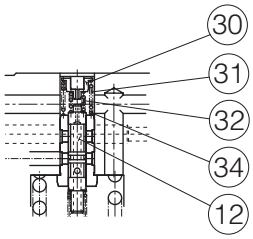
Section X-X



Section Y-Y



Section Z-Z



Detail A

List of Seals

Item	Name of Parts	Part Numbers	Qty.
41	O-Ring	JIS-B 2401-1B-P11	8
42	O-Ring	JIS-B 2401-1B-P55	1
43	O-Ring	JIS-B 2401-1B-G45	3
44	O-Ring	JIS-B 2401-1B-G50	1
45	O-Ring	JIS-B 2401-1B-G55	4
46	O-Ring	JIS-B 2401-1B-G65	1
58	O-Ring	JIS-B 2401-1B-P14	1★
59	O-Ring	AS568-013(NBR, Hs90)	1★
60	O-Ring	JIS-B 2401-1A-P6	1★

★ O-rings, item 58, 59 and 60, are used only without the proportional pilot relief valve [EFBG-10-1000(-E)].

Note: When ordering seals, please specify the seal lit number from the table right. In addition to the above o-rings, seals for pilot valve and solenoid ass'y are included in the seal kit.
For the detail of the pilot valve and solenoid ass'y seals, see page 674.

List of Seal Kits

Valve Model Numbers	Seal Kit Numbers
EFBG-10-1000-51∗	KS-EFBG-10-1000-51
EFBG-10-1000-C/H-51∗	KS-EFBG-10-1000-C-51

Pilot Valve, Solenoid Ass'y and Safety Valve

Valve Model Numbers	㉔ Pilot Valve Model Numbers	㉕ Solenoid Ass'y Model No.	㉓ Safety Valve Model No.
EFBG-10-1000-C(-E)-51/5190	EDG-01V-C-1-PNT20-5197	E318-Y06M1-28-61	——
EFBG-10-1000-H(-E)-51/5190	EDG-01V-H-1-PNT20-5197		——
EFBG-10-1000(-E)-51/5190	——		SB1094-2002

Note: The connector assembly GDM-211-B-11 (Item 25) is not included in the solenoid assembly.

Interchangeability between Current and New Design

EFBG-03/06/10 series valves have changed model from 50 to 51 design in line with the model change of solenoid ass'y.

Specifications and Characteristics

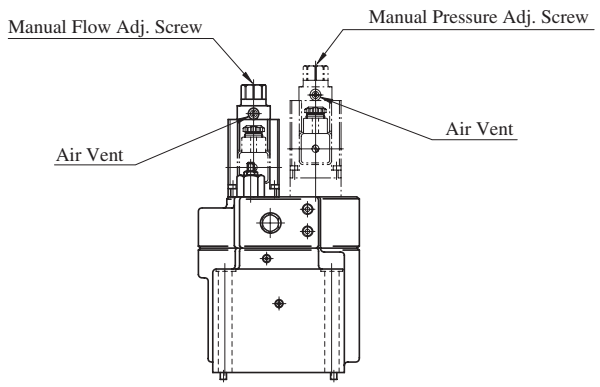
No changes in specifications and characteristics between current and new design.

Mounting Interchangeability

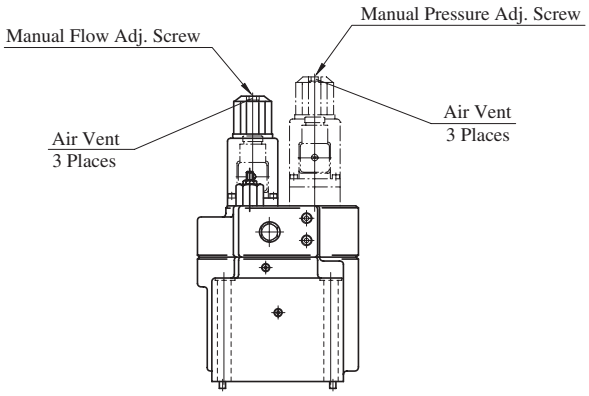
There is an interchangeability in the mounting dimensions between current and new design, however, note that because of improvements made on the solenoids, the overall shapes have been changed as shown below.

- EFBG-03

Current : Design 50

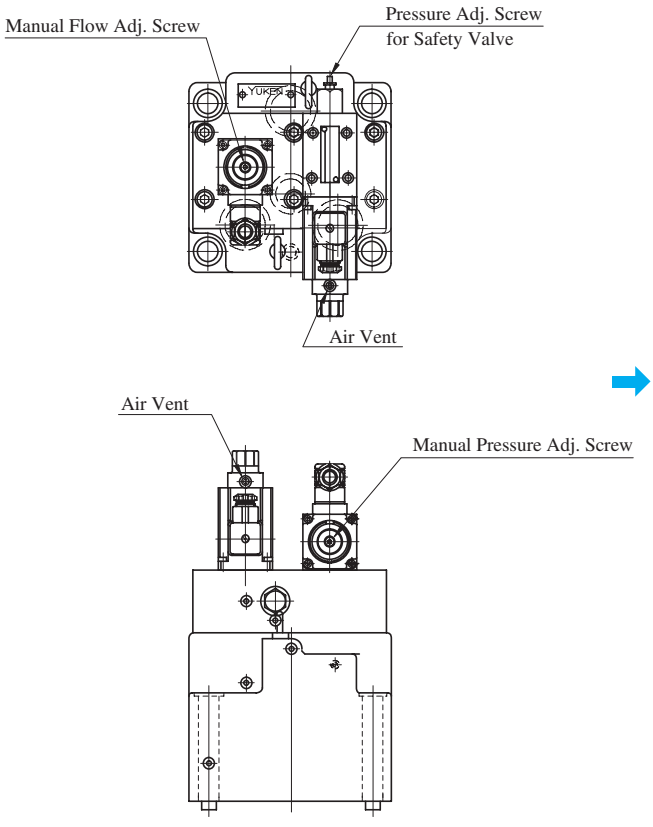


New : Design 51

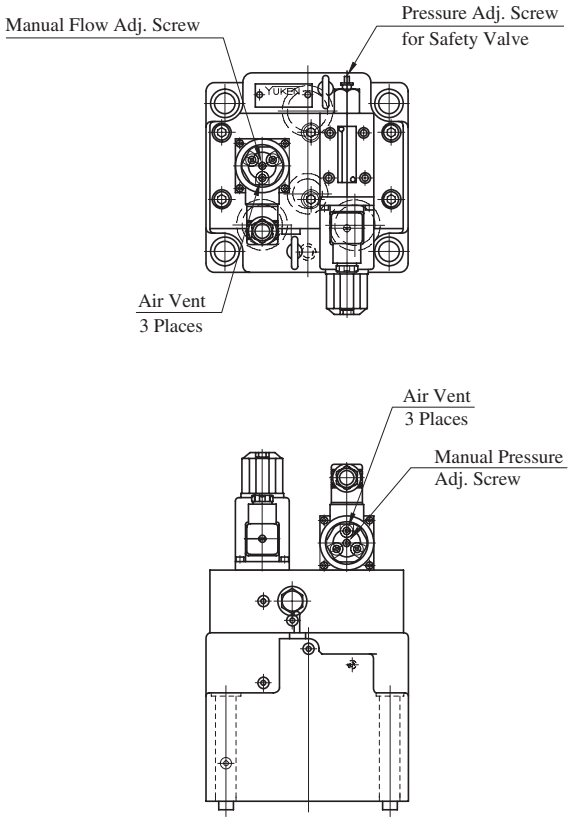


- EFBG-06/10

Current : Design 50



New : Design 51



General Description

Series TDA 2/2 way proportional throttle valves are used to control large oil flows.

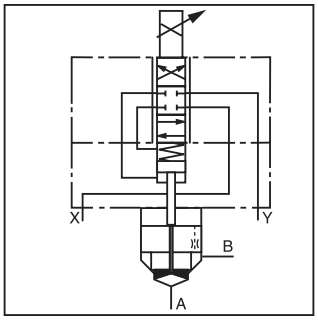
Features

- Cavity and mounting pattern according to ISO 7368.
- Fail-safe function at power failure.
- Leak-free from port B to A.
- Pressure differential up to 350 Bar (5075 PSI) possible.
- 8 sizes NG16 up to NG100.

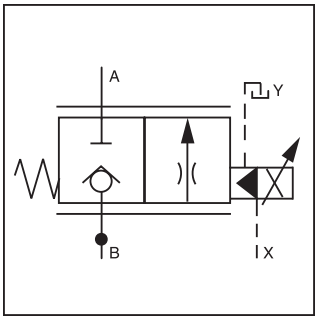
Function

The TDA valve has a 3-stage design consisting of the first solenoid operated pilot stage with a spool in sleeve design, the second pilot stage with the control spring and the sequence spool and as main stage the poppet in the sleeve. The proportional solenoid operates the pilot spool against the feedback of the control spring and controls the position of the sequence spool. The main poppet follows the position of the sequence spool and provides an open area for flow from B to A (optional A to B) in proportion to the solenoid current. The poppet is positioned independent of the differential pressure, which can become as high as the maximum working pressure.

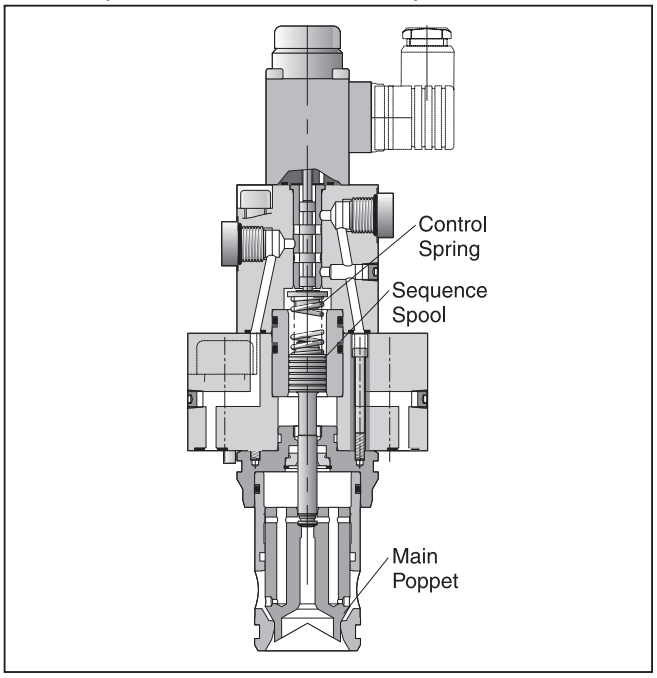
In combination with the digital power amplifier PCD00A-400 the valve parameters can be saved, changed and duplicated.



Function Symbol



Short Symbol



Ordering Information

TDA		E	W	0	9		2			W	
Proportional Throttle Valve	Nominal Size	Slip-in Valve ISO 7368	Design	Poppet Shape	Nominal Flow	Flow Direction	Piloting	Seals	Solenoid Voltage	Plug Socket without Plug	Design Series

NOTE: Not required when ordering.

Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
A	A to B
B	B to A

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
L	6 VDC
X	16 VDC

Weight:

TDA016	3.1 kg (6.8 lbs.)	TDA050	15.0 kg (33.1 lbs.)
TDA025	4.3 kg (9.5 (lbs.)	TDA063	33.0 kg (72.8 lbs.)
TDA032	5.8 kg (12.8 lbs.)	TDA080	63.0 kg (138.9 lbs.)
TDA040	9.2 kg (20.3 lbs.)	TDA100	87.0 kg (191.8 lbs.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

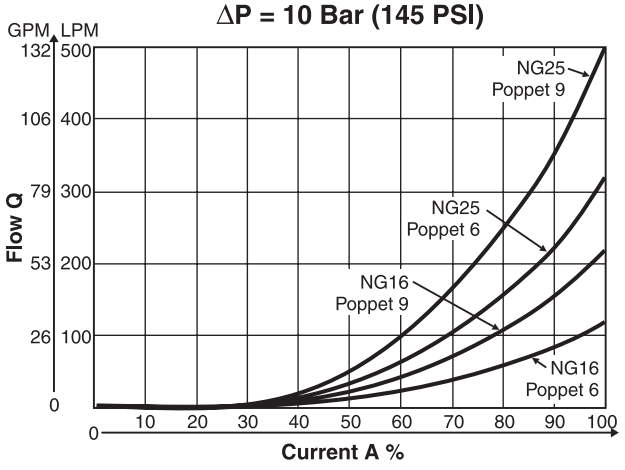
Cat3200_02.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

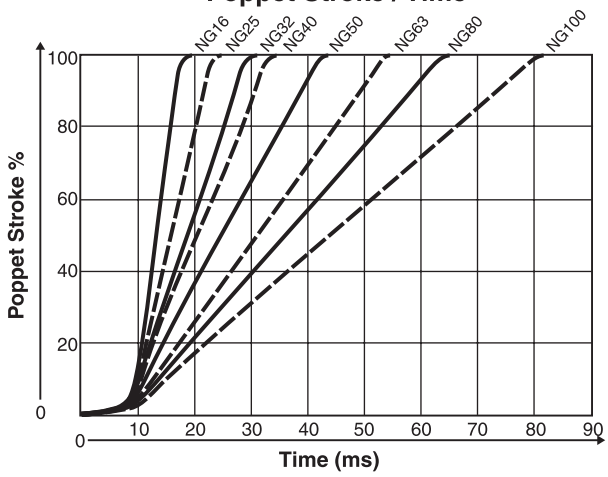
General								
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Interface	Slip-in cartridge according to ISO 7368							
Mounting Position	Unrestricted							
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)							
Hydraulic								
Maximum Operating Pressure	Ports A, B and X: 350 Bar (5075 PSI), Port Y 10: Bar (145 PSI) maximum							
Nominal Flow LPM **Δp = 10 Bar (145 PSI) GPM**	220 (58)	500 (132)	950 (251)	1400 (370)	2300 (609)	4000 (1058)	6000 (1587)	9500 (2513)
Flow Direction	See Ordering Information							
Fluid	Hydraulic oil according to DIN 51524 ... 525							
Viscosity Recommended	30 to 80 cSt (mm^2/s)							
Viscosity Permitted	20 to 380 cSt (mm^2/s)							
Fluid Temperature	0°C to +60°C (+32°F to +140°F)							
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)							
Minimum Pilot Pressure	> 25% of system pressure							
Minimum Operating Pressure	Port A to B at 10 Bar (145 PSI), B to A at 15 Bar (208 PSI)							
Pilot Oil Supply	Depending on flow direction A or B using X or external X							
Pilot Oil Drain	External using Y, 10 Bar (145 PSI) maximum							
Pilot Oil at p = 100 Bar (1450 PSI)	Port X to Y < 1.5 LPM (0.4 GPM)							
Opening Point	At 30% of nominal current							
Manufacturing Tolerance	±5% of Qnom							
Static / Dynamic								
Hysteresis	< 3%							
Repeatability	< 1%							
Response Time **px = 50 Bar (725 PSI)**	20 ms	25 ms	30 ms	35 ms	45 ms	55 ms	65 ms	80 ms
Electrical (Proportional Solenoid)								
Duty Ratio	100% ED							
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)							
Solenoid Code	**L**				**X**			
Size	**NG16-50**		**NG63-100**		**NG16-50**		**NG63-100**	
Solenoid Voltage **Nominal Current (100% ED)**	6 VDC 2.6 amps				16 VDC 1.05 amps			
Nominal Resistance	2.2 Ohm		2.5 Ohm		11.3 Ohm		14 Ohm	
Power Amplifier Recommended	PCD00A-400							
Solenoid Connection	Connector as per EN 175301-803							

The pilot pressure in X-line must be at least 25% (NG16-40) or 45% (NG50-100) of the pressure in the draining-off line of the cartridge to make sure that the main poppet closes safely without malfunction.

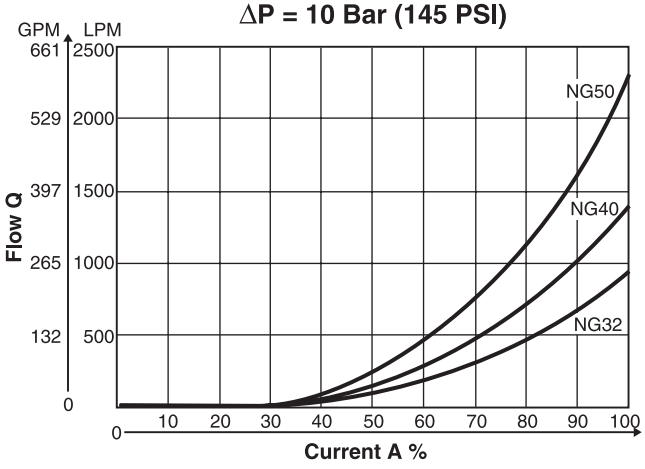
NG16 and NG25 Solenoid Current
ΔP = 10 Bar (145 PSI)



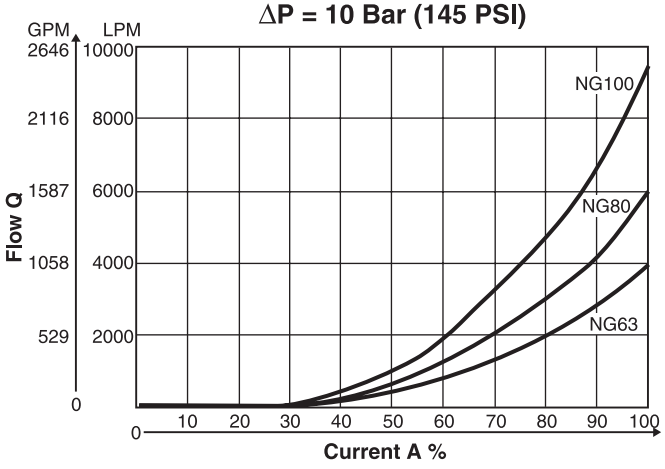
Poppet Stroke / Time



NG32, NG40 and NG50 Solenoid Current
ΔP = 10 Bar (145 PSI)



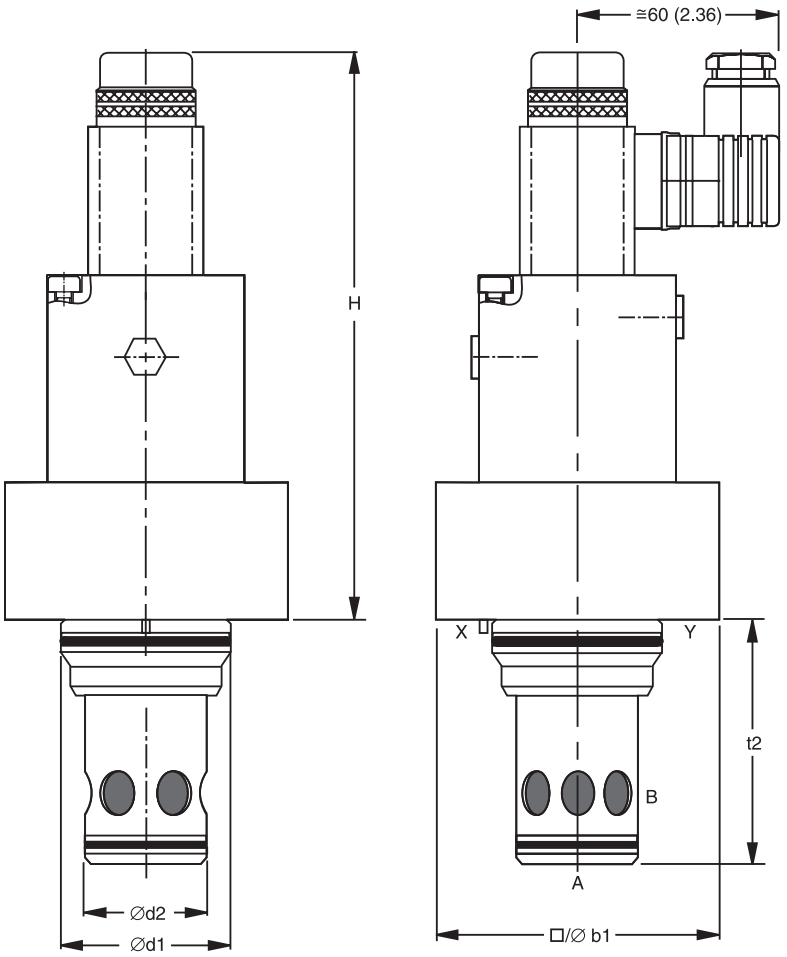
NG63, NG80 and NG100 Solenoid Current
ΔP = 10 Bar (145 PSI)



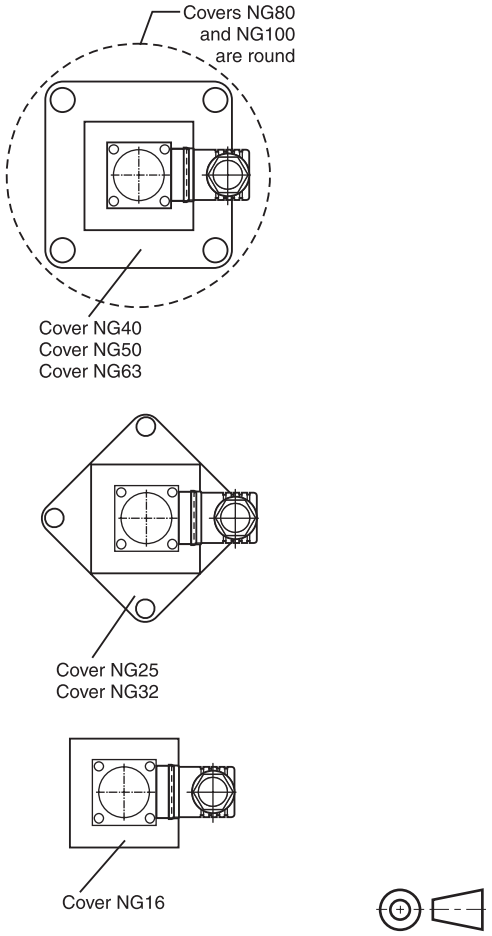
$$\Delta p_{actual} = \left(\frac{Q_{actual}}{Q_{nominal}}\right)^2 \bullet \Delta p_{nominal}$$

Inch equivalents for millimeter dimensions are shown in (**)

Valves



Valve Covers



Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
H	168.0 (6.61)	173.0 (6.81)	178.0 (7.01)	262.0 (10.31)	198.0 (7.80)	287.0 (11.30)	327.0 (12.87)	342.0 (13.46)
b1	65.0 (2.56)	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)	Ø250.0 (9.84)	Ø300.0 (11.81)
$d1^{H7}$	32.0 (1.26)	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)	145.0 (5.71)	180.0 (7.09)
$d2^{H7}$	25.0 (0.98)	34.0 (1.34)	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)	110.0 (4.33)	135.0 (5.31)
$t2^{+0.1}$	56.0 (2.20)	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)	205.0 (8.07)	245.0 (9.65)

NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
16	BK-M8x100-4pcs	33 Nm (24.3 lb.-ft.)	SK-TDA016EN20	SK-TDA016EV20
25	BK391 (BK77)	115 Nm (54.8 lb.-ft.)	SK-TDA025EN20	SK-TDA025EV20
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-TDA032EN20	SK-TDA032EV20
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-TDA040EN20	SK-TDA040EV20
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-TDA050EN20	SK-TDA050EV20
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-TDA063EN20	SK-TDA063EV20
80	BK419 (BK135)	935 Nm (689.6 lb.-ft.)	SK-TDA080EN20	SK-TDA080EV20
100	BK420 (BK90)	1910 Nm (1408.6 lb.-ft.)	SK-TDA100EN20	SK-TDA100EV20

Rexroth
Bosch Group

Pressure relief valve, pilot operated

RE 25751/10.05 1/8
Replaces: 05.02

Types ZDB and Z2DB

HAD5564

Nominal size 6
Component series 4X
Maximum operating pressure 315 bar
Maximum flow 60 L/min

Overview of contents

Features

- Sandwich plate valve
- Connection location to DIN 24340 form A (**without** locating pin), (standard)
- Connection location to ISO 4401-03-02-0-94 (**with** locating pin), (ordering code .../**60**)
- 4 pressure stages
- 5 circuit options
- With 1 or 2 pressure valve cartridges
- 4 adjustment elements for pressure adjustment, optional
  - Rotary knob
  - Sleeve with hexagon and protective cap
  - Lockable rotary knob with scale
  - Rotary knob with scale

For information regarding the available spare parts see:
www.boschrexroth.com/spc

Ordering details

Z		DB	6		–4X/	V		*

Sandwich plate **= Z**

1 pressure valve cartridge **= No code**
(only for versions „VA“, „VB“ and „VP“)
2 pressure valve cartridges **= 2**
(only for versions „VC“ and „VD“)

Pressure relief valve **= DB**

Nominal size 6 **= 6**

Relief function from – to:
A – T **= VA**
P – T **= VP**
B – T **= VB**
A – T and B – T **= VC**
A – B and B – A **= VD**

Adjustment element for pressure adjustment
Rotary knob **= 1**
Sleeve with hexagon and protective cap **= 2**
Lockable rotary knob with scale **= 3** [1]
Rotary knob with scale **= 7**

4X = Component series 40 to 49
(40 to 49: unchanged installation and connection dimensions)

Pressure stage
50 = Settable pressure up to 50 bar
100 = Settable pressure up to 100 bar
200 = Settable pressure up to 200 bar
315 = Settable pressure up to 315 bar

Seal material
V = FKM seals
(other seals on request)
⚠ Attention!
The compatibility of the seals and pressure fluid is to be taken into account!

Further details in clear text
No code = **Without** locating pin
/60 [2] **=** **With** locating pin

[1] H key under Material No. **R900008158** is included within the scope of supply

[2] Locating pin ISO 8752-3x8-St, Material No. **R900005694** (separate order)

Further standard components can be found within the EPS (Standard Price List).

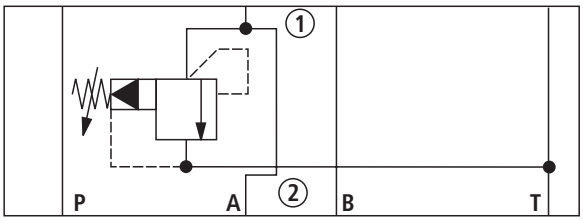
Preferred types (readily available)

Type ZDB	Material No.
ZDB 6 VA2-4X/100V	R900409889
ZDB 6 VA2-4X/200V	R900409886
ZDB 6 VA2-4X/315V	R900409893
ZDB 6 VB2-4X/200V	R900409854
ZDB 6 VB2-4X/315V	R900409896
ZDB 6 VP2-4X/50V	R900409847
ZDB 6 VP2-4X/100V	R900409933
ZDB 6 VP2-4X/200V	R900409844
ZDB 6 VP2-4X/315V	R900409898

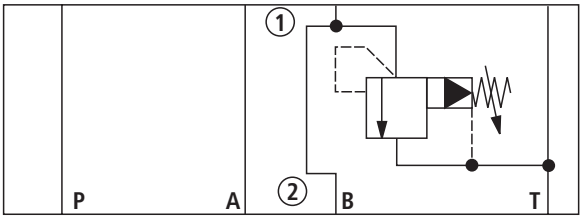
Type Z2DB	Material No.
Z2DB 6 VC2-4X/200V	R900411312
Z2DB 6 VC2-4X/315V	R900411318
Z2DB 6 VD2-4X/100V	R900411317
Z2DB 6 VD2-4X/200V	R900411314
Z2DB 6 VD2-4X/315V	R900411357

Symbols (① = valve side, ② = subplate side)

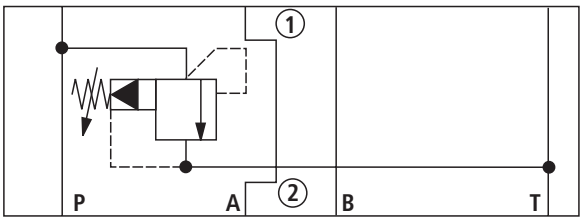
Type ZDB 6 VA...



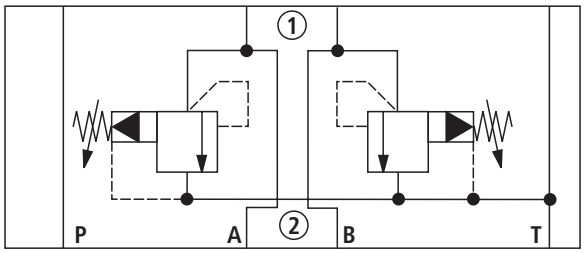
Type ZDB 6 VB...



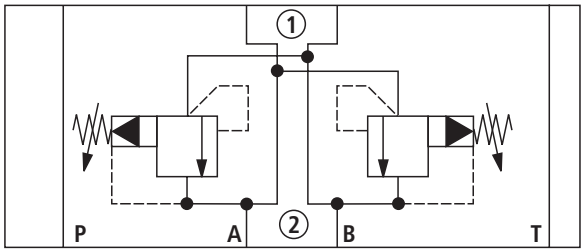
Type ZDB 6 VP...



Type Z2DB 6 VC...



Type Z2DB 6 VD...



Function, section

Pressure valve types ZDB and Z2DB are pilot operated pressue relief valves and of sandwich plate design.

They are used to limit the pressure within a hydraulic system.

They basically consist of the housing (7), together with one or two pressue relief valve cartridges.

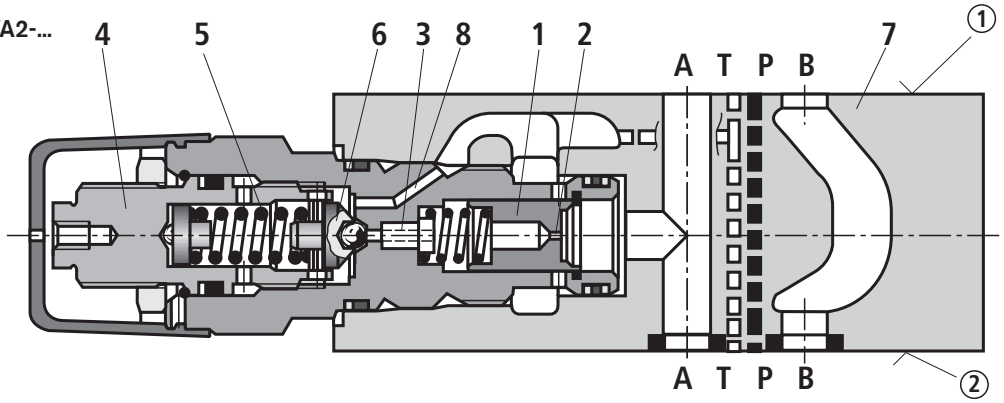
The system pressure is set by means of adjustment element (4).

At rest, the valve is closed. Pressure in port A acts on the spool (1). At the same time pressure passes through orifice (2) onto the spring loaded side of spool (1) and via orifice (3) to the pilot poppet (6). If the pressure in port A rises above the value set on spring (5), then the pilot poppet (6) opens.

Fluid can now flow from the spring loaded side of the spool (1), then via orifice (3), and channel (8) into port T. The resulting pressure drop then moves the spool (1) thereby opening the connection A to T, while maintaining the pressure set at spring (5).

Pilot oil return from the two spring chambers is taken externally via port T.

Type ZDB 6 VA2-...



Technical data (for applications outside these parameters, please consult us!)

General

Weight	Type ZDB 6	kg	Approx. 1
	Type Z2DB 6	kg	Approx. 1,2
Installation			Optional
Ambeint temperature range		°C	–20 to +80

Hydraulic

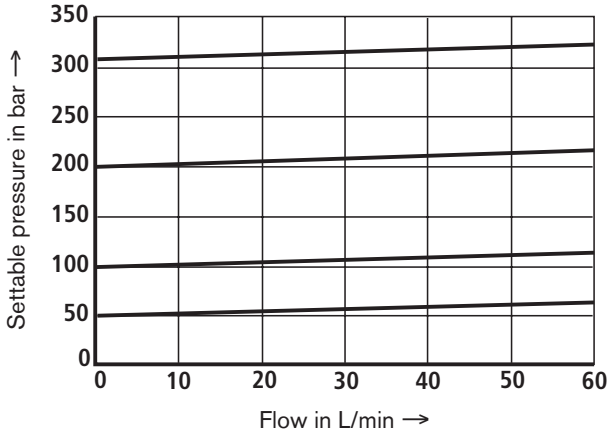
Maximum operating pressure	bar	315
Maximum settable pressure	bar	50; 100; 200; 315
Maximum back pressure (port Y)	bar	315 (take the max. tank pressure of the built-on valve/ directional valve into account!)
Maximum flow	L/min	60
Pressure fluid		Mineral oil (HL, HLP) to DIN 51524; fast bio-degradable pressure fluids to VDMA 24568 (also see RE 90221); HETG (rape seed oil); HEPG (polyglycols); HEES (synthetic ester); other pressure fluids on request
Pressure fluid temperature range	°C	–20 to +80
Viscosity range	mm^2/s	10 to 800
Max. permissible degree of pressure fluid contamination Cleanliness class to ISO 4406 (c)		Class 20/18/15 [1]

[1] The cleanliness class stated for the components must be adhered to in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the components service life.

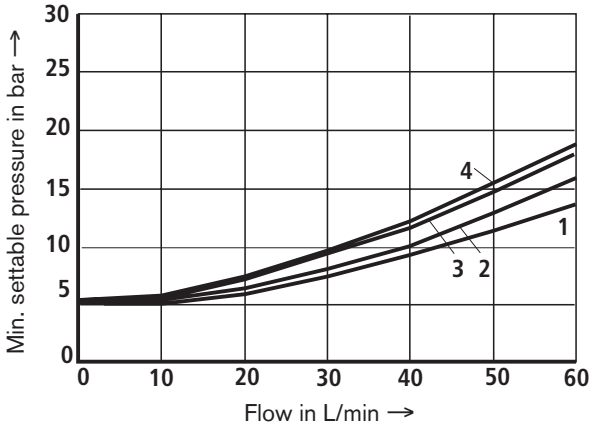
For the selection of filters see data sheets RE 50070, RE 50076, RE 50081, RE 50086 and RE 50088.

Characteristic curves (measured with HLP46 and $\vartheta_{oil} = 40\ °C \pm 5\ °C$)

p_E–q_V– characteristic curves



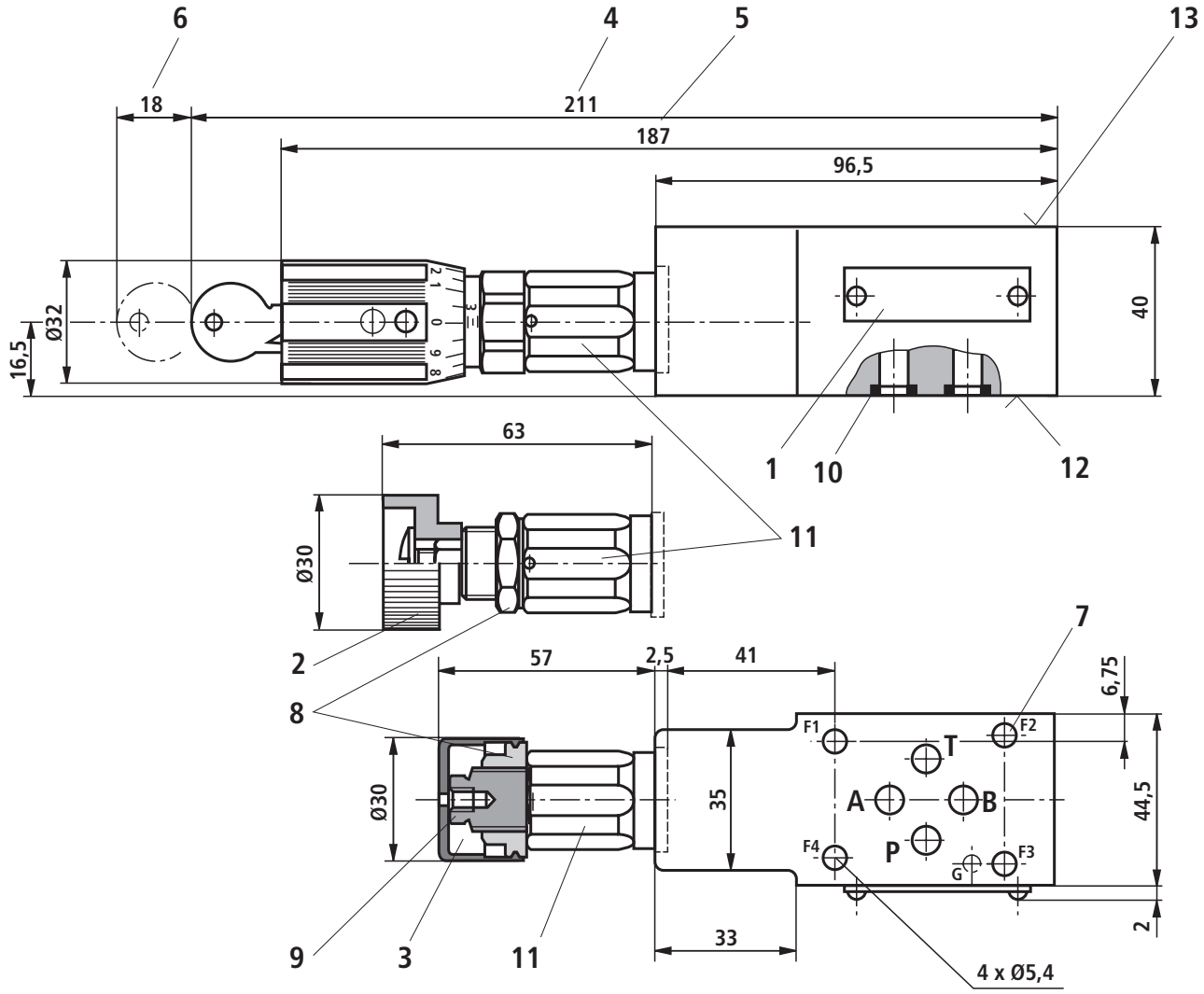
$p_{E\,min}$–q_V– characteristic curves

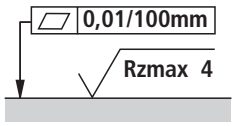


1 VD (A to B)
2 VA
3 VB, VC
4 VP, VD

The characteristic curves are valid for an outlet pressure = zero over the entire flow range!

Unit dimensions: type ZDB 6 VA... (nominal dirmensions in mm)





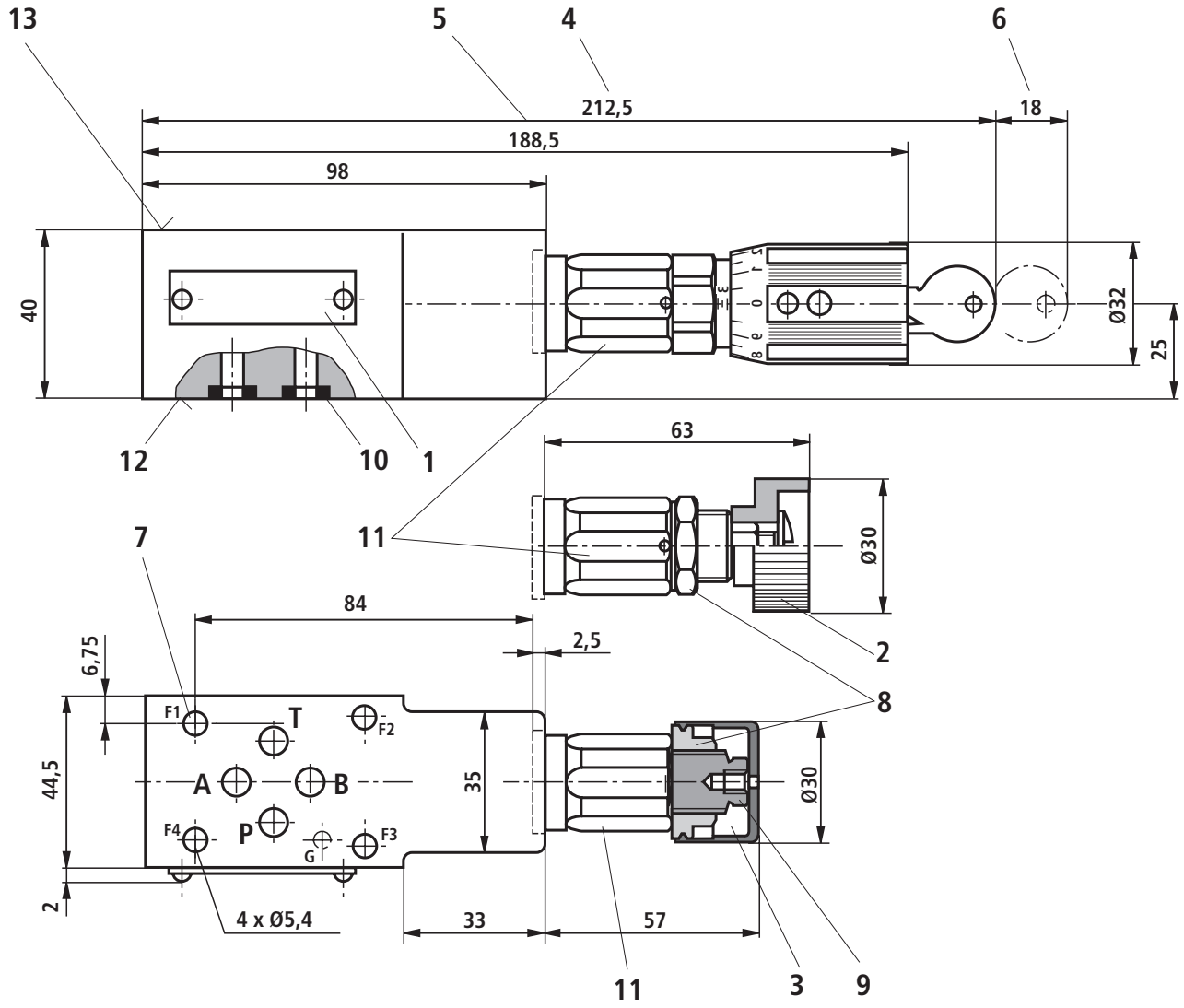
Required surface finish of the valve mounting surface

1 Name plate
2 Adjustment type "1"
3 Adjustment type "2"
4 Adjustment type "3"
5 Adjustment type "7"
6 Space required to remove the key
7 Valve sixing screw holes
8 Locknut A/F24, tightening torque $M_A = 10^{+5}$ Nm
9 Hexagon A/F10
10 Identical seal rings for ports A, B, P, T (subplate side)
11 Hexagon 24A/F, tightening torque $M_A = 50$ Nm
12 Subplate side – connection location to DIN 24340 form A (**without** locating pin), or ISO 4401-03-02-0-94 (**with** locating pin Ø3 x 5 mm deep for locating pin ISO 8752-3x8-St, Material No. **R900005694**, separate order)
13 Valve side – connection location to DIN 24340 form A (**without** locating pin), or ISO 4401-03-02-0-94 (**with** locating pin Ø4 x 4 mm deep)

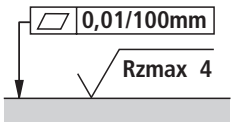
Valve fixing screws (separate order)

- **4 S.H.C.S. ISO 4762 - M5 - 10.9-flZn-240h-L** Friction co-efficient $\mu_{total} = 0.09$ to 0.14; Tightening torque $M_A = 7.4$ Nm ± 10%, or
- **4 S.H.C.S. ISO 4762 - M5 - 10.9** Friction co-efficient $\mu_{total} = 0.12$ to 0.17, Tightening torque $M_A = 8.1$ Nm ± 10%

Unit dimensions: type ZDB 6 VB... and type ZDB 6 VP... (nomainl dimensions in mm)



1 Name plate
2 Adjusment type "1"
3 Adjusment type "2"
4 Adjusment type "3"
5 Adjusment type "7"
6 Space required to remove the key
7 Valve fixing screw holes
8 Locknut 24A/F, tightening torque $M_A = 10^{+5}$ Nm
9 Hexagon 10A/F
10 Identical seal rings for ports A, B, P, T (subplate side)
11 Hexagon 24A/F, tightening torque $M_A = 50$ Nm
12 Valve side – connection location to DIN 24340 form A (**without** locating pin), or ISO 4401-03-02-0-94 (**with** locating pin Ø3 x 5 mm deep for locating pin ISO 8752-3x8-St, Material No. **R900005694**, separate order)
13 Valve side – connection location to DIN 24340 form A (**without** locating pin), or ISO 4401-03-02-0-94 (**with** locating pin Ø4 x 4 mm deep)



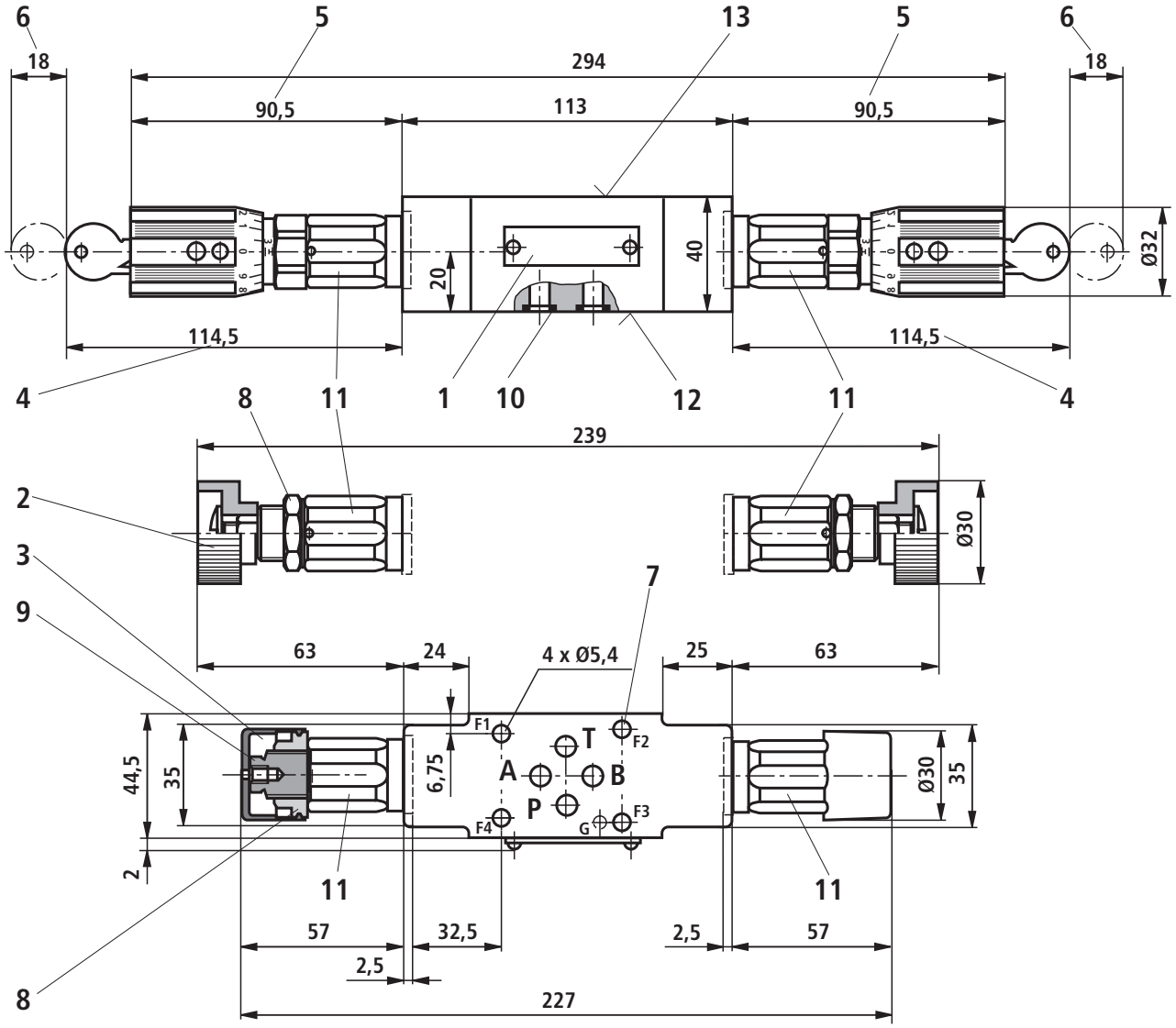
Required surface finish of the valve mounting surface

Valve fixing screws (separate order)

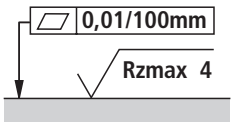
– **4 S.H.C.S. ISO 4762 - M5 - 10.9-flZn-240h-L**
Friction co-efficient $\mu_{total} = 0.09$ to 0.14;
Tightening torque $M_A = 7.4$ Nm ± 10%,
or

– **4 S.H.C.S. ISO 4762 - M5 - 10.9**
Friction co-efficient $\mu_{total} = 0.12$ to 0.17,
Tightening torque $M_A = 8.1$ Nm ± 10%

Unit dimensions: type Z2DB 6 VC... and type Z2DB 6 VD... (nominal dimensions in mm)



1 Name plate
2 Adjustment type "1"
3 Adjustment type "2"
4 Adjustment type "3"
5 Adjustment type "7"
6 Space required to remove the key
7 Valve fixing screw holes
8 Locknut 24A/F, tightening torque $M_A = 10^{+5}$ Nm
9 Hexagon 10A/F
10 Identical seal rings for ports A, B, P, T (valve side)
11 Hexagon 24A/F, tightening torque $M_A = 50$ Nm
12 Subplate side – connection location to DIN 24340 form A (**without** locating pin), or ISO 4401-03-02-0-94 (**with** locating pin Ø3 x 5 mm deep for locating pin ISO 8752-3x8-St, Material No. **R900005694**, separate order)
13 Valve side – connection location to DIN 24340 form A (**without** locating pin), or ISO 4401-03-02-0-94 (**with** locating pin Ø4 x 4 mm deep)



Required surface finish of the valve mounting surface

Valve fixing screws (separate order)

– **4 S.H.C.S. ISO 4762 - M5 - 10.9-flZn-240h-L**
Friction co-efficient $\mu_{total} = 0.09$ to 0.14;
Tightening torque $M_A = 7.4$ Nm ± 10%,
or

– **4 S.H.C.S. ISO 4762 - M5 - 10.9**
Friction co-efficient $\mu_{total} = 0.12$ to 0.17,
Tightening torque $M_A = 8.1$ Nm ± 10%

Notes

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www.boschrexroth.de

Proportional Throttle Valve with Shut-Off Valve - Series TEA | #TEA050EW09B2NXWJ

With flow rates up to 9500 l/min and fast response times, proportional throttle valves series TEA are predestined for injection molding and die cast applications. The directional valve integrated in the pilot circuit provides the safety function.

View Series Page Share / Email Print

Technical Specifications

Port Connection:	NG50	**Function:**	Flow direction from B to A
Seal Material:	NBR	**Input Voltage:**	16 VDC
Solenoid Option:	24 V / 1.25 A	**Product Series:**	Throttle valve
Operation Type:	Pilot	**Actuation Type:**	Proportional
Function:	2-way	**Mounting Type:**	Slip-in cartridge
Mounting Position:	Unrestricted	**Configuration:**	N/A
Maximum Operating Pressure:	350 bar	**Minimum Pilot Pressure:**	> 25 % of system pressure
Maximum Flow Rate:	2300 L/min	**Flow Rate:**	N/A
Flow Direction:	B to A	**Maximum Operating Temperature:**	60 °C
Minimum Operating Temperature:	-20 °C	**Seal Material:**	NBR
For Fluid Type:	Hydraulic oil according to DIN 51524	**Weight:**	22 kg

Proportional Throttle Valve with Shut-Off Valve - Series TEA | #TEA040EW09B2NXWJ

With flow rates up to 9500 l/min and fast response times, proportional throttle valves series TEA are predestined for injection molding and die cast applications. The directional valve integrated in the pilot circuit provides the safety function.

View Series Page Share / Email Print

Technical Specifications

Port Connection:	NG40	**Function:**	Flow direction from B to A
Seal Material:	NBR	**Input Voltage:**	16 VDC
Solenoid Option:	24 V / 1.25 A	**Product Series:**	Throttle valve
Operation Type:	Pilot	**Actuation Type:**	Proportional
Function:	2-way	**Mounting Type:**	Slip-in cartridge
Mounting Position:	Unrestricted	**Configuration:**	N/A
Maximum Operating Pressure:	350 bar	**Minimum Pilot Pressure:**	> 25 % of system pressure
Maximum Flow Rate:	1400 L/min	**Flow Rate:**	N/A
Flow Direction:	B to A	**Maximum Operating Temperature:**	60 °C
Minimum Operating Temperature:	-20 °C	**Seal Material:**	NBR
For Fluid Type:	Hydraulic oil according to DIN 51524	**Weight:**	13 kg
Body Material:	Steel		

Technical Specifications

Port Connection:	NG100	**Function:**	Flow direction from B to A
Seal Material:	NBR	**Input Voltage:**	16 VDC
Solenoid Option:	24 V / 1.25 A	**Product Series:**	Throttle valve
Operation Type:	Pilot	**Actuation Type:**	Proportional
Function:	2-way	**Mounting Type:**	Slip-in cartridge
Mounting Position:	Unrestricted	**Configuration:**	N/A
Maximum Operating Pressure:	350 bar	**Minimum Pilot Pressure:**	> 25 % of system pressure
Maximum Flow Rate:	9500 L/min	**Flow Rate:**	N/A
Flow Direction:	B to A	**Maximum Operating Temperature:**	60 °C
Minimum Operating Temperature:	-20 °C	**Seal Material:**	NBR
For Fluid Type:	Hydraulic oil according to DIN 51524	**Weight:**	85 kg
Body Material:	Steel		

MANNESMANN REXROTH

4/3-and 5/3-Way-Proportional-Directional Valves

Pilot operated type .WRZ, external pilot operation type .WRH
Sizes 10, 25, 32, 52 Series 5X; Size 16 Series 6X

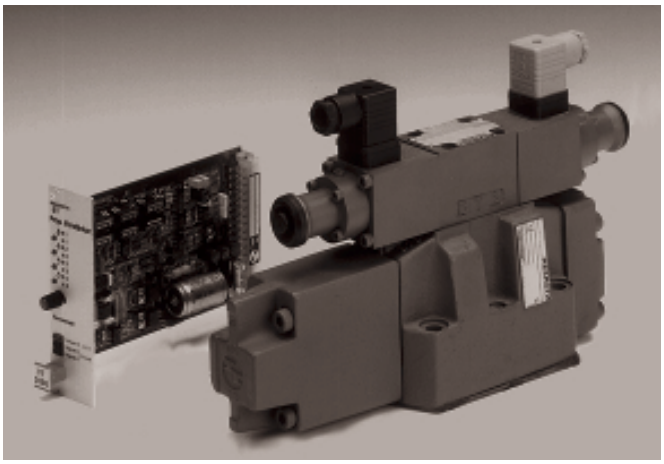
Size 10 to 52	up to 350 bar	up to 2800 L/min

RE 29 113/09.95

Replaces: 07.93

Characteristics:

- Pilot operated 2-stage proportional directional valve
- Valve for controlling both flow direction and volume
- Proportional solenoid operation
- For sub-plate mounting:
  Porting pattern to DIN 24 340 Form A,
  ISO 4401 and CETOP-RP121H
  For subplates see data sheets RE 45 054 to RE 45 060
  (subject to separate order), see pages 13 to 16
- Emergency operator, optional
- Spring centreing
- Control unit:
  Electrical amplifier (subject to separate order)
  see pages 6 and 20



H/A 1200/87

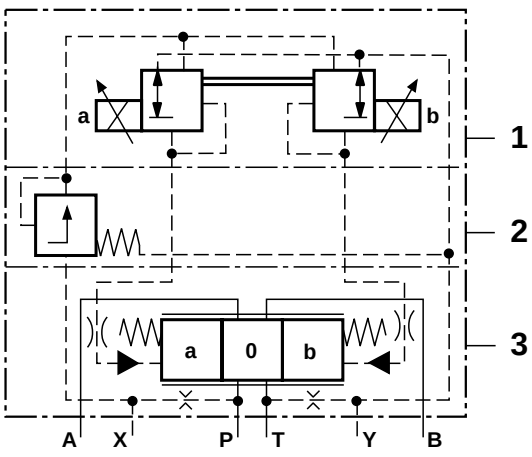
Type 4WRZ 16 ...6X/6A..NZ4...
with associated electronic control (to be ordered separately)

Table of contents

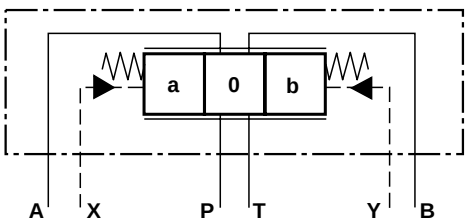
Symbols (detailed)

Example: 4WRZ ...

1 Pilot valve
2 Pressure reducing valve D3 (optional)
3 Main valve



Example: 4WRH 52 ...



Functional description, section

Pilot valve type 3DREP 6 ...

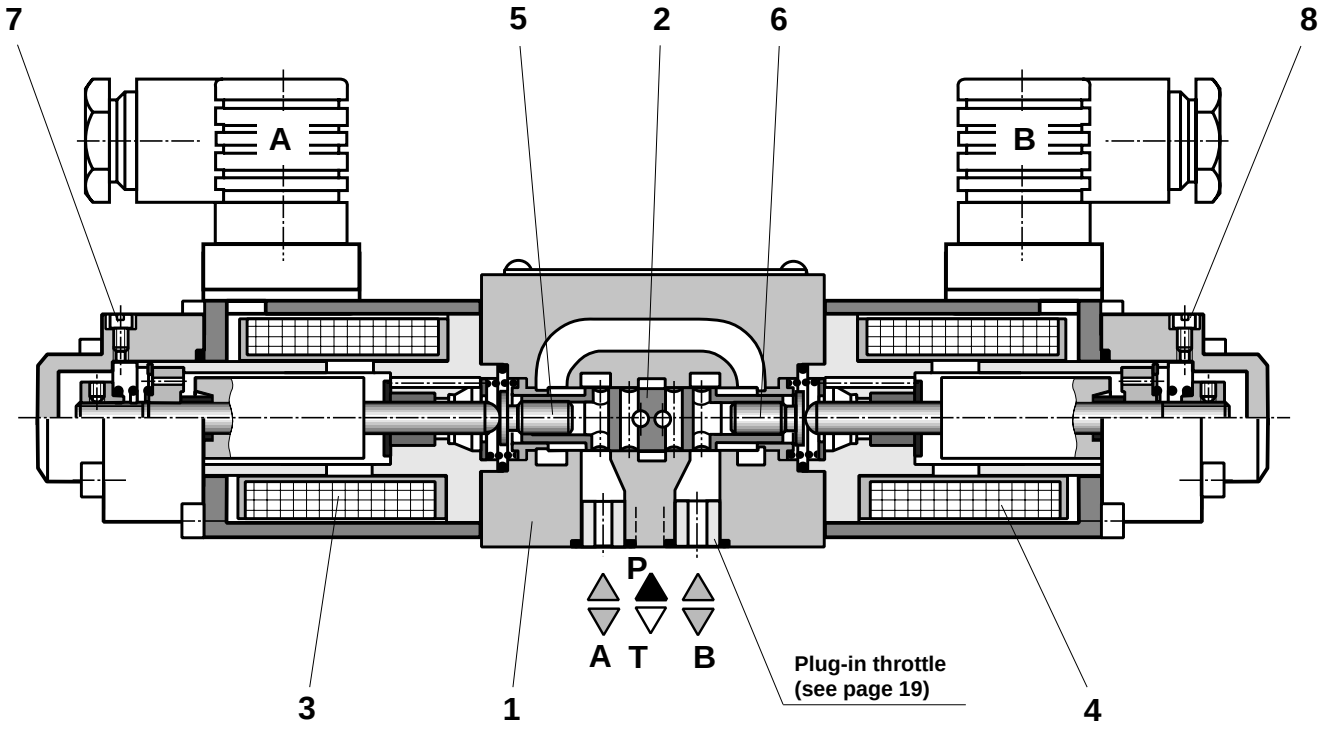
The pilot valve is a proportional solenoid operated 3-way pressure control valve. It is used to convert an electrical input signal into a proportional pressure output signal and is used on all 4WRZ... and 5WRZ... type valves.

The proportional solenoids are controllable DC wet pin solenoids. They convert an electrical current proportionally into mechanical force. Increasing the current intensity causes a corresponding increase in their solenoid force. The set solenoid force remains constant over the entire control stroke.

The pilot valve consists basically of housing (1), two pressure measuring spools (5; 6) and two proportional solenoids (3; 4).
In the de-energised condition the control spool (2) is held in the centre position by the return springs. The control spool (2) is directly operated by the proportional solenoids (3 or 4). If solenoid “a” (3) is energised, its force acts via the pressure measuring spool (5) on the control spool (2) and pushes it to the right, thereby allowing pressure fluid to flow from P to B. The pressure which is building up in port B acts via the radial drillings in the control spool (2) on the pressure measuring spools (6).

The resulting pressure force acts against the solenoid and pushes the control spool (2) towards its closing position until the two forces are again in balance.The pressure measuring spool (6) supports itself on the pin of solenoid “b” (4).
At this point the connection from P to B is closed, the pressure in service port B is held constant. A reduction in the solenoid force leads to an excess in force on the control spool (2). This causes the spool to move to the left.
The pressure fluid can flow via the connection from B to T and the pressure reduces accordingly.
Again, force balancing means holding the pressure constant, however, now at the lower level.
In the neutral position - proportional solenoids de-energised - the connections A and T are open, allowing the pressure fluid to flow unhindered back to the reservoir.
At the same time the connection P to A and P to B is closed.

Note on bleeding the valves (Bleed screws at Pos. 7 and 8) see page 3.



Type 3DREP 6 C1X/...

Functional description, section

Pilot operated proportional directional valve Types 4WRZ and 5WRZ...

Valve types WRZ... are pilot operated 4-way valves operated by means of proportional solenoids. They control the direction and flow rate of hydraulic fluid.

These valves consist basically of the pilot valve (9) with its two proportional solenoids (1 and 6), the main valve (12) together with the main spool (14) and centering spring (15).

In the non-operated condition the centering spring (15) holds the main spool (14) in the centre position. If "b" (6) is energised, it moves the control spool (2) to the right. Pilot oil is then either fed "internally" from line P or "externally" via port X into the pressure chamber (13) via the pilot valve (9) and moves the main spool (14) a distance proportional to the strength of the electric current. The throttling grooves in the main spool (14) open progressively with increasing current, thus controlling the flow of hydraulic fluid to the actuator ports.

When the solenoid current is switched off the control spool (2) and also the main spool (14) are returned to their neutral position, regardless of the control pressure. An emergency hand operator (10 and 11, optional) permits movement of the pilot spool (2) without energising the solenoid.

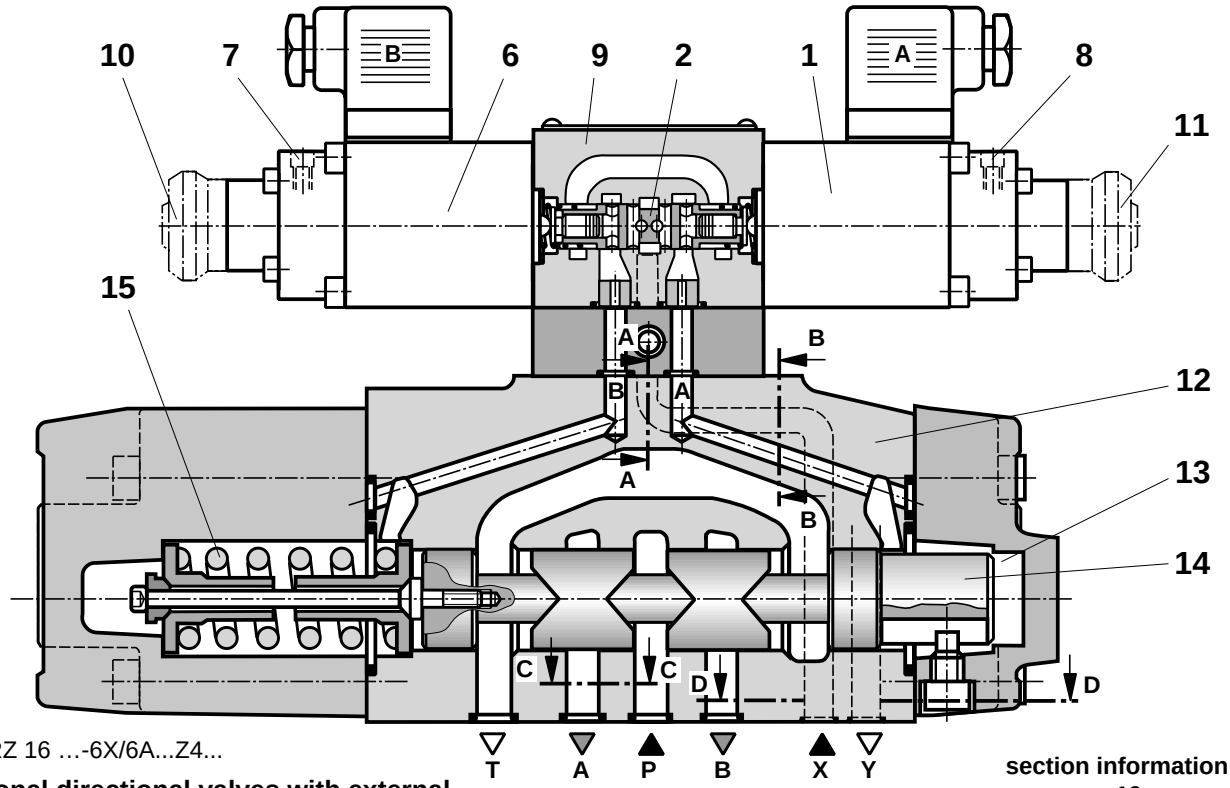
Size 52 sub-plate mounting 5-way valves are fitted with an additional "R" port. Depending on the spool position, fluid flows from P to A and B to T or P to B and A to R.

Note!

In order to achieve the optimum functioning of the valve, the valve must be bled at the commissioning stage:

- Supply pressure to valve,
- remove screws at 7 and 8, and top up with hydraulic fluid as required,
- when no further bubbles exit screw in items 7 and 8.

In order to prevent the tank line from emptying under adverse conditions, a back pressure valve should be fitted. (back pressure approx. 2 bar).



Type 4WRZ 16 …-6X/6A...Z4...

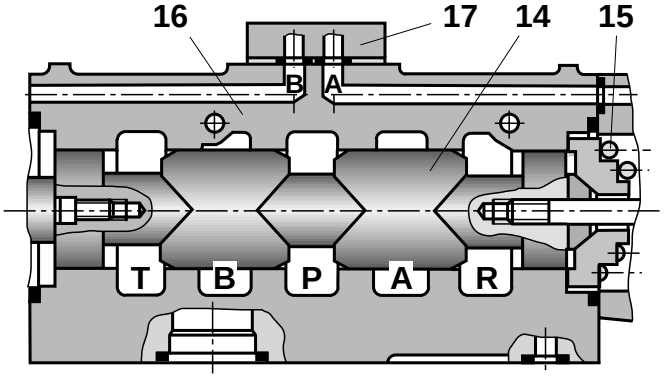
section information see page 19

Proportional directional valves with external pilot operation Types 4WRH... and 5WRH...

Type WRH... are pilot operated proportional directional valves for external operation via pressure control valves. Proportional directional valves type WRH... (Fig. 3) consist basically of a housing (16) with spool (14) centering spring (15), together with an interconnecting plate (17). The interconnecting plate (17) connects pilot connection A with port T(Y) and pilot connection B with port P(X).

The application of pilot pressure at port X moves the spool (14) into switching position P to B, A to T (R). The movement of the main spool (14) and thus the opening of the control ports is proportional to the pilot pressure present. The pilot pressure at port Y moves the spool (14) into switching positions P to A and B to T.

The pilot pressure at the main stage must not exceed 25 bar (16 bar for size 52)!



Type 5WRH 52 …-5X/...

Ordering codes for 4WRZ and 4WRH; size 10 up to 32 subplate mounting; size 52 flange connections

4WR _ | | | – | / | | | | | / | | | *

Further details in clear text

No code = O-Ring [5])
R = R-Ring

M = NBR seals, suitable for mineral oil (HL, HLP)to DIN 51 524

V = FPM seals, suitable for phosphate ester (HFD-R)

No code = **without** pressure reducing valve

D3 = **with** reducing valve type ZDR 6 DP0-4X/40YM-W80 [2]) (fixed setting)

Electrical connection

Z4= angled plug to DIN 43 650 [2,3])
K4= without angled plug

Pilot oil feed and discharge

No code = pilot oil feed external, pilot oil drain external

E = pilot oil feed internal, pilot oil drain external

ET = pilot oil feed internal, pilot oil drain internal

T = pilot oil feed external, pilot oil drain internal

(size 52 and type 4WRH only possible without code)

No code = without special insulation
J = seawater resistant

No code = without emergency operator
N = with emergency operator [2, 4])
N9 = with concealed emergency operator [2, 3])

Electronic control supply voltage

12 = 12 volt DC (on request) [2])
24 = 24 volt DC (standard design) [2])

6A = pilot valve size 6 [2]) with wet pin DC solenoids

No code = for subplate mounting
F = for flange mounting (size 52 only)

5X = series 50 to 59 (sizes 10, 25, 32, 52) (50 to 59: externally interchangeable)

6X = series 60 to 69 (size 16 only) (60 to 69: externally interchangeable)

Nominal flow in L/min with a10 bar valve pressure drop

25 =	**50 =**	**85 =** [1])	for size 10
	100 =	**150 =** [1])	for size 16
	220 =	**325 =** [1])	for size 25
	360 =	**520 =** [1])	for size 32
		1000 = [1])	for size 52

[1]) E2- and W2- possible only with max. flow $q_{V\,max}$

Symbols

E
= E1-
E2-

= E3-

W
= W1-
W2-

= W3-

= EA

= WA

= EB

= WB

With symbols E1- and W1-:

P to A: $q_{V\,max}$ B to T: $q_V/2$

P to B: $q_V/2$ A to T: $q_{V\,max}$

With symbols E2- and W2-:

P to A: $q_V/2$ B to T: $q_{V\,max}$

P to B: $q_{V\,max}$ A to T: $q_V/2$

With symbols E3- and W3-:

P to A: $q_{V\,max}$ B to T: closed

P to B: $q_V/2$ A to T: $q_{V\,max}$

(Regenerative circuit, base of spool at port A)

Note: With spools W, W1, W2-, W3-, WA, and WB in their neutral position, there is a connection from A to T and B to T with an opening of less than 3% of the relevant cross section

[2]) Omitted for 4WRH and 4WRZ without pilot valve.

[3]) Cannot be supplied in seawater resistant design "J".

[4]) **Note:** Accidental activation of the emergency operator can result in uncontrolled machine movements.

[5]) Size 16 is only available with R-rings.

Special electrical insulation on request!

Valve types which are marked in grey are readily available!

Order codes 5WRZ 52 and 5WRH 52; subplate mounting

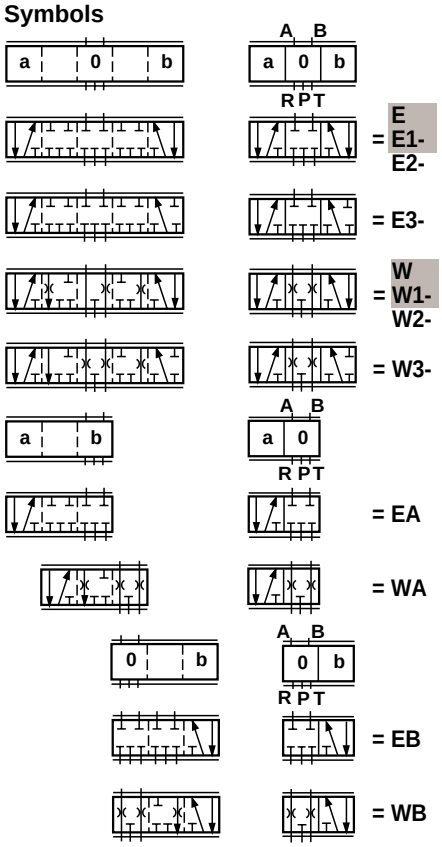
5WR _	52 –	/					/			*

Hydraulic operation = H

Electro-hydraulic operation = Z

Size 52 = 52

Symbols



= E, E1-, E2-

= E3-

= W, W1-, W2-

= W3-

= EA

= WA

= EB

= WB

Further details in clear text

No code = O-Ring
R = R-Ring

M = NBR seals, suitable for mineral oil (HL, HLP) to DIN 51 524
V = FPM seals, suitable for phosphate ester (HFD-R)

No code = **without** pressure reducing valve
D3 = with pressure reducing valve type ZDR 6 DP0-4X/40YM-W80 [1]) (fixed setting)

Electrical connection
Z4 = angled plug to DIN 43 650 [1,2])
K4= without angled plug

No code = without special insulation
J = seawater resistant

No code = without emergency operator
N = with emergency operator [1,3])
N9 = with concealed emergency operator [1,2])

Electronic control supply voltage
12 = 12 volt DC (on request) [1])
24 = 24 volt DC (standard design) [1])

6A = pilot valve size 6 [1]) with wet pin DC solenoid

5X = series 50 to 59 (50 to 59: externally interchangeable)

Flow at 10 bar valve pressure drop
1000 = 1000 L/min

With symbols E1- and W1-:

P to A: q_V = 1000 L/min B to T: q_V = 500 L/min

P to B: q_V = 500 L/min A to R: q_V = 1000 L/min

With symbols E2- and W2-:

P to A: q_V = 500 L/min B to T: q_V = 1000 L/min

P to B: q_V = 1000 L/min A to R: q_V = 500 L/min

With symbols E3- and W3-:

P to A: q_V = 1000 L/min B to T: closed

P to B: q_V = 500 L/min A to R: q_V = 1000 L/min

(Regenerative circuit, base of spool at port A)

Note:

– Pilot oil feed and discharge only possible enternally

– With spools W, W1, W2-, W3-, WA, and WB in their neutral position, there is a connection from A to T and B to T with an opening of less than 3% of the relevant cross section.

[1]) Omitted on 5WRH and 5WRZ without pilot valve.

[2]) Cannot be supplied in seawater resistant design "J".

[3]) **Note:** Accidental activation of the emergency operator may result in uncontrolled machine movements.

Special electrical insulation on request!

Valve types which are marked in grey are readily available!

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

General

Installation position				optional, preferably horizontal (for comissioning guidelines see RE 07 800)			
Ambient temperature			°C	– 20 to + 50			
Weight		Spool symbol		E, E1-, E2-, E3-, W, W1-, W2-, W3-			EA, WA, EB, WB
		Size 10	kg	7,8			7,4
		Size 16	kg	13,4			12,7
		Size 25	kg	18,2			17,5
		Size 32	kg	42,2			41,8
		Size 52	kg	79,5			78,5
	for flange connection	Size 52	kg	77,5			76,5

Hydraulic (measured at v = 41 mm²/s and t = 50 °C)

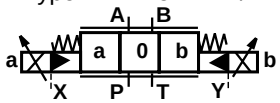
			Size 10	Size 16	Size 25	Size 32	Size 52
Operating pressure							
– Pilot valve,	Pilot oil feed external	bar	30 to 100				20 to 100
	Pilot oil feed internal	bar					–
		bar	100 to 315 only with "D3"				
– Main valve		bar	up to 315	up to 350	up to 350	up to 350	up to 350
Return line pressure	– Port T (port R) (Pilot oil drain external)	bar	up to 315	up to 250	up to 250	up to 150	up to 250
	– Port T (Pilot oil drain internal)	bar	up to 30	up to 30	up to 30	up to 30	–
	– Port Y	bar	up to 30	up to 30	up to 30	up to 30	up to 30
Pilot oil volume for spool movement 0 → 100 %		cm³	1,7	4,6	10	26,5	54,3
Pilot oil flow at ports X and Y at stepped input signals 0 → 100 %		L/min	3,5	5,5	7	15,9	7
Flow through main valve		L/min	up to 170	up to 460	up to 870	up to 1600	up to 2800
Degree of fluid contamination			Maxiumum permissible degree of contamination of the fluid is to NAS 1638, class 7 (pilot stage) and class 9 (main stage) We, therefore, recommend a filter with a minimum retention rate of $ß_5 \geq 75$ for the pilot stage; *and* $ß_{15} \geq 75$ for the main stage				
Hydraulic fluid			Mineral oil (HL, HLP) to DIN 51 524 Phosphate ester (HFD-R)				
Hydraulic fluid temperature range		°C	– 20 to +70				
Viscosity range		mm²/s	20 to 380				
Hysteresis		%	≤ 6				
Repetitive accuracy		%	≤ 3				

Electrical

Type of voltage			DC	
Nominal current,	– at 12 V	mA	1300	
per proportional solenoid	– at 24 V	mA	700	
Pilot current		mA	≤ 20	
Coil resistance	– value when cold at 20 °C	Ω	19,5 (24 V)	5,4 (12 V)
	– max. value when hot	Ω	28,8 (24 V)	7,9 (12 V)
Coil temperature		°C	to + 150	
Duty			Continuous	
Electrical connection			Plug connection to DIN 43 650/2-pin. + PE/Pg11	
Type of insulation to DIN 40 050			IP 65	
Electronic control (to separate order)	– Amplifier in Eurocard format		VT 3000 (see page 20 and data sheet RE 29 935) VT 3006 (see data sheet RE 29 926) VT 3024 (see data sheet RE 29 934)	
	– Amplifier in modular design		VT 11 013 (see data sheet RE 29 738)	

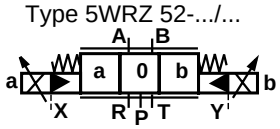
Symbols (simplified)

Type 4WRZ..-.../... and
Type 4WRZ 52 ..-..F/...



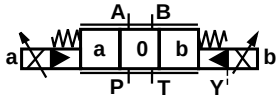
X = external
Y = external

Type 5WRZ 52-.../...



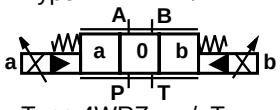
X = external
Y = external

Type 4WRZ..-.../..E..



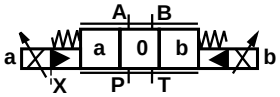
X = internal
Y = external

Type 4WRZ..-.../..ET..



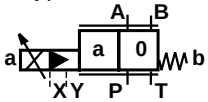
X = internal
Y = internal

Type 4WRZ..-.../..T..

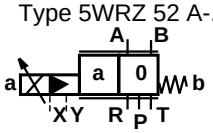


X = external
Y = internal

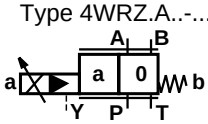
Type 4WRZ..A-.../... and
Type 4WRZ 52 A..-..F/...



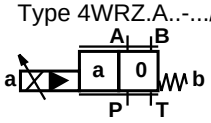
Type 5WRZ 52 A-.../...



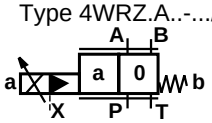
Type 4WRZ.A..-.../..E..



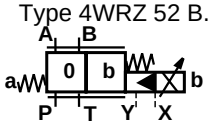
Type 4WRZ.A..-.../..ET..



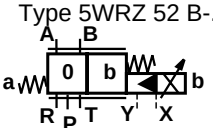
Type 4WRZ.A..-.../..T..



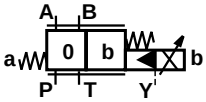
Type 4WRZ ..B-.../... and
Type 4WRZ 52 B..-..F/...



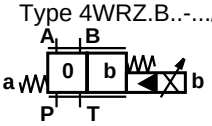
Type 5WRZ 52 B-.../...



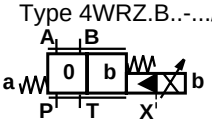
Type 4WRZ.A..-.../..E..



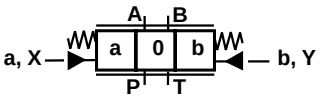
Type 4WRZ.B..-.../..ET..



Type 4WRZ.B..-.../..ET..

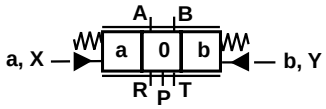


Type 4WRH ..-.../... and
Type 4WRH 52 ..-..F/...



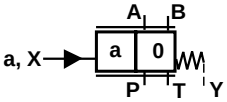
X = external
Y = external

Type 5WRH 52 ..-...

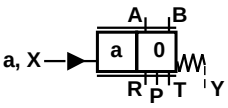


X = external
Y = external

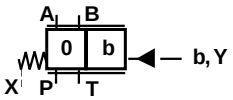
Type 4WRH ..A..-.../... and
Type 4WRH 52 ..-..F/...



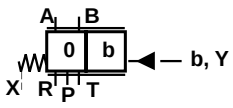
Type 5WRH 52 A..-.../...



Type 4WRH ..B..-.../... and
Type 4WRH 52 B..-..F/...

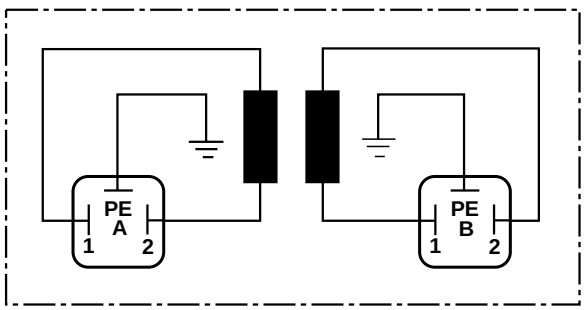


Type 5WRH 52 B..-.../...

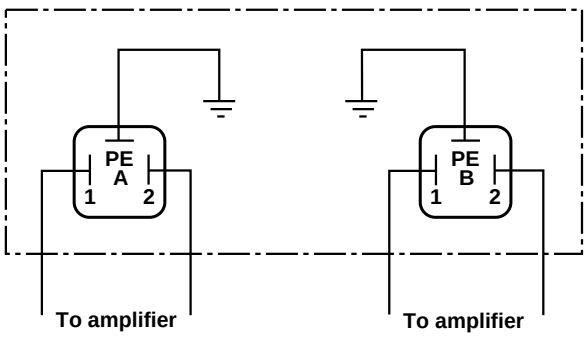


Electrical connections

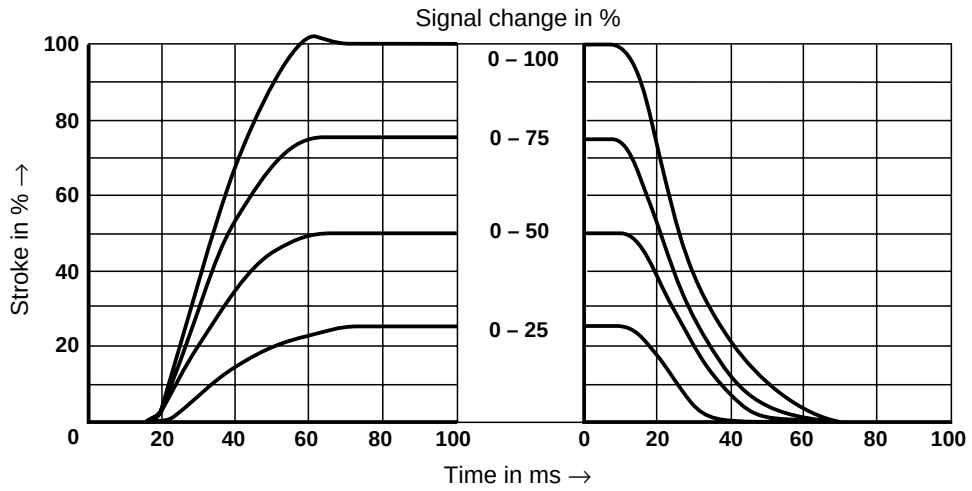
Coil connection



Plug connection

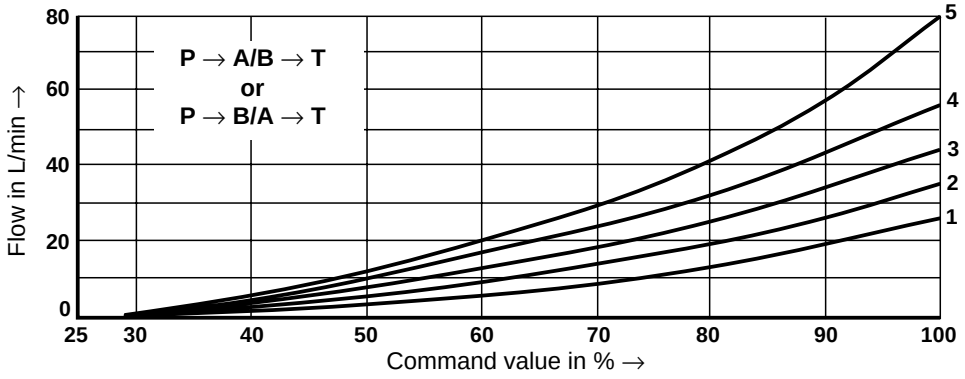


Transient function with stepped electrical input signals — Size 10



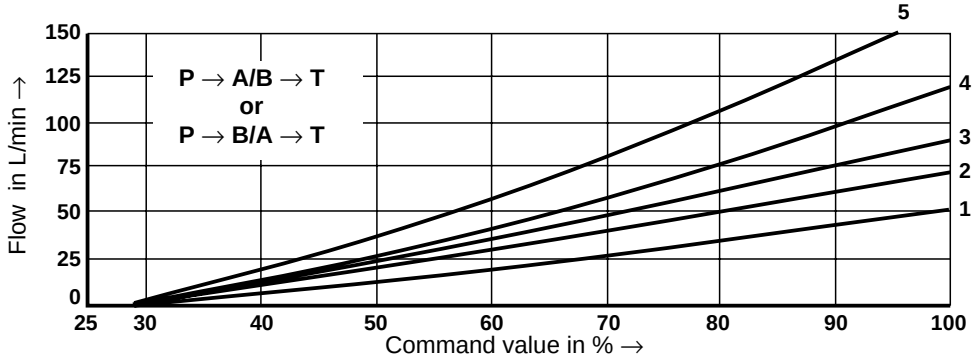
Pilot pressure p = 50 bar

Technical Data (measured with spools "E, W, EA, WA, EB, WB" at ν = 41 mm²/s and t = 50 °C) Size 10



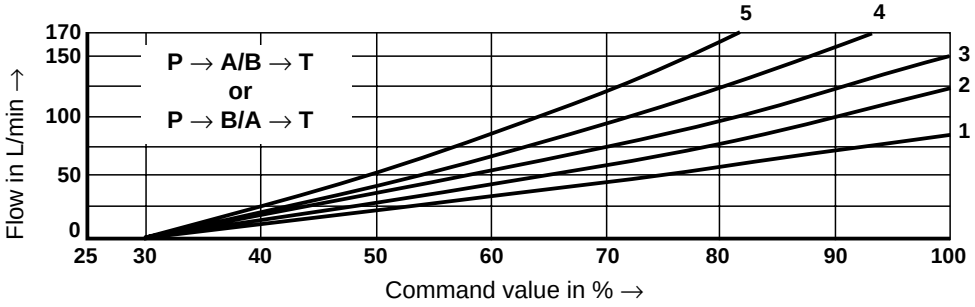
25 L/min flow at 10 bar valve pressure differential

1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant



50 L/min flow at 10 bar valve pressure differential

1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

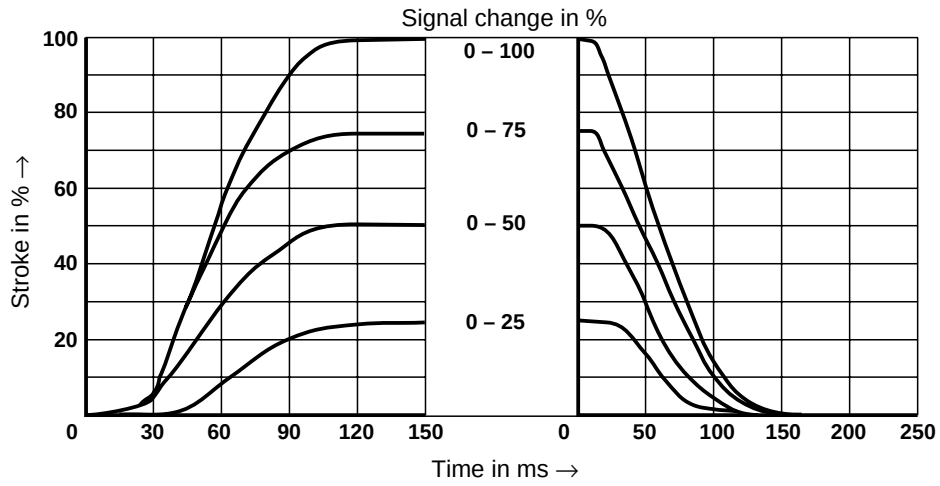


85 L/min flow at 10 bar valve pressure differential

1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

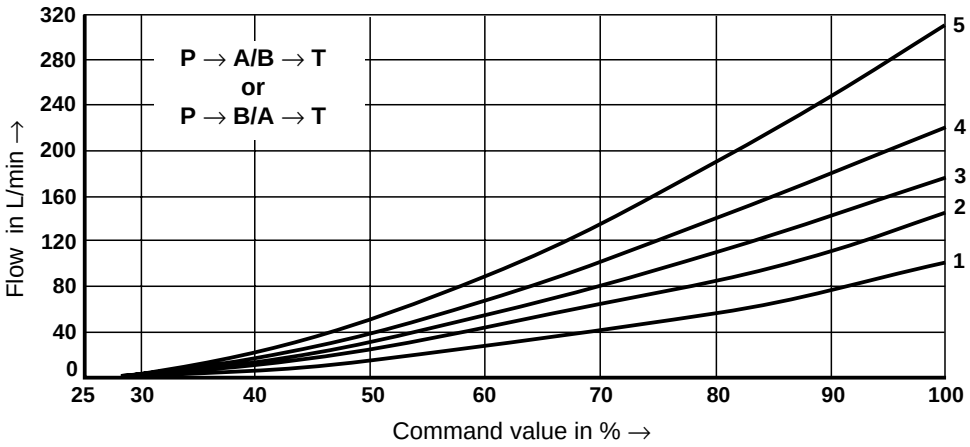
Δp = Valve pressure differential to DIN 24 311(Input pressure minus load pressure and return line pressure)

Transient function with stepped electrical input signals — Size 16



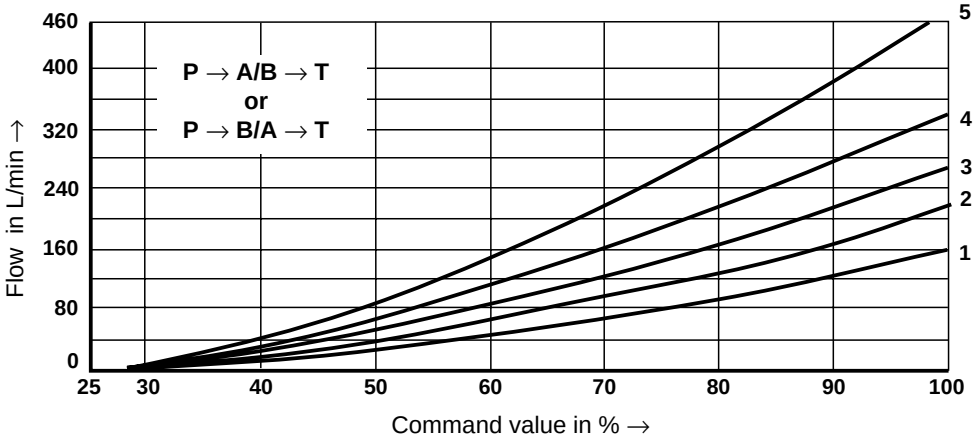
Pilot pressure p = 50 bar

Technical data (measured with spools "E, W, EA, WA, EB, WB" at ν = 41 mm²/s and t = 50 °C) — Size 16



100 L/min flow at 10 bar valve pressure differential

1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

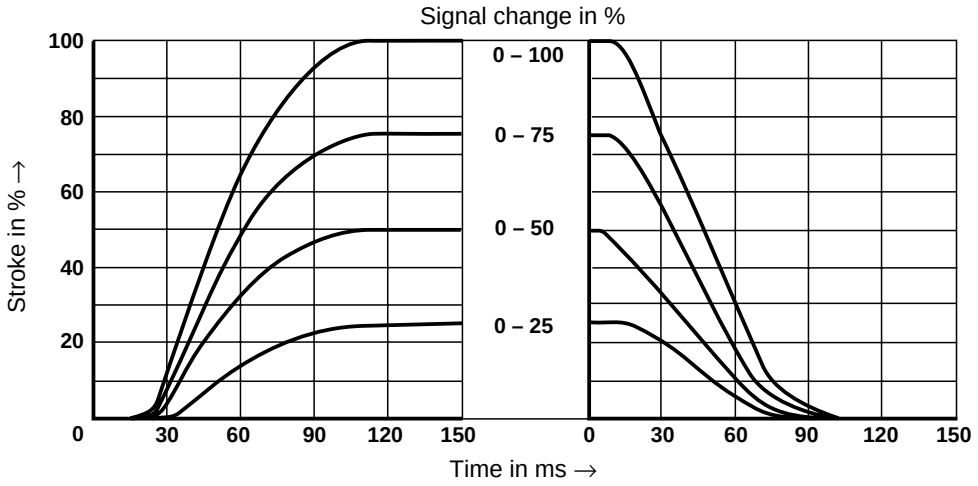


150 L/min flow at 10 bar valve pressure differential

1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

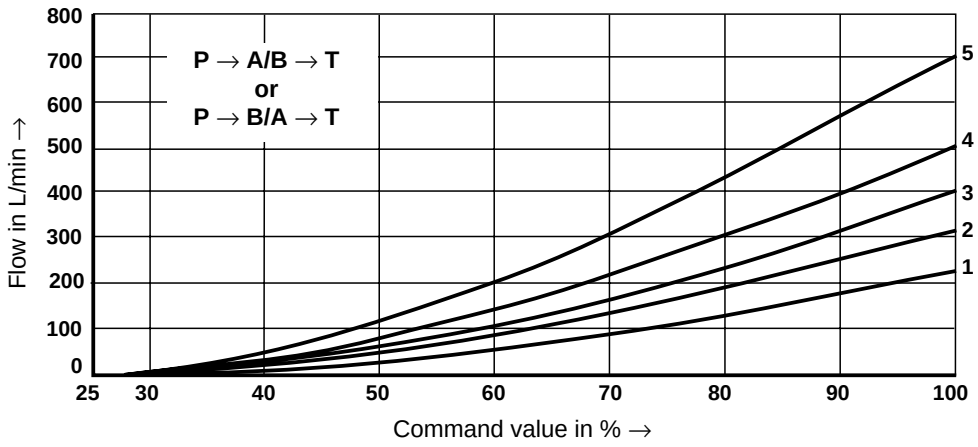
Δp = Valve pressure differential to DIN 24 311(Input pressure minus load pressure and return line pressure)

Transient function with stepped electrical input signals — Size 25



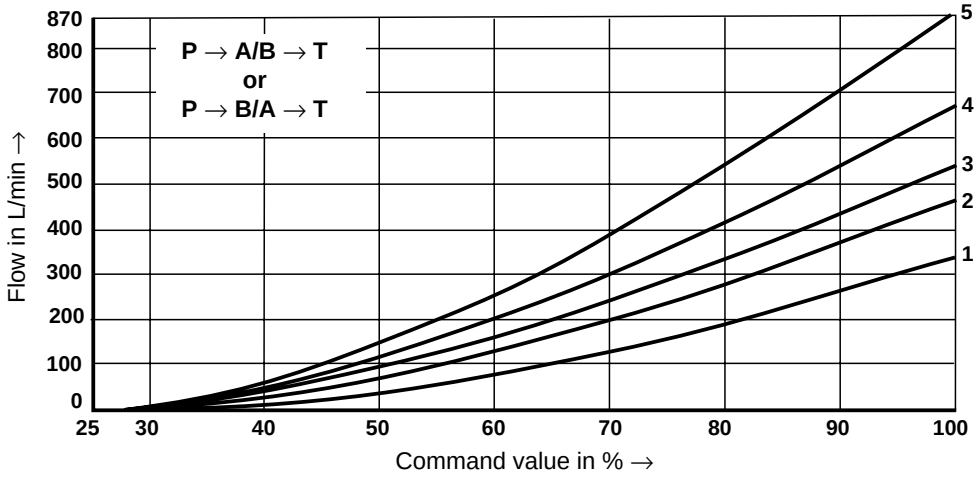
Pilot pressure p = 50 bar

Technical data (measured with spools "E, W, EA, WA, EB, WB" at ν = 41 mm²/s and t = 50 °C) — Size 25



220 L/min flow at 10 bar valve pressure differential

1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

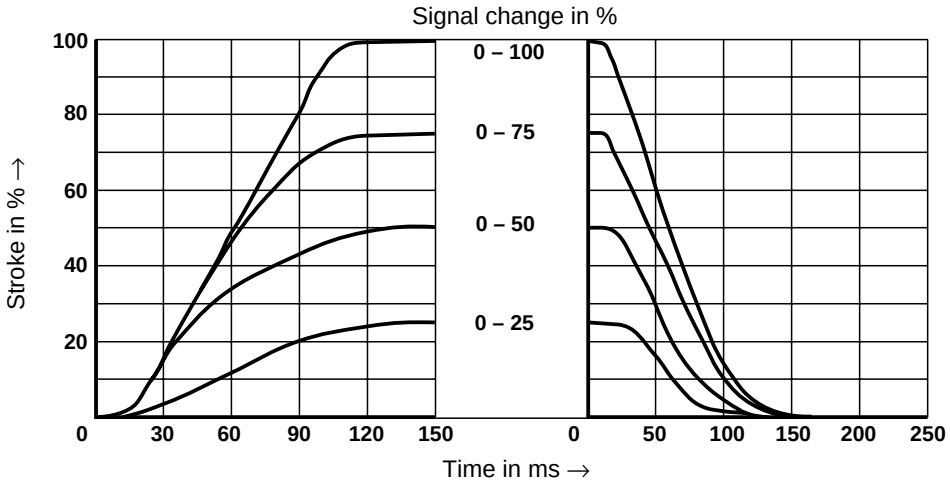


325 L/min flow at 10 bar valve pressure differential

1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

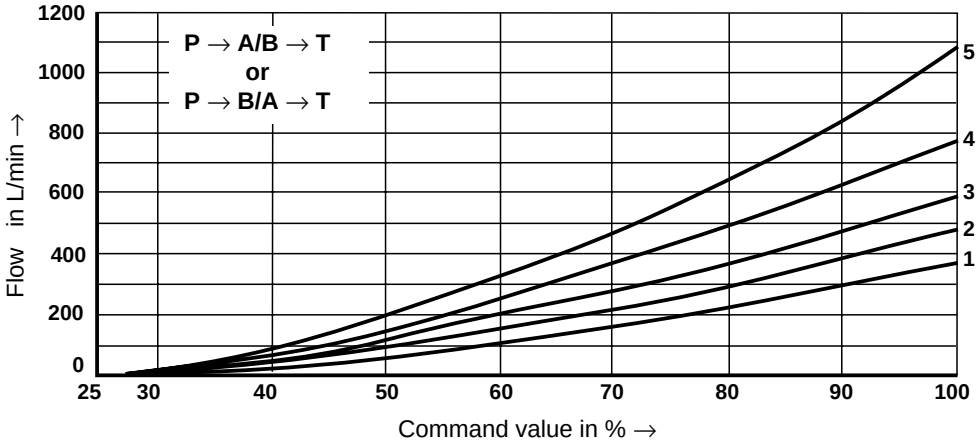
Δp = Valve pressure differential to DIN 24 311(Input pressure minus load pressure and return line pressure)

Transient function with stepped electrical input signals — Size 32



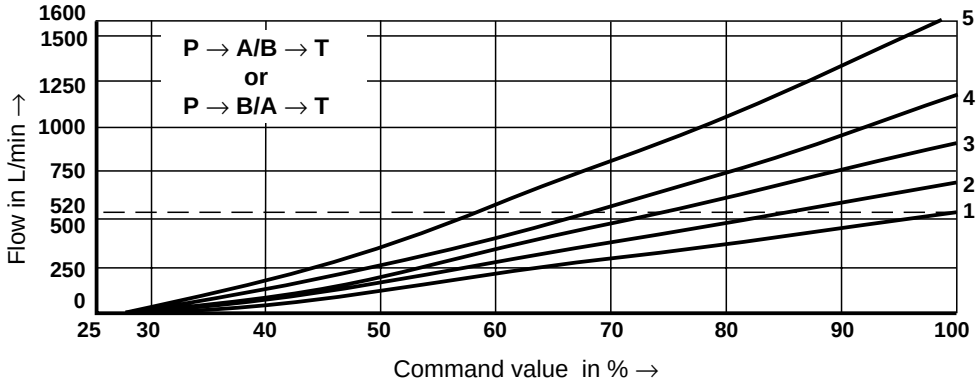
Pilot pressure p = 50 bar

Technical data (measured with spools "E, W, EA, WA, EB, WB" at ν = 41 mm²/s and t = 50 °C) — Size 32



360 L/min flow at 10 bar valve pressure differential

1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

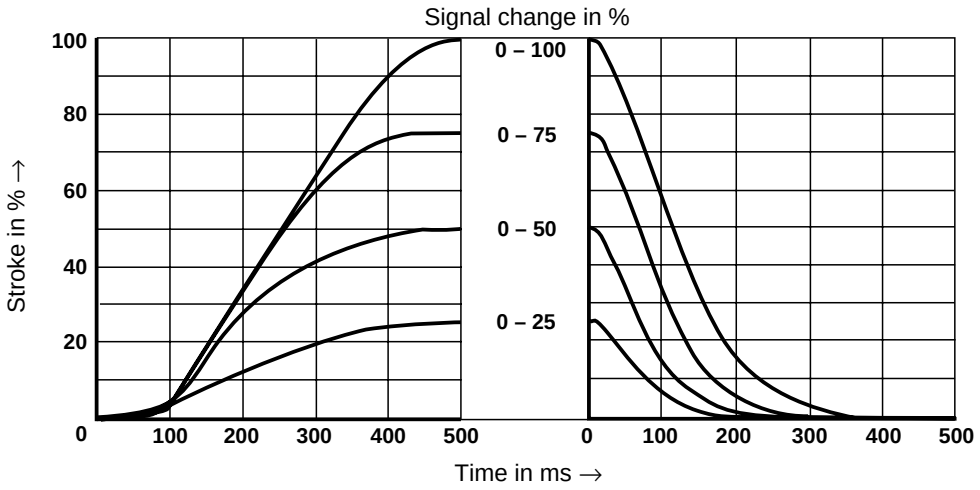


520 L/min flow at 10 bar valve pressure differential

1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

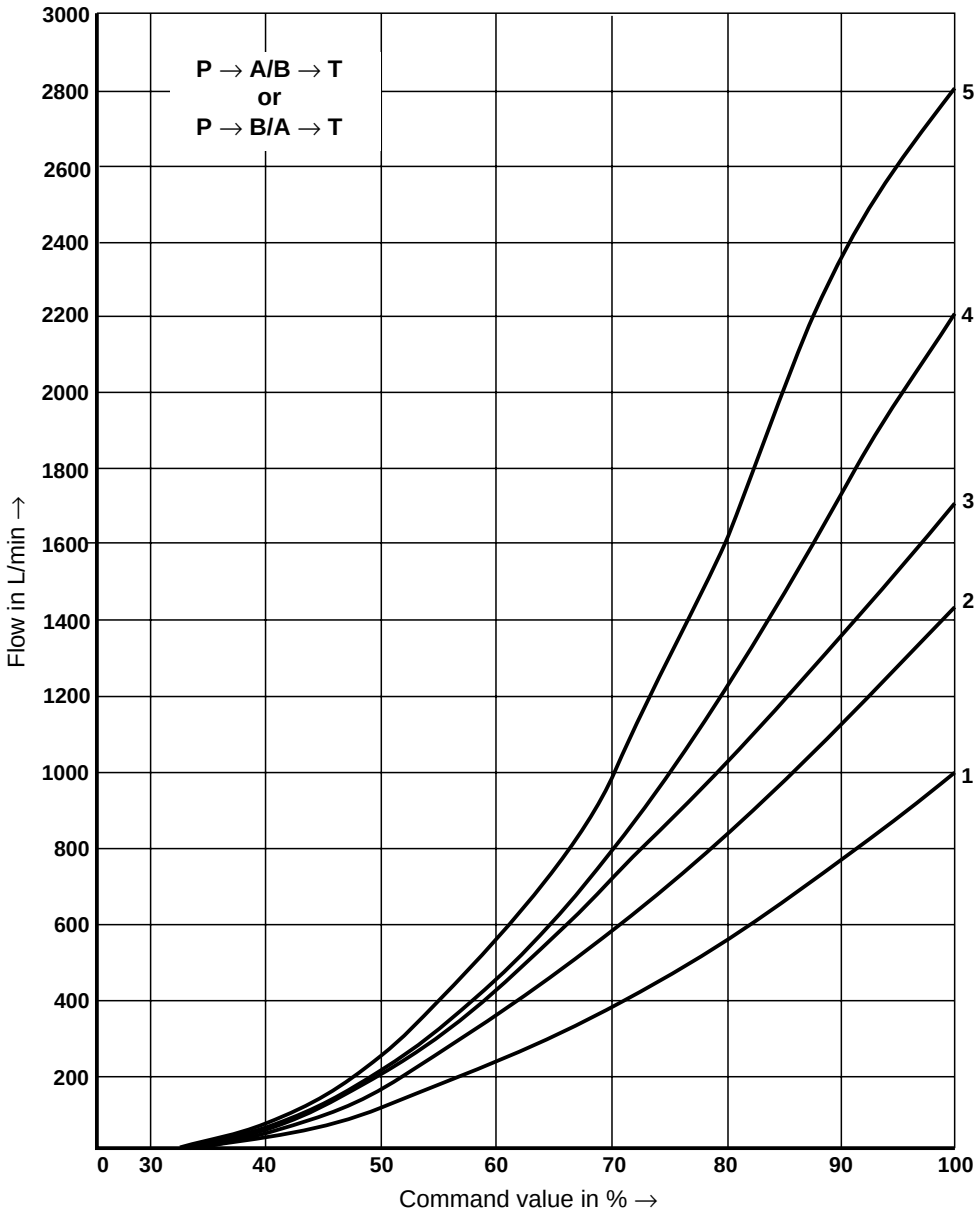
Δp = Valve pressure differential to DIN 24 311(Input pressure minus load pressure and return line pressure)

Transient function with stepped electrical input signals — Size 52



Pilot pressure p = 50 bar

Technical data (measured with spools "E, W, EA, WA, EB, WB" at ν = 41 mm²/s and t = 50 °C) — Size 52



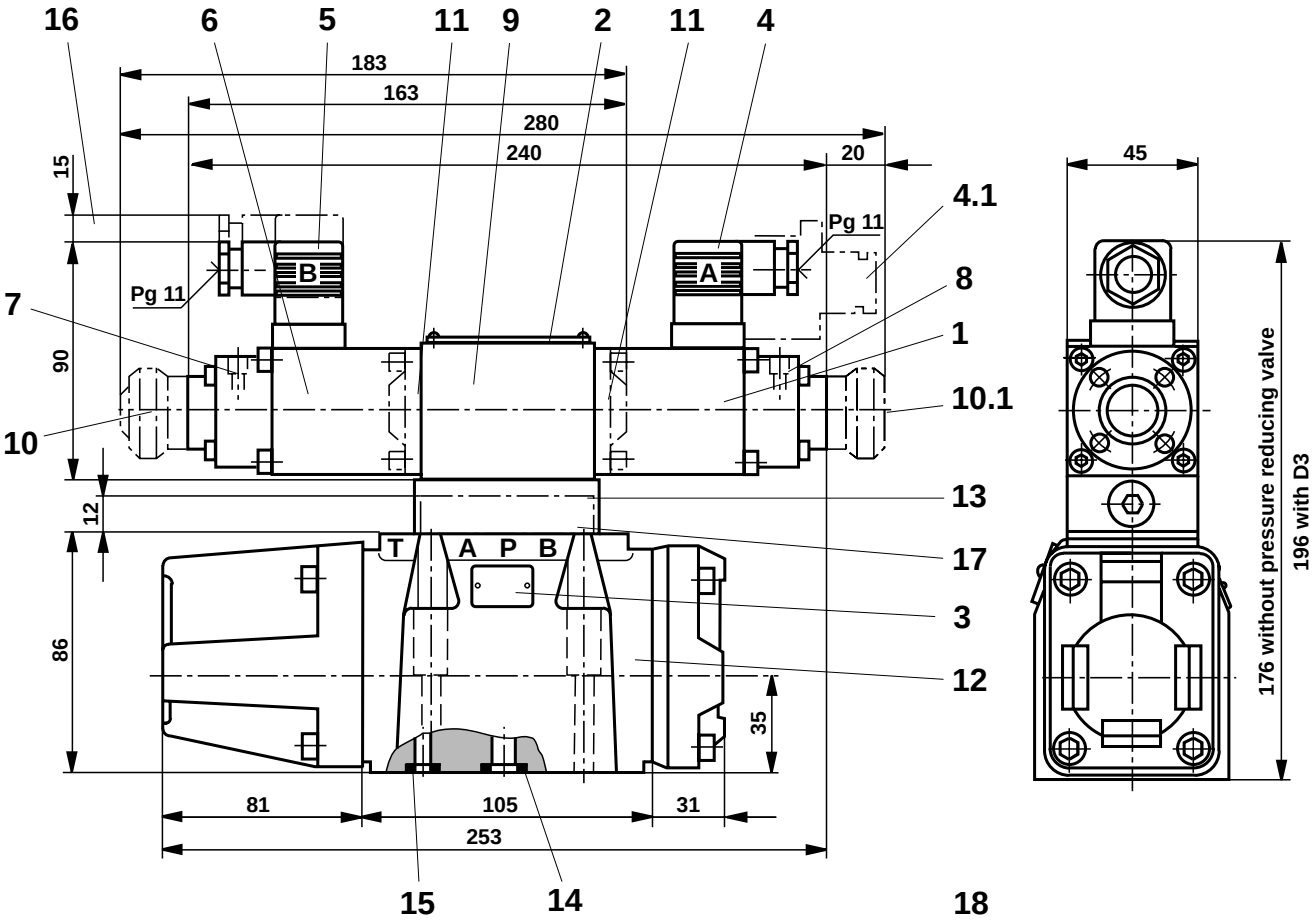
1000 L/min flow at 10 bar valve pressure differential

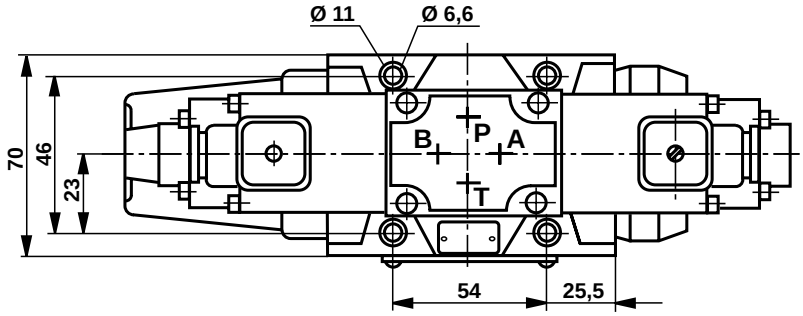
1 Δp = 10 bar constant
2 Δp = 20 bar constant
3 Δp = 30 bar constant
4 Δp = 50 bar constant
5 Δp = 100 bar constant

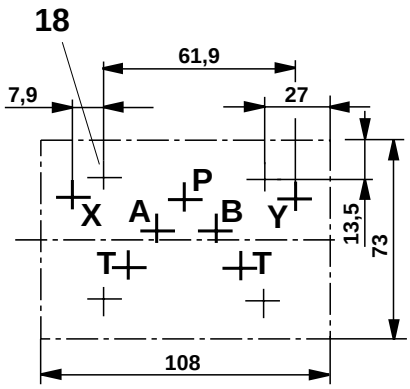
Δp = Valve prressue differential to DIN 24 311 (Input pressure minus load pressure and return line pressure)

Unit dimensions Size 10

(Dimensions in mm)



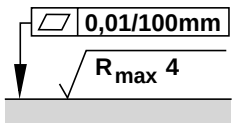




Subplates to data sheet RE 45 054 and valve fixing screws to be ordered separately.

Subplates: G 534/01 (G 3/4) **without** ports X and Y
G 535/01 (G 3/4) **with** ports X and Y
G 536/01 (G 1) **with** ports X and Y

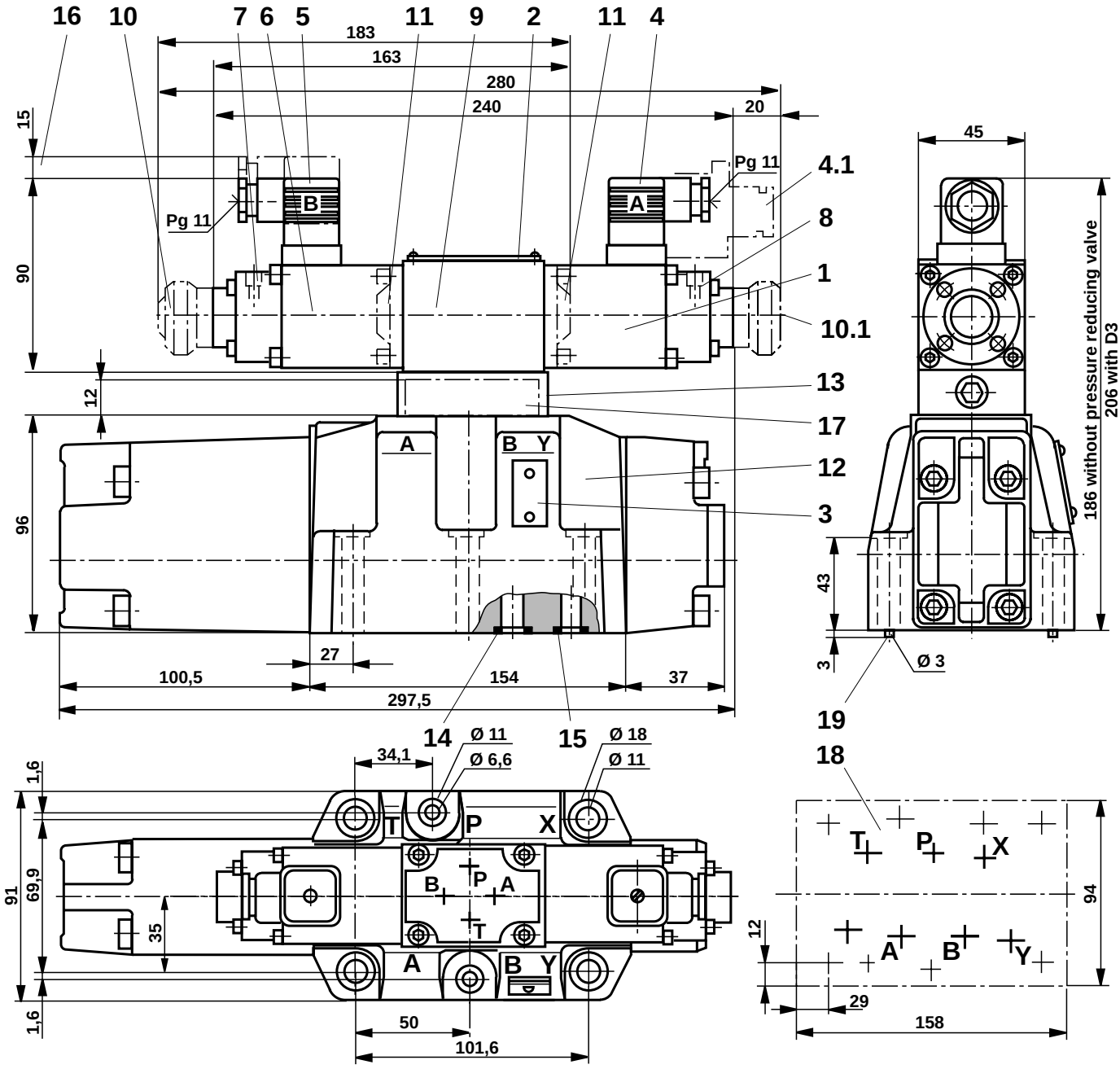
Valve fixing screws:
4 off M6 x 45 DIN 912-10.9; M_A = 15,5 Nm



Required surface finish of mating piece

1 Proportional solenoid "a"
2 Name plate for pilot valve
3 Name plate for overall valve
4 Plug "A", colour grey
Order No.: 008 908
4.1 Plug "A",
sea water resistant type
(dimensions see page 17)
5 Plug "B", colour black
Order No.: 008 909
6 Proportional solenoid "b"
7 Bleed screw, solenoid "b"
8 Bleed screw, solenoid "a"
9 Pilot valve
10 Emergency operator "N"
10.1 Emergency operator "N9"
(concealed type)
11 Cover for single solenoid valves
(types "A" or "B")
12 Main valve
13 Pressure reducing valve
14 R-ring 13 x 1,6 x 2 (O-ring 12 x 2);
Ports A, B, P, T
15 R-ring 11,18 x 1,6 x 1,78
(O-ring 10,82 x 1,78);
Ports X, Y
16 Space required to remove plug
17 Interconnecting plate
(type 4WRH...)
18 Machined valve mounting surface,
position of ports to
DIN 24 340 form A, ISO 4401 and
CETOP-RP121H
(X, Y as required)

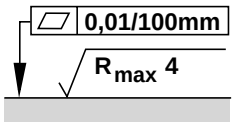
Unit dimensions Size 16 (Dimensions in mm)



Subplates to data sheet RE 45 056 and and valve fixing screws must be ordered separately.

Subplates: G 172/01 (G 3/4), G 172/02 (M27 x 2)
G 174/01 (G 1) G 174/02 (M33 x 2)
G 174/08 (Flange)

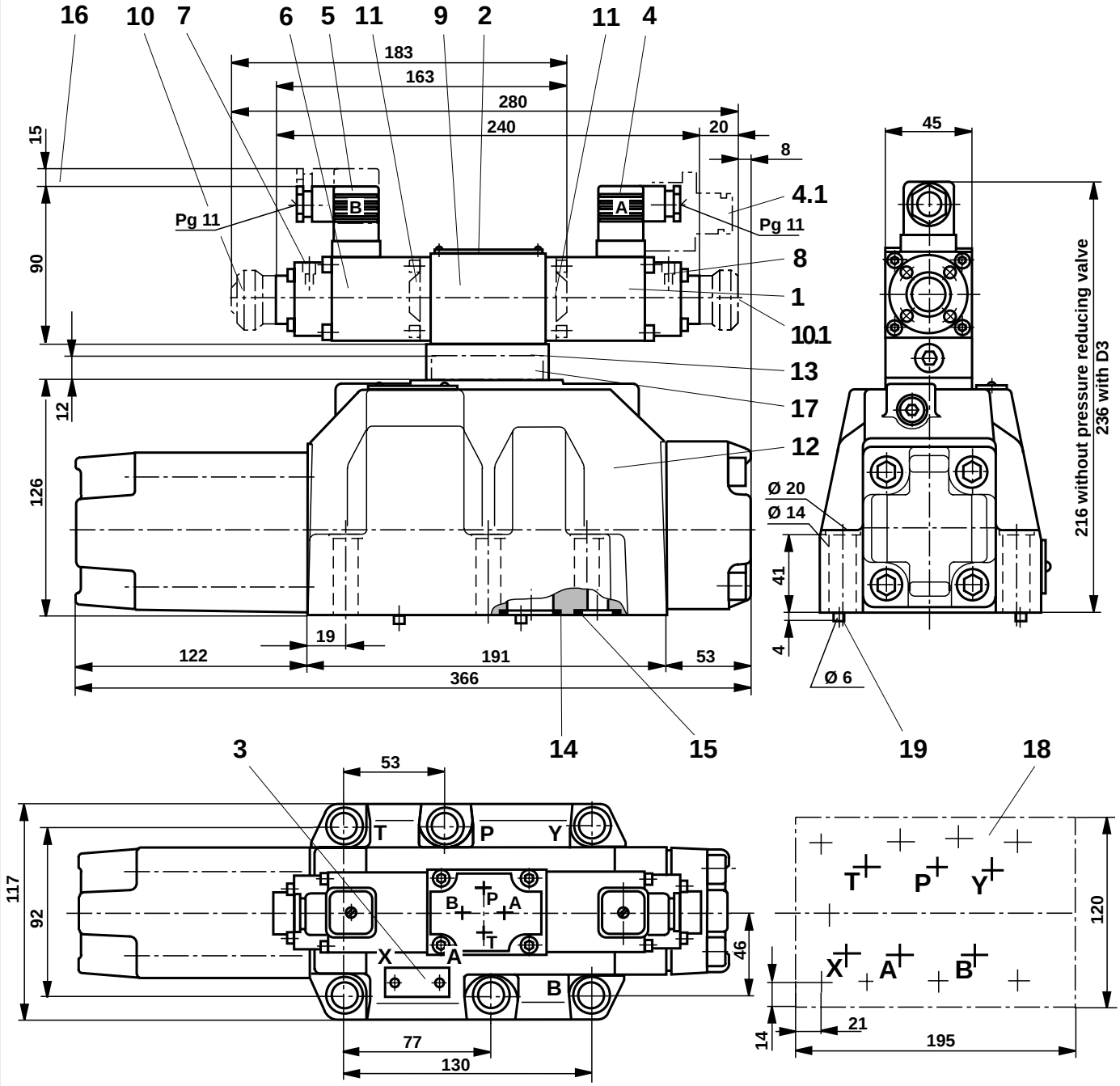
Valve fixing screws:
2 off M6 x 60 DIN 912-10.9; M_A = 15,5 Nm
4 off M10 x 60 DIN 912-10.9; M_A = 75 Nm



Required surface finish of mating piece

1 Proportional solenoid "a"
2 Name plate for pilot valve
3 Name plate for overall valve
4 Plug "A", colour grey
Order No.: 008 908
4.1 Plug "A",
sea water resistant type
(dimensions see page 17)
5 Plug "B", colour black
Order No.: 008 909
6 Proportional solenoid "b"
7 Bleed screw, solenoid "b"
8 Bleed screw, solenoid "a"
9 Pilot valve
10 Emergency operator "N"
10.1 Emergency operator "N9"
(concealed type)
11 Cover for single solenoid valves
(types "A" oder "B")
12 Main valve
13 Pressure reducing valve
14 R-ring 22,53 x 2,3 x 2,62;
Ports A, B, P, T
15 R-ring 10 x 2 x 2; Ports X, Y
16 Space required to remove plug
17 Interconnecting plate
(type 4WRH...)
18 Machined valve mounting surface,
position of ports to
DIN 24 340 form A, ISO 4401 and
CETOP-RP121H
19 Locating pin

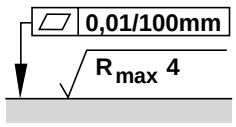
Unit dimensions Size 25 (Dimensions in mm)



Subplates to data sheet RE 45 058 and valve fixing screws must be ordered separately.

Subplates: G 151/01 (G 1)
G 154/01 (G 1 1/4); G 154/08 (Flange)
G 156/01 (G 1 1/2)

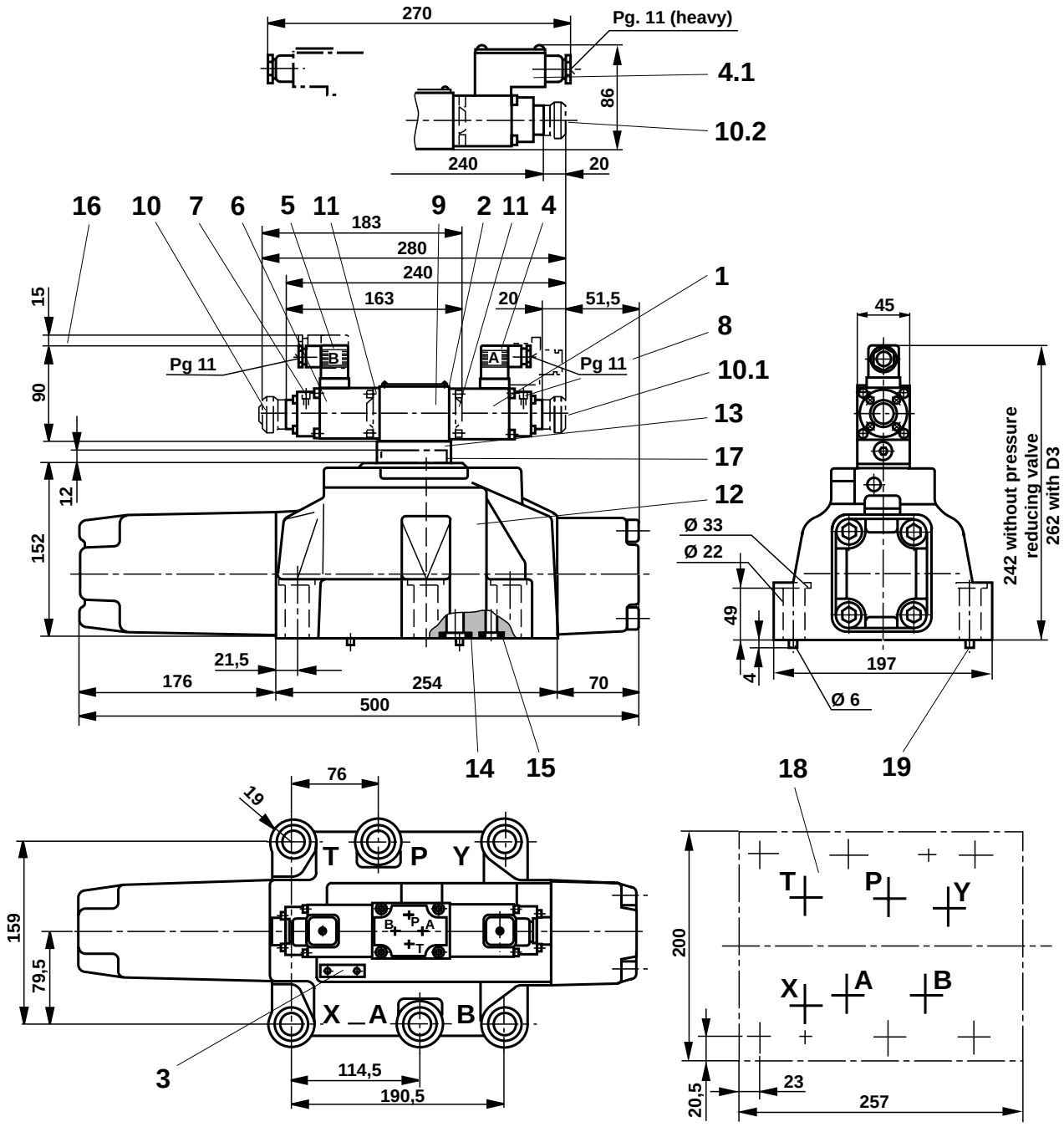
Valve fixing screws:
6 off M12 x 60 DIN 912-10.9; M_A = 130 Nm



Required surface finish of mating piece

1 Proportional solenoid "a"
2 Name plate for pilot valve
3 Name plate for overall valve
4 Plug "A", colour grey
Order No.: 008 908
4.1 Plug "A",
Sea water resistant type
(dimensions see page 17)
5 Plug "B", colour black
Order No.: 008 909
6 Proportional solenoid "b"
7 Bleed screw, solenoid "b"
8 Bleed screw, solenoid "a"
9 Pilot valve
10 Emergency operator "N"
10.1 Emergency operator "N9"
(concealed type)
11 Cover for single solenoid valves
(types "A" or "B")
12 Main valve
13 Pressure reducing valve
14 R-ring 27,8 x 2,6 x 3 (O-Ring 27 x 3);
Ports A, B, P, T
15 R-ring 19 x 3 x 3 (O-ring 19 x 3);
Ports X, Y
16 Space required to remove plug
17 Interconnecting plate
(type 4WRH...)
18 Machined valve mounting surface,
position of ports to
DIN 24 340 form A, ISO 4401 and
CETOP-RP121H
19 Locating pin

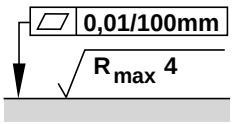
Unit dimensions Size 32 (Dimensions in mm)



Subplates to data sheet RE 45 060 and valve fixing screws must be ordered separately.

Subplates: G 157/01 (G 1 1/2)
G 157/02 (M48 x 2)
G 158/10 (G 1 1/2) (Flange)

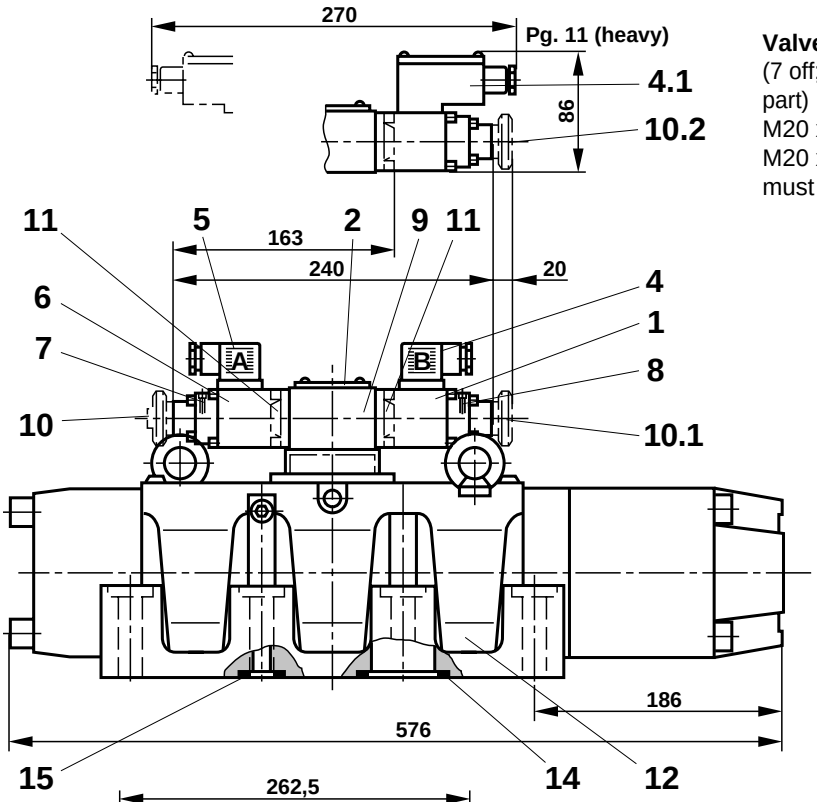
Valve fixing screws:
6 off M20 x 80 DIN 912-10.9; M_A = 430 Nm



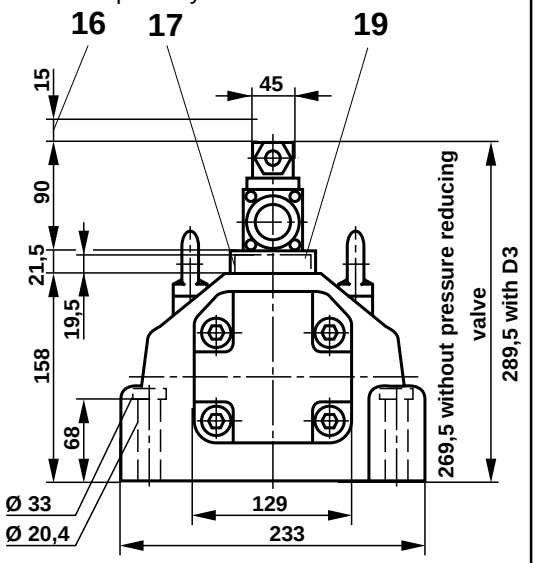
Required surface finish of mating piece

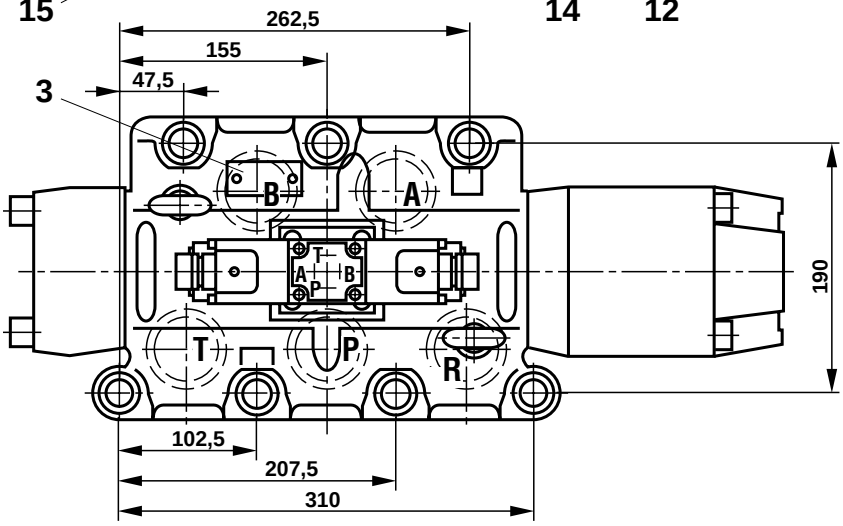
1 Proportional solenoid "a"
2 Name plate for pilot valve
3 Name plate for overall valve
4 Plug "A", colour grey
Order No.: 008 908
4.1 Plug "A",
Sea water resistant type
(dimensions see page 17)
5 Plug "B", colour black
Order No.: 008 909
6 Proportional solenoid "b"
7 Bleed screw, solenoid "b"
8 Bleed screw, solenoid "a"
9 Pilot valve
10 Emergency operator "N"
10.1 Emergency operator "N9"
(concealed type)
10.2 Emergency operator "N"
(sea water resistant type)
11 Cover of singe solenoid valves
(types "A" or "B")
12 Main valve
13 Pressure reducing valve
14 R-ring 42,5 x 3 x 3 (O-ring 42 x 3);
Ports A, B, P, T
15 R-ring 19 x 3 x 3 (O-ring 19 x 3);
Ports X, Y
16 Space required to remove plug
17 Interconnecting plate
(type 4WRH...)
18 Machined valve mounting plate,
position of ports to
DIN 24 340 form A, ISO 4401 and
CETOP-RP121H
19 Locating pin

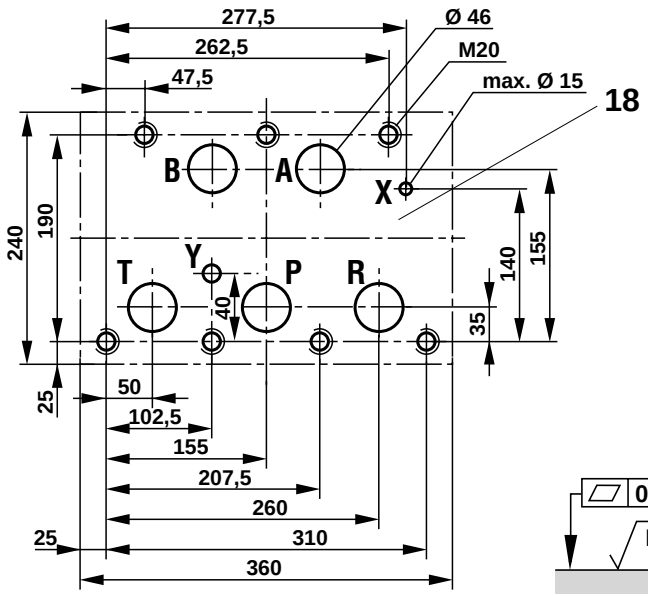
Unit dimensions Size 52 (subplate mounting) (Dimensions in mm)

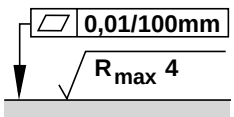


Valve fixing screws
(7 off; length is dependant on the material of the adjoining part)
M20 x 90 DIN 912-10.9; M_A = 610 Nm (for steel) **or**
M20 x 100 DIN 912-10.9; M_A = 610 Nm (for cast iron)
must be ordered separately.





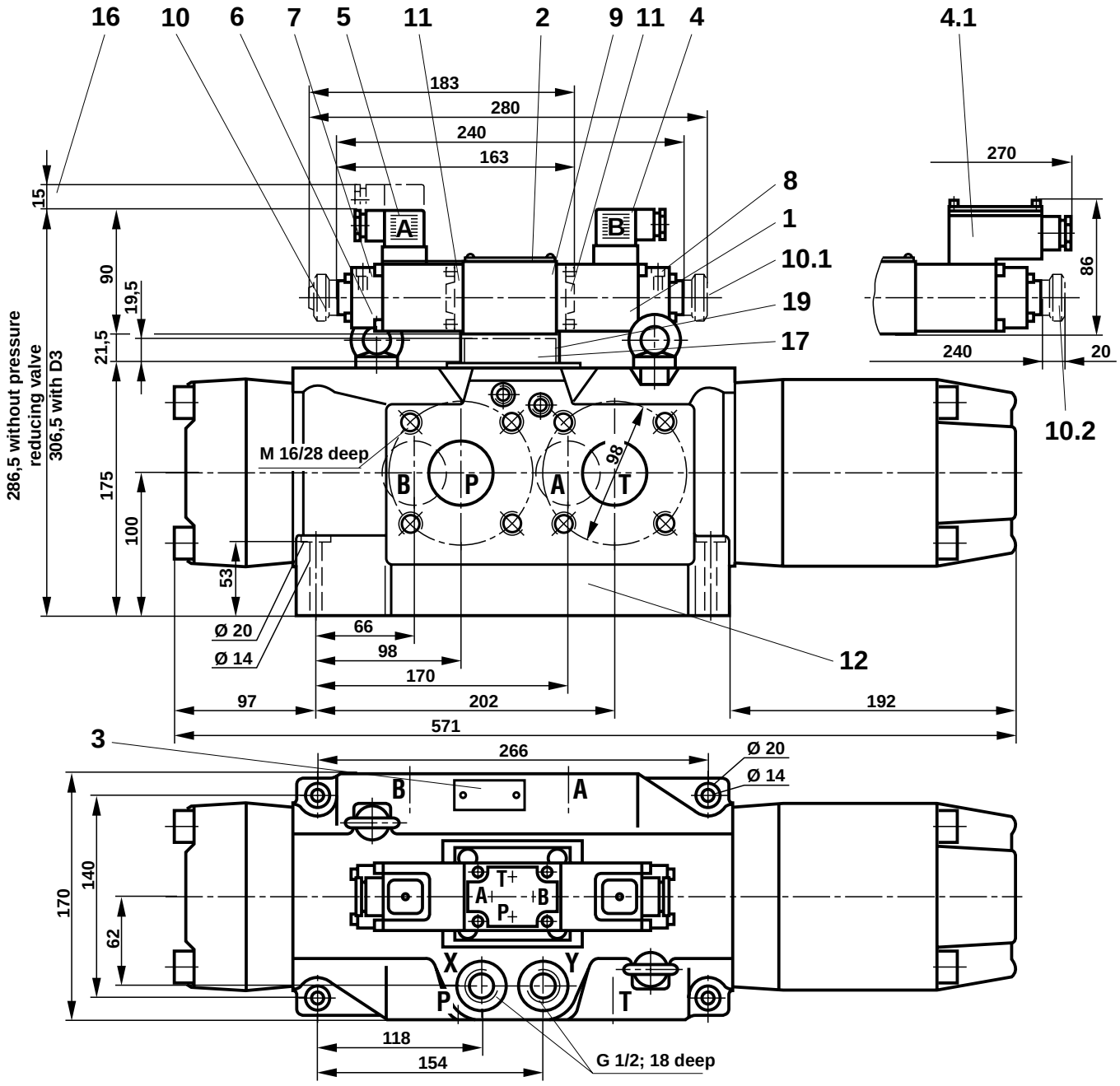




Required surface finish of mating piece

1 Proportional solenoid "b"
2 Name plate for pilot valve
3 Name plate for overall valve
4 Plug "B", colour black
Order No.: 008 909
4.1 Electrical connection "B",
(sea water resistant type)
5 Plug "A", colour grey
Order No.: 008 908
6 Proportional solenoid "a"
7 Bleed screw, solenoid "a"
8 Bleed screw, solenoid "b"
9 Pilot valve
10 Emergency operator "N"
10.1 Emergency operator "N9"
(concealed type)
10.2 Emergency operator "N"
(sea water resistant type)
11 Cover for single solenoid valves
(types "A" or "B")
12 Main valve
14 R-ring 54,5 x 3,53 x 3,53
(O-ring 53,57 x 3,53);
Ports A, B, P, T,R
15 R-ring 18,64 x 3,53 x 3,53
(O-ring 18,66 x 3,53);
Ports X, Y, L
16 Space required to remove plug
17 Interconnecting plate
(type 4WRH...)
18 Machined valve mounting surface,
position of ports to DIN 24 340
form A, ISO 4401 and
CETOP-RP 121 H
19 Adaptor plate

Unit dimensions Size 52 (Flange connection) (Dimensions in mm)



Mounting flanges to data sheet RE 45 501 and
Valve fixing screws
4 off M12 x 70 DIN 912-10.9; M_A =130 Nm
must be ordered separately.

1 Proportional solenoid "b"
2 Name plate for pilot valve
3 Name plate for overall valve
4 Plug "B",colour black
Order No.: 008 909
4.1 Plug "B",
sea water resistant type
(dimensions see page 17)
5 Page "A", colour grey
Order No.: 008 908
6 Proportional solenoid "a"
7 Bleed screw, solenoid "a"
8 Bleed screw, solenoid "b"
9 Pilot valve
10 Emergency operator "N"
10.1 Emergency operator "N9"
(concealed type)
10.2 Emergency operator "N"
(sea water resistant type)
11 Cover for single solenoid valves
(types "A" or "B")
12 Main valve
16 Space required to remove plugs
17 Interconnecting plate
(type 4WRH...)
19 Adaptor plate

Pilot oil supply

Type 4WRZ…-../… and **Pilot oil feed external**
Type 4WRH…-../… **Pilot oil drain external**

With this model pilot oil feed is from a separate control circuit (external).
Pilot oil discharge is not via the T line on the main valve, but is routed separately into the tank via port Y (external).

Type 4WRZ…-../…E… **Pilot oil feed internal**
Pilot oil drain external

With this model pilot oil feed is from the P line on the main valve (internal).
Pilot oil discharge is not via the T line on the main valve, but is routed separately into the tank via port Y (external).
Port X should be closed on the subplate.

Type 4WRZ…-../…ET… **Pilot oil feed internal**
Pilot oil drain internal

On this model pilot oil feed is from the P line on the main valve (internal).
The pilot oil discharge is direct into the T line on the main valve (internal).
Ports X and Y should be closed on the subplate.

Type 4WRZ…-../…T… **Pilot oil feed external**
Pilot oil drain internal

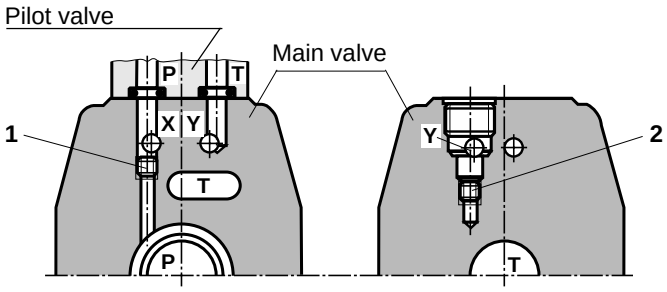
On this model pilot oil feed is from a separate control circuit (external).
Pilot oil discharge is directly into the T line on the main valve (internal).
Port Y is closed on the subplate.

Items **1** and **2**: Plug M6 DIN 906-8.8 A/F 3

For section see page 3

Size 10

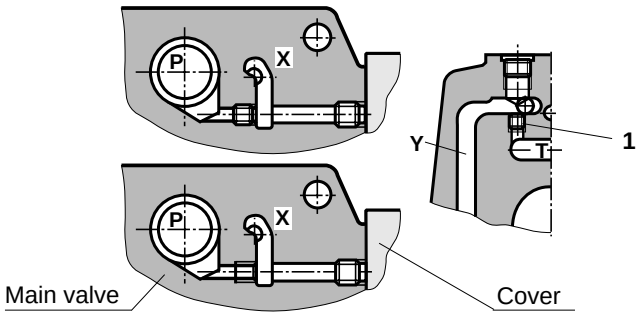
Section **A – A** Section **B – B**



Pilot oil feed	external:	1	closed
	internal:	1	open
Pilot oil drain	external:	2	closed
	internal:	2	open

Size 16

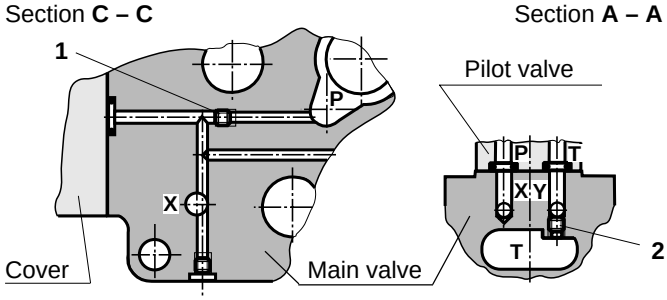
Section **D – D** Section **B – B**



Pilot oil feed	external:	P	closed
	internal:	P	open
Pilot oil drain	external:	1	closed
	internal:	1	open

Size 25

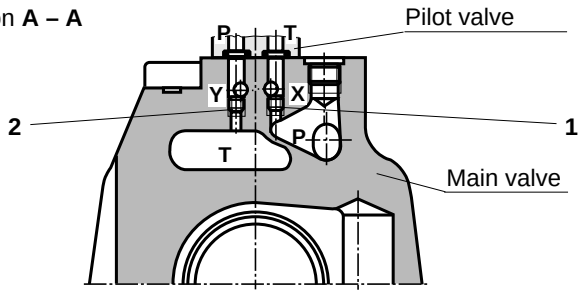
Section **C – C** Section **A – A**



Pilot oil feed	external:	1	closed
	internal:	1	open
Pilot oil drain	external:	2	closed
	internal:	2	open

Size 32

Section **A – A**



Pilot oil feed	external:	1	closed
	internal:	1	open
Pilot oil drain	external:	2	closed
	internal:	2	open

Plug-in throttle valves

When using a proportional directional valve type 4 WRZ... the following plug-in throttle valves should be used in lines A and B:

Size	10	16	25	32	52
Ø in mm	2,0	2,0	2,8	–	–
Part No.	158 547	158 547	157 948	–	–

Electronic control: electrical amplifier type VT 3000, Series 3X (separate order)

Technical data

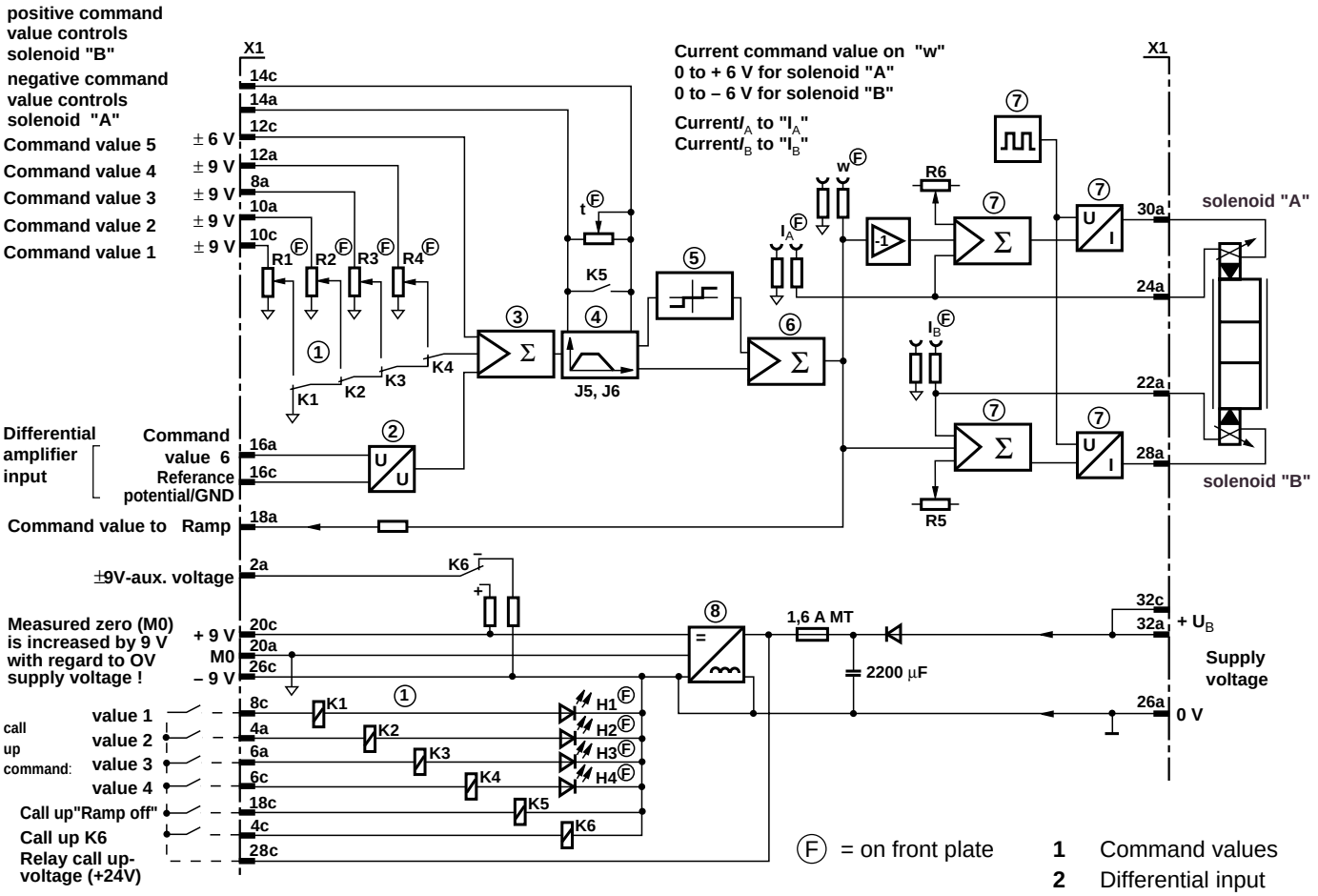
Supply voltage	U_B:	24 VDC; + 60 %; – 5 %
– upper limiting value	$u_B(t)_{max}$:	39 V
– lower limiting value	$u_B(t)_{min}$:	22 V
Pilot current	I:	20 mA ± 25 %
Max. output current	I_{max}:	800 mA

Card dimensions:	Eurocard 100 x 160 mm DIN 41 494
Front plate dimensions	
– Height:	3 HE (128,4 mm)
– Width conductor side:	1 TE (5,08 mm)
– Width conponent side:	7 TE

For applications outside these parameters, please consult us!

Detailed information: Data sheet RE 29 935

Block diagram/Terminal connections



Ⓕ = on front plate

1 Command values
2 Differential input
3; **6** Summator
4 Ramp generator
5 Step function
7 Current amplifier with pulse generator
8 Power supply

H1 to **H4** = LED display for selecting command value
K1 to **K6** = Call-up relay
R1 to **R4** = Command values

R5 = Pilot current solenoid "B"
R6 = Pilot current solenoid "A"
t = Ramp time

Order codes

VT 3000 – 3X/ *

Amplifier for proportional valves without positional feed back

Series 30 to 39 **= 3X**
(Series 30 to 39: unchanged technical data and connection definitions)

Further details in clear text

Mannesmann Rexroth GmbH
D-97813 Lohr am Main
Jahnstraße 3-5 • D-97816 Lohr am Main
Telefon 0 93 52 / 18-0 • Telefax 0 93 52 / 18-10 40
Telex 6 89 418-0

Mannesmann Rexroth Limited
Cromwell Road, St. Neots,
Huntingdon, Cambs. PE19 2ES
Tel: (01480) 476041
Fax: (01480) 219052

Rexroth
Bosch Group

3/2, 4/2 and 4/3 directional valves, internally pilot operated, externally pilot operated

RE 24751/08.08 1/38
Replaces: 02.03

Types 4WEH and 4WH


H6092+5589

Sizes 10 to 32
Component series 4X; 6X; 7X
Maximum operating pressure 350 bar *[5076 psi]*
Maximum flow 1100 l/min *[290 US gpm]*

Table of contents

Information on available spare parts:
www.boschrexroth.com/spc

Features

- 2 types of actuation:
  - Electrohydraulic (type WEH)
  - Hydraulic (type WH)
- For subplate mounting
- Porting pattern to ISO 4401 and NFPA T3.5.1 R2
- For subplates to data sheets RE 45054 to RE 45060 (separate order), see page 32
- Spring- or pressure-centering, spring end position or hydraulic end position
- Wet-pin DC or AC voltage solenoids, optional
- Manual override, optional
- Electrical connection as individual or central connection, see RE 23178 and RE 08010
- Switching time adjustment, optional
- Pre-load valve in channel P of main valve, optional
- Stroke adjustment of main spool, optional
- Stroke adjustment and/or end position control, optional
- Inductive position switches and proximity sensors (contactless), see RE 24830

Ordering code

						/					

Up to 280 bar **= No code**
Up to 350 bar **= H –**

3-way design **= 3**
4-way design **= 4**

Types of actuation
Electrohydraulic **= WEH**
Hydraulic **= WH**

Size
NG10 **= 10**
NG16 **= 16**
NG25 (type 4W.H 22 .7X/…) **= 22**
NG25 (type 4W.H 25 .6X/…) **= 25**
NG32 **= 32**

Spool return in main valve
By springs **= No code**
Hydraulic [1] **= H**

For spool symbols, see pages 4 and 5

Component series
40 to 49 – NG10 **= 4X**
(40 to 49: unchanged installation and connection dimensions)
60 to 69 – NG25 (4W.H 25.) and NG32 **= 6X**
(60 to 69: unchanged installation and connection dimensions)
70 to 79 – NG16 (series 72 or higher) and NG25 (4W.H 22.) **= 7X**
(70 to 79: unchanged installation and connection dimensions)

Spool return in pilot valve with 2 spool positions and 2 solenoids
Only possible with spools A, B, C, D, K, Z and hydraulic spool return in main valve:
With spring return **= No code**
Without spring return **= O**
Without spring return **with** detent [2] **= OF**

Pilot valve [2]
High-performance valve (RE 23178) **= 6E**

DC voltage 24 V [2] **= G24**
AC voltage 230 V 50/60 Hz [2] **= W230**
For further voltages, frequencies and electric data, see data sheet RE 23178

Without manual override **= No code**
With manual override **= N**
With concealed manual override **= N9**

External pilot oil supply, external pilot oil drain [3] **= No code**
Internal pilot oil supply, external pilot oil drain [3; 4] **= E**
Internal pilot oil supply, internal pilot oil drain [4] **= ET**
External pilot oil supply, internal pilot oil drain [3] **= T**
(for type 4WH… **only "No code"** possible!)
(Variants "ET" and "T" for 3-position valve, pressure-centering **only** possible, if $p_{St} \geq 2 \times p_{Tank} + p_{St\,min}$!)

p_{St} = pilot pressure
$p_{St\,min}$ = pilot pressure, min,
p_{Tank} = tank pressure
$p_{ö}$ = cracking pressure

Standard types and components are shown in the EPS (standard price list).

For explanation of footnotes, see page 3!

Further details in clear text

Seal material

No code = NBR seals
V = FKM seals
(other seals on request)

⚠ Attention!
Observe compatibility of seals with hydraulic fluid used!

No code = **Without** pressure reducing valve
D3 [5] **=** **With** pressure reducing valve

Pre-load valve (not for NG10) [2; 5]

No code = **Without** pre-load valve
P4,5 = **With** pre-load valve ($p_{ö}$ = 4.5 bar *[65 psi]*)

Throttle insert [2]

No code = Without throttle insert
B08 = Throttle Ø 0.8 mm *[0.0315 inch]*
B10 = Throttle Ø 1.0 mm *[0.0394 inch]*
B12 = Throttle Ø 1.2 mm *[0.0472 inch]*
B15 = Throttle Ø 1.5 mm *[0.0591 inch]*
B20 = Throttle Ø 2.0 mm *[0.0787 inch]*
B25 = Throttle Ø 2.5 mm *[0.0984 inch]*

Stroke adjustment
For ordering code, see pages 34 and 35

Spool position monitoring

No code = Without position switch
QMAG24 = Monitored spool position “a“
QMBG24 = Monitored spool position “b“
QMABG24 = Monitored spool positions “a“ and “b“
QM0G24 = Monitored rest position
For further details, see RE 24830

Electrical connection [2]

K4 [6] **=** Without mating connector, individual connection with component plug to DIN EN 175301-803
For further electrical connections, see RE 23178 and RE 08010

No code = **Without** switching time adjustment
S = Switching time adjustment as meter-in control
S2 = Switching time adjustment as meter-out control

[1] – 2 spool positions (hydraulic end position): Spools C, D, K, Z, Y only
– 3 spool positions (hydraulically centered): Only with NG16, NG25 (type 4W.H **25** …) and NG32

[2] Only with electrohydraulic actuation

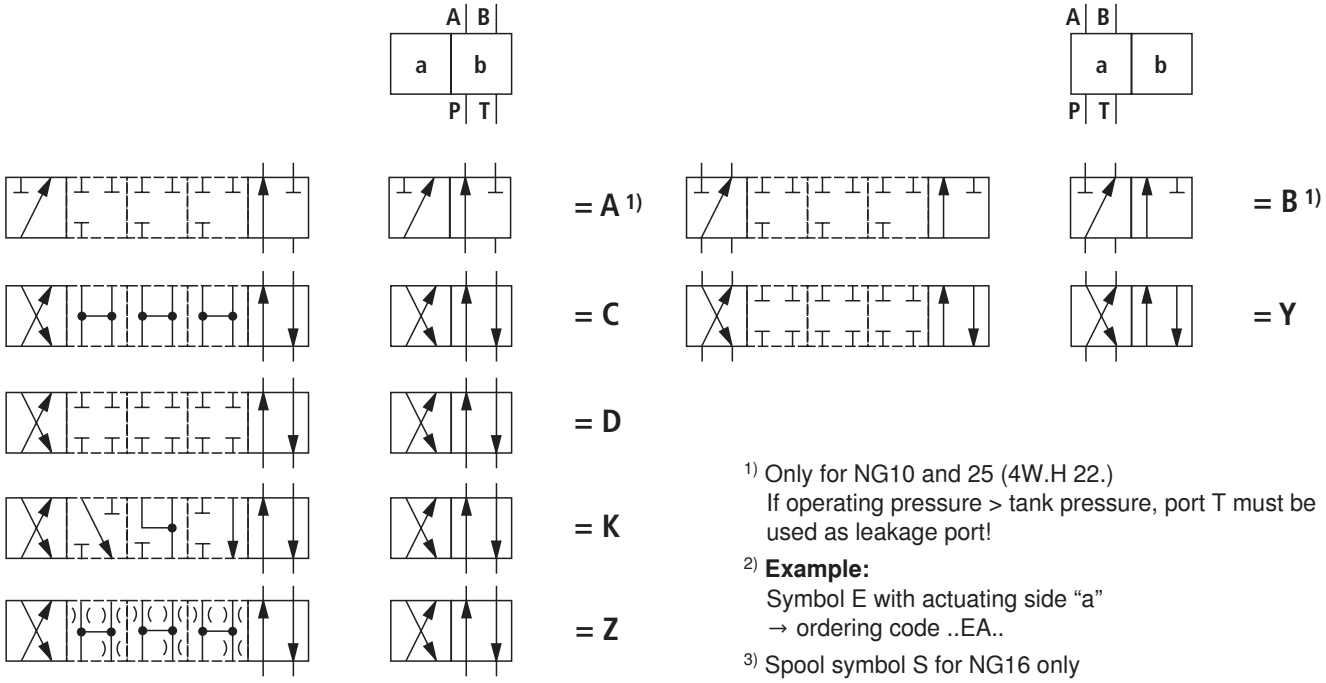
[3] Pilot oil supply X or drain Y **external**:
– In the case of NG10, variant SO30 must be provided for the use of sandwich plates. Code SO30 must be entered at the end of the type code (sandwich plate).
– Make sure that the permissible operating parameters of the pilot oil are not exceeded (see RE 23178)!
– Maximum pilot pressure: Please observe page 14!

[4] Internal pilot oil **supply** (version “ET“ and “E“):
– Minimum pilot pressure: Please observe page 15!
– To avoid impermissibly high pressure peaks, a **throttle insert “B10“** must be provided in the P port of the pilot valve (see page 13).
– In conjunction with version “H-“, **pressure reducing valve “D3“** must be provided additionally.

[5] Only in conjunction with throttle insert **“B10“**

[6] Mating connectors, separate order, see RE 23178

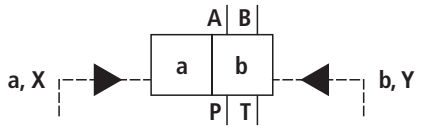
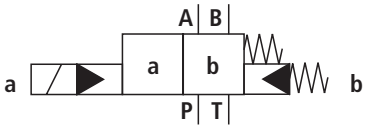
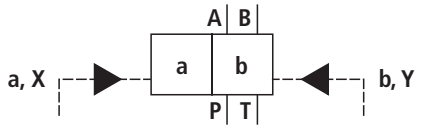
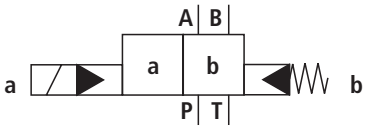
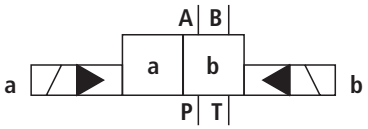
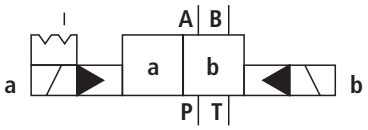
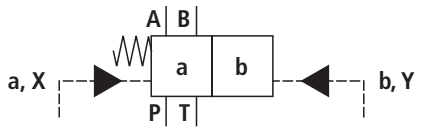
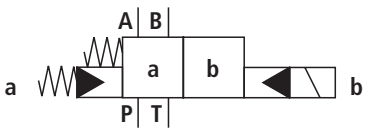
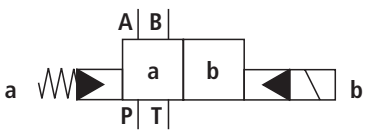
Spool symbols: 2 spool positions



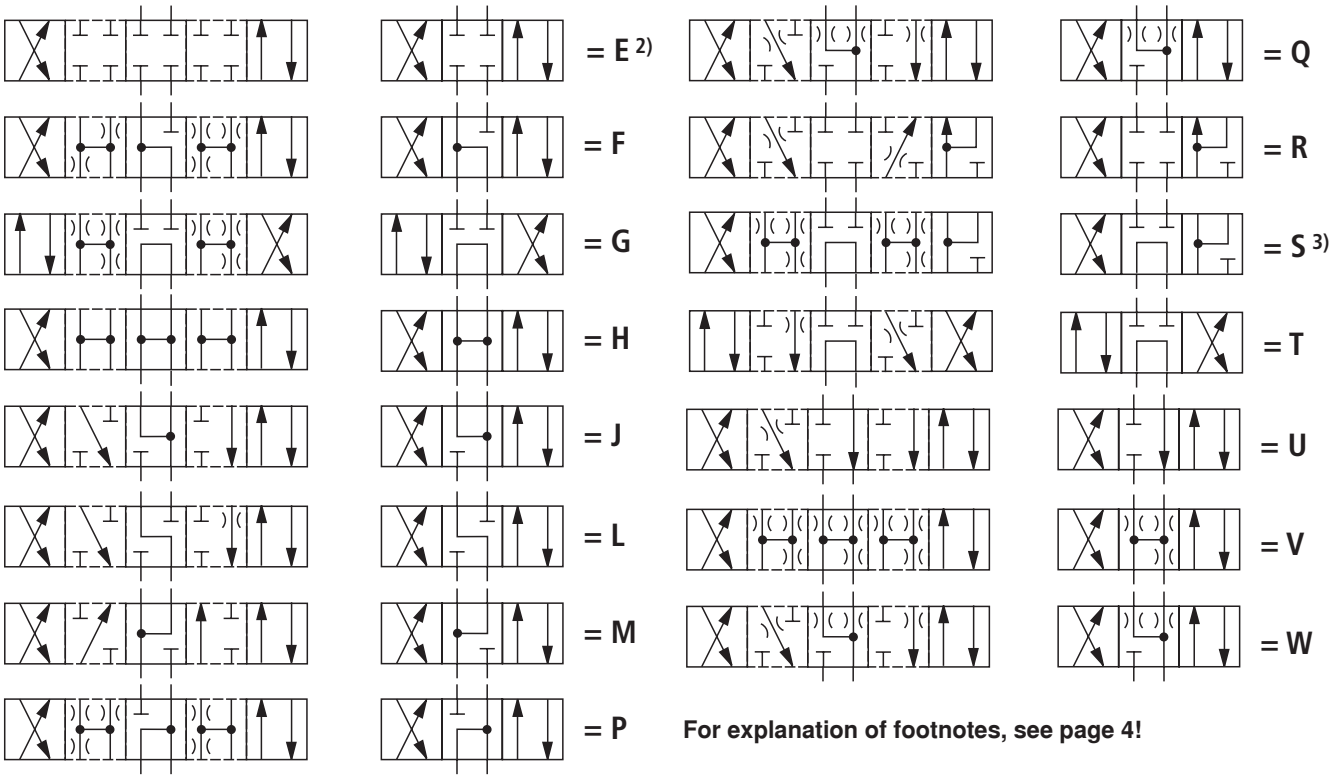
1) Only for NG10 and 25 (4W.H 22.)
If operating pressure > tank pressure, port T must be used as leakage port!

2) **Example:**
Symbol E with actuating side “a”
→ ordering code ..EA..

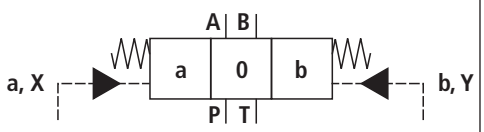
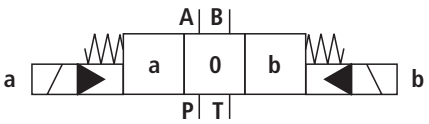
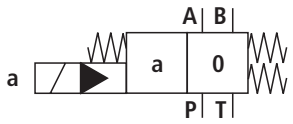
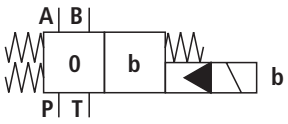
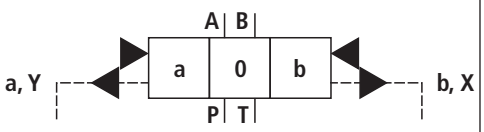
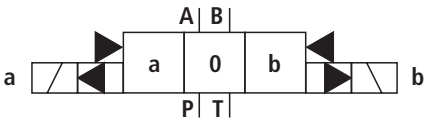
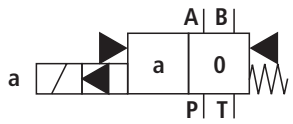
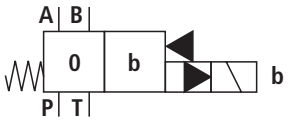
3) Spool symbol S for NG16 only

Ordering code		Type of actuation	
Spool symbol	Spool return	Hydraulic Type WH	Electrohydraulic Type WEH
A, C, D, K, Z	../..		
	..H../..		
	..H../O		
	..H../OF		
B, Y	../..		
	..H../..		

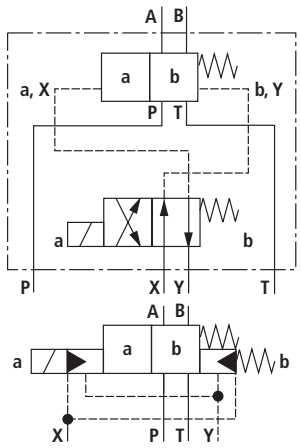
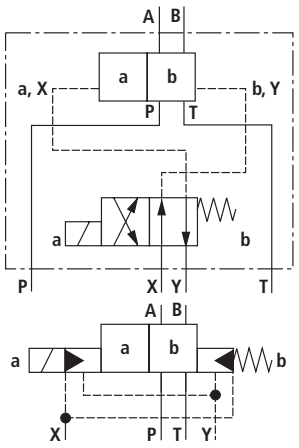
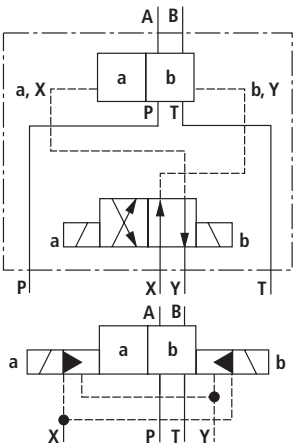
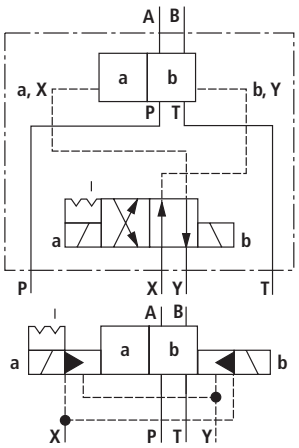
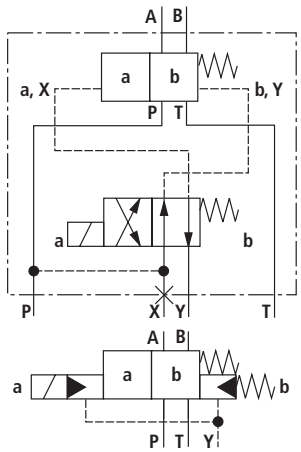
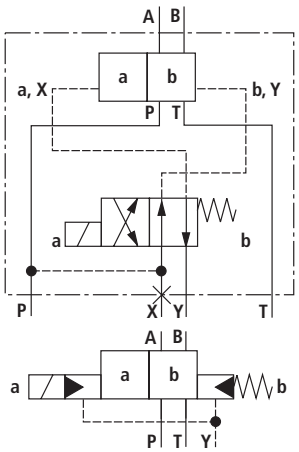
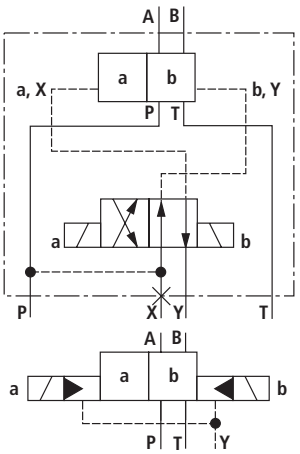
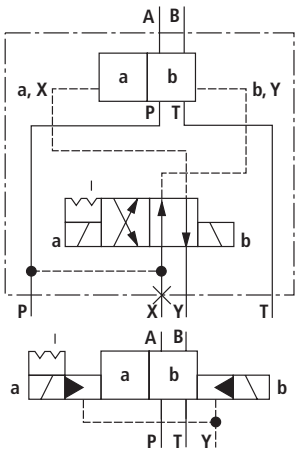
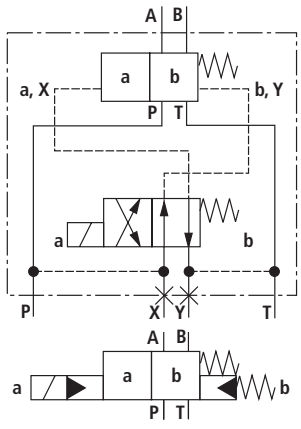
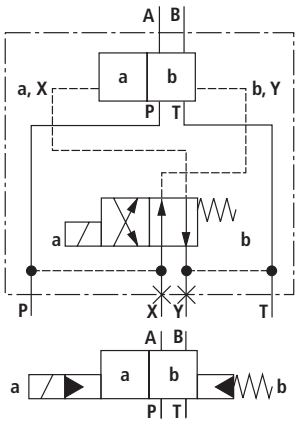
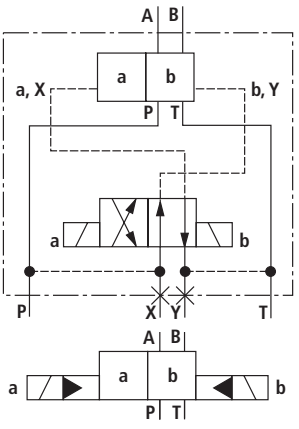
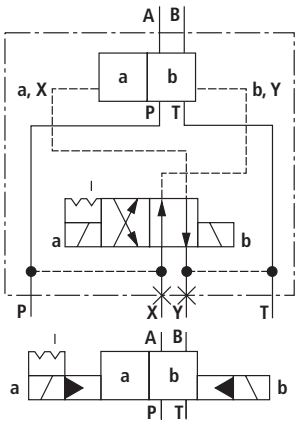
Spool symbols: 3 spool positions



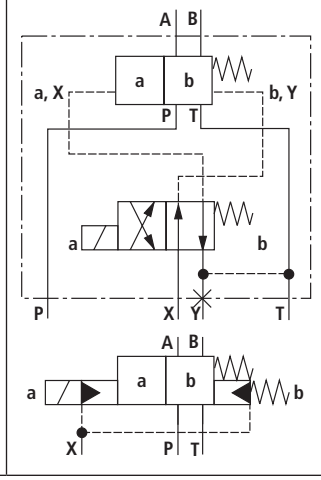
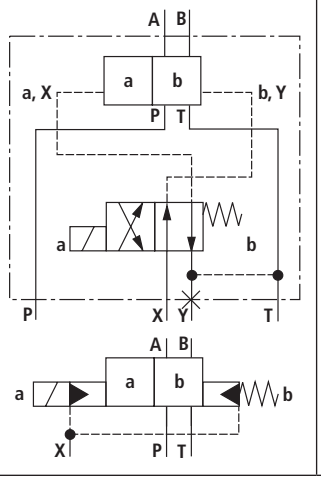
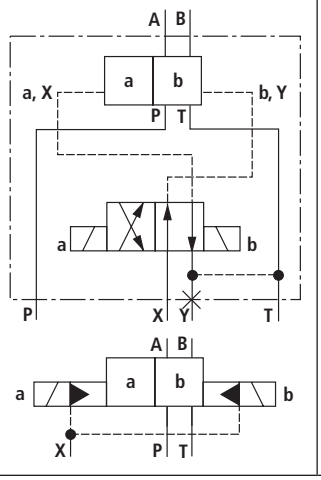
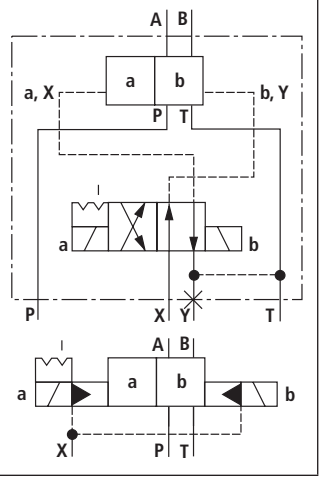
For explanation of footnotes, see page 4!

Ordering code			Type of actuation	
Spool symbol	Actuating side	Spool return	Hydraulic Type WH	Electrohydraulic Type WEH
E, F, G, H, J, L, M, Q, R, S, T, U, V, W		../..		
	.A			
	.B			
		..H../..		
		H.A		
		H.B		

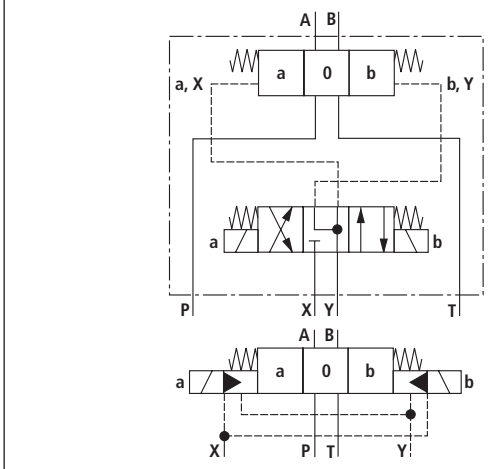
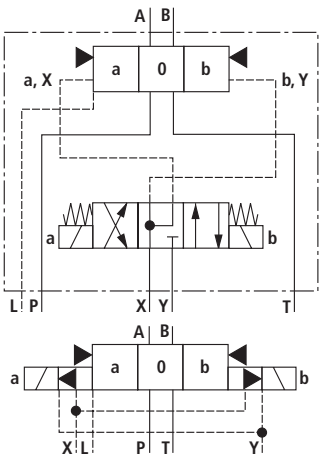
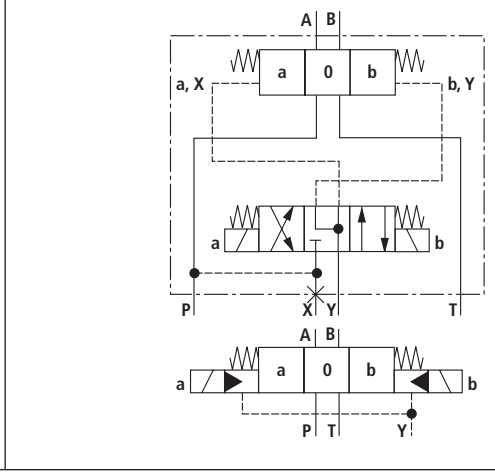
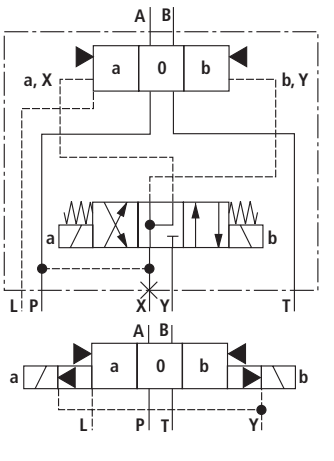
Symbols for valves with 2 spool positions

	Valve with spring end position	Valve with hydraulic end position		
X = external; **Y** = external	Type 4WEH…/..	Type 4WEH . H../...	Type 4WEH . H../O...	Type 4WEH . H../OF...
				
X = internal; **Y** = external	Type 4WEH…/…E…	Type 4WEH . H../…E…	Type 4WEH . H../O…E…	Type 4WEH . H../OF…E…
				
X = internal; **Y** = internal	Type 4WEH…/…ET…	Type 4WEH . H../…ET…	Type 4WEH . H../O…ET…	Type 4WEH . H../OF…ET…
				

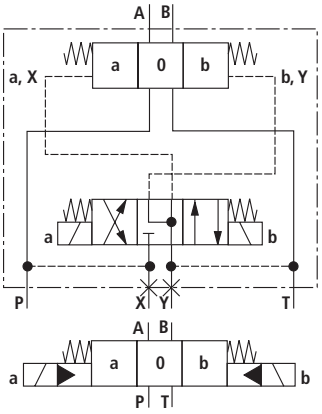
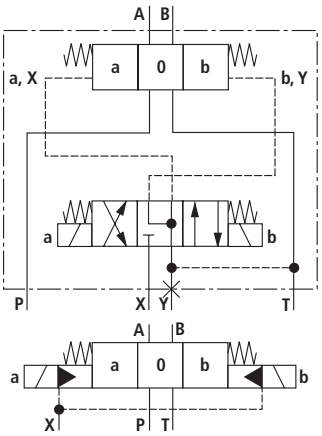
Symbols for valves with 2 spool positions

	Valve with spring end position	Valve with hydraulic end position		
	Type 4WEH…/…T…	Type 4WEH . H../…T…	Type 4WEH . H../O…T…	Type 4WEH . H../OF…T…
X = external; Y = internal				

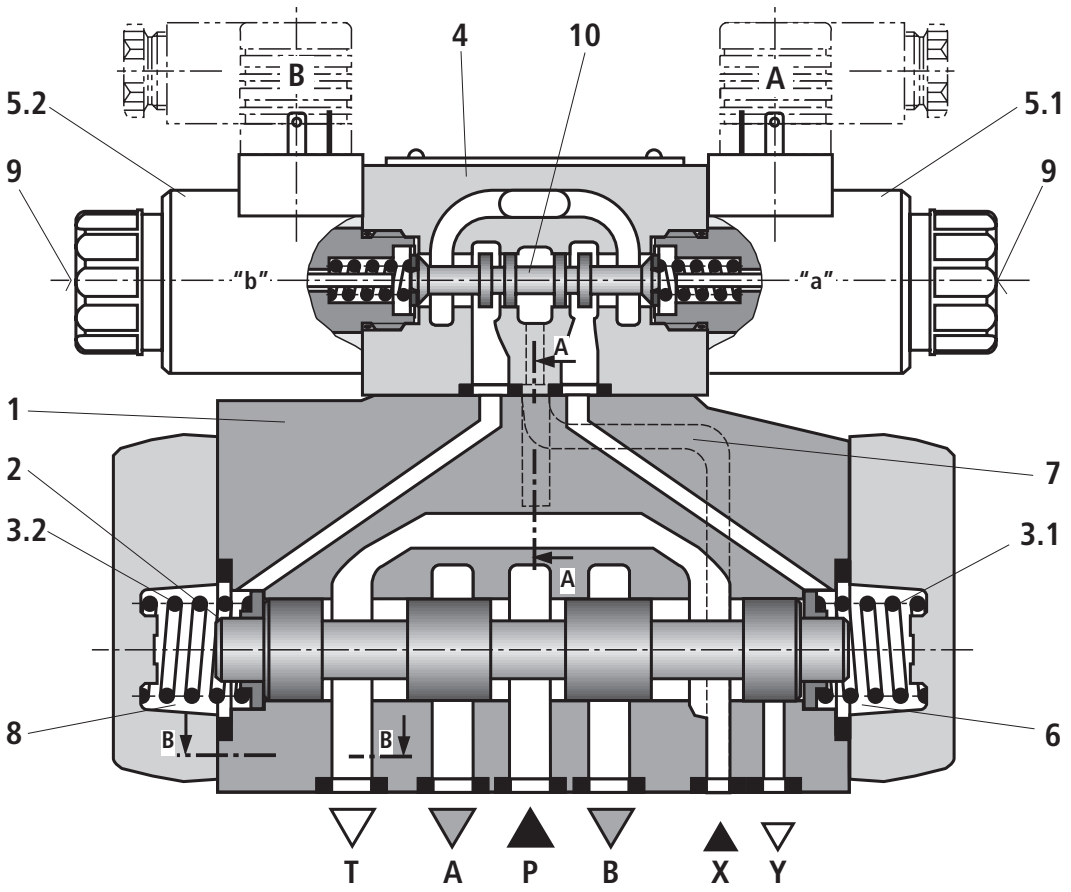
Symbols for valves with 3 spool positions

	Valve with spring-centered zero position	Valve with pressure-centered zero position only NG16, 25 (type 4W.H **25** .6X/…) and 32
	Type 4WEH…/…	Type 4WEH . H../…
X = external; Y = external		
	Type 4WEH…/…E…	Type 4WEH . H../…E…
X = internal; Y = external		

Symbols for valves with 3 spool positions

Valve with spring-centered zero position		**Valve with pressure-centered zero position** nur NG16, 25 (Type 4W.H **25** .6X/…) and 32
X = internal; **Y** = internal	**Type 4WEH…/…ET…** 	3-position valves, pressure-centered, preferably with external pilot oil supply and/or drain (“No code“, “E“) For the preconditions for internal pilot oil supply and/or drain (“ET“, “T“), see pages 4 and 15.
X = external; **Y** = internal	**Type 4WEH…/…T…** 	

Function, section: Type 4WEH



Directional valves of type 4WEH…

Valves of type WEH are directional spool valves with electro-hydraulic actuation. The control the start, stop and direction of a flow.

These directional valves basically consist of the main valve with housing (1), main control spool (2), one or two return springs (3.1) and (3.2), as well as pilot valve (4) with one or two solenoids “a“ (5.1) and/or “b“ (5.2).

Main control spool (2) in the main valve is held in the zero or initial position by springs or through pressurization. In the de-pressurized condition, the two spring chambers (6) and (8) are pressureless connected to the tank via pilot valve (4). The pilot valve is supplied with pilot oil via pilot line (7). The supply can be provided internally or externally (externally via port X).

When the pilot valve is operated, e.g. solenoid “a“, pilot spool (10) is pushed to the left and spring chamber (8) is therefore pressurized to pilot pressure. Spring chamber (6) remains pressureless.

The pilot pressure acts on the left side of main control spool (2) and shifts the latter against spring (3.1). In the main valve, port P is consequently connected to B and A to T.

When the solenoid is de-energized, pilot spool (10) returns to its starting position (except for impulse spool). Spring chamber (8) is unloaded to the tank.

The pilot oil is drained internally (via channel T) or externally (via channel Y).

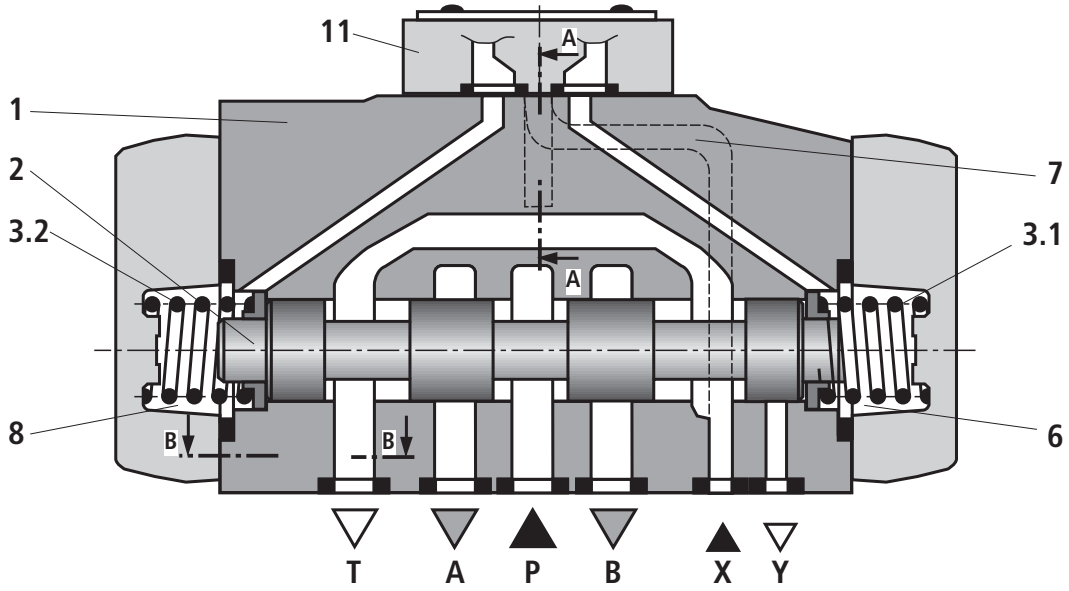
An optional manual override (9) allows pilot spool (10) to be moved without energization of the solenoid.

☞ **Note!**

Return springs (3.1) and (3.2) in spring chambers (6) and (8) hold the main control spool (2) in the central position, even if the valve is arranged, for example, vertically.

Pilot oil supply (sections A – A and B – B),
see pages 12 and 13.

Function, section: Type 4WH



Directional valves of type 4WH…

Valves of type WH are directional spool valves with hydraulic actuation. They control the start, stop and direction of a flow.

These directional valves basically consist of valve housing (1), main control spool (2), one or two return springs (3.1) and (3.2) on valves with spring return or spring centering, as well as reconnection plate (11).

The main control spool (2) is actuated directly through pressurization.

Main control spool (2) is held in the zero or initial position by springs or through pressurization. The pilot oil is supplied and drained externally (see page 12).

4/3 directional valve with spring centering of the pilot spool

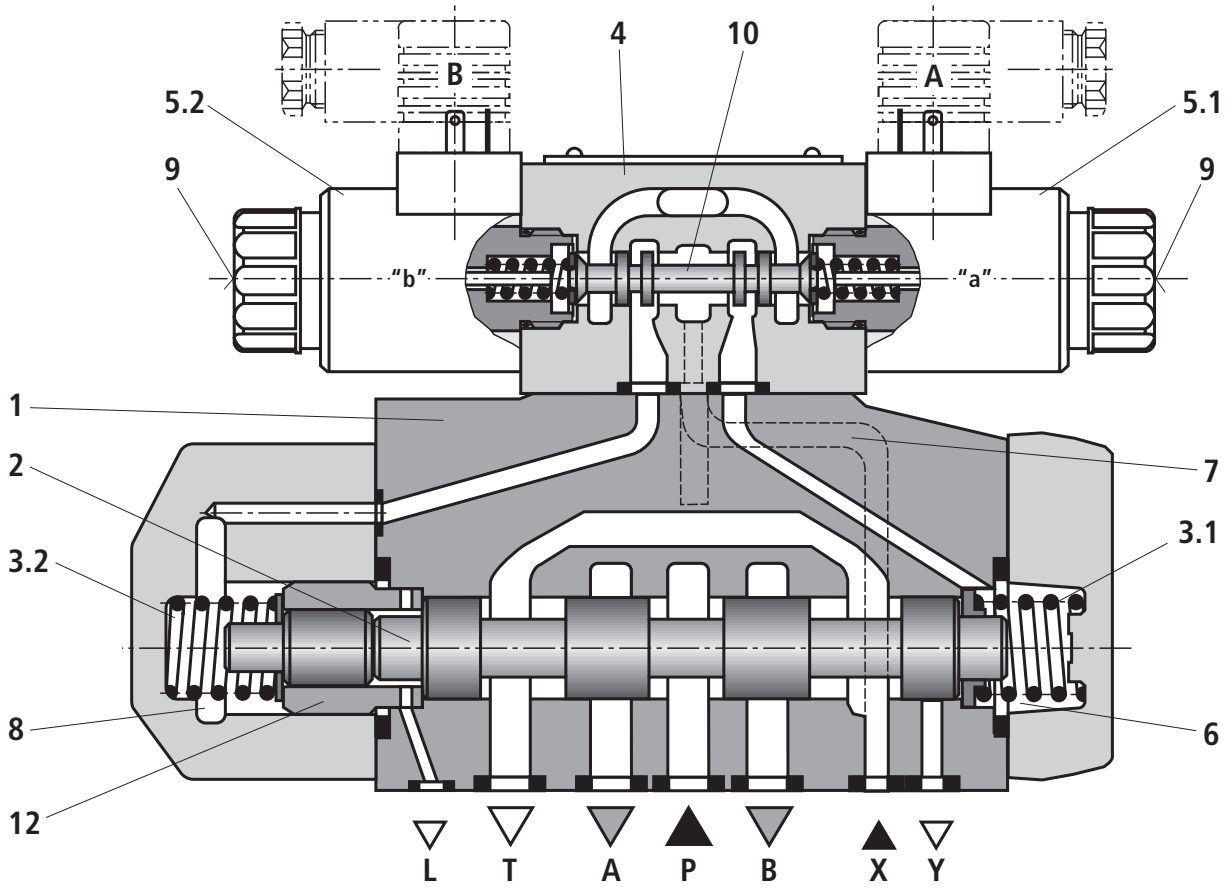
With this version, main control spool (2) is held by two return springs (3.1) and (3.2) in the zero position. The two spring chambers (6) and (8) are connected via reconnection plate (11) to ports X and Y.

When main control spool (2) is pressurized to pilot pressure on one of the two front faces, it is pushed to the operated position. The connections within the valve are established as required.

When the pressurized spool is depressurized, the spring on the opposite side causes the spool to be returned to the zero or initial position.

Pilot oil supply (sections A – A and B – B),
see pages 12 and 13.

Function, section: Type 4WEH…H



4/3 directional valves with pressure-centering of the main control spool, type 4WEH…H

Main control spool (2) in the main valve is held in the zero position through pressurization of the two spool faces. Centering bushing (12) is supported within the housing and holds the spool in position.

By depressurization of one spool face, main control spool (2) is brought to the operated position.

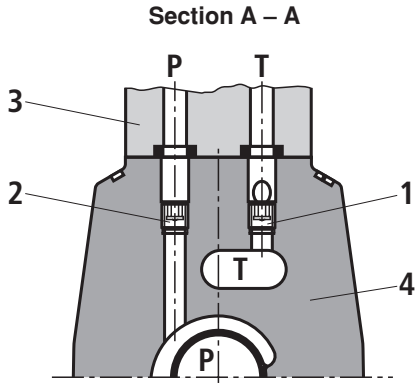
The unloaded spool area displaces the returning pilot oil via the pilot valve into channel Y (external).

☞ **Note!**

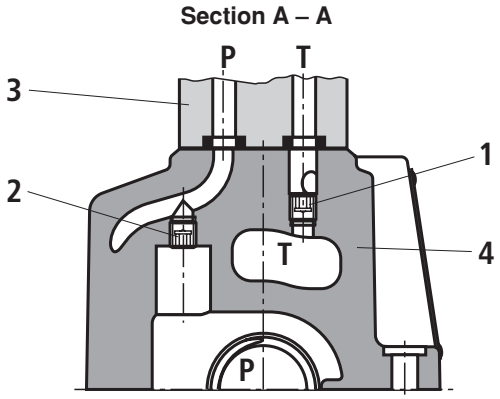
In this variant, springs (3.1) and (3.2) do not assume a return function. The hold the horizontally installed main control spool (2) in the central position when de-pressurized.

Pilot oil supply

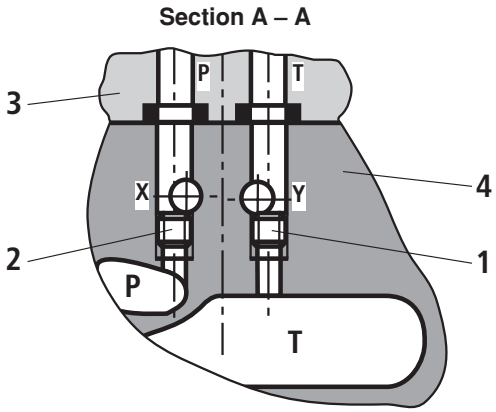
NG10



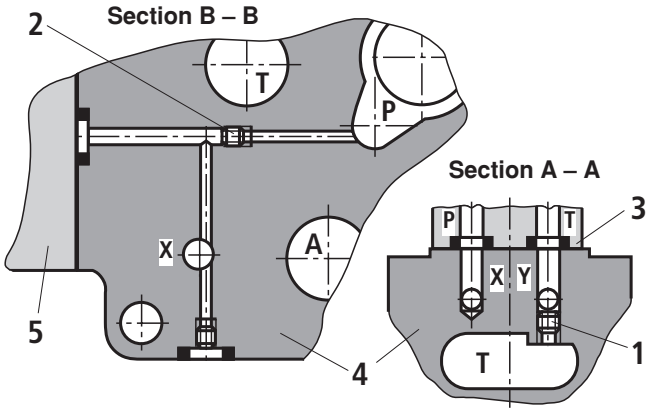
NG16



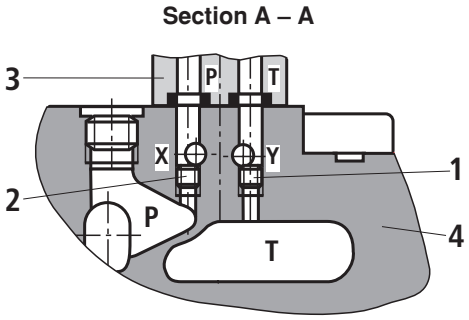
NG25 (type 4W.H **22** .7X/…)



NG25 (type 4W.H **25** .6X/…)



NG32



PIlot oil supply		**Pilot oil drain**	
External:	**2** closed	External:	**1** closed
internal:	**2** open	Internal:	**1** open

For further details and explanations of items, see next page.

Pilot oil supply

Type 4WH…

The pilot oil is supplied and drained **externally** via channels X and Y.

Type 4WEH…

The pilot oil is supplied **externally** - via channel X - from a separate pressure supply.

The pilot oil is drained **externally** - via channel Y - to the tank.

Type 4WEH…E…

The pilot oil is supplied **internally** from channel P of the main valve. (See page 15, footnotes [8] and [9])

The pilot oil is drained **externally** - via channel Y - to the tank. Port X in the subplate is plugged.

Type 4WEH…ET…

The pilot oil is supplied **internally** from channel P of the main valve.

The pilot oil is drained **internally** - via channel T - to the tank. Ports X and Y in the subplate are plugged.

Type 4WEH…T…

The pilot oil is supplied **externally** - via channel X - from a separate pressure supply.

The pilot oil is drained **internally** - via channel T - to the tank. Port Y in the subplate is plugged.

1 Plug screw M6, 3 A/F – pilot oil drain

2 Plug screw M6, 3 A/F – pilot oil supply

3 Pilot valve

4 Main valve

5 Cover

6 Throttle insert

Tightening torques M_T for cover mounting screws:

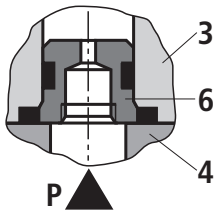
NG16: 35 Nm *[25.8 ft-lbs]*; **NG25**: 68 Nm *[50.2 ft-lbs]*

Tightening torques M_T for mounting screws of the pilot valve: **NG10 to 32**: 9 Nm *[6.6 ft-lbs]*

Throttle insert

The use of throttle insert (6) is required, if the pilot oil supply in channel P of the pilot valve is to be restricted (see below).

Throttle insert (6) is to be installed in channel P of the pilot valve.



⚠ Attention!

The pilot oil supply may only be changed by authorized specialists or in the factory!

– **External** pilot oil supply X or drain Y:
  - For NG10, version SO30 must be provided for the use of sandwich plates. Code SO30 must be entered at the end of the type designation (sandwich plate).
  - Make sure that the permissible maximum parameters of the pilot valve are not exceeded (see RE 23178)!
  - Maximum pilot pressure: Please observe page 14!

– Internal pilot oil **supply** (versions “ET“ and “E“):
  - Minimum pilot pressure: Please observe page 15!
  - To avoid impermissibly high pressure peaks, a **throttle insert “B10“** must be provided in port P of the pilot valve (see above) .
  - In conjunction with version “H-“, **pressure reducing valve “D3“** must be provided additionally (see page 36).

Technical data (for applications outside these parameters, please consult us!)

General

Sizes			NG	**10**	**16**	**25** 4W.H **22**	**25** 4W.H **25**	**32**
Weight, ca.	– Valve with one solenoid		kg *[lbs]*	6.4 *[14.1]*	8.5 *[18.7]*	11.5 *[25.3]*	17.6 *[38.8]*	17.6 *[38.8]*
	– Valve with two solenoids, spring-centered		kg *[lbs]*	6.8 *[15.0]*	8.9 *[19.6]*	11.9 *[26.2]*	19.0 *[41.9]*	41.0 *[90.4]*
	– Valve with two solenoids, pressure-centered		kg *[lbs]*	6.8 *[15.0]*	8.9 *[19.6]*	11.9 *[26.2]*	19.0 *[41.9]*	41.0 *[90.4]*
	– Valve with hydraulic actuation (type 4WH…)		kg *[lbs]*	5.5 *[12.1]*	7.3 *[16.1]*	10.5 *[23.1]*	16.5 *[36.4]*	39.5 *[87.1]*
	– Switching time adjustment		kg *[lbs]*	0.8 *[1.8]*	0.8 *[1.8]*	0.8 *[1.8]*	0.8 *[1.8]*	0.8 *[1.8]*
	– Pressure reducing valve		kg *[lbs]*	0.4 *[0.9]*	0.4 *[0.9]*	0.4 *[0.9]*	0.4 *[0.9]*	0.4 *[0.9]*
Installation position				Optional; horizontal in the case of valves with hydraulic spool return “H“ and spool symbols A, B, C, D, K, Z, Y				
Ambient temperature range			°C *[°F]*	–30 to +50 *[–22 to +122]*				
Storage temperature range			°C *[°F]*	–20 to +70 *[–4 to +158]*				
Surface protection (valve body)				Paint-coating, layer thickness max. 100 µm				

Hydraulic

Maximum operating pressure								
– Ports P, A, B	Type 4WEH		bar *[psi]*	280 *[4061]*	280 *[4061]*	280 *[4061]*	280 *[4061]*	280 *[4061]*
	Type H-4WEH		bar *[psi]*	350 *[5076]*	350 *[5076]*	350 *[5076]*	350 *[5076]*	350 *[5076]*
– Port T	Pilot oil drain Y external	Type 4WEH	bar *[psi]*	280 *[4061]*	250 *[3626]*	250 *[3626]*	250 *[3626]*	250 *[3626]*
		Type H-4WEH		315 *[4568]*	250 *[3626]*	250 *[3626]*	250 *[3626]*	250 *[3626]*
	Pilot oil drain Y internal [1]		bar *[psi]*	210 *[3046]* with DC voltage; 160 *[2320]* with AC voltage				
– Port Y	External pilot oil drain		bar *[psi]*	210 *[3046]* with DC voltage; 160 *[2320]* with AC voltage				
	Type 4WH		bar *[psi]*	250 *[3626]*	250 *[3626]*	210 *[3046]*	250 *[3626]*	250 *[3626]*
	Type H-4WH		bar *[psi]*	315 *[4568]*	315 *[4568]*	270 *[3916]*	315 *[4568]*	315 *[4568]*
Hydraulic fluid [2]				Mineral oil (HL, HLP) to DIN 51524 [3]; fast bio-degradable hydraulic fluids to VDMA 24568 (see also RE 90221); HETG (rape seed oil) [3]; HEPG (polyglycols) [4]; HEES (synthetic esters) [4]; other hydraulic fluids on request				
Hydraulic fluid temperature range			°C *[°F]*	–30 to +80 *[–22 to +176]* (NBR seals) –20 to +80 *[–4 to +176]* (FKM seals)				
Viscosity range			mm^2/s *[SUS]*	2,8 to 500 *[35 to 2320]*				
Permissible max. degree of contamination of the hydraulic fluid - cleanliness class to ISO 4406 (c)				Class 20/18/15 [5]				
Maximum pilot pressure [6]			bar *[psi]*	250 *[3626]*	250 *[3626]*	210 *[3046]*	250 *[3626]*	250 *[3626]*

Technical data (for applications outside these parameters, please consult us!)

Hydraulic

Size		NG	10	16	25 4W.H 22	25 4W.H 25	32
Minimum pilot pressure (see also characteristic curves on page 17)							
– Pilot oil supply X external, pilot oil supply X internal (with spools: D, K, E, J, L, M, Q, R, U, W)							
3-position valve, spring-centered	Type H-4WEH…	bar *[psi]*	10 *[145]*	14 *[203]*	12,5 *[181]*	13 *[188]*	8,5 *[123]*
	Type 4WEH…	bar *[psi]*	10 *[145]*	14 *[203]*	10,5 *[152]*	13 *[188]*	8,5 *[123]*
3-position valve, pressure-centered		bar *[psi]*	–	14 *[203]*	–	18 *[261]*	8,5 *[123]*
2-position valve with spring end position	Type H-4WEH…	bar *[psi]*	10 *[145]*	14 *[203]*	14 *[203]*	13 *[188]*	10 *[145]*
	Type 4WEH…	bar *[psi]*	10 *[145]*	14 *[203]*	11 *[159]*	13 *[188]*	10 *[145]*
2-position valve with hydraulic end position		bar *[psi]*	7 *[101]*	14 *[203]*	8 *[116]*	8 *[116]*	5 *[72]*
– Pilot oil supply X internal (with spools C, F, G, H, P, T, V, Z, S [7])		bar *[psi]*	4.5 *[65]* [8]	4.5 *[65]* [9]	4.5 *[65]* [9]	4.5 *[65]* [9]	4.5 *[65]* [9]

[1] With 3-position valve, pressure-centering is only possible, if $p_{St} \geq 2 \times p_{Tank} + p_{St\,min}$.

[2] The ignition temperature of the process and operating medium used must be higher than the maximum solenoid surface temperature.

[3] Suitable for NBR **and** FKM seals

[4] Suitable **only** for FKM seals

[5] The cleanliness classes specified for components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, prolongs the service life of components.

For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

[6] – Internal pilot oil **supply**:

- In the case of a higher pilot pressure, a pressure reducing valve “D3“ must be used.
- In conjunction with version “H-“, **pressure reducing valve “D3“** must be provided additionally. (If not used, pilot pressure = operating pressure in the port)

– External pilot oil **supply**:

- In conjunction with version “H-“, the adherence to the maximum pilot pressure must be ensured by taking suitable measures (e.g. installation of a pressure relief valve to protect the separate pilot oil circuit)!

[7] Spool S only for NG16

[8] With symbols C, F, G, H, P, T, V, Z, an internal pilot oil supply is only possible, if the flow from P to T in the central position (with 3-position valve) or while passing the central position (with 2-position valve) is so high that the pressure differential from P to T reaches a value of at least 6.5 bar *[94 psi]*.

[9] For spools C, F, G, J, H, P, T, V, Z, S [7] – by means of pre-load valve (not NG10) or correspondingly greater flow. (For the establishment of the required flow, see characteristic curves “Pre-load valve“ on page 37.)

Technical data (for applications outside these parameters, please consult us!)

Hydraulic

Size		NG	**10**	**16**	**25** 4W.H **22**	**25** 4W.H **25**	**32**
Pilot oil volume for switching process							
– 3-position valve, spring-centered		cm³ *[inch³]*	2.04 *[0.124]*	5.72 *[0.349]*	7.64 *[0.466]*	14.2 *[0.866]*	29.4 *[1.794]*
– 2-position valve		cm³ *[inch³]*	4.08 *[0.249]*	11.45 *[0.699]*	15.28 *[0.932]*	28.4 *[1.733]*	58.8 *[3.588]*
– 3-position valve, pressure-centered							
from zero position to spool position “a“	Type WH	cm³ *[inch³]*	–	2.83 *[0.173]*	–	7.15 *[0.436]*	14.4 *[0.879]*
	Type WEH	cm³ *[inch³]*	–	2.83 *[0.173]*	–	7.15 *[0.436]*	14.4 *[0.879]*
from spool position “a“ to zero position	Type WH	cm³ *[inch³]*	–	5.72 *[0.349]*	–	14.18 *[0.865]*	29.4 *[1.794]*
	Type WEH	cm³ *[inch³]*	–	2.9 *[0.177]*	–	7.0 *[0.427]*	15.1 *[0.921]*
from zero position to spool position “b“	Type WH	cm³ *[inch³]*	–	5.72 *[0.349]*	–	14.18 *[0.865]*	29.4 *[1.794]*
	Type WEH	cm³ *[inch³]*	–	5.72 *[0.349]*	–	14.15 *[0.863]*	29.4 *[1.794]*
from spool position “b“ to zero position	Type WH	cm³ *[inch³]*	–	8.55 *[0.522]*	–	19.88 *[1.213]*	43.8 *[2.673]*
	Type WEH	cm³ *[inch³]*	–	2.83 *[0.173]*	–	5.73 *[0.349]*	14.4 *[0.879]*
Pilot oil flow for shortest switching time, ca.		l/min *[US gpm]*	35 *[9.2]*	35 *[9.2]*	35 *[9.2]*	35 *[9.2]*	45 *[11.9]*

Switching times (= closing of contact on the pilot valve until the control land starts to open in the main valve and change of spool stroke by 95%)

Pilot pressure		bar *[psi]*	70 *[1015]*	210 *[3046]*	250 *[3626]*	Spring
			ON			OFF
NG10	– Without throttle insert	ms	40 to 60	–	40 to 60	20 to 30
	– With throttle insert	ms	60 to 90	–	50 to 70	20 to 30
NG16	– Without throttle insert	ms	50 to 80	–	40 to 60	50 to 80
	– With throttle insert	ms	110 to 130	–	80 to 100	50 to 80
NG25 (4W.H **22)**	– Without throttle insert	ms	40 to 70	40 to 60	–	50 to 70
	– With throttle insert	ms	140 to 160	80 to 110	–	50 to 70
NG25 (4W.H **25)**	– Without throttle insert	ms	70 to 100	–	50 to 70	100 to 130
	– With throttle insert	ms	200 to 250	–	120 to 150	100 to 130
NG32	– Without throttle insert	ms	80 to 130	–	70 to 100	140 to 160
	– With throttle insert	ms	420 to 560	–	230 to 350	140 to 160

☞ **Notes!**

– The switching times are measured in accordance with ISO 6403 with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*. At different oil temperatures, deviations are possible!

– The switching times were established using DC voltage solenoids. They are reduced by ca. 20 ms when AC voltage solenoids are used.

– The de-energization of the solenoid generates voltage peaks, which can be prevented by installing suitable diodes.

– When pressure reducing valve “D3“ is used, the switching times increase by ca. 30 ms.

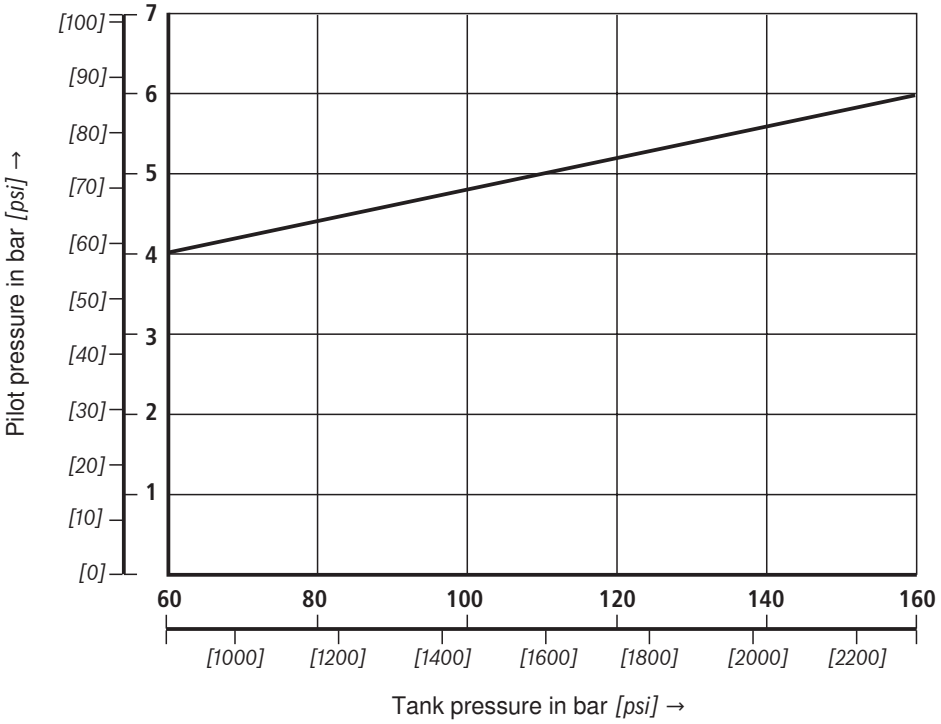
– The switching times were established under ideal conditions and can deviate within the system depending on the operating conditions.

Free flow cross-sections in zero position with spools Q, V and W

Size		NG	**10**	**16**	**25** 4W.H **22**	**25** 4W.H **25**	**32**
Spool **Q**	A – T; B – T	mm² *[inch²]*	13 *[0.02]*	32 *[0.05]*	78 *[0.121]*	83 *[0.129]*	78 *[0.121]*
Spool **V**	P – A; P – B	mm² *[inch²]*	13 *[0.02]*	32 *[0.05]*	73 *[0.113]*	83 *[0.129]*	73 *[0.113]*
	A – T; B – T	mm² *[inch²]*	13 *[0.02]*	32 *[0.05]*	84 *[0.13]*	83 *[0.129]*	84 *[0.13]*
Spool **W**	A – T; B – T	mm² *[inch²]*	2,4 *[0.004]*	6 *[0.009]*	10 *[0.015]*	14 *[0.022]*	20 *[0.031]*

Characteristic curves (measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

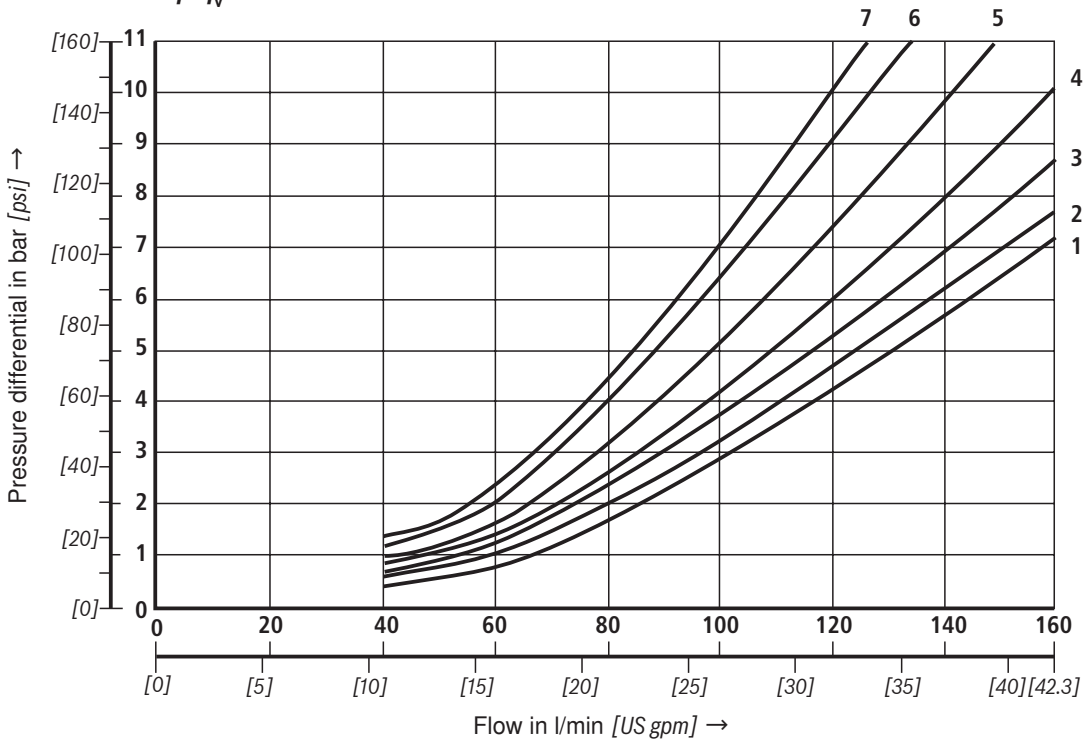
Minimum pilot pressure in dependence on tank pressure



At a higher tank pressure the minimum pilot pressure must be raised in accordance with this diagram.

Characteristic curves: NG10 (measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

Δp-q_V characteristic curves



Spool	Spool position				Spool	Zero position		
	P – A	P – B	A – T	B – T		A – T	B – T	P – T
E, Y, D	2	2	4	5				
F	1	4	1	4	**F**	3	–	6
G, T	4	2	2	6	**G, T**	–	–	7
H, C	4	4	1	4	**H**	1	3	5
J, K	1	2	1	3				
L	2	3	1	4	**L**	3	–	–
M	4	4	3	4				
P	4	1	3	4	**P**	–	7	5
Q, V, W, Z	2	2	3	5				
R	2	2	3	–				
U	3	3	3	4	**U**	–	4	–
A, B	2	2	–	–				

Performance limits: NG10 (measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

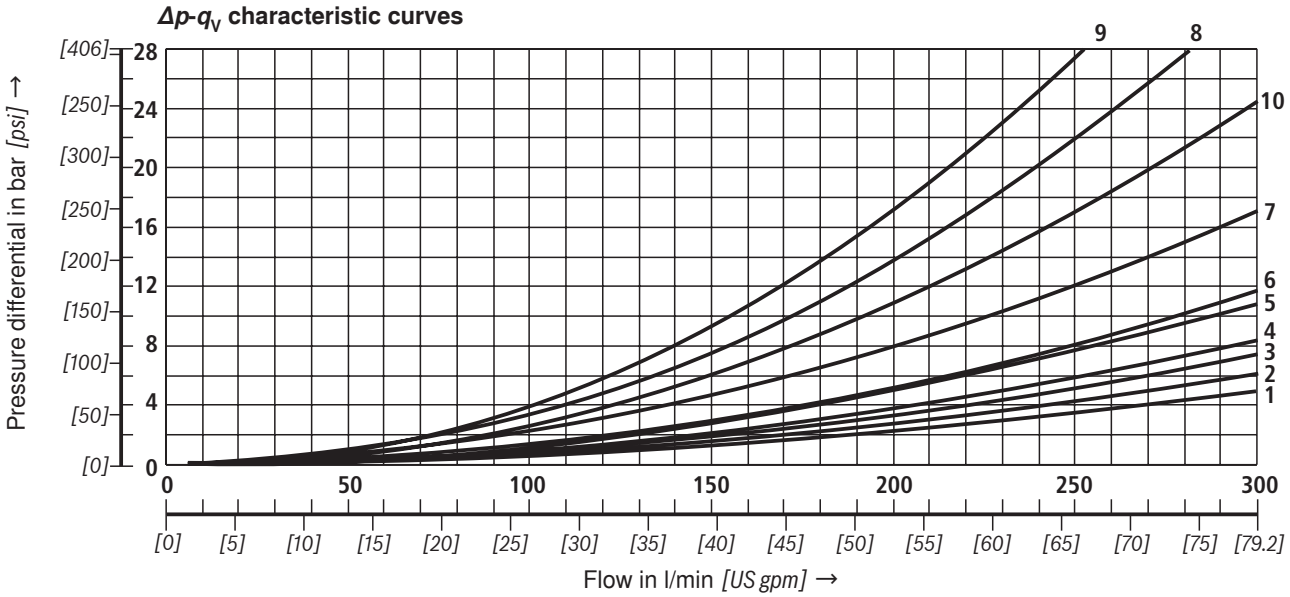
2-position valves – $q_{V\,max}$ in l/min *[US gpm]*

Spool	Operating pressure p_{max} in bar *[psi]*		
	200 *[2900]*	**250** *[3626]*	**315** *[4568]*
E, J, L, M, Q, R, U, V, W, C, D, K, Z, Y	160 *[42]*	160 *[42]*	160 *[42]*
H	160 *[42]*	150 *[39]*	120 *[32]*
G, T	160 *[42]*	160 *[42]*	140 *[37]*
F, P	160 *[42]*	140 *[37]*	120 *[32]*

⚠ **Attention!**

Important notes - see page 26!

Characteristic curves: NG16 (measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)



Spool	Spool position				Zero position		
	P – A	P – B	A – T	B – T	P – T	A – T	B – T
D, E	1	1	3	3			
F	1	2	5	5	4	3	–
G	4	1	5	5	7	–	–
C, H	1	1	5	6	2	4	4
K, J	2	2	6	6	–	3	–
L	2	2	5	4	–	3	–
M	1	1	3	4			
P	2	1	3	6	5	–	–

Spool	Spool position				Zero position		
	P – A	P – B	A – T	B – T	P – T	A – T	B – T
Q	1	1	6	6			
R	2	4	7	–			
S	3	3	3	–	9	–	–
T	4	1	5	5	7	–	–
U	2	2	3	6			
V, Z	1	1	6	6	10	8	8
W	1	1	3	4			

Performance limits: NG16 (measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

2-position valves – $q_{V\,max}$ in l/min *[US gpm]*

Spool	Operating pressure p_{max} in bar *[psi]*				
	70 *[1015]*	140 *[2030]*	210 *[3046]*	280 *[4061]*	350 *[5076]*
X external – spring end position in main valve (at $p_{St\,min}$ = 12 bar *[174 psi]*)					
C, D, K, Y, Z	300 *[79]*	300 *[79]*	300 *[79]*	300 *[79]*	300 *[79]*
X external – spring end position in main valve [1]					
C	300 *[79]*	300 *[79]*	300 *[79]*	300 *[79]*	300 *[79]*
D, Y	300 *[79]*	270 *[71]*	260 *[68]*	250 *[66]*	230 *[60]*
K	300 *[79]*	250 *[66]*	240 *[63]*	230 *[60]*	210 *[55]*
Z	300 *[79]*	260 *[68]*	190 *[50]*	180 *[47]*	160 *[42]*
X external – hydraulic end position in main valve					
HC, HD, HK, HZ, HY	300 *[79]*	300 *[79]*	300 *[79]*	300 *[79]*	300 *[79]*

3-position valves – $q_{V\,max}$ in l/min *[US gpm]*

Spool	Operating pressure p_{max} in bar *[psi]*				
	70 *[1015]*	140 *[2030]*	210 *[3046]*	280 *[4061]*	350 *[5076]*
X external – spring-centered					
E, H, J, L, M, Q, U, W, R	300 *[79]*	300 *[79]*	300 *[79]*	300 *[79]*	300 *[79]*
F, P	300 *[79]*	250 *[66]*	180 *[47]*	170 *[45]*	150 *[39]*
G, T	300 *[79]*	300 *[79]*	240 *[63]*	210 *[55]*	190 *[50]*
S	300 *[79]*	300 *[79]*	300 *[79]*	250 *[66]*	220 *[58]*
V	300 *[79]*	250 *[66]*	210 *[55]*	200 *[53]*	180 *[47]*
X external – pressure-centered (at minimum pilot pressure of 16 bar *[232 psi]*)					
All spools [2]	300 *[79]*	300 *[79]*	300 *[79]*	300 *[79]*	300 *[79]*

⚠ Attention!

[1] When the specified flow values are exceeded, the function of the return springs can no longer be guaranteed in the event of a pilot pressure failure!

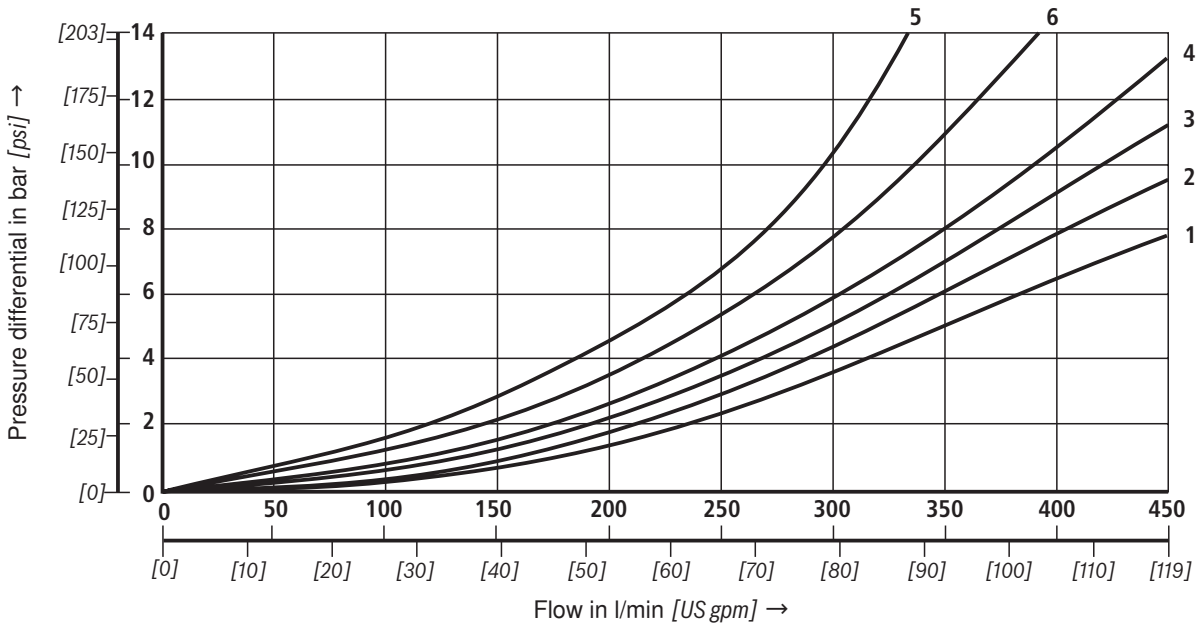
[2] With spool V , the pilot valve is not required in the case of flows > 160 l/min *[42 US gpm]*.

For further important notes, see page 26!

Characteristic curves: NG25 (type W.H **22**)

(measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

Δp-q_V characteristic curves



Spool	Spool position				
	P – A	P – B	A – T	B – T	B – A
E, M, P, Q, U, V, Z, C	2	2	1	4	–
F	1	2	1	2	–
G, T	2	2	2	4	–
H, J, W, K, D	2	2	1	3	–
L	2	2	1	2	–
R	1	2	1	–	5
A, B	2	2	–	–	–

Spool	Zero position		
	A – T	B – T	P – T
F	–	–	4
G, P	–	–	6
H	–	–	2
L	4	–	–
T	–	–	5
U	–	6	–

Performance limits: NG25 (type W.H **22**)
(measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

2-position valves – $q_{V\,max}$ in l/min *[US gpm]*

Spool	Operating pressure p_{max} in bar *[psi]*				
	70 *[1015]*	**140** *[2030]*	**210** *[3046]*	**280** *[4061]*	**350** *[5076]*
X external – spring end position in main valve (at $p_{St\,min}$ = 11 bar / 14 bar *[159 / 203 psi]*)					
C, D, K, Y, Z	450 *[119]*	450 *[119]*	450 *[119]*	450 *[119]*	450 *[119]*
X external – spring end position in main valve [1]					
C	450 *[119]*	450 *[119]*	320 *[84]*	250 *[66]*	200 *[53]*
D, Y	450 *[119]*	450 *[119]*	450 *[119]*	400 *[105]*	320 *[84]*
K	450 *[119]*	215 *[57]*	150 *[39]*	120 *[32]*	100 *[26]*
Z	350 *[92]*	300 *[79]*	290 *[76]*	260 *[68]*	160 *[42]*
X external – hydraulic end position in main valve					
HC, HD, HK, HZ, HY	450 *[119]*	450 *[119]*	450 *[119]*	450 *[119]*	450 *[119]*
HC./O…, HD./O…, HK./O…, HZ./O…	450 *[119]*	450 *[119]*	450 *[119]*	450 *[119]*	450 *[119]*
HC./OF…, HD./OF…, HK./OF…, HZ./OF…	450 *[119]*	450 *[119]*	450 *[119]*	450 *[119]*	450 *[119]*

3-position valves – $q_{V\,max}$ in l/min *[US gpm]*

Spool	Operating pressure p_{max} in bar *[psi]*				
	70 *[1015]*	**140** *[2030]*	**210** *[3046]*	**280** *[4061]*	**350** *[5076]*
X external – spring-centered					
E, J, L, M, Q, U, W, R	450 *[119]*	450 *[119]*	450 *[119]*	450 *[119]*	450 *[119]*
H	450 *[119]*	450 *[119]*	300 *[79]*	260 *[68]*	230 *[61]*
G	400 *[105]*	350 *[92]*	250 *[66]*	200 *[53]*	180 *[47]*
F	450 *[119]*	270 *[71]*	175 *[46]*	130 *[34]*	110 *[29]*
V	450 *[119]*	300 *[79]*	240 *[63]*	220 *[58]*	160 *[42]*
T	400 *[105]*	300 *[79]*	240 *[63]*	200 *[53]*	160 *[42]*
P	450 *[119]*	270 *[71]*	180 *[47]*	170 *[45]*	110 *[29]*

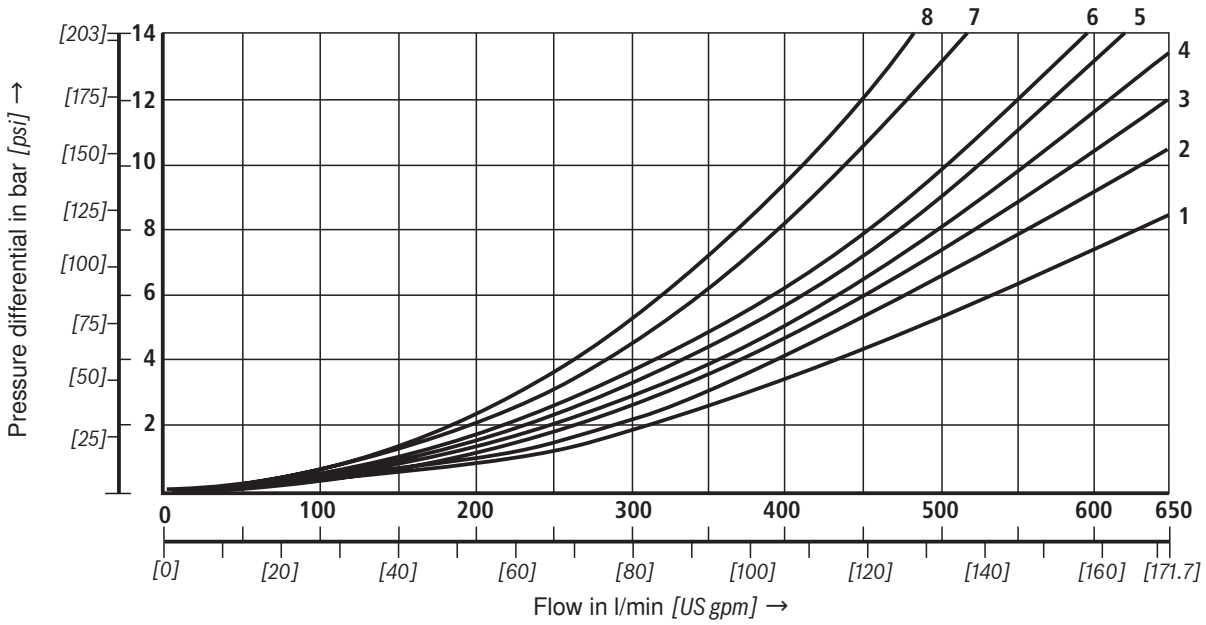
⚠ Attention!

[1] When the specified flow values are exceeded, the function of the return springs can no longer be guaranteed in the event of a pilot pressure failure!

For further important notes, see page 26!

Characteristic curves: NG25 (type W.H **25**)
(measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

***Δp-q*$_V$ characteristic curves**



Spool	Spool position			
	P – A	P – B	A – T	B – T
E, C	1	1	1	3
F	1	4	3	3
G	3	1	2	4
H, D	4	4	3	4
J, Q, K	2	2	3	5
L	2	2	3	3
M	4	4	1	4

Spool	Spool position				
	P – A	P – B	A – T	B – T	B – A
P	4	1	1	5	–
R	2	1	1	–	8
U	4	1	1	6	–
V, Z	2	4	3	6	–
W	1	1	1	3	–
T	3	1	2	4	–

7 Spool G, central position P – T

8 Spool T, central position P – T

Performance limits: NG25 (type W.H **25**)
(measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

2-position valves – $q_{V\,max}$ in l/min *[US gpm]*

Spool	Operating pressure p_{max} in bar *[psi]*				
	70 *[1015]*	**140** *[2030]*	**210** *[3046]*	**280** *[4061]*	**350** *[5076]*
X external – spring end position in main valve (at $p_{St\,min}$ = 13 bar *[188 psi]*)					
C, D, K, Y, Z	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*	650 *[172]*
X external – spring end position in main valve [1)]					
C	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*	650 *[172]*
D, Y	700 *[185]*	650 *[172]*	400 *[105]*	350 *[92]*	300 *[79]*
K	700 *[185]*	650 *[172]*	420 *[111]*	370 *[98]*	320 *[84]*
Z	700 *[185]*	700 *[185]*	650 *[172]*	480 *[127]*	400 *[105]*
X external – hydraulic end position in main valve					
HC, HD, HK, HZ, HY	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*
HC./O…, HD./O…, HK./O…, HZ./O…	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*
HC./OF…, HD./OF…, HK./OF…, HZ./OF…	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*

3-position valves – $q_{V\,max}$ in l/min *[US gpm]*

Spool	Operating pressure p_{max} in bar *[psi]*				
	70 *[1015]*	**140** *[2030]*	**210** *[3046]*	**280** *[4061]*	**350** *[5076]*
X external – spring-centered					
E, L, M, Q, U, W	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*	650 *[172]*
G, T	400 *[105]*	400 *[105]*	400 *[105]*	400 *[105]*	400 *[105]*
F	650 *[172]*	550 *[145]*	430 *[113]*	330 *[87]*	300 *[79]*
H	700 *[185]*	650 *[172]*	550 *[145]*	400 *[105]*	360 *[95]*
J	700 *[185]*	700 *[185]*	650 *[172]*	600 *[158]*	520 *[137]*
P	650 *[172]*	550 *[145]*	430 *[113]*	330 *[87]*	300 *[79]*
V	650 *[172]*	550 *[145]*	400 *[105]*	350 *[92]*	310 *[82]*
R	700 *[185]*	700 *[185]*	700 *[185]*	650 *[172]*	580 *[153]*
X external – pressure-centered (at minimum pilot pressure of 18 bar *[261 psi]*)					
E, F, H, J, L, M, P, Q, R, U, V, W	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*	650 *[172]*
G, T	400 *[105]*	400 *[105]*	400 *[105]*	400 *[105]*	400 *[105]*
X external – pressure-centered (at pilot pressure > 30 bar *[435 psi]*)					
G, T	700 *[185]*	700 *[185]*	700 *[185]*	700 *[185]*	650 *[172]*

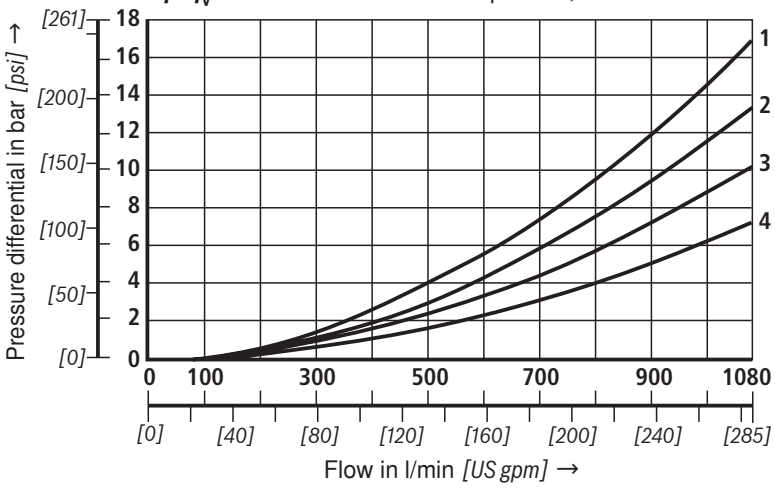
⚠ Attention!

[1)] When the specified flow values are exceeded, the function of the return springs can no longer be guaranteed in the event of a pilot pressure failure!

For further important notes, see page 26!

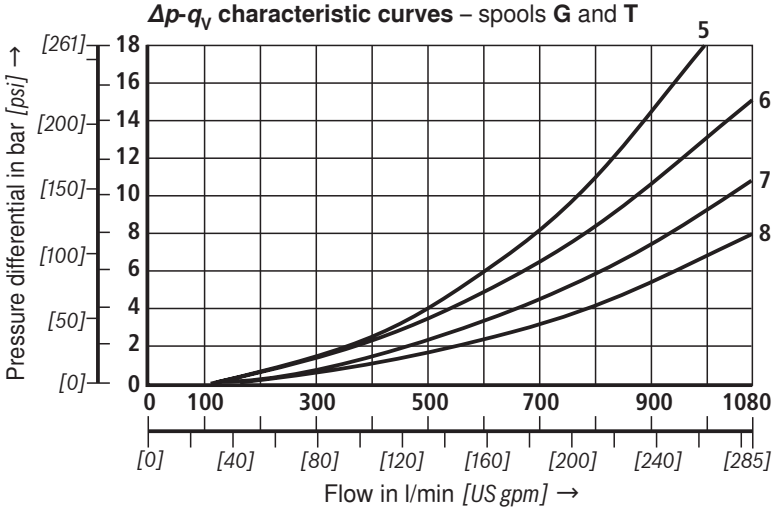
Characteristic curves: NG32 (measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

Δp-q_V characteristic curves – spools **E**, **R** and **W**



Spool	Spool position				
	P – A	P – B	A – T	B – T	B – A
E	4	4	3	2	–
R	4	4	3	–	1
W	4	4	3	2	–

Δp-q_V characteristic curves – spools **G** and **T**



Spool	Spool position				
	P – A	P – B	A – T	B – T	P – T
G	7	8	7	5	6
T	7	8	7	5	6

Performance limits: NG32 (measured with HLP46, ϑ_{oil} = 40 °C ±5 °C *[104 °F ±9 °F]*)

2-position valves – $q_{V\,max}$ in l/min *[US gpm]*

Spool	Operating pressure p_{max} in bar *[psi]*				
	70 *[1015]*	**140** *[2030]*	**210** *[3046]*	**280** *[4061]*	**350** *[5076]*
X external – spring end position in main valve (at $p_{St\,min}$ = 10 bar *[145 psi]*)					
C, D, K, Y, Z	1100 *[290]*	1040 *[275]*	860 *[227]*	750 *[198]*	680 *[179]*
X external – spring end position in main valve [1]					
C	1100 *[290]*	1040 *[275]*	860 *[227]*	800 *[211]*	700 *[185]*
D, Y	1100 *[290]*	1040 *[275]*	540 *[142]*	480 *[127]*	420 *[111]*
K	1100 *[290]*	1040 *[275]*	860 *[227]*	500 *[132]*	450 *[119]*
Z	1100 *[290]*	1040 *[275]*	860 *[227]*	700 *[185]*	650 *[172]*
X external – hydraulic end position in main valve					
HC, HD, HK, HZ, HY	1100 *[290]*	1040 *[275]*	860 *[227]*	750 *[198]*	680 *[179]*

3-position valves – $q_{V\,max}$ in l/min *[US gpm]*

Spool	Operating pressure p_{max} in bar *[psi]*				
	70 *[1015]*	**140** *[2030]*	**210** *[3046]*	**280** *[4061]*	**350** *[5076]*
X external – spring-centered					
E, J, L, M, Q, R, U, W	1100 *[290]*	1040 *[275]*	860 *[227]*	750 *[198]*	680 *[179]*
G, T, H, F, P	900 *[238]*	900 *[238]*	800 *[211]*	650 *[172]*	450 *[119]*
V	1100 *[290]*	1000 *[264]*	680 *[179]*	500 *[132]*	450 *[119]*
X external – pressure-centered (at minimum pilot pressure 8,5 bar *[123 psi]*)					
All spools	1100 *[290]*	1040 *[275]*	860 *[227]*	750 *[198]*	680 *[179]*

⚠ Attention!

[1] When the specified flow values are exceeded, the function of the return springs can no longer be guaranteed in the event of a pilot pressure failure!

For further important notes, see page 26!

Performance limits: Important notes

General:

⚠ Attention!

The specified switching performance limits are valid for operation with two directions of flow (e.g. from P to A and simultaneous return flow from B to T in the ratio of 1:1).

Due to the flow forces acting within the valve, the permissible switching performance limits may be considerably lower with only one direction of flow (e.g. from P to A while port B is blocked with flow in only one direction or different flows)!

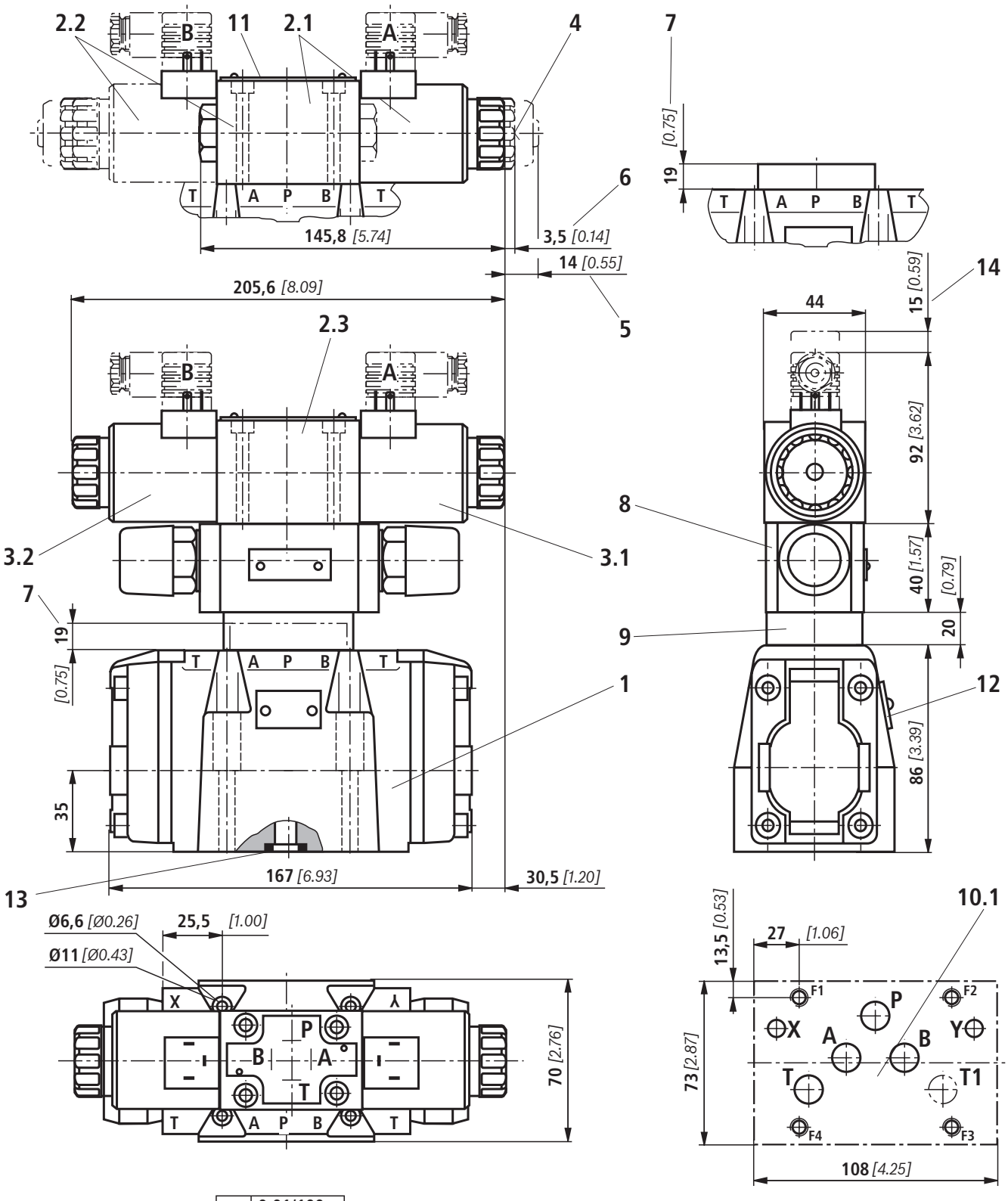
In the case of such applications, please consult us!

The switching performance limit was established when the solenoids were at operating temperature, at 10% undervoltage and without tank pre-loading.

⚠ Attention!

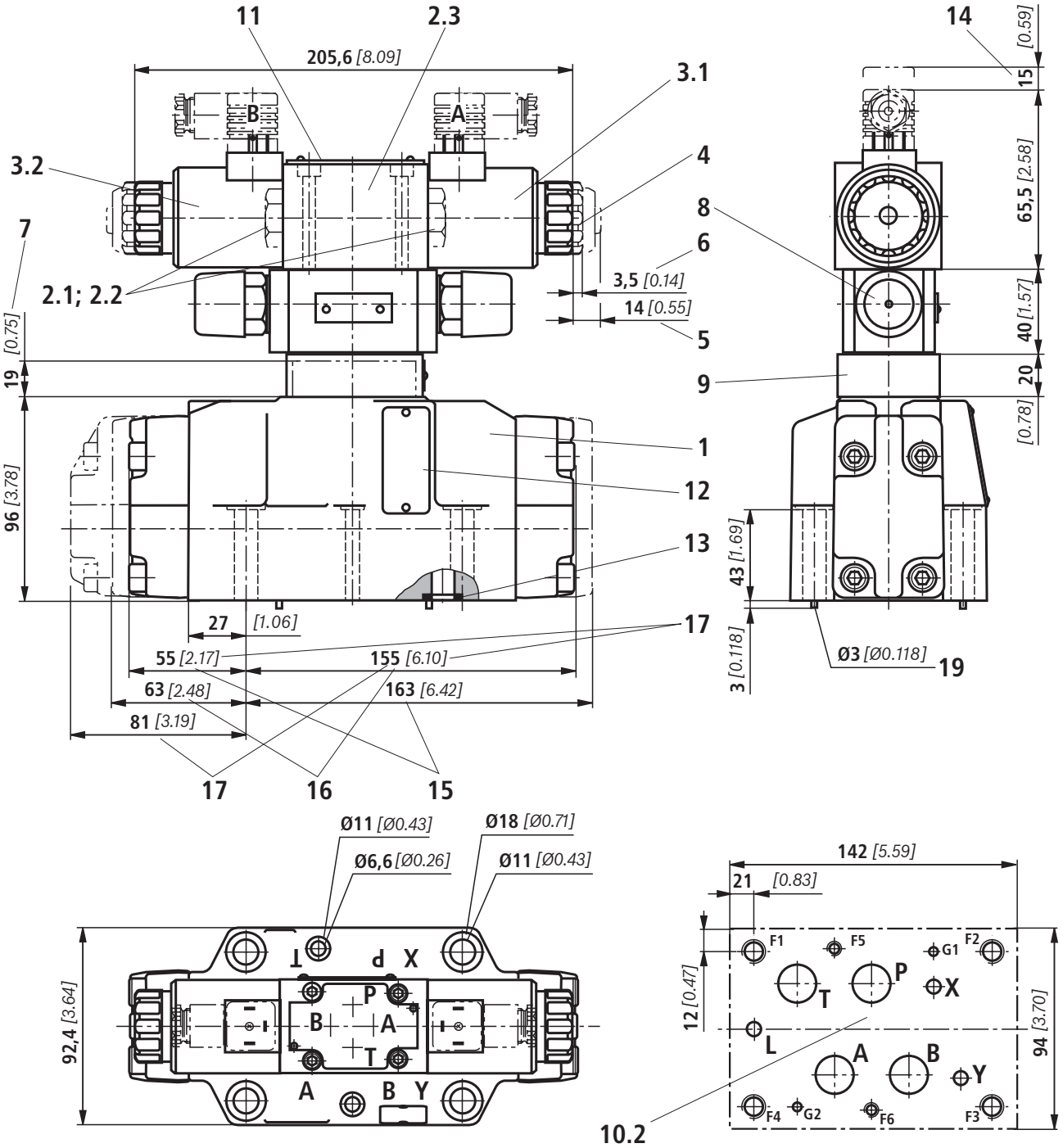
NG16	– With **X internal** pilot oil supply, a pre-load valve must be used at flows < 160 l/min *[42 US gpm]* due to the negative overlap of spools C, Z and HC, HZ. – When 4/3 directional valves with pressure-centered control spool in the main valve are used beyond the specified performance limit, a higher pilot pressure is required. At, for example, an operating pressure of p_{max} = 350 bar *[5076 psi]* and a flow of q_V = 300 l/min *[79 US gpm]* a pilot pressure of 16 bar *[232 psi]* is required. The maximum flow for these valves therefore depends on the Δp value, which is acceptable for the system. – With **X internal** pilot oil supply, a pre-load valve must generally be used (see page 37) due to the negative overlap of spools F, G, H, J, P, S, and T.
NG25	– With **X internal** pilot oil supply, a pre-load valve must be used at flows < 180 l/min *[47.5 US gpm]* due to the negative overlap of spools Z, HZ, and V. – With **X internal** pilot oil supply, a pre-load valve must generally be used due to the negative overlap of spools C, HC, F, G, H, P, and T.
NG32	– With **X internal** pilot oil supply, a pre-load valve must be used at flows < 180 l/min *[47.5 US gpm]* due to the negative overlap of spools Z, HZ, and V. – When 4/3 directional valves with pressure-centered control spool in the main valve are used beyond the specified performance limit, a higher pilot pressure is required. At, for example, an operating pressure of p_{max} = 350 bar *[5076 psi]* and a flow of q_V = 1100 l/min *[290 US gpm]* a pilot pressure of 15 bar *[217 psi]* is required. The maximum flow for these valves therefore depends on the Δp value, which is acceptable for the system. – With **X internal** pilot oil supply, a pre-load valve must generally be used due to the negative overlap of spools C, HC, F, G, H, P and T.

Unit dimensions: NG10 (dimensions in mm *[inch]*)

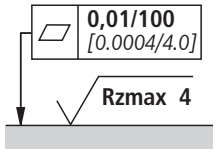


For the explanation of items and subplates, see page 32.
For valve mounting screws, see page 33.

Unit dimensions: NG16 (dimensions in mm *[inch]*)

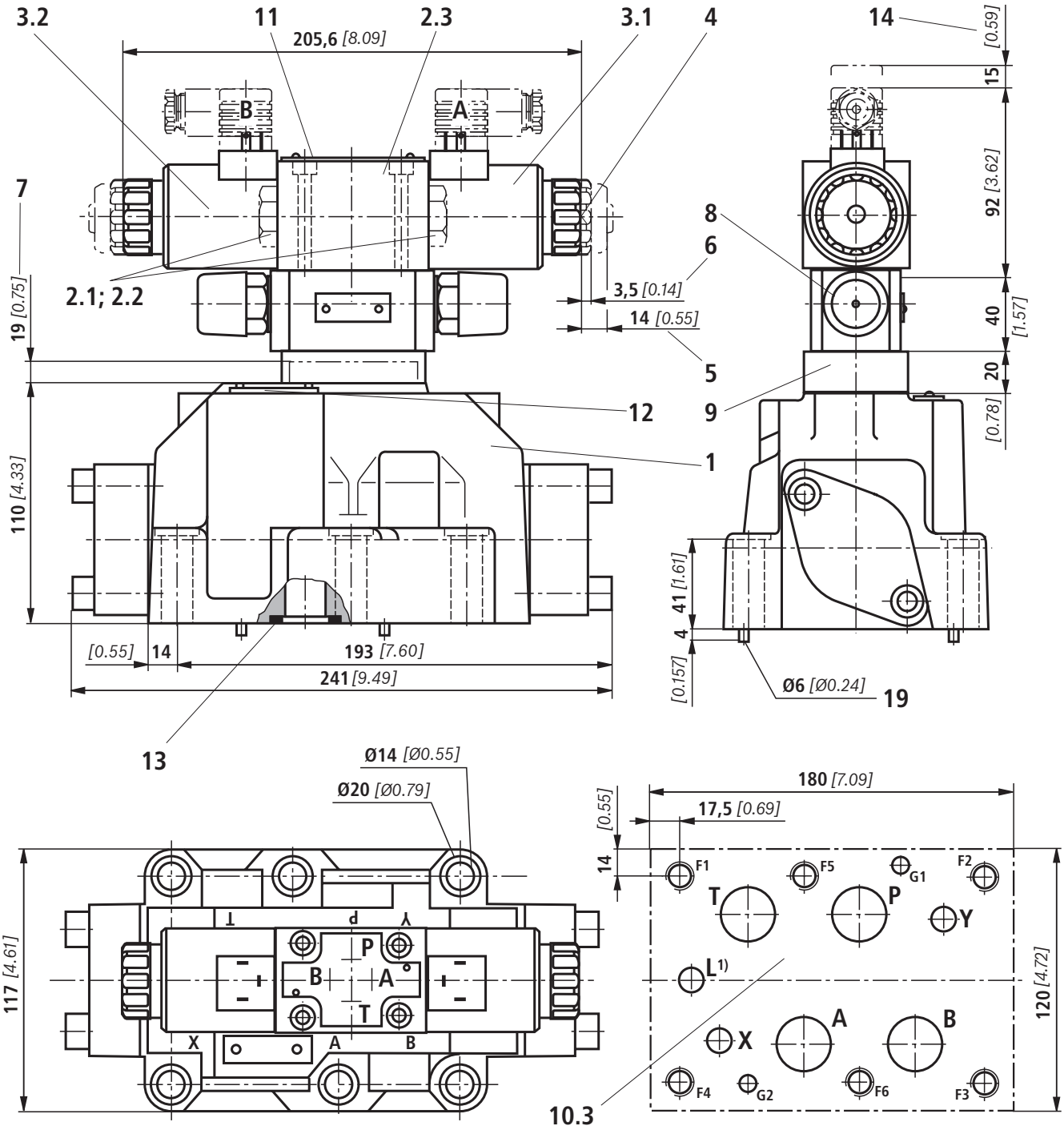


For the explanation of items and subplates, see page 32.
For valve mounting screws, see page 33.



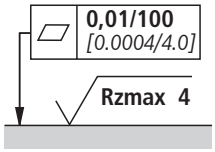
Required surface quality
of the valve mounting face

Unit dimensions: NG25 (type W.H **22**) (dimensions in mm *[inch]*)



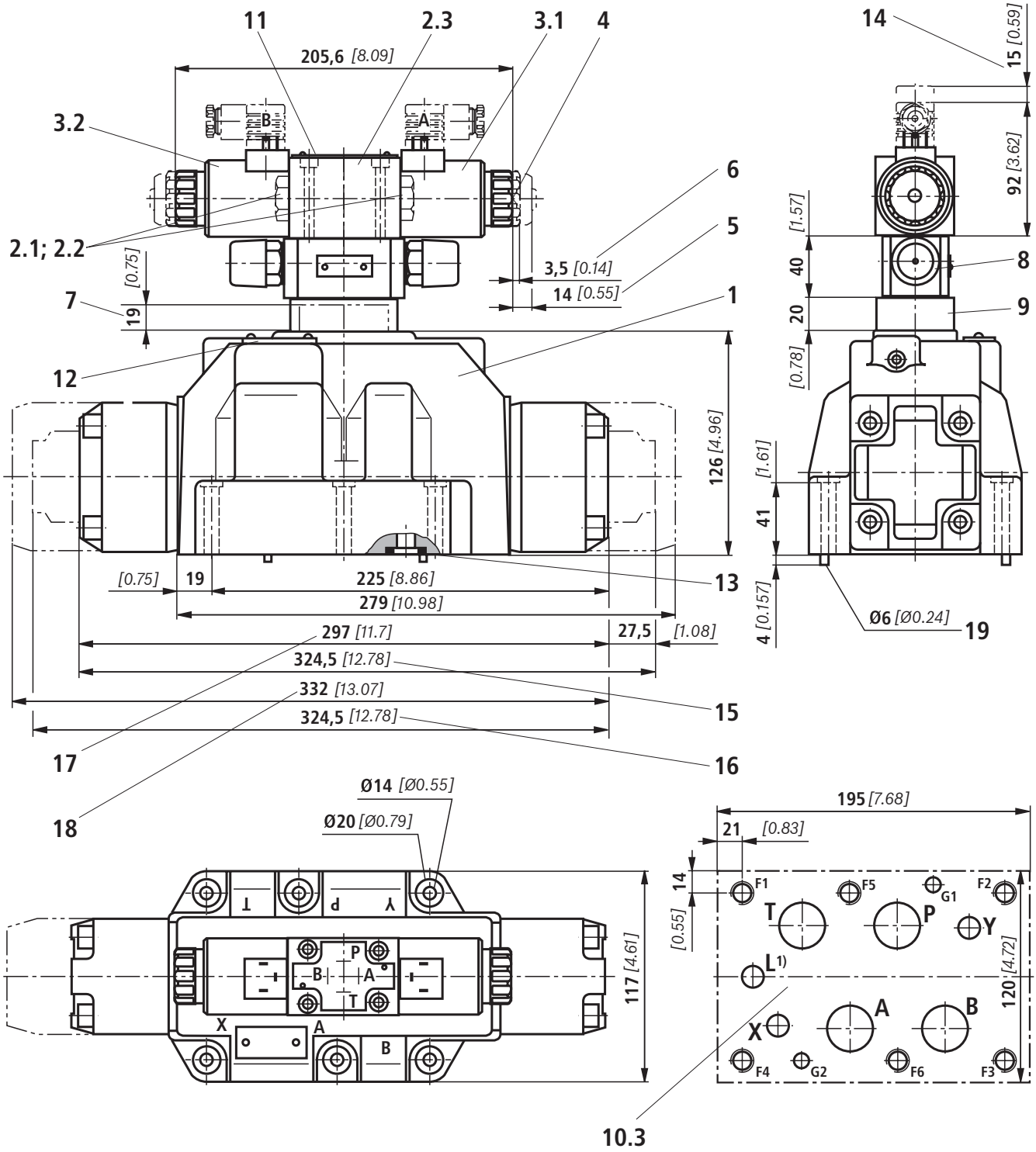
1) Port L only on valves with pressure-centered zero position

For the explanation of items and subplates, see page 32.
For valve mounting screws, see page 33.



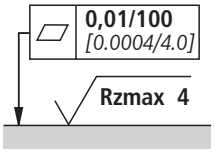
Required surface quality
of the valve mounting face

Unit dimensions: NG25 (type W.H **25**) (dimensions in mm *[inch]*)



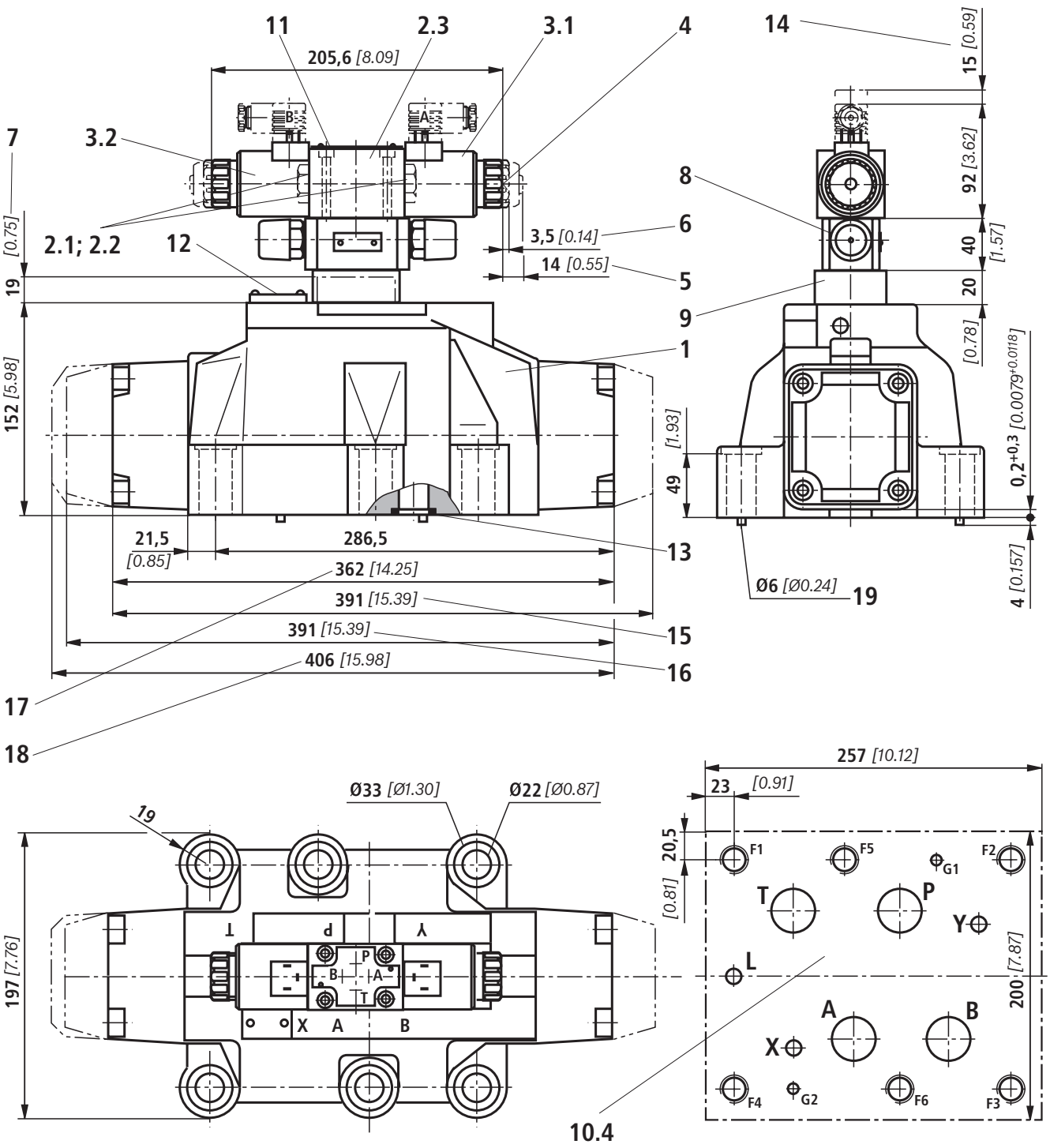
1) Port L only on valves with pressure-centered zero position

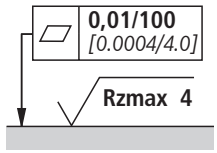
For the explanation of items and subplates, see page 32.
For valve mounting screws, see page 33.



Required surface quality
of the valve mounting face

Unit dimensions: NG32 (dimensions in mm *[inch]*)





Required surface quality
of the valve mounting face

For the explanation of items and subplates, see page 32.
For valve mounting screws, see page 33.

Unit dimensions

1 Main valve

2 Pilot valve type 4WE 6 …
to data sheet RE 23178:

2.1 – Pilot valve type 4WE 6 D… (1 solenoid)
for main valves with spools C, D, K, Z
spools HC, HD, HK, HZ

– Pilot valve type 4WE 6 JA… (1 solenoid “a“)
for main valves with spools EA, FA, etc.,
spring return

– Pilot valve type 4WE 6 MT… (1 solenoid “a“)
for main valves with spools HEA, HFA, etc.,
hydraulic Spool return

2.2 – Pilot valve type 4WE 6 Y… (1 solenoid)
for main valves with spool Y
spool HY

– Pilot valve type 4WE 6 JB… (1 solenoid “b“)
for main valves with spools EB, FB, etc.,
spring return

– Pilot valve type 4WE 6 MB… (1 solenoid “b“)
for main valves with spools HEB, HFB, etc.,
hydraulic spool return

2.3 – Pilot valve type 4WE 6 J… (2 solenoids)
for main valves with 3 spool positions, spring-centered

– Pilot valve type 4WE 6 M… (2 solenoids)
for main valves with 3 spool positions,
pressure-centered

3.1 Solenoid “a“

3.2 Solenoid “b“

4 Manual override “N“, optional

– The manual override can only be actuated up to a tank pressure of ca. 50 bar. Avoid damage to the bore for the manual override! (Special tool for operation, separate order, Material no. **R900024943**). When the manual override is blocked, operation of the solenoids must be ruled out!

– The simultaneous operation of the solenoids must be ruled out!

5 Solenoid **without** manual override

6 Solenoid **with** manual override

7 Height of reconnection plate for hydraulic operation (type 4WH…)

8 Switching time adjustment (6 A/F), optional

9 Pressure reducing valve, optional

10.1 Machined valve mounting face; porting pattern to ISO 4401-05-05-0-05 and NFPA T3.5.1 R2-D05

10.2 Machined valve mounting face; porting pattern to ISO 4401-07-07-0-05 and NFPA T3.5.1 R2-D07

10.3 Machined valve mounting face; porting pattern to ISO 4401-08-08-0-05 and NFPA T3.5.1 R2-D08

10.4 Machined valve mounting face; porting pattern to ISO 4401-10-09-0-05 and NFPA T3.5.1 R2-D10

11 Nameplate of pilot valve

12 Nameplate of complete valve

13 Seal rings

14 Space required to remove mating connector

15 2-position valves with spring end position in main valve (spool symbols A, C, D, K, Z)

16 2-position valves with spring end position in main valve (spool symbols B, Y)

17 3-position valves, spring-centered;
2-position valves with hydraulic end position in main valve

18 3-position valves, pressure-centered

19 Locating pin

Subplates (separate order)

– NG10 (to data sheet RE 45054)
- **Without** ports X, Y: G 534/01 (G3/4)
  G 534/12 (SAE-12; 1 1/16-12) [1)]
- **With** port X, Y: G 535/01 (G3/4)
  G 536/01 (G1)
  G 535/12 (SAE-12; 1 1/16-12) [1)]
  G 536/12 (SAE-16; 1 5/16-12) [1)]

– NG16 (to data sheet RE 45056)
G 172/01 (G3/4)
G 172/02 (M27 x 2)
G 174/01 (G1)
G 174/02 (M33 x 2)
G 174/08 (flange)
G 172/12 (SAE-12; 1 1/16-12) [1)]
G 174/12 (SAE-16; 1 5/16-12) [1)]

– NG25 (type W.H 22 to data sheet RE 45058)
G 151/01 (G1)
G 154/01 (G1 1/4)
G 156/01 (G1 1/2)
G 155/12 (SAE-16; 1 5/16-12) [1)]
G 154/12 (SAE-20; 1 5/8-20) [1)]
G 156/12 (SAE-24; 1 7/8-20) [1)]

– NG25 (type W.H 25 to data sheet RE 45058)
G 151/01 (G1)
G 153/01 (G1), for valves with pressure-centered zero position
G 154/01 (G1 1/4)
G 154/08 (flange)
G 156/01 (G1 1/2)
G 153/12 (SAE-16; 1 5/16-12) [1)]
G 154/12 (SAE-20; 1 5/8-20) [1)]
G 156/12 (SAE-24; 1 7/8-20) [1)]

– NG32 (to data sheet RE 45060)
G 157/01 (G1 1/2)
G 157/02 (M48 x 2)
G 158/10 (flange)
G 157/12 (SAE-24; 1 7/8-12) [1)]

[1)] on request

For valve mounting screws, see page 33.

Unit dimensions

Valve mounting screws (separate order)

– NG10:
4 hexagon socket head cap screws, metric
ISO 4762 - M6 x 45 - 10.9-flZn-240h-L
(Friction coefficient μ_{total} = 0.09 to 0.14);
tightening torque M_T = 12.5 Nm *[9.2 ft-lbs]* ±10%,
Material no. **R913000258**

4 hexagon socket head cap screws, UNC
1/4-20 UNC x 1 3/4" ASTM-A574
on request

– NG16:
4 hexagon socket head cap screws, metric
ISO 4762 - M10 x 60 - 10.9-flZn-240h-L
(Friction coefficient μ_{total} = 0.09 to 0.14);
tightening torque M_T = 75 Nm *[55.3 ft-lbs]* ±10%,
Material no. **R913000116**

2 hexagon socket head cap screws metric
ISO 4762 - M6 x 60 - 10.9-flZn-240h-L
(Friction coefficient μ_{total} = 0.09 to 0.14);
tightening torque M_T = 12.5 Nm *[9.2 ft-lbs]* ±10%,
Material no. **R913000115**

4 hexagon socket head cap screws, UNC
3/8-16 UNC x 2 1/4" ASTM-A574
on request

2 hexagon socket head cap screws, UNC
1/4-20 UNC x 2 1/4" ASTM-A574
on request

– NG25:
6 hexagon socket head cap screws, metric
ISO 4762 - M12 x 60 - 10.9-flZn-240h-L
(Friction coefficient μ_{total} = 0.09 to 0.14);
tightening torque M_T = 130 Nm *[95.9 ft-lbs]* ±10%,
Material no. **R913000121**

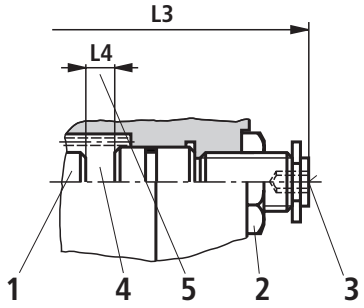
6 hexagon socket head cap screws, UNC
1/2-13 UNC x 2 1/2" ASTM-A574
on request

– NG32:
6 hexagon socket head cap screws, metric
ISO 4762 - M20 x 80 - 10.9-flZn-240h-L
(Friction coefficient μ_{total} = 0.09 to 0.14);
tightening torque M_T = 430 Nm *[317.2 ft-lbs]* ±10%,
Material no. **R901035246**

6 hexagon socket head cap screws, UNC
3/4-10 UNC x 3 1/4" ASTM-A574
on request

Stroke adjustment, attachment options (dimensions in mm *[inch]*)

The stroke adjustment feature limits the stroke of control spool (1). To reduce the spool stroke, loosen locknut (2) and turn adjustment screw (3) clockwise. Control chamber (4) must be depressurized during this process.

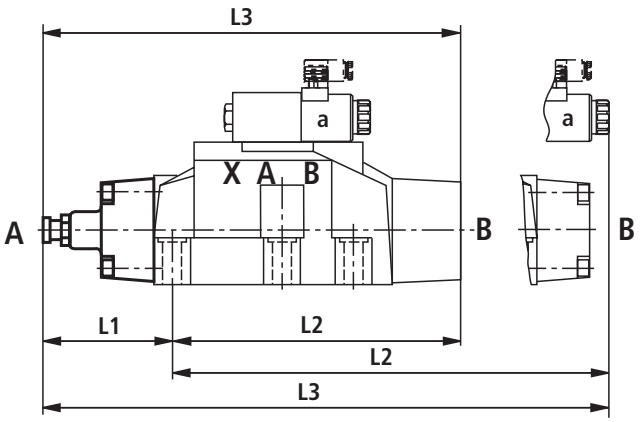


NG	L4
10	6,5 *[0.26]*
16	10 *[0.39]*
25 (type 4W.H 22)	9,5 *[0.37]*
25 (type 4W.H 25)	12,5 *[0.49]*
32	15 *[0.59]*

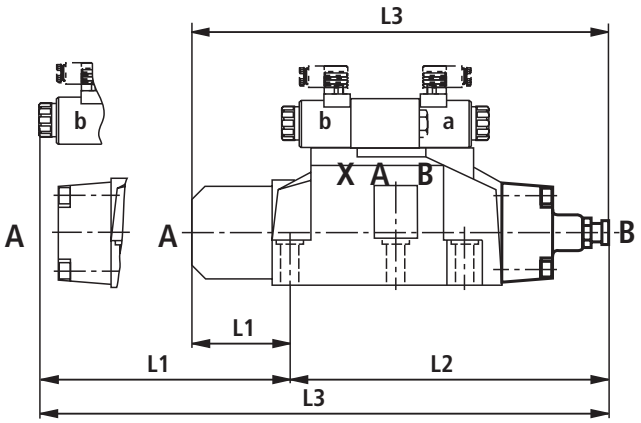
For further dimensions, see below and page 35.

5 Adjustment range
- NG10:
  1 turn = 1 mm *[0.0394 inch]* adjustment travel
- NG16 and 32:
  1 turn = 1.5 mm *[0.0591 inch]* adjustment travel

Stroke limitation on side A



Stroke limitation on side B



Attachment options	Ordering code	NG	3-position valve [1] Spring-centered L1	L2	L3	Pressure-centered L1	L2	L3
Stroke adjustment on valve sides A and B	**10**	10	90 *[3.54]*	144 *[5.67]*	234 *[9.21]*			
		16	100 *[3.94]*	200 *[7.87]*	300 *[11.81]*			
		25 [1]	96 *[3.77]*	241 *[9.49]*	337 *[13.27]*			
		25 [2]	123 *[4.84]*	276 *[10.87]*	399 *[15.71]*			
		32	133 *[5.24]*	344 *[13.54]*	477 *[18.78]*			
Stroke adjustment on valve side A	**11**	10	90 *[3.54]*	106 *[4.17]*	196 *[7.72]*			
		16	100 *[3.94]*	156 *[6.14]*	256 *[10.08]*			
		25 [1]	96 *[3.77]*	193 *[7.60]*	289 *[11.38]*			
		25 [2]	123 *[4.84]*	225 *[8.86]*	348 *[13.70]*			
		32	133 *[5.24]*	287 *[11.30]*	420 *[16.54]*			
Stroke adjustment on valve side B	**12**	10	52 *[2.05]*	144 *[5.67]*	196 *[7.72]*	–	–	–
		16	56 *[2.20]*	200 *[7.87]*	256 *[10.08]*	81 *[3.19]*	200 *[7.87]*	281 *[11.06]*
		25 [1]	48 *[1.89]*	241 *[9.49]*	289 *[11.38]*	–	–	–
		25 [2]	72 *[2.83]*	276 *[10.87]*	348 *[13.70]*	107 *[4.21]*	276 *[10.87]*	283 *[11.14]*
		32	76 *[2.99]*	344 *[13.54]*	420 *[16.54]*	120 *[4.72]*	344 *[13.54]*	464 *[18.27]*

[1] With spool symbol A, only version “11“ possible, with spool symbol B, only version “12“ .

Stroke adjustment, attachment options (dimensions in mm *[inch]*)

Attachment options	Ordering code	NG	2-position valve								
			Spring end position						Hydraulic end position		
			A, C, D, K, Z			B, Y			HC, HD, HK, HZ, HY		
			L1	L2	L3	L1	L2	L3	L1	L2	L3
Stroke adjustment on valve sides A and B	**10**	10	–	–	–	–	–	–	90 *[3.54]*	144 *[5.67]*	234 *[9.21]*
		16	–	–	–	–	–	–	100 *[3.94]*	200 *[7.87]*	300 *[11.81]*
		25 [1]	96 *[3.78]*	241 *[9.49]*	337 *[13.27]*	96 *[3.78]*	241 *[9.49]*	337 *[13.27]*	96 *[3.78]*	241 *[9.49]*	337 *[13.27]*
		25 [2]	–	–	–	–	–	–	123 *[4.84]*	276 *[10.87]*	399 *[15.71]*
		32	–	–	–	–	–	–	133 *[5.24]*	344 *[13.54]*	477 *[18.78]*
Stroke adjustment on valve side A	**11**	10	90 *[3.54]*	106 *[4.17]*	196 *[7.72]*	–	–	–	90 *[3.54]*	106 *[4.17]*	196 *[7.72]*
		16	100 *[3.94]*	180 *[7.09]*	280 *[11.02]*	–	–	–	100 *[3.94]*	156 *[6.14]*	256 *[10.08]*
		25 [1]	96 *[3.78]*	193 *[7.60]*	289 *[11.38]*	96 *[3.78]*	193 *[7.60]*	289 *[11.38]*	96 *[3.78]*	193 *[7.60]*	289 *[11.38]*
		25 [2]	123 *[4.84]*	253 *[9.96]*	376 *[14.8]*	–	–	–	123 *[4.84]*	225 *[8.86]*	348 *[13.70]*
		32	133 *[5.24]*	316 *[12.44]*	449 *[17.68]*	–	–	–	133 *[5.24]*	287 *[11.30]*	420 *[16.53]*
Stroke adjustment on valve side B	**12**	10	–	–	–	52 *[2.05]*	144 *[5.67]*	196 *[7.72]*	52 *[2.05]*	144 *[5.67]*	196 *[7.72]*
		16	–	–	–	80 *[3.15]*	200 *[7.87]*	280 *[11.02]*	56 *[2.21]*	200 *[7.87]*	256 *[10.08]*
		25 [1]	48 *[1.89]*	241 *[9.49]*	289 *[11.38]*	48 *[1.89]*	241 *[9.49]*	289 *[11.38]*	48 *[1.89]*	241 *[9.49]*	289 *[11.38]*
		25 [2]	–	–	–	100 *[3.94]*	276 *[10.87]*	376 *[14.80]*	72 *[2.84]*	276 *[10.87]*	348 *[13.70]*
		32	–	–	–	105 *[4.13]*	344 *[13.54]*	449 *[17.68]*	76 *[2.99]*	344 *[13.54]*	420 *[16.53]*

[1] Types 4WEH 22… and 4WH 22…

[2] Types 4WEH 25… and 4WH 25…

Switching time adjustment

The switching time of main valve (1) can be influenced by using a double throttle check valve (2)
(type Z2FS 6 to data sheet RE 27506).

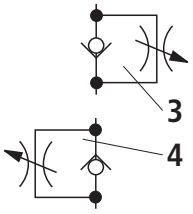
Conversion of meter-in (3) into meter-out control (4):

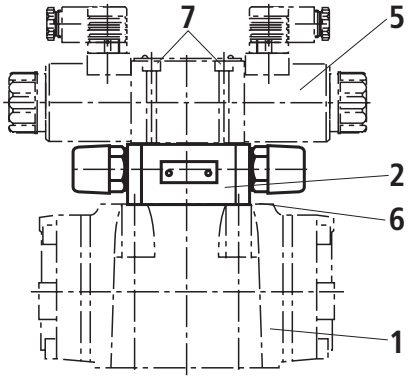
Remove pilot valve (5) – plate (6) for accommodating the seal rings remains in place – turn switching time adjustment feature (2) around its longitudinal axis and put it down again, re-mount pilot valve (5) .

Tightening torque of screws (7) M_T = 9 Nm *[6.6 ft-lbs]*.

⚠ Attention!

The conversion may only be carried out by authorized specialists or in the factory!





Type 4WEH 10 ..4X/…S
Type 4WEH 10 ..4X/…S2

Pressure reducing valve “D3“

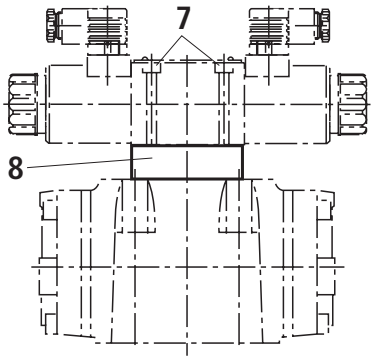
Pressure reducing valve (8) must be used in the case of a pilot pressure above 250 bar *[3626 psi]* (with type 4WEH 22 …: 210 bar *[3046 psi]*) and version “H-“.

The secondary pressure is held constant at 45 bar *[652 psi]*.

⚠ Attention!

When a pressure reducing valve “D3“ (8) is used, a throttle insert “B10“ must be provided in the P channel of the pilot valve.

Tightening torque of screws (7) M_T = 9 Nm *[6.6 ft-lbs]*.



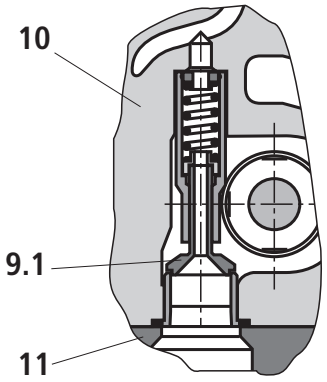
Type 4WEH 10 ..4X/…/..D3

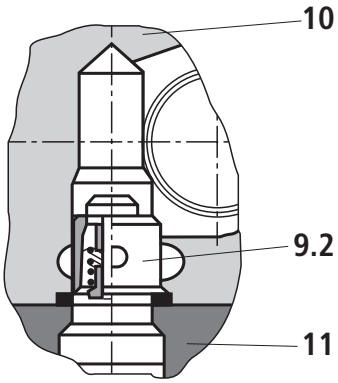
Pre-load valve (not for NG10)

For valves with pressureless circulation and internal pilot oil supply, a pre-load valve (9) must be installed in channel P of the main valve to build up the minimum pilot pressure.

The pressure differential of the pre-load valve must be added to the pressure differential of the main valve (see characteristic curves) to obtain a total value.

The cracking pressure is ca. 4.5 bar *[65 psi]*.





9.1 Pre-load valve NG16

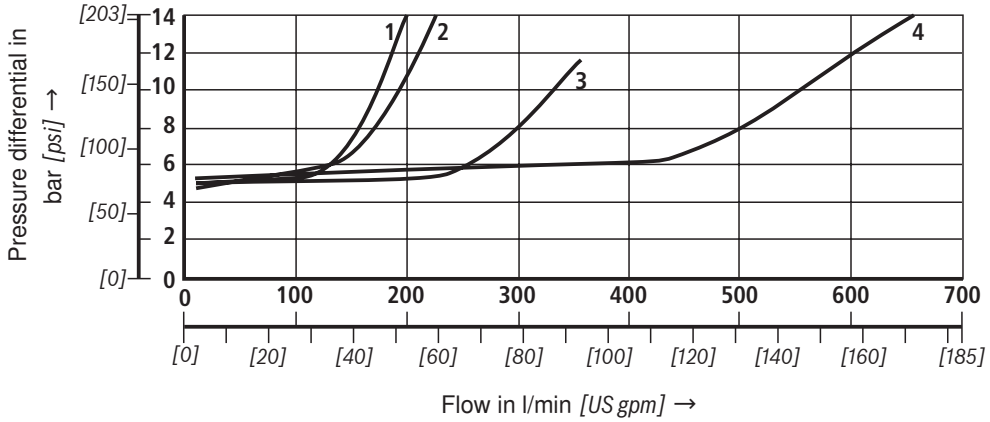
9.2 Pre-load valve NG25 and NG32

10 Main valve

11 Suplate

Type	**Material number P4,5**
4W.H **16** …	R901002365
4W.H **22** …	R900315596
4W.H **25** …	R900303717
4W.H **32** …	R900317066

***Δp–q*$_V$ characteristic curve** (measured with HLP46, ϑ_{oil} = 40 °C ± 5 °C *[104 °F ±9 °F]*)



1 **NG16**

2 **NG25** (type 4W.H **25** …)

3 **NG25** (type 4W.H **22** …)

4 **NG32**

Notes

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Notes

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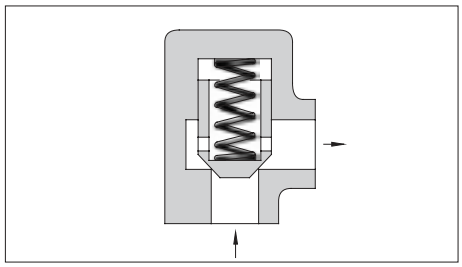
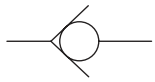
Right Angle Check Valves

These valves allow free flow in one direction and prevent flow in the reverse direction. Cracking pressure specified is the pressure required to open the valve and allow free flow.



Graphic Symbol



Specifications

Type of Connection	Model Numbers	Rated Flow★ L/min (U.S.GPM)	Max. Operating Pres. MPa (PSI)	Cracking Pres. MPa (PSI)	Approx. Mass kg (lbs.)
Threaded Connection	CRT-03-∗-50/5080/5090	40 (10.6)	25 (3630)	0.04 (6)	0.9 (2.0)
	CRT-06-∗-50/5080/5090	125 (33)		0.35 (50)	1.7 (3.7)
	CRT-10-∗-50/5080/5090	250 (66)		0.5 (70)	5.6 (12.3)
Sub-plate Mounting	CRG-03-∗-50/5090	40 (10.6)	25 (3630)	0.04 (6)	1.7 (3.7)
	CRG-06-∗-50/5090	125 (33)		0.35 (50)	2.9 (6.4)
	CRG-10-∗-50/5090	250 (66)		0.5 (70)	5.5 (12.1)

★Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 0.3 MPa (44 PSI), the fluid has a specific gravity of 0.85 and a kinematic viscosity of 20 mm^2/s (98 SSU), and the cracking pressure is 0.04 MPa (6 PSI).

Model Number Designation

F-	CR	T	-03	-04	-50	∗
Special Seals	Series Number	Type of Connection	Valve Size	Cracking Pressure MPa (PSI)	Design Number	Design Standards
F: Special seals for phosphate ester type fluids (Omit if not required)	**CR**: Right Angle Check Valve	**T**: Threaded Connection	**03**	**04**: 0.04 (6)	**50**	**None**: Japanese Std. "JIS" **80**: European Design Std. **90**: N. American Design Std.
			06	**35**: 0.35 (50)	**50**	
			10	**50**: 0.5 (70)	**50**	
		G: Sub-plate Mounting	**03**	**04**: 0.04 (6)	**50**	**None**: Japanese Std. "JIS" & European Design Std. **90**: N. American Design Std.
			06	**35**: 0.35 (50)	**50**	
			10	**50**: 0.5 (70)	**50**	

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N.American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
CRG-03	CRGM-03-50	Rc 3/8	CRGM-03-5080	3/8 BSP.F	CRGM-03-5090	3/8 NPT	1.6 (3.5)
	CRGM-03X-50	Rc 1/2	CRGM-03X-5080	1/2 BSP.F	CRGM-03X-5090	1/2 NPT	1.6 (3.5)
CRG-06	CRGM-06-50	Rc 3/4	CRGM-06-5080	3/4 BSP.F	CRGM-06-5090	3/4 NPT	2.4 (5.3)
	CRGM-06X-50	Rc 1	CRGM-06X-5080	1 BSP.F	CRGM-06X-5090	1 NPT	3.0 (6.6)
CRG-10	CRGM-10-50	Rc 1-1/4	CRGM-10-5080	1-1/4 BSP.F	CRGM-10-5090	1-1/4 NPT	4.8 (10.6)
	CRGM-10X-50	Rc 1-1/2	CRGM-10X-5080	1-1/2 BSP.F	CRGM-10X-5090	1-1/2 NPT	5.7 (12.6)

●Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.

Yuken can offer flanged connection valves described below.
For details, contact us.

Model No.	Rated Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)
CRF-10-∗-50∗	300 (79.3)	25 (3630)
CRF-16-∗-50∗	600 (159)	
CRF-24-∗-50∗	1300 (343)	

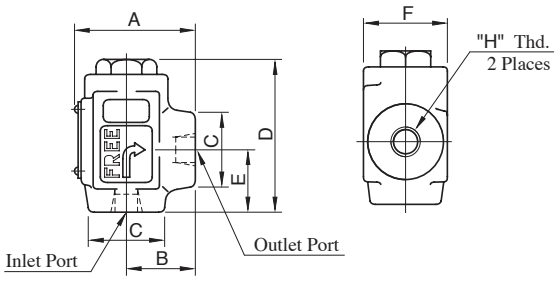
Mounting Bolts

Socket head cap screws in the table below are included.

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Standard "JIS" European Design Standard	N.American Design Standard	
CRG-03	M10 × 45 Lg.	3/8-16 UNC × 1-3/4 Lg.	4
CRG-06	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4
CRG-10	M10 × 55 Lg.	3/8-16 UNC × 2-1/4 Lg.	6

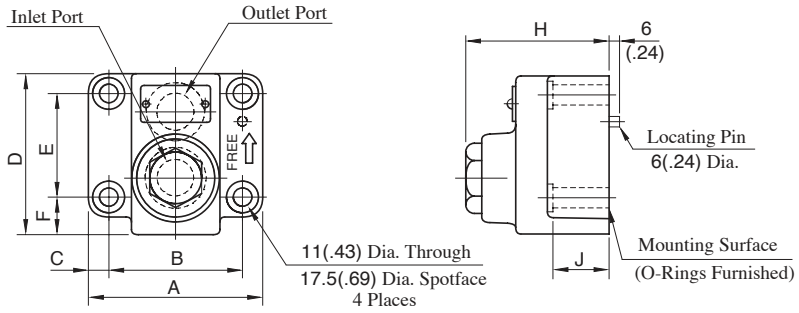
CRT-03-∗-50/5080/5090
CRT-06-∗-50/5080/5090
CRT-10-∗-50/5080/5090

DIMENSIONS IN MILLIMETRES (INCHES)



Model Numbers	Dimensions mm (Inches)						"H" Thd.
	A	B	C	D	E	F	
CRT-03-∗-50	62 (2.44)	36 (1.42)	38 (1.50) Dia	80.5 (3.17)	33 (1.30)	44 (1.73)	Rc 3/8
CRT-03-∗-5080							3/8 BSP.F
CRT-03-∗-5090							3/8 NPT
CRT-06-∗-50	74 (2.91)	45 (1.77)	54 (2.13) Dia.	104.5 (4.11)	49 (1.93)	54 (2.13)	Rc 3/4
CRT-06-∗-5080							3/4 BSP.F
CRT-06-∗-5090							3/4 NPT
CRT-10-∗-50	107 (4.21)	65 (2.56)	80 (3.15) SQ.	130 (5.12)	65 (2.56)	80 (3.15)	Rc 1-1/4
CRT-10-∗-5080							1-1/4 BSP.F
CRT-10-∗-5090							1-1/4 NPT

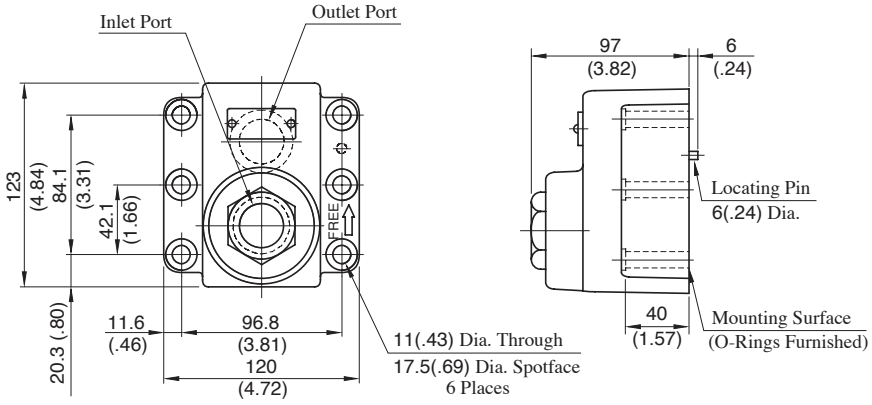
CRG-03-∗-50/5090
CRG-06-∗-50/5090



Model Numbers	Dimensions mm (Inches)								Mounting Surface
	A	B	C	D	E	F	H	J	
CRG-03	90 (3.54)	66.7 (2.63)	11.7 (.46)	72 (2.83)	42.9 (1.69)	17.5 (.69)	72.5 (2.85)	30 (1.18)	ISO 5781-AG-06-2-A
CRG-06	102 (4.02)	79.4 (3.13)	11.3 (.44)	93 (3.66)	60.3 (2.37)	21.4 (.84)	84.5 (3.33)	35 (1.38)	ISO 5781-AH-08-2-A

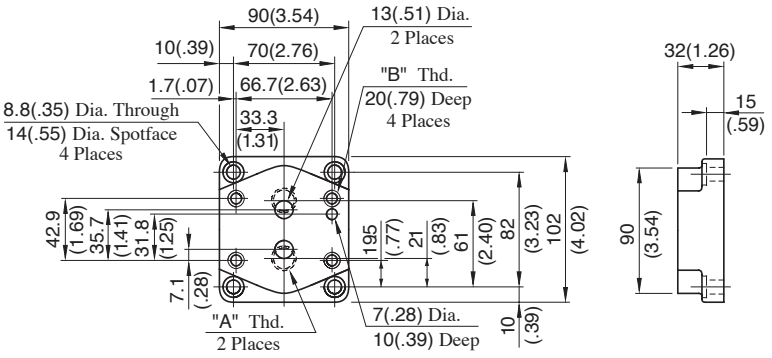
CRG-10-∗-50/5090

Mounting surface: ISO 5781-AJ-10-2-A



Sub-plate

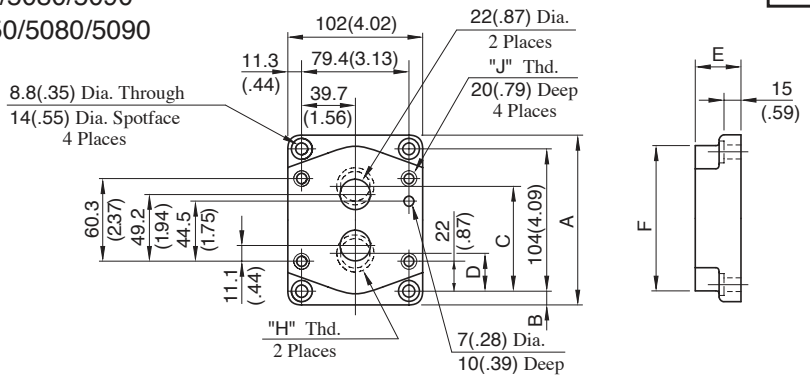
CRGM-03-50/5080/5090
CRGM-03X-50/5080/5090



Sub-plate Model Numbers	Thread Size	
	"A" Thd.	**"B"** Thd.
CRGM-03-50	Rc 3/8	M10
CRGM-03-5080	3/8 BSP.F	
CRGM-03-5090	3/8 NPT	3/8-16 UNC
CRGM-03X-50	Rc 1/2	M10
CRGM-03X-5080	1/2 BSP.F	
CRGM-03X-5090	1/2 NPT	3/8-16 UNC

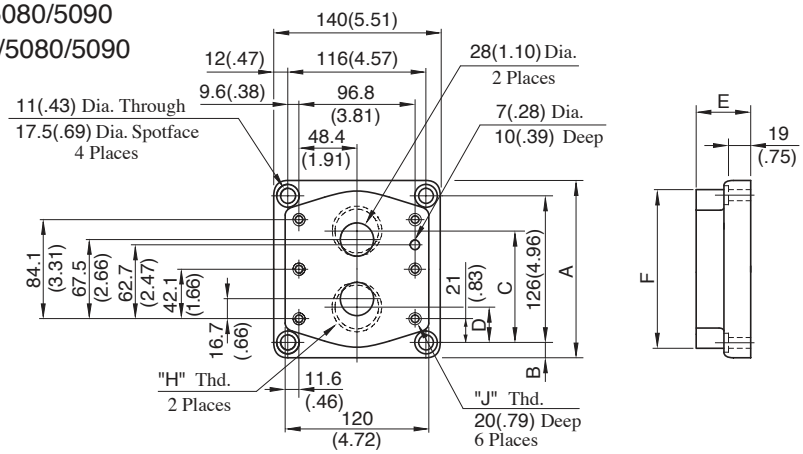
DIMENSIONS IN MILLIMETRES (INCHES)

CRGM-06-50/5080/5090
CRGM-06X-50/5080/5090



Sub-plate Model Numbers	Dimensions mm (Inches)						Thread Size	
	A	**B**	**C**	**D**	**E**	**F**	**"H"** Thd.	**"J"** Thd.
CRGM-06-50	124 (4.88)	10 (.39)	77 (3.03)	27 (1.06)	36 (1.42)	110 (4.33)	Rc 3/4	M10
CRGM-06-5080							3/4 BSP.F	
CRGM-06-5090							3/4 NPT	3/8-16 UNC
CRGM-06X-50	136 (5.35)	16 (.63)	82.3 (3.24)	22 (.87)	45 (1.77)	130 (5.12)	Rc 1	M10
CRGM-06X-5080			80 (3.15)	24 (.94)			1 BSP.F	
CRGM-06X-5090			82.3 (3.24)	22 (.87)			1 NPT	3/8-16 UNC

CRGM-10-50/5080/5090
CRGM-10X-50/5080/5090

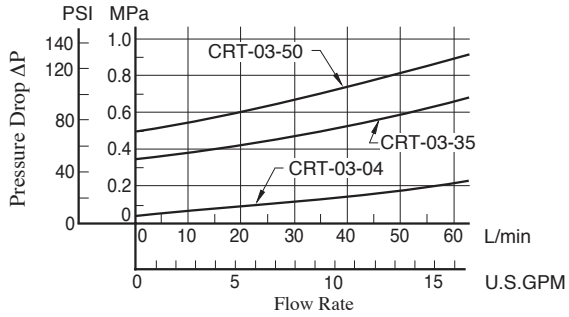


Sub-plate Model Numbers	Dimensions mm (Inches)						Thread Size	
	A	**B**	**C**	**D**	**E**	**F**	**"H"** Thd.	**"J"** Thd.
CRGM-10-50	150 (5.91)	12 (.47)	96 (3.78)	30 (1.18)	45 (1.77)	135 (5.31)	Rc 1-1/4	M10
CRGM-10-5080							1-1/4 BSP.F	
CRGM-10-5090							1-1/4 NPT	3/8-16 UNC
CRGM-10X-50	177 (6.97)	25.5 (1.00)	104 (4.09)	22 (.87)	50 (1.97)	167 (6.57)	Rc 1-1/2	M10
CRGM-10X-5080							1-1/2 BSP.F	
CRGM-10X-5090							1-1/2 NPT	3/8-16 UNC

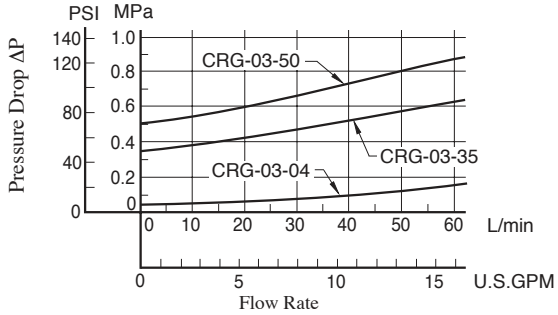
Pressure Drop

Hydraulic Fluid: Viscosity 30mm²/s (141 SSU), Specific Gravity 0.850

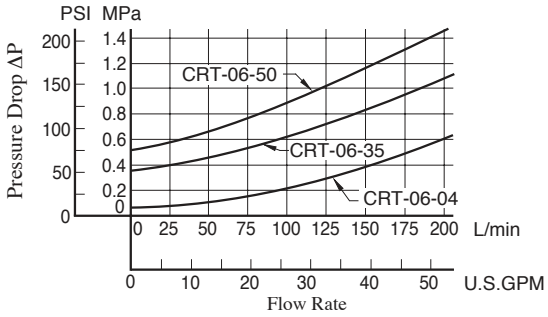
CRT-03



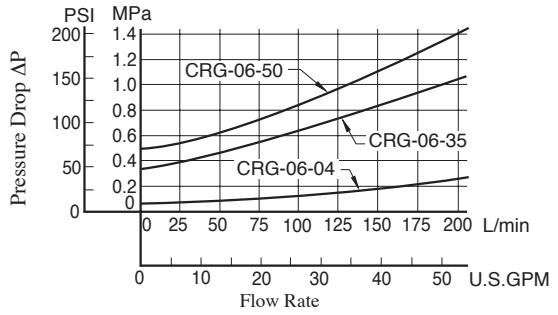
CRG-03



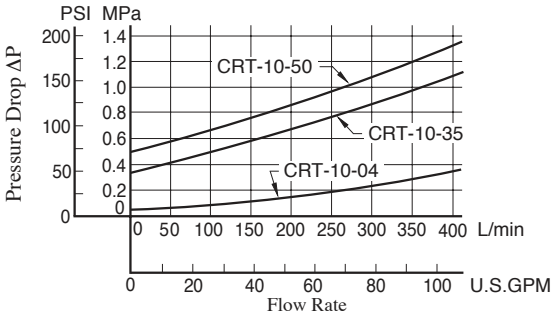
CRT-06



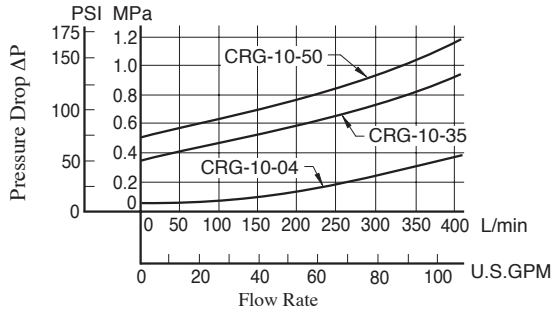
CRG-06



CRT-10

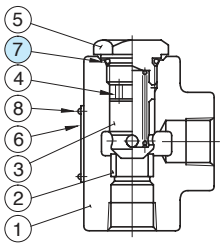


CRG-10



List of Seals

CRT-03-50/5080/5090
CRT-06-50/5080/5090
CRT-10-50/5080/5090

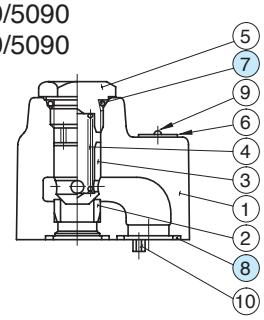


List of Seals & Seal Kits

Item	Name of Parts	Part Numbers			Qty.
		CRT-03	CRT-06	CRT-10	
7	O-Ring	SO-NB-P21	SO-NB-P24	SO-NB-P32	1
★	Seal Kit	KS-CRT-03-50	KS-CRT-06-50	KS-CRT-10-50	—

★When ordering the O-Rings, please specify the seal kit number from the table above.

CRG-03-50/5090
CRG-06-50/5090
CRG-10-50/5090



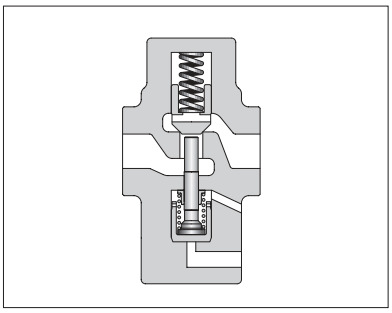
List of Seals & Seal Kits

Item	Name of Parts	Part Numbers			Qty.
		CRG-03	CRG-06	CRG-10	
7	O-Ring	SO-NB-P21	SO-NB-P24	SO-NB-P32	1
8	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2
★	Seal Kit	KS-CRG-03-50	KS-CRG-06-50	KS-CRG-10-50	—

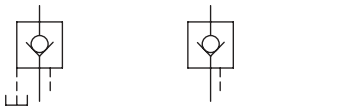
★When ordering the O-Rings, please specify the seal kit number from the table above.

Pilot Operated Check Valves

These check valves allow flow in one direction and prevent flow in the reverse direction, until operated by pilot pressure to allow free reverse flow. The specified cracking pressure is required to open the valve to allow free flow direction.



Graphic Symbols



Internal Drain Type External Drain Type

Specifications

Type of Connection	Model Numbers	Rated Flow ★ L/min (U.S.GPM)	Max. Operating Pres. MPa (PSI)	Cracking Pres. MPa (PSI)	Approx. Mass kg (lbs.)
Threaded Connection	CPT/CPDT-03-∗-∗-50∗	40 (10.6)	25 (3630)	0.04 (6) 0.2 (29) 0.35 (50) 0.5 (70)	3.0 (6.6)
	CPT/CPDT-06-∗-∗-50∗	125 (33)			5.5 (12.1)
	CPT/CPDT-10-∗-∗-50∗	250 (66)			9.6 (21.2)
Sub-plate Mounting	CPG/CPDG-03-∗-∗-50∗	40 (10.6)	25 (3630)	0.04 (6) 0.2 (29) 0.35 (50) 0.5 (70)	3.3 (7.3)
	CPG/CPDG-06-∗-∗-50∗	125 (33)			5.4 (11.9)
	CPG/CPDG-10-∗-∗-50∗	250 (66)			8.5 (18.7)

★Rated flow is the approximate flow rate, when there is a free flow pressure drop of maximum 0.3 MPa (44 PSI), the fluid has a specific gravity of 0.85 and a kinematic viscosity of 20 mm^2/s (98 SSU), and the cracking pressure is 0.04 MPa (6 PSI).

Model Number Designatioin

F-	CP	T	03	-E	-04	-50	∗
Special Seals	Series Number	Type of Connection	Valve Size	Drain Connection	Cracking Pres. MPa (PSI)	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluids (Omit if not required)	**CP**: Pilot Operated Check Valve **CPD**: Decompression Type Pilot Operated Check Valve	**T**: Threaded Connection	**03** **06** **10**	**None**: Internal Drain	**04**:0.04 (6) **20**:0.2 (29) **35**:0.35 (50) **50**:0.5 (70)	**50** **50** **50**	**None**: Japanese Std. "JIS" **80**: European Design Std. **90**: N. American Design Std.
		G: Sub-plate Mounting	**03** **06** **10**	**E**: External Drain		**50** **50** **50**	**None**: Japanese Std. "JIS" & European Design Std. **90**: N. American Design Std.

Mounting Bolts

Socket head cap screws in the table below are included.

Valve Model Numbers	Socket Head Cap Screw		Qty.
	Japanese Standard "JIS" & European Design Standard	N.American Design Standard	
CP∗G-03	M10 × 45 Lg.	3/8-16 UNC × 1-3/4 Lg.	4
CP∗G-06	M10 × 50 Lg.	3/8-16 UNC × 2 Lg.	4
CP∗G-10	M10 × 55 Lg.	3/8-16 UNC × 2-1/4 Lg.	6

Yuken can offer flanged connection valves described below.
For details, contact us.

Model Numbers	Rated Flow L/min (U.S.GPM)	Max. Operating Pressure MPa (PSI)
CP∗F-10-∗-∗-50∗	250 (66)	25 (3630)
CP∗F-16-∗-∗-50∗	600 (159)	25 (3630)

Sub-plate

Valve Model Numbers	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
CP∗G-03	HGM-03-20	Rc 3/8	HGM-03-2080	3/8 BSP.F	HGM-03-2090	3/8 NPT	1.6 (3.5)
	HGM-03X-20	Rc1/2	HGM-03X-2080	1/2 BSP.F	HGM-03X-2090	1/2 NPT	1.6 (3.5)
CP∗G-06	HGM-06-20	Rc 3/4	HGM-06-2080	3/4 BSP.F	HGM-06-2090	3/4 NPT	2.4 (5.3)
	HGM-06X-20	Rc 1	HGM-06X-2080	1 BSP.F	HGM-06X-2090	1 NPT	3.0 (6.6)
CP∗G-10	HGM-10-20	Rc 1-1/4	HGM-10-2080	1-1/4 BSP.F	HGM-10-2090	1-1/4 NPT	4.8 (10.6)
	HGM-10X-20	Rc 1-1/2	HGM-10X-2080	1-1/2 BSP.F	HGM-10X-2090	1-1/2 NPT	5.7 (12.6)

- Sub-plates are available, specify the sub-plate model number from the table above. When sub-plates are not used, the mountingsurface should have a good machined finish.
- Sub-plates are shared with those for H Type Pressure Control Valves. Refer to pages 244 to 246 for dimensions.

Instructions

- **Operation of internal and external drain types**

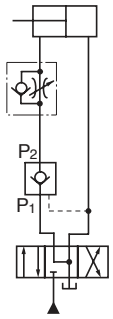
  When the outlet side P1 is directly connected to the tank in reversed free flow (Fig. a), the internal drain type is normally used. When the back pressure is applied to the outlet side P_1 (Fig. b), be sure to use the external drain type.

- **Minimum pilot pressure characteristics**

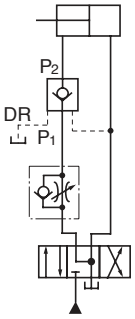
  That depends on the pressure of the inlet side P_2 in the reversed free flow.
  This value can be determined from the characteristics chart.

- **Cautionson replacementof 20 design low crackingpressure type valves with 50 design valves.**

  In 20 design valve with cracking pressure of 0.035 MPa (5 PSI) (Code "5"), for closing the valve completely and certainly, it was necessary to introduce the pressurized oil into the drain port to push down the piston compulsory.
  While in 50 design valve with cracking pressure of 0.04 MPa (6 PSI) (Code "6"), it has such structure that the valve can be closed completely and certainly without introducing the pressurized oil into the drain port. On the contrary, what is worse is that if the pressurized oil is introduced into the drain port, the oil acts towards the direction of opening the valve, which is very dangerous and has to be absolutely avoided. Therefore, please do not supply any pressurized oil into the drain port in case of using 50 design valve.



(Fig.a)

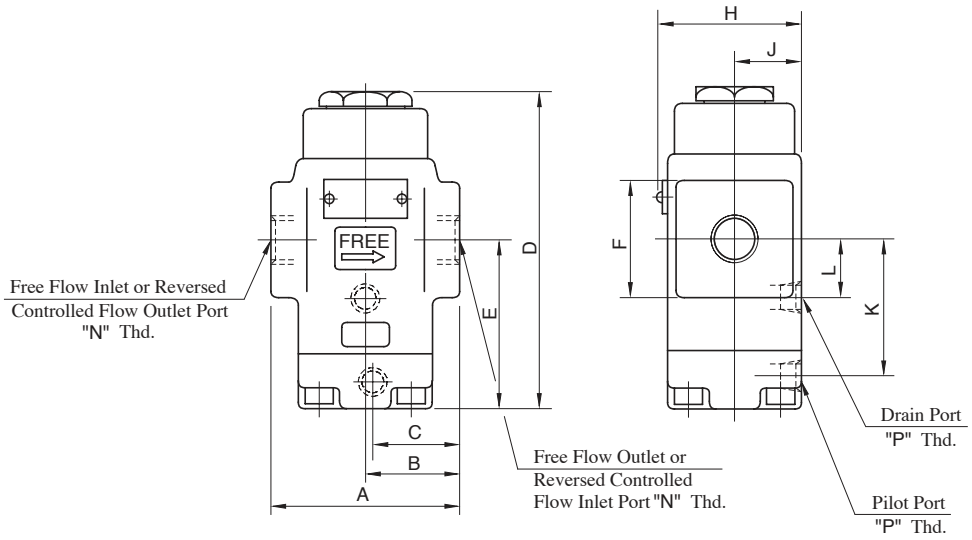


(Fig.b)

⚠ WARNING

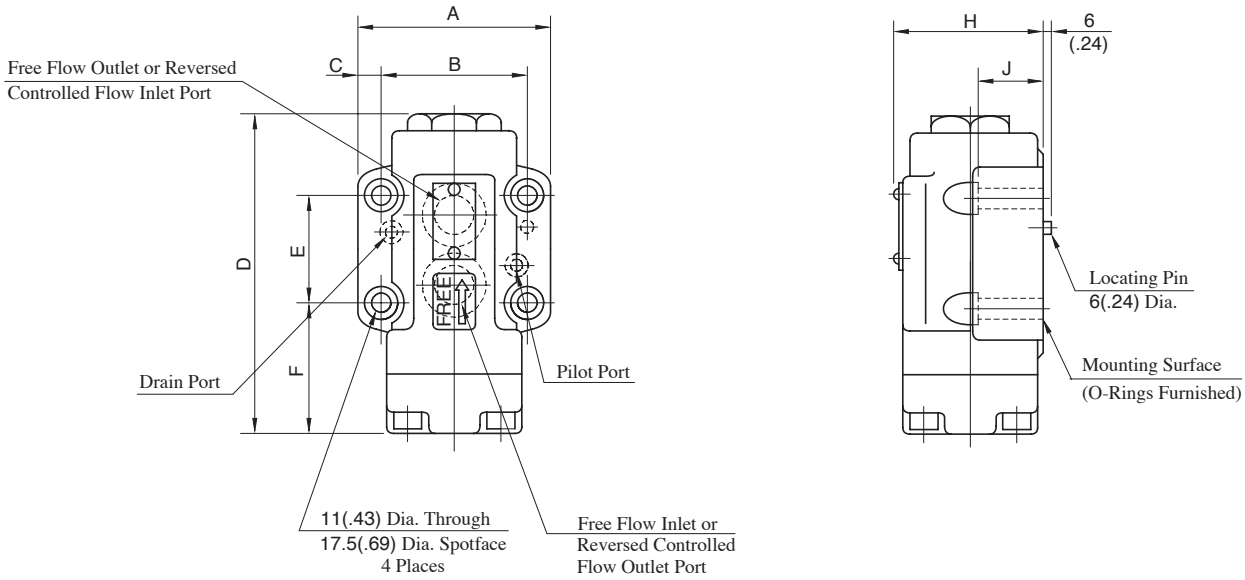
The machinery, if misused due to failure to observe the "Cautions" on the left, may perform unforeseeable movements, resulting in a disastrous accident.

CPT/CPDT-03-∗-∗-50/5080/5090
CPT/CPDT-06-∗-∗-50/5080/5090
CPT/CPDT-10-∗-∗-50/5080/5090



Model Numbers	Dimensions mm (Inches)										Thread Size	
	A	**B**	**C**	**D**	**E**	**F**	**H**	**J**	**K**	**L**	**"N"** Thd.	**"P"** Thd.
CPT/CPDT-03-∗-∗-50	80 (3.15)	40 (1.57)	39 (1.54)	150.5 (5.93)	84.5 (3.33)	38 (1.50) Dia.	60 (2.36)	29 (1.14)	67.5 (2.66)	26.5 (1.04)	Rc 3/8	Rc 1/4
CPT/CPDT-03-∗-∗-5080											3/8 BSP.F	1/4 BSP.F
CPT/CPDT-03-∗-∗-5090											3/8 NPT	1/4 NPT
CPT/CPDT-06-∗-∗-50	96 (3.78)	48 (1.89)	47 (1.85)	171.5 (6.75)	92.5 (3.64)	62 (2.44) SQ.	72 (2.83)	35 (1.38)	75.5 (2.97)	31 (1.22)	Rc 3/4	Rc 1/4
CPT/CPDT-06-∗-∗-5080											3/4 BSP.F	1/4 BSP.F
CPT/CPDT-06-∗-∗-5090											3/4 NPT	1/4 NPT
CPT/CPDT-10-∗-∗-50	140 (5.51)	70 (2.76)	64 (2.52)	203.5 (8.01)	113 (4.45)	80 (3.15) SQ.	82 (3.23)	40 (1.57)	96 (3.78)	43 (1.69)	Rc 1-1/4	Rc 1/4
CPT/CPDT-10-∗-∗-5080											1-1/4 BSP.F	1/4 BSP.F
CPT/CPDT-10-∗-∗-5090											1-1/4 NPT	1/4NPT

CPG/CPDG-03-∗-∗-50/5090
CPG/CPDG-06-∗-∗-50/5090

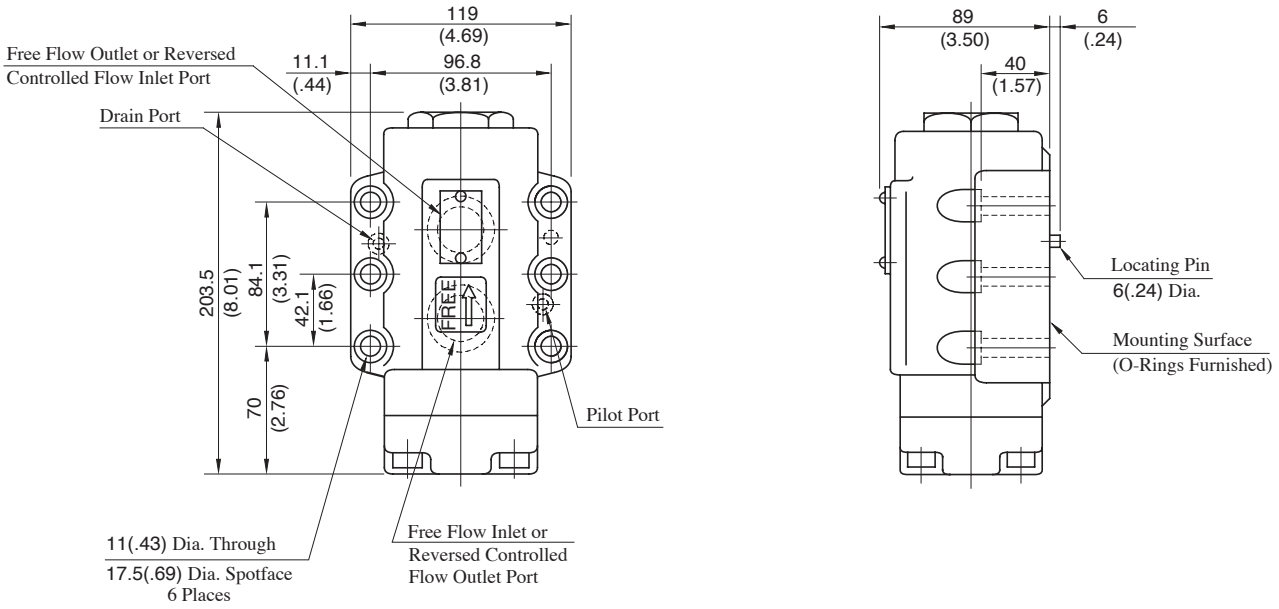


Model Numbers	Dimensions mm (Inches)								Mounting Surface
	A	B	C	D	E	F	H	J	
CPG/CPDG-03-∗-∗-50/5090	90 (3.54)	66.7 (2.63)	11.7 (.46)	150.5 (5.93)	42.9 (1.69)	66 (2.60)	62 (2.44)	30 (1.18)	ISO 5781-AG-06-2-A
CPG/CPDG-06-∗-∗-50/5090	102 (4.02)	79.4 (3.13)	11.3 (.44)	171.5 (6.75)	60.3 (2.37)	67.5 (2.66)	74 (2.91)	35 (1.38)	ISO 5781-AH-08-2-A

CPG/CPDG-10-∗-∗-50/5090

Mounting surface: ISO 5781-AJ-10-2-A

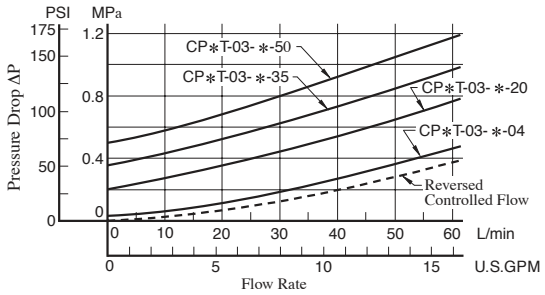
DIMENSIONS IN MILLIMETRES (INCHES)



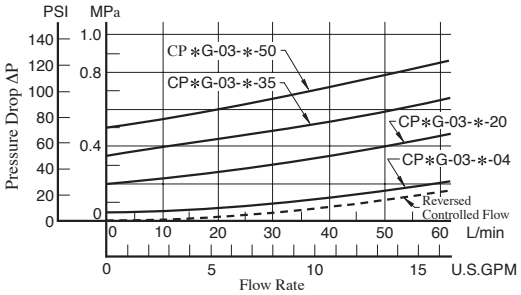
Hydraulic Fluid: Viscosity 30 mm²/s (141 SSU), Specific Gravity 0.850

Pressure Drop

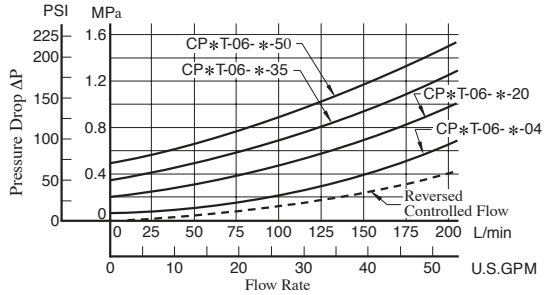
CPT-03, CPDT-03



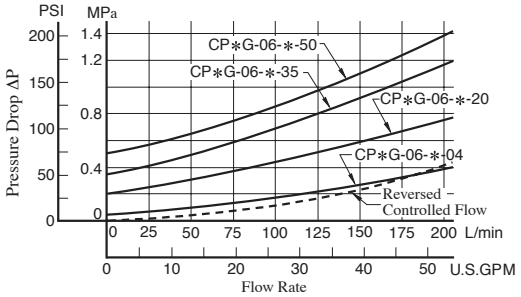
CPG-03, CPDG-03



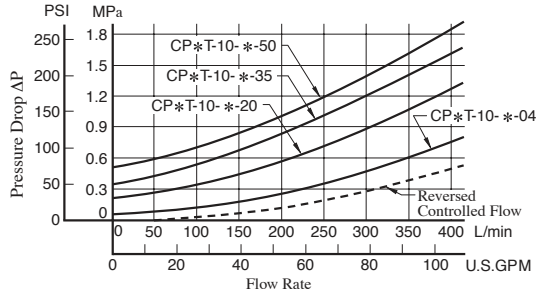
CPT-06, CPDT-06



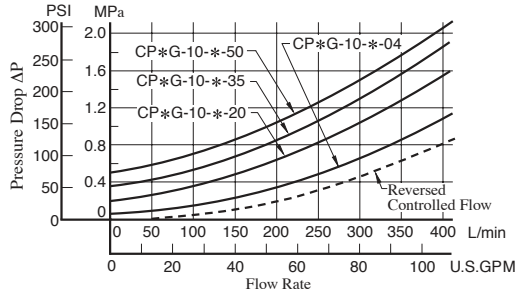
CPG-06, CPDG-06



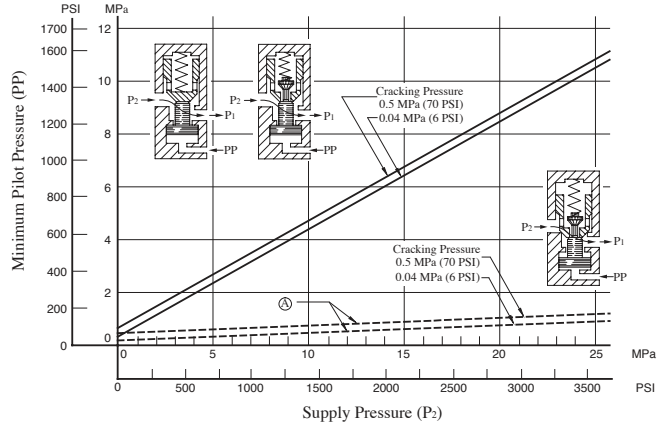
CPT-10, CPDT-10



CPG-10, CPDG-10



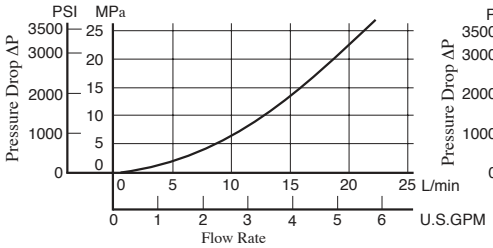
Min. Pilot Pressure Chart



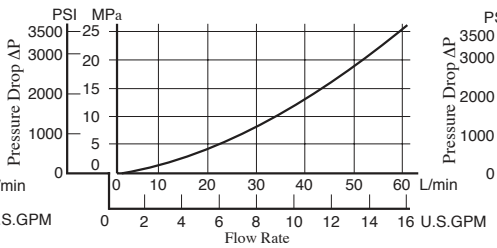
Ⓐ : Min. Pilot Pressure to open the Decompression Valve

Pressure Drop for Reversed Controlled Flow Only when Decompression Valve is Opened

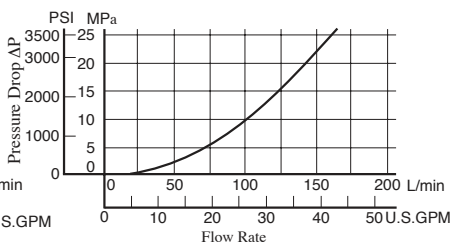
CPDT-03, CPDG-03



CPDT-06, CPDG-06

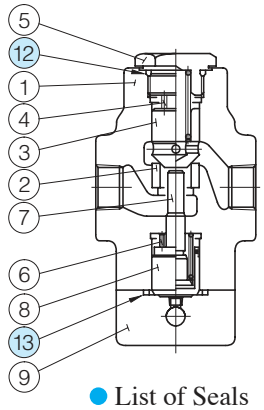


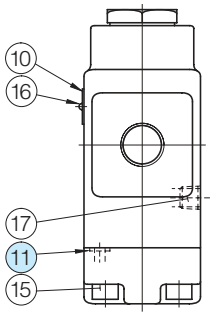
CPDT-10, CPDG-10

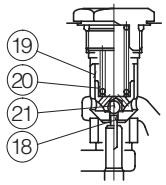


List of Seals

CPT/CPDT-03-∗-∗-50/5080/5090
CPT/CPDT-06-∗-∗-50/5080/5090
CPT/CPDT-10-∗-∗-50/5080/5090







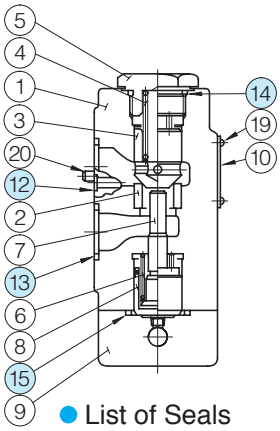
CPDT-03/06/10

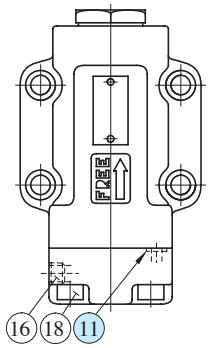
List of Seals

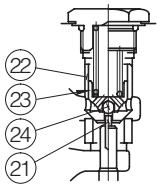
Item	Name of Parts	Part Numbers			Qty.
		CPT/CPDT-03	CPT/CPDT-06	CPT/CPDT-10	
11	O-Ring	SO-NB-P7	SO-NB-P9	SO-NB-P9	1
12	O-Ring	SO-NB-P21	SO-NB-P29	SO-NB-P36	1
13	O-Ring	SO-NB-G25	SO-NB-P32	SO-NB-P42	1

Note: When ordering the seals, please specify the seal kit number from the table below.

CPG/CPDG-03-∗-∗-50/5090
CPG/CPDG-06-∗-∗-50/5090
CPG/CPDG-10-∗-∗-50/5090







CPDG-03/06/10

List of Seals

Item	Name of Parts	Part Numbers			Qty.
		CPG/CPDG-03	CPG/CPDG-06	CPG/CPDG-10	
11	O-Ring	SO-NB-P7	SO-NB-P9	SO-NB-P9	1
12	O-Ring	SO-NB-P9	SO-NB-P9	SO-NB-P9	2
13	O-Ring	SO-NB-P18	SO-NB-P28	SO-NB-P32	2
14	O-Ring	SO-NB-P21	SO-NB-P29	SO-NB-P36	1
15	O-Ring	SO-NB-G25	SO-NB-P32	SO-NB-P42	1

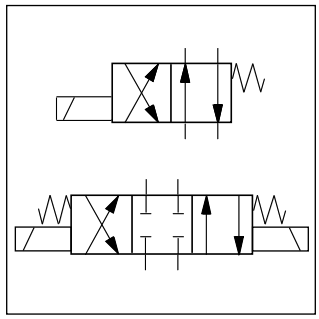
Note: When ordering the O-Rings, please specify the seal kit number from the table below.

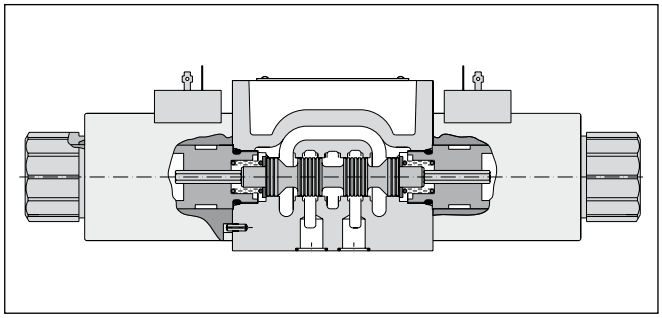
List of Seal Kits

Model Numbers	Seal Kit Numbers
CPT/CPDT-03-∗-∗-50/5080/5090	KS-CPT-03-50
CPT/CPDT-06-∗-∗-50/5080/5090	KS-CPT-06-50
CPT/CPDT-10-∗-∗-50/5080/5090	KS-CPT-10-50
CPG/CPDG-03-∗-∗-50/5090	KS-CPG-03-50
CPG/CPDG-06-∗-∗-50/5090	KS-CPG-06-50
CPG/CPDG-10-∗-∗-50/5090	KS-CPG-10-50

The direct operated directional control valve size NG10 is available with both Parker (series D3W) and Denison (series 4D02) model codes.

Both series are available with a soft shift option for smooth operation. An additional orifice in the solenoid anchor dampens the shifting time for D3W. For the 4D02 the orifice is located in the valve body.





Technical data

General							
Design		Directional spool valve					
Actuation		Solenoid					
Size		DIN NG10 / CETOP 05 / NFPA D05					
Mounting interface		DIN 24340 A10 / ISO 4401 / CETOP RP 121-H / NFPA D05					
Mounting position		unrestricted, preferably horizontal					
Ambient temperature	[°C]	-25...+50					
Weight	[kg]	4.8 (1 solenoid), 6.3 (2 solenoids)					
Hydraulic							
Max. operating pressure	[bar]	P, A B: 350; T: 210 (DC), 105 (AC), 210 (AC Code “H“)					
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525					
Fluid temperature	[°C]	-25 ... +70					
Viscosity permitted	[cSt] / [mm²/s]	2.8...400					
Viscosity recommended	[cSt] / [mm²/s]	30...80					
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)					
Flow max.	[l/min]	150 (DC); 115 (AC)					
Leakage at 50 bar	[ml/min]	Up to 20 per flow path, depending on spool					
Static / Dynamic							
Step response		see table response time					
Electrical characteristics							
Duty ratio		100% ED; CAUTION: coil temperature up to 150 °C possible					
Max. switching frequency	[1/h]	10000					
Protection class		IP 65 in accordance with EN 60529 (plugged and mounted)					
	Code	K	J	U	G	Y	T
Supply voltage / ripple	[V]	12 V =	24 V =	98 V =	205 V =	110V at 50Hz/ 120V at 60Hz	230V at 50Hz/ 240V at 60Hz
Tolerance supply voltage	[%]	±10	±10	±10	±10	±5	±5
Current consumption hold	[A]	3	1.5	0.37	0.18	0.8 / 0.72	0.4 / 0.36
Current consumption in rush	[A]	3	1.5	0.37	0.18	3.41 / 3.31	1.75 / 1.7
Power consumption hold	[W]	36	36	36	36	88 / 86	88 / 86
Power consumption in rush	[W]	36	36	36	36	375 / 397	385 / 408
Solenoid connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461.					
Wiring min.	[mm²]	3 x 1.5 recommended					
Wiring length max.	[m]	50 recommended					

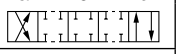
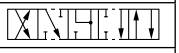
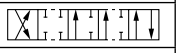
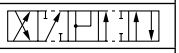
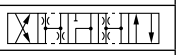
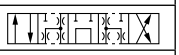
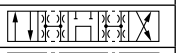
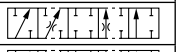
With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

D3W stand_UK.INDD CM_21.01.2008.1

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

2

D	3	W			
Directional control valve	**Size DIN NG10 CETOP 05 NFPA D05**	**Wet pin solenoid**	**Spool type**	**Spool position**	**Seals**

3 position spools	
Code	Spool type a 0 b
1	
2	
3	
4	
5	
6	
7	
8 [1]	
9 [1]	
10 [2]	
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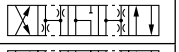
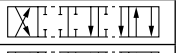
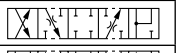
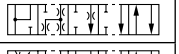
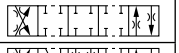
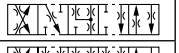
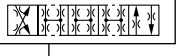
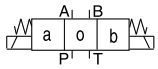
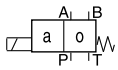
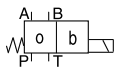
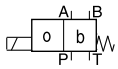
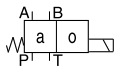
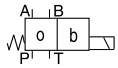
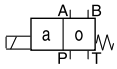
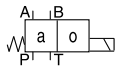
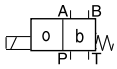
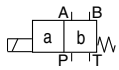
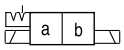
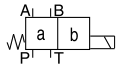
12	
14	
15	
16	
21 [2]	
22 [2]	
31 [2]	
32 [2]	
81 [2]	
82 [2]	
102 [2]	

2 position spools	
Code	Spool type a b
20	
26	
30	
101 [2]	

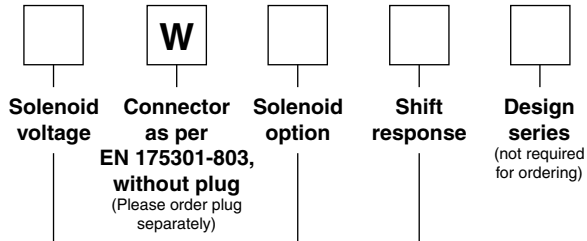
[1] Consider specific spool position.
[2] Only available for DC voltage.

Code	Seals
N	**NBR**
V	FPM

3 position spools			
Code	all 3 position spools		
C			**3 positions. Spring offset in position “0“. Operated in position “a“ or “b“.**
	Standard	Spool type 8 and 9	
E	 Operated in position “a“.	 Operated in position “b“.	**2 positions. Spring offset in position “0“.**
F	 Spring offset in position “b“.	 Spring offset in position “a“.	2 positions. Operated in position “0“.
K	 Operated in position “b“.	 Operated in position “a“.	**2 positions. Spring offset in position “0“.**
M	 Spring offset in position “a“.	 Spring offset in position “b“.	2 positions. Operated in position “0“.

2 position spools		
Code	Spool position	
B		**2 positions. Spring offset in position “b“. Operated in position “a“.**
D		**2 positions. Operated in position “a“ or “b“. No centre or offset position.**
H		**2 positions. Spring offset in position “a“. Operated in position “b“.**

Bold letters =
Short-term availability



Code	Solenoid voltage
K	**12V =**
J	**24V =**
U [3]	98V =
G [3]	205V =
Y	110V 50Hz / 120V 60Hz
T	230V 50Hz / 240V 60Hz

[3] To be used with retifier plug when DC solenoids are used with AC input.

Code	Solenoid option
omit	**Standard solenoid with manual override**
H	High pressure solenoid tube for AC. Tank pressure up to 210bar
T	without manual override

Code	Shift response
omit	Standard response
S4 [4]	orifice diameter 1.0 mm
S7 [4]	orifice diameter 1.5 mm

[4] Only for DC

The Parker model code should be used for all new applications. Otherwise also refer to Denison model code.

Further spool types and solenoid voltages on request.

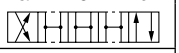
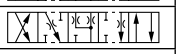
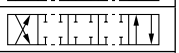
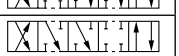
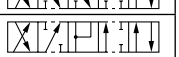
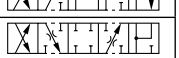
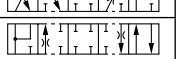
2

4D02 – ☐ ☐ ☐ – ☐ ☐ – **C**

Directional control valve size DIN NG10 CETOP 05 NFPA D05	Body	Control	Spool type	Spool position	End cap	Design series

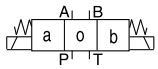
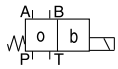
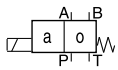
Code	Body
3	Standard 3-chamber
D	5-chamber for soft-shift (G3)

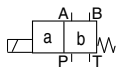
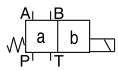
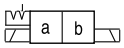
Code	Control
1	1 solenoid
2	2 solenoids
7	2 solenoids and 2 pos. detent (only for spool types 11 and 51)

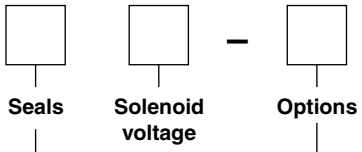
3 position spools	
Code	Spool type a 0 b
01	
02	
03	
07	
08	
09	
10	
46	
55	
56	

2 position spools	
Code	Spool type a b
11	
12	
51	

Code	End cap
01	for control 1
02	for control 2 and 7

3 position spools		
Code	Spool position	
03		3 positions. Spring centered to “0“.
05		2 positions. Spring centered energized to “b“.
06		2 positions. Spring centered energized to “a“.

2 position spools		
Code	Spool position	
01		2 positions. Spring offset to “b“ energized to “a“.
02		2 positions. Spring offset to “a“ energized to “b“.
09		2 positions detent. Operated in “a“ or “b“. No centre or spring offset position.



Code	Seals
1	NBR
5	FPM

Code	Solenoid voltage
G0R	12V =
G0Q	24V =
GAR *	98V =
GAG *	205V =
W30	110V 50Hz / 120V 60Hz
W31	230V 50Hz / 240V 60Hz

* To be used with retifier plug when DC solenoids are used with AC input.

Code	Options
omit	Solenoid connector as per EN 175301-803 without plug. With manual override
G3	Soft shift with orifice in body (for DC and body D only)
32	Without manual override

DENISON Hydraulics

The Denison model code is available for existing applications. For new applications we advise to refer to Parker model code.

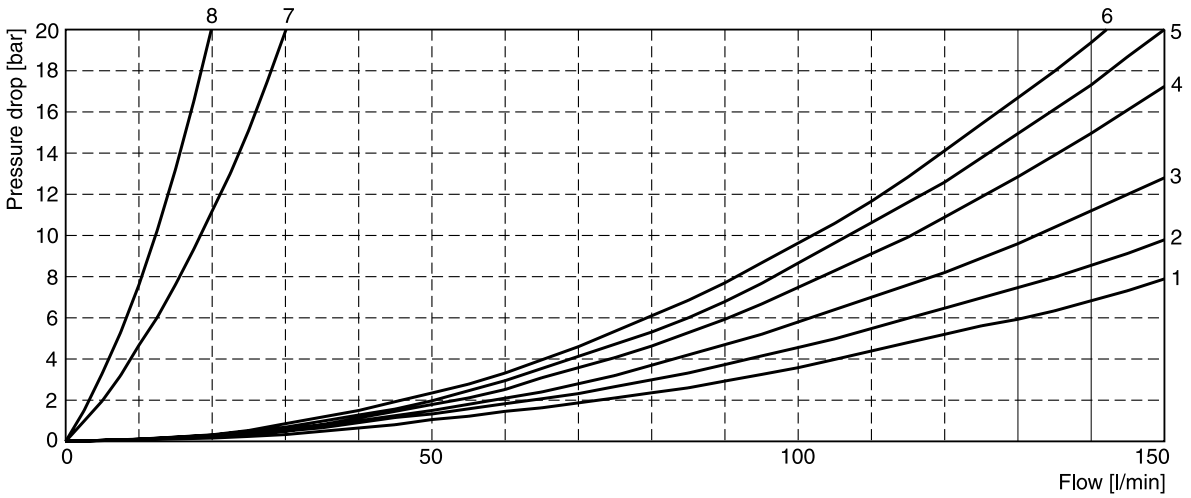
Further spool types and solenoid voltages on request.

The flow curve diagram shows the flow versus pressure drop curves for all spool types. For each spool type, operating position and flow direction the relevant curve number is given in the table below.

Spool		Position „b“		Position „a“		Position „0“					
D3W	4D02	P->A	B->T	P->B	A->T	P->A	P->B	A->T	B->T	P->T	A->B
1	**03**	4	3	4	3	–	–	–	–	–	–
2	**01**	4	1	4	1	3	3	1	1	5	1
3	**10**	4	3	5	2	–	–	4	–	–	–
4	**08**	4	2	4	2	–	–	3	3	–	5
5	–	4	3	5	3	5	–	–	–	–	–
6	**46**	4	3	4	3	6	6	–	–	–	6
7	–	5	1	4	3	–	4	–	2	6	–
10	–	4	–	4	–	–	–	–	–	–	–
11	**02**	4	3	4	3	–	–	8	8	–	–
12	–	4	3	4	3	7	7	7	7	8	8
14	–	4	3	5	1	4	–	2	–	6	–
15	**09**	5	2	4	3	–	–	–	4	–	–
16	–	5	3	4	3	–	5	–	–	–	–
20	**51**	4	3	4	3	–	–	–	–	–	–
26	**12**	4	–	4	–	–	–	–	–	–	–
30	**11**	4	2	4	2	–	–	–	–	–	–
		P->B	A->T	P->A	B->T	P->A	P->B	A->T	B->T	P->T	A->B
8	–	4	3	4	3	–	–	–	–	6	–
9	**07**	4	4	4	4	–	–	–	–	6	–

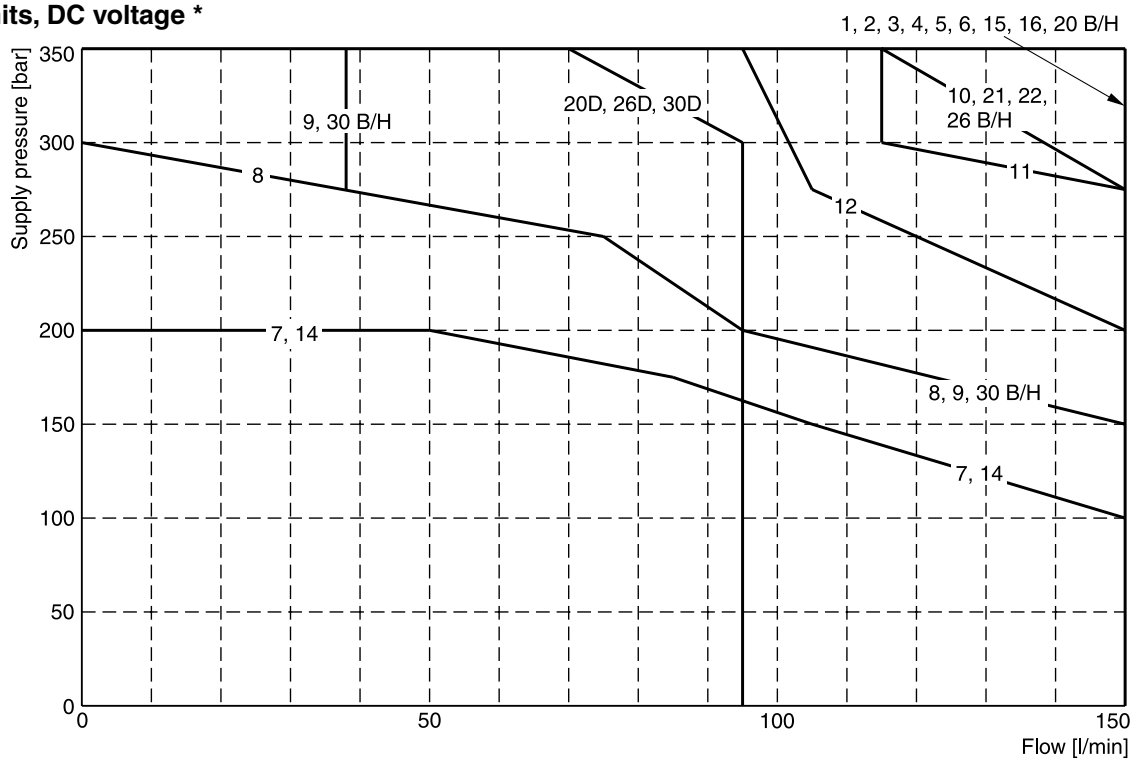
		Position „b“			Position „a“		
		P->A	P->B	A->B	P->B	A->T	
21	**55**	5	4	6	3	3	
		P->A	B->T		P->A	P->B	A->B
22	**56**	3	3		4	5	6

Flow curve diagram

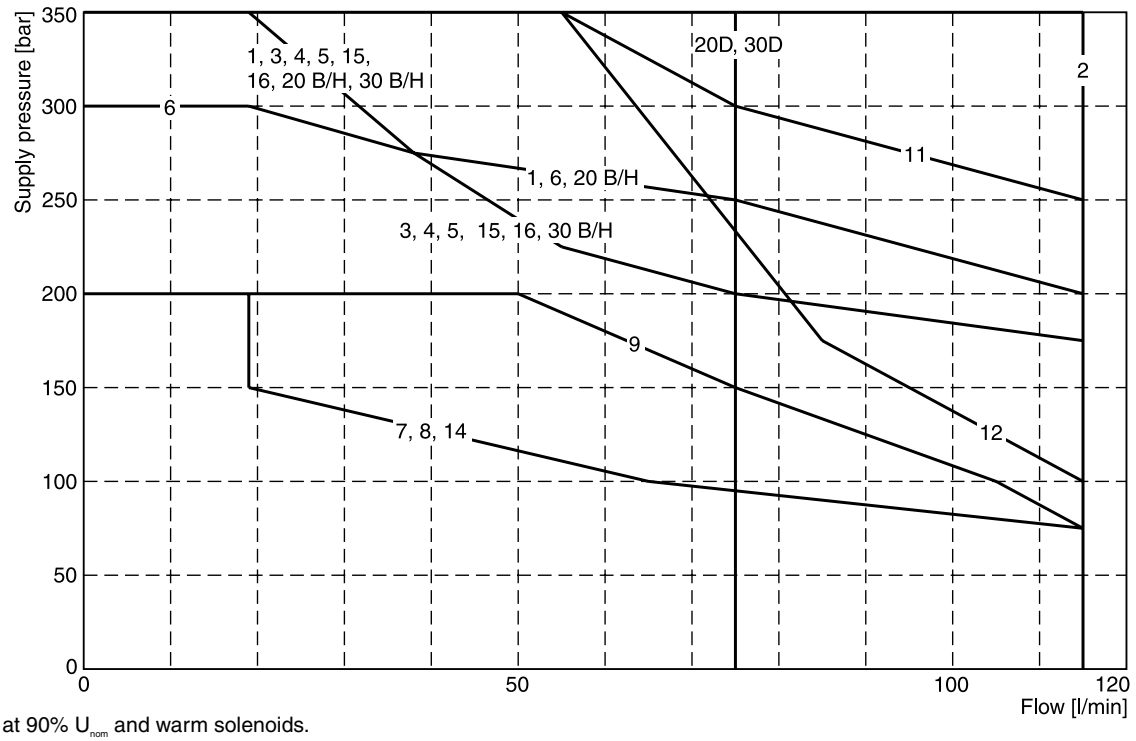


The diagram below specifies the shift limits for valves with DC and AC solenoids. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.

Shift limits, DC voltage *



Shift limits, AC voltage *



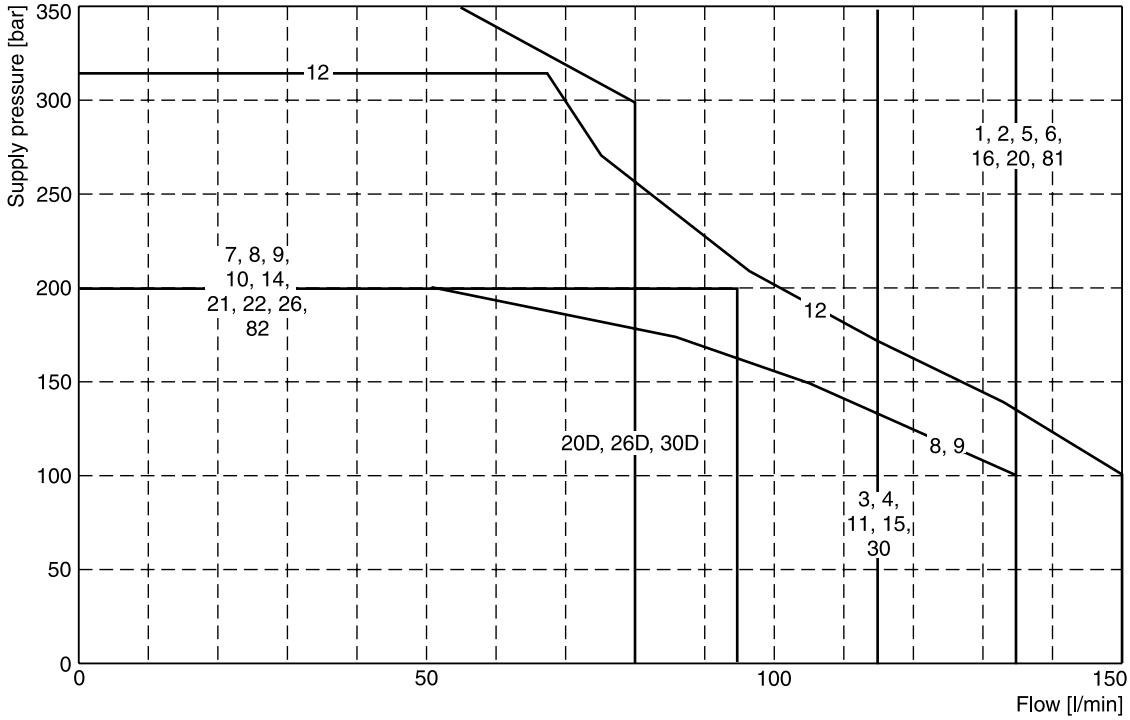
Measured at 90% U_{nom} and warm solenoids.

* For 4D02 spool code see flow curve table.

2

Shift limits soft shift

The diagram below specifies the shift limits. Valves with spool position “F” or “M” can only be operated up to 70% of the limits. The specifications apply to a viscosity 35mm²/s and balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.



Measured at 90% U_{nom} and warm solenoids.

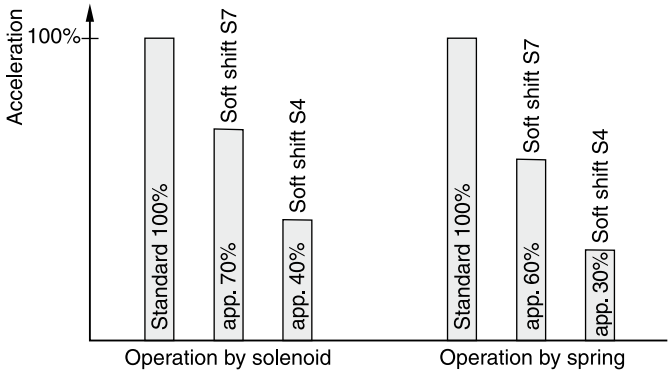
Response times D3W Soft Shift

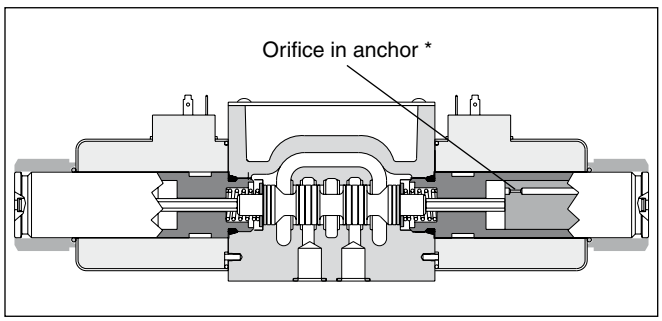
Code	Orifice size	Energize	De-energize
(Standard)	–	105 ms (DC) 21 ms (AC)*	85 ms (DC) 35 ms (AC)*
S4	1.0 mm	320 ms	550 ms
S7	1.75 mm	160 ms	370 ms

Step response times were obtained under the following conditions: υ = 35 mm²/s at 50°C with the valve operating at 175 bar and 65 l/min. Published response times are nominal and may vary with spool, flow, pressure and temperature.

* For AC input and soft shift use rectifier plug.

Acceleration for different orifice sizes (archived against a valve without soft shift)



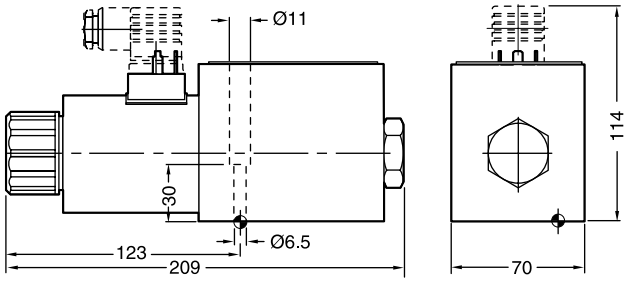


* Note: For 4D02 the orifice is located in the Z-channel of the valve body.

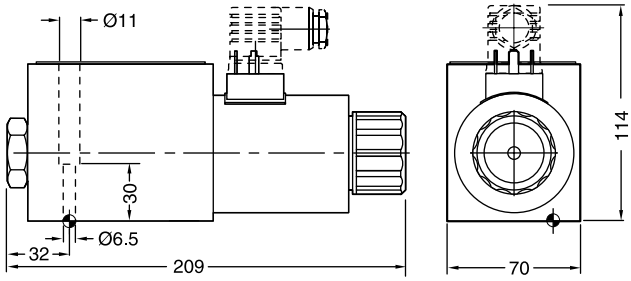
For even softer shifting, the proportional spools 81, 82, 101 and 102 can be used.

Interface EN 175301-803, DC solenoid

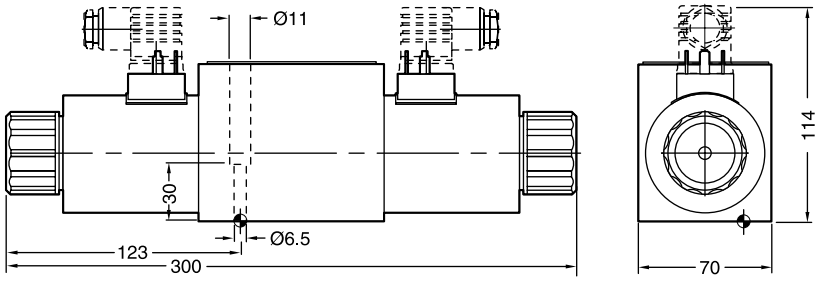
B, E, F -style



H, K, M -style

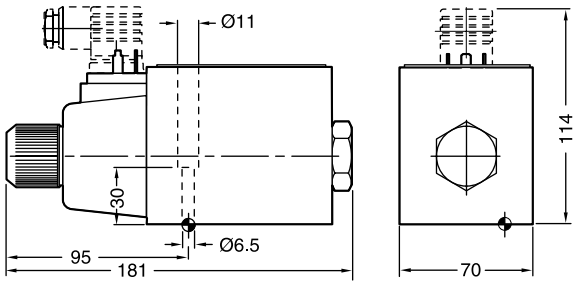


C, D -style

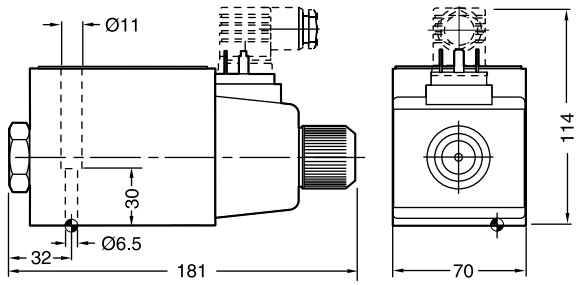


Interface EN 175301-803, AC solenoid

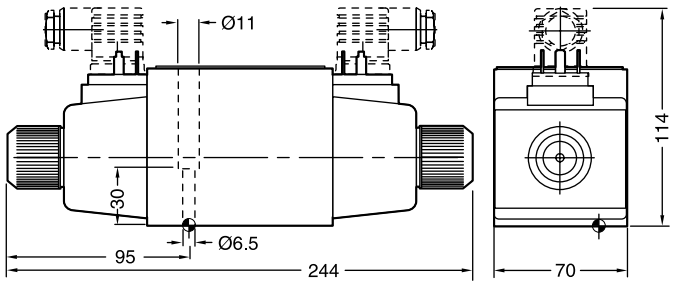
B, E, F -style



H, K, M -style



C, D -style



Surface finish	Kit			Kit
$\sqrt{R_{max}6.3}$ ⏥ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm ±15%	**NBR: SK-D3W-30** FPM: SK-D3W-V30

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

D3W stand_UK.INDD CM_21.01.2008.1

Parker Hannifin GmbH & Co. KG
Hydraulic Controls Division
Kaarst, Germany

Notes

RE 25402
Edition: 2020-03
Replaces: 2019-07

rexroth
A Bosch Company

Pressure relief valve, direct-operated

Type DBD

H5585

- Size 6 ... 30
- Component series 1X
- Maximum operating pressure 630 bar
- Maximum flow 330 l/min

CE

Features

- As screw-in cartridge valve (cartridge)
- For threaded connection
- For subplate mounting
- Adjustment types for pressure adjustment, optionally:
  - Bushing with hexagon and protective cap
  - Rotary knob
  - Hand wheel
  - Lockable rotary knob
- Corrosion-protected design

Contents

Ordering code

01	02	03	04	05		06	07	08	09	10	11
DBD				**1X**	**/**						*****

01	Pressure relief valve, direct operated	**DBD**

Adjustment type for pressure adjustment

02		NG6	NG8	NG10	NG15	NG20	NG25	NG30	
	Bushing with hexagon and protective cap	✓	✓	✓	✓	✓	✓	✓	**S**
	Rotary knob [1)]	✓	✓	✓	✓	✓	–	–	**H**
	Hand wheel [2)]	–	–	–	–	–	✓	✓	**H**
	Lockable rotary knob [1; 3; 4)]	✓	✓	✓	✓	✓	–	–	**A**

03	Size 6 (port G1/4)	**6**
	Size 8 (port G3/8)	**8**
	Size 10 (port G1/2)	**10**
	Size 15 (port G3/4)	**15**
	Size 20 (port G1)	**20**
	Size 25 (port G1 1/4)	**25**
	Size 30 (port G1 1/2)	**30**

Type of connection

04		NG6	NG8	NG10	NG15	NG20	NG25	NG30	
	As screw-in cartridge valve (cartridge)	✓	–	✓	–	✓	–	✓	**K**
	For threaded connection	✓	✓	✓	✓	✓	✓	✓	**G**
	For subplate mounting	✓	–	✓	–	✓	–	✓	**P**

05	Component series 10 ... 1Z (10 ... 1Z: unchanged installation and connection dimensions)	**1X**

Pressure rating [5)]

06		NG6	NG8	NG10	NG15	NG20	NG25	NG30	
	Set pressure up to 25 bar	✓	✓	✓	✓	✓	✓	✓	**25**
	Set pressure up to 50 bar	✓	✓	✓	✓	✓	✓	✓	**50**
	Set pressure up to 100 bar	✓	✓	✓	✓	✓	✓	✓	**100**
	Set pressure up to 200 bar	✓	✓	✓	✓	✓	✓	✓	**200**
	Set pressure up to 315 bar	✓	✓	✓	✓	✓	✓	✓	**315**
	Set pressure up to 400 bar	✓	✓	✓	✓	✓	–	–	**400**
	Set pressure up to 630 bar [6)]	–	–	✓	–	–	–	–	**630**

Corrosion resistance (for availability see table on page 3)

07	None	**no code**
	Improved corrosion protection (240 h salt spray test according to EN ISO 9227)	**J3**
	High corrosion protection (720 h salt spray test according to EN ISO 9227)	**J5**

Seal material (observe compatibility of seals with hydraulic fluid used, see page 6)

08	NBR seals	**no code**
	FKM seals	**V**

Line connection

09	Pipe thread according to ISO 228/1	**no code**
	SAE thread	**12**

Equipment Directive

10	**Without** type-examination procedure	**no code**
	Type-examination tested safety valve according to PED 2014/68/EU [7)]	**E**

11	For further details, see the plain text	

Ordering code

1) For size 20, only available for the pressure ratings 25, 50 or 100 bar.
2) Available for the pressure ratings 25, 50 or 100 bar only.
3) Key with material no. **R900008158** is included in the scope of delivery.
4) Not available for type-examination tested safety valves "E".
5) When selecting the pressure rating, please observe the characteristic curves and notices on page 8.
6) With version "G" and "P", only available as "SO292", see page 9 and 12.
7) See ordering code on page 15.

☞ **Notice:** Preferred types and standard units are contained in the EPS (standard price list).

Availability corrosion resistance (Without type-examination procedure; only adjustment type "S")

Type of connection	NG6	NG8	NG10	NG15	NG20	NG25	NG30
As screw-in cartridge valve "K"	no code, J5	–	no code, J5	–	no code, J5	–	no code, J5
For threaded connection "G"	no code, J3	no code	no code, J3	no code	no code, J3	no code	no code, J3
For subplate mounting "P"	no code, J3	–	no code, J3	–	no code, J3	–	no code, J3

☞ **Notice:**
Deviating ordering code for type-examination tested safety valves "E" can be found on page 15

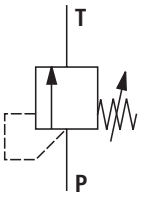
Function, section, symbol

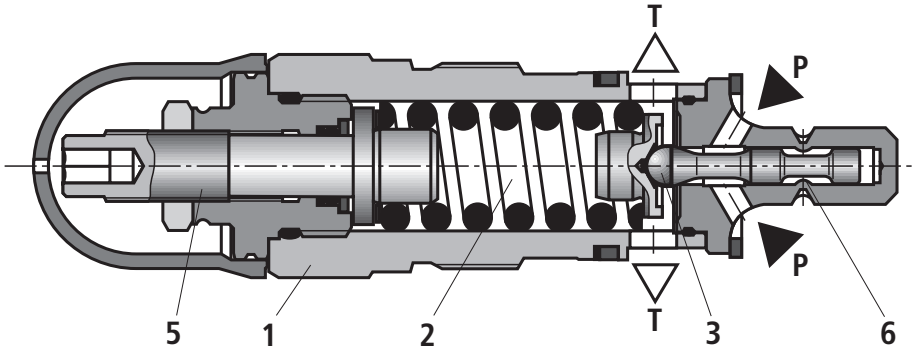
Pressure relief valves of type DBD are direct operated seat valves. They are used for limiting a system pressure.
The valves basically consist of sleeve (1), spring (2), poppet with damping piston (3) (pressure rating 25 ... 400 bar) or ball (4) (pressure rating 630 bar) and adjustment type (5). The system pressure can be set steplessly via the adjustment type (5). The spring (2) pushes the poppet (3) or the ball (4) onto the seat. Channel P is connected to the system. The pressure existing in the system acts on the poppet surface (or the ball).
If the pressure in channel P exceeds the value set at the spring (2), the poppet (3) or the ball (4) opens against the spring (2). Now, hydraulic fluid from channel P flows into channel T. The stroke of the poppet (3) is limited by the embossing (6).

In order to achieve good pressure adjustment over the entire pressure range, the entire pressure range has been divided into 7 pressure ratings. One pressure rating corresponds to a certain spring for a maximum operating pressure that can be set by means of that spring.

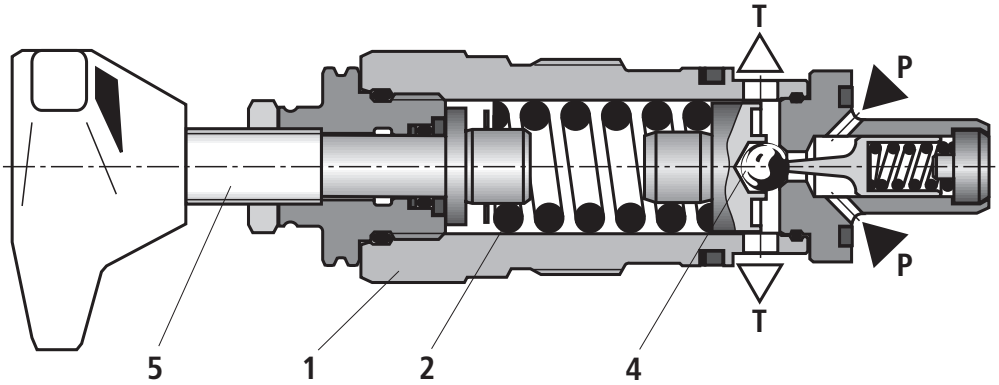
☞ **Notice:**
The adjustment type (5) is constructed so that it cannot be lost. Due to the gimbal-mounting, the adjustment element remains loose (movable) in the adjustment type (5) in case of complete unloading.
Pressure rating "25":
If despite completely unloaded adjustment type, the minimum pressure does not settle, the adjustment element has to be "pulled back" to the stop due to the low spring and/or restoring force.
For pressure adjustment / increase, the adjustment element can then be screwed in again.

Symbol





Type DBDS..K1X/...
Version pressure rating 25 ... 400 bar (poppet seat valve)



Type DBDH 10 K1X/...
Version pressure rating 630 bar (ball seat valve, only NG10)

Technical data

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

General					
Size	NG	6, 8	10	15, 20	25, 30
Weight		See pages 9, 11 and 12			
Installation position		any			
Ambient temperature range	°C	–30 ... +80 (NBR seals) –15 ... +80 (FKM seals)			
Minimum stability of the housing materials		Housing materials are to be selected so that there is sufficient safety for all imaginable operating conditions (e. g. with reference to pressure resistance, thread stripping strengths and tightening torques).			
$MTTF_D$ values according to EN ISO 13849	years	150 ... 1200 (for more information see data sheet 08012)			

Hydraulic						
Maximum operating pressure	▶ Input					
	– Standard	bar	400	400	400	315
	– Version "630"	bar	–	630	–	–
	▶ Output	bar	315	315	315	315
Minimum set pressure			See characteristic curves page 7			
Maximum flow (standard valves)			See characteristic curves page 8			
Hydraulic fluid			see table page 6			
Hydraulic fluid temperature range		°C	–30 ... +80 (NBR seals) –15 ... +80 (FKM seals)			
Viscosity range		mm^2/s	10 ... 800			
Maximum admissible degree of contamination of the hydraulic fluid; cleanliness class according to ISO 4406 (c)			Class 20/18/15 [1]			

[1] The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and simultaneously increases the life cycle of the components.
Available filters can be found at www.boschrexroth.com/filter.

Deviating technical data for type-examination tested safety valves can be found on page 14.

☞ **Notice:**
Hydraulic counter pressures in port T add 1:1 to the response pressure of the valve set at the adjustment type.

Example:
- Pressure adjustment of the valve due to spring preload (item 2 on page 4) p_{spring} **= 200 bar**
- Hydraulic counter pressure in port T: $p_{hydraulic}$ **= 50 bar**
- ⇒ Response pressure = p_{spring} + $p_{hydraulic}$ **= 250 bar**

Technical data

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

Hydraulic fluid		Classification	Suitable sealing materials	Standards	Data sheet
Mineral oils		HL, HLP, HLPD, HVLP, HVLPD	NBR, FKM	DIN 51524	90220
Bio-degradable	▶ Insoluble in water	HETG	FKM	ISO 15380	90221
		HEES	FKM		
	▶ Soluble in water	HEPG	FKM	ISO 15380	
Flame-resistant	▶ Water-free	HFDU (glycol base)	FKM	ISO 12922	90222
		HFDU (ester base)	FKM		
		HFDR	FKM		
	▶ Containing water	HFC (Fuchs: Hydrotherm 46M, Renosafe 500; Petrofer: Ultra Safe 620; Houghton: Safe 620; Union: Carbide HP5046)	NBR	ISO 12922	90223

☞ **Important notices on hydraulic fluids:**

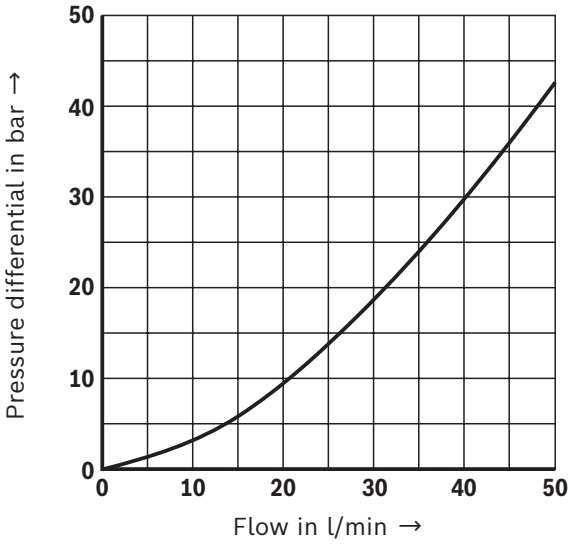
- ▶ For further information and data on the use of other hydraulic fluids, please refer to the data sheets above or contact us.
- ▶ There may be limitations regarding the technical valve data (temperature, pressure range, life cycle, maintenance intervals, etc.).
- ▶ The ignition temperature of the hydraulic fluid used must be 50 K higher than the maximum surface temperature.
- ▶ **Bio-degradable and flame-resistant – containing water:** If components with galvanic zinc coating (e.g. version "J3" or "J5") or parts containing zinc are used, small amounts of dissolved zinc may get into the hydraulic system and cause accelerated aging of the hydraulic fluid. Zinc soap may form as a chemical reaction product, which may clog filters, nozzles and solenoid valves – particularly in connection with local heat input.
- ▶ **Flame-resistant – containing water**:
  Due to the increased cavitation tendency with HFC hydraulic fluids, the life cycle of the component may be reduced by up to 30% as compared to the use with mineral oil HLP. In order to reduce the cavitation effect, it is recommended – if possible specific to the installation – to back up the return flow pressure in ports T to approx. 20% of the pressure differential at the component.

Characteristic curves

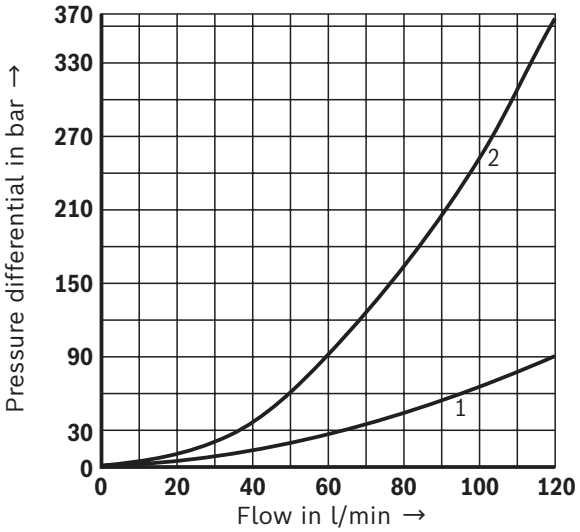
(measured with HLP46, ϑ_{oil} = 40 ±5 °C)

Minimum set pressure

Size 6



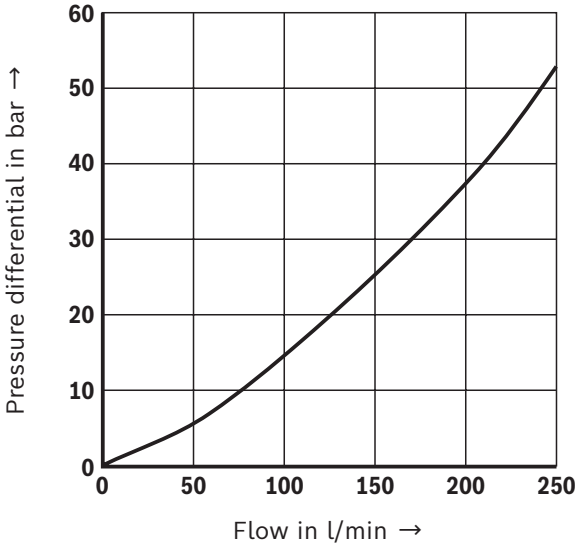
Size 8 and 10



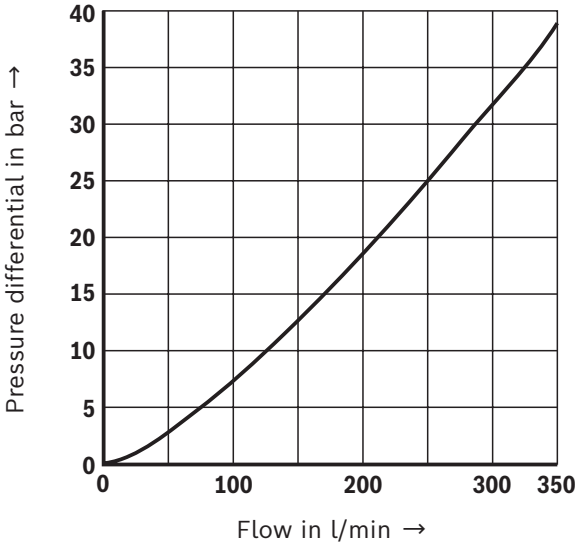
1 Pressure rating 25 ... 400 bar

2 Pressure rating 630 bar

Size 15 and 20



Size 25 and 30

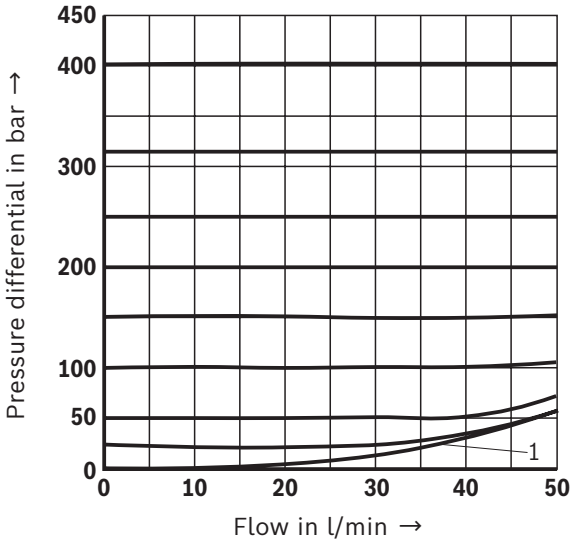


Characteristic curves

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

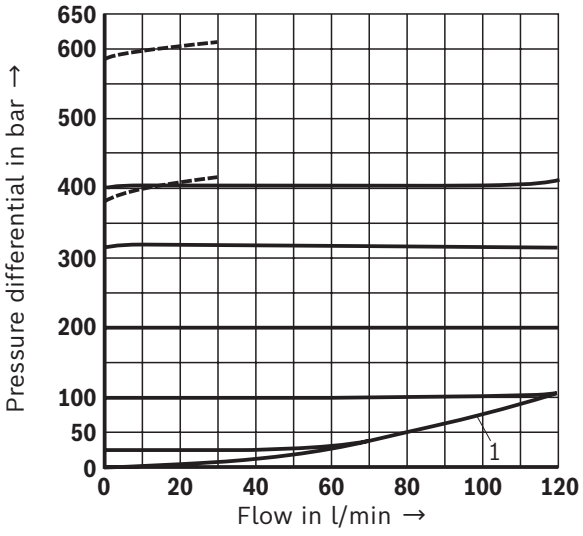
Δp-q_V characteristic curves

Size 6



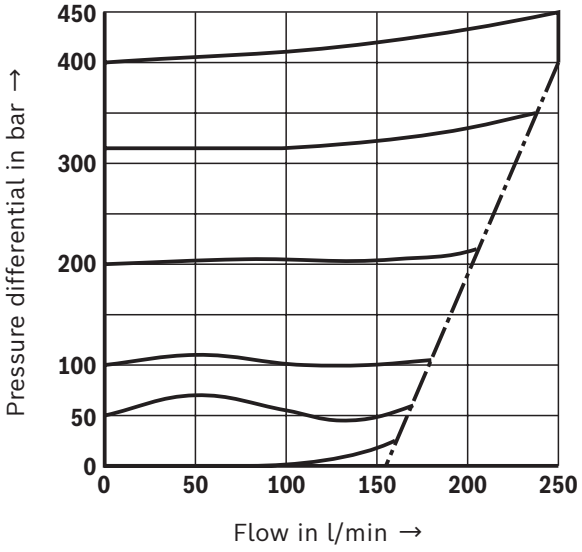
1 minimum adjustable pressure

Size 8 and 10

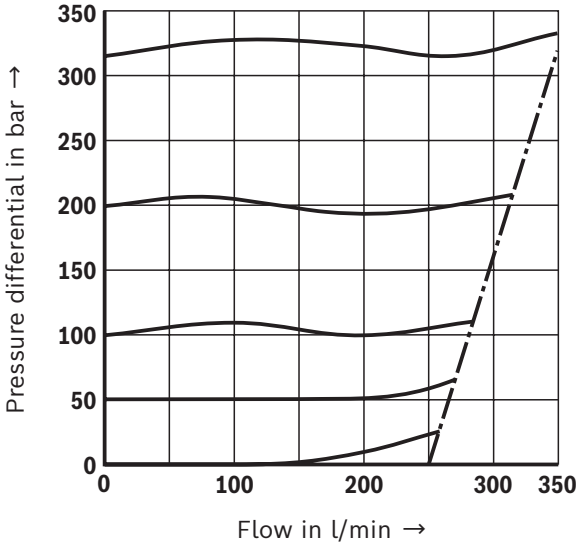


– – – – Pressure rating 630 bar (NG10 only)

Size 15 and 20



Size 25 and 30

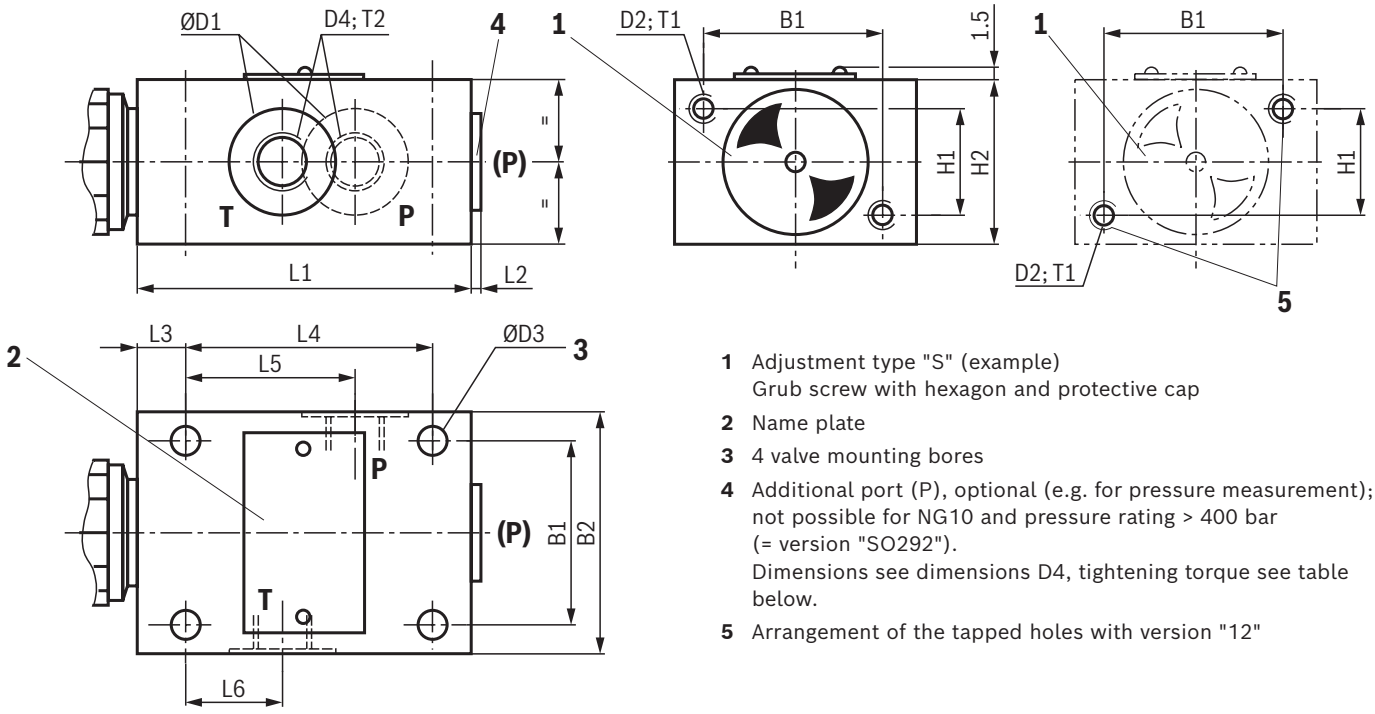


☞ **Notice:**

- The characteristic curves apply to the pressure at the valve output ***p*** = 0 bar across the entire flow range.
- The characteristic curves only apply with the specified environmental and temperature conditions. It has to be noted that the development of the characteristic curve will be influenced in case of deviating boundary conditions.

- The characteristic curves refer to the specified pressure ratings (e.g. 200 bar). The more the set pressure value differs from the nominal pressure rating (e.g. < 200 bar), the larger the pressure increase with increasing flow gets.

Dimensions: Threaded connection (dimensions in mm)



1 Adjustment type "S" (example)
Grub screw with hexagon and protective cap

2 Name plate

3 4 valve mounting bores

4 Additional port (P), optional (e.g. for pressure measurement); not possible for NG10 and pressure rating > 400 bar (= version "SO292").
Dimensions see dimensions D4, tightening torque see table below.

5 Arrangement of the tapped holes with version "12"

NG	B1	B2	ØD1 [1]	D2 [1]	ØD3	D4 [1]	Tightening torques M_A in Nm for fittings [2]	
							Plug screw (4)	Pipe fittings
6	45	60	25	M6	6.6	G1/4	30	60
8	60	80	28	M8	9	G3/8	40	90
10	60	80	34	M8	9	G1/2	60	130
15	70	100	42	M8	9	G3/4	80	200
20	70	100	47	M8	9	G1	135	380
25	100	130	56	M10	11	G1 1/4	480	500
30	100	130	65	M10	11	G1 1/2	560	600

NG	H1	H2	L1	L2	L3	L4	L5	L6	T1	T2 [1]	Weight, approx. in kg
6	25	40	80	4	15	55	40	20	10	12	1.5
8	40	60	100	4	20	70	48	21	15	12	3.7
10	40	60	100	4	20	70	48	21	15	14	3.7
15	50	70	135	4	20	100	65	34	18	16	6.4
20	50	70	135	5.5	20	100	65	34	18	18	6.4
25	60	90	180	5.5	25	130	85	35	20	20	13.9
30	60	90	180	5.5	25	130	85	35	20	22	13.9

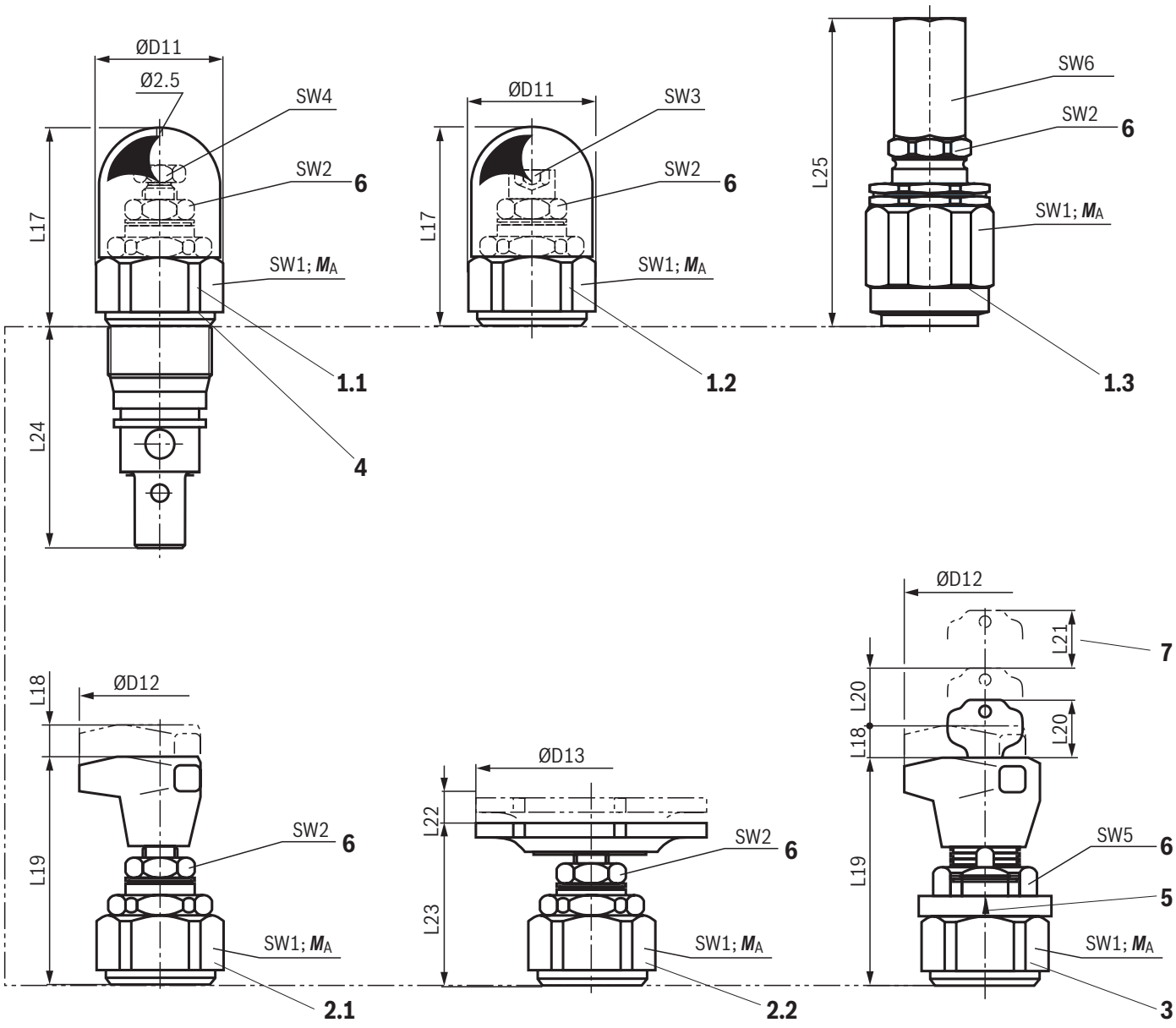
[1] Deviating dimensions for version "12"

NG	ØD1	D2	D4	T2
6	21	1/4"-20 UNC	7/16"-20 UNF	12
8	25	5/16"-18 UNC	9/16-18 UNF	13
10	32	5/16"-18 UNC	3/4-16 UNF	15
15	41	5/16"-18 UNC	1 1/16"-12 UN	20
20	49	5/16"-18 UNC	1 5/16"-12 UN	20
25	58	3/8"-16 UNC	1 5/8-12 UN	20
30	70	3/8"-16 UNC	1 7/8-12 UN	16

[2] The tightening torques are guidelines, referring to the maximum operating pressure and when using a manual torque wrench (tolerance ±10%).

For the versions and dimensions of the adjustment types refer to page 10 and 11.

Dimensions: Screw-in cartridge valve (dimensions in mm)



1.1 Adjustment type "S" – Grub screw with hexagon and protective cap; internal hexagon (NG6 ... NG20)

1.2 Adjustment type "S" – Grub screw with hexagon and protective cap; external hexagon (NG30)

1.3 Adjustment type "S" – Grub screw with hexagon and protective cap; version "J3" and "J5"

2.1 Adjustment type "H" – rotary knob (NG6 ... NG20)

2.2 Adjustment type "H" – hand wheel (NG30)

3 Adjustment type "A" – lockable rotary knob NG6 ... NG10 (NG20 ... 100 bar)

4 Type designation

5 Marking (adjustment of the zero position after the valve has been screwed in; then fixing of the ring by horizontal shifting until it engages on the plug screw SW6).

6 Lock nut, tightening torque $M_A = 10^{+5}$ Nm

7 Space required to remove the key

Dimensional tables see page 11, installation bore see page 13.

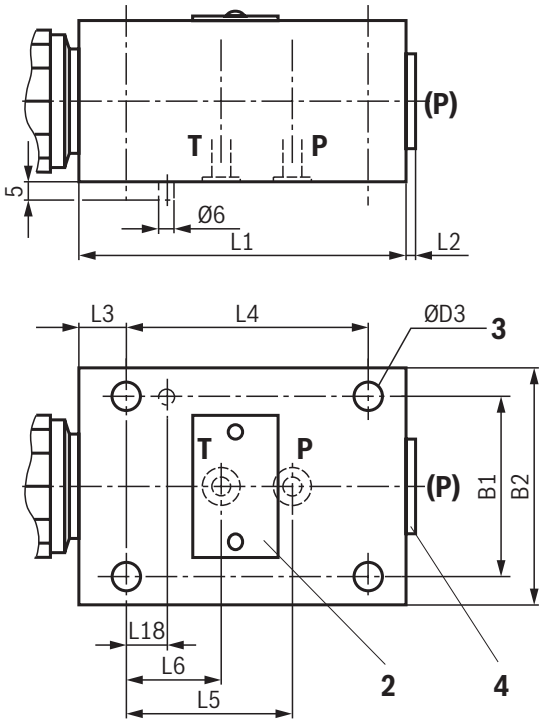
Dimensions: Screw-in cartridge valve (dimensions in mm)

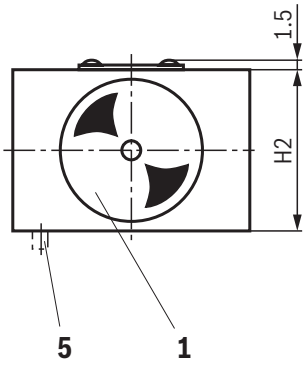
NG	ØD11	ØD12	ØD13	L17	L18	L19	L20	L21	L22	L23	L24	L25
6	34	60	–	72	11	83	28	20	–	–	64.5	82.2
10	38	60	–	68	11	79	28	20	–	–	77	78.5
20	48	60	–	65	11	77	28	20	–	–	106	75
30	63	–	80	83	–	–	–	–	11	56	131	94.3

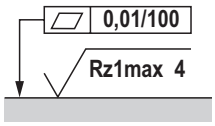
NG	SW1	SW2	SW3	SW4	SW5	SW6	**Tightening torques M_A in Nm for screw-in cartridge valves** [2] Pressure rating in bar up to 200	up to 400	up to 630	**Weight**, approx. in kg
6	32	19	6	–	30	19	$50^{\pm5}$	$80^{\pm5}$	–	0.4
10	36	19	6	–	30	19	$100^{\pm5}$	$150^{\pm10}$	$200^{\pm10}$	0.5
20	46	19	6	–	30	19	$150^{\pm10}$	$300^{\pm15}$	–	1
30	60	19	–	13	–	19	$350^{\pm20}$	$500^{\pm30}$	–	2.2

[2] The tightening torques are guidelines with a friction coefficient μ_{total} = 0.12 and when using a manual torque wrench.

Dimensions: Subplate mounting (dimensions in mm)







Required surface quality of the valve contact surface

1 Adjustment type "S" (example)
Grub screw with hexagon and protective cap

2 Name plate

3 4 valve mounting bores

4 Additional port (P), optional (e.g. for pressure measurement); not possible for NG10 and pressure rating > 400 bar (= version "SO292"). Tightening torques see dimensional table on page 9)

5 Locking pin (only with type-examination tested safety valves)

For the versions and dimensions of the adjustment types refer to page 10 and 11.

NG	B1	B2	ØD3	H2	L1	L2	L3
6	45	60	6.6	40	80	4	15
10	60	80	9	60	100	4	20
20	70	100	9	70	135	5.5	20
30	100	130	11	90	180	5.5	25

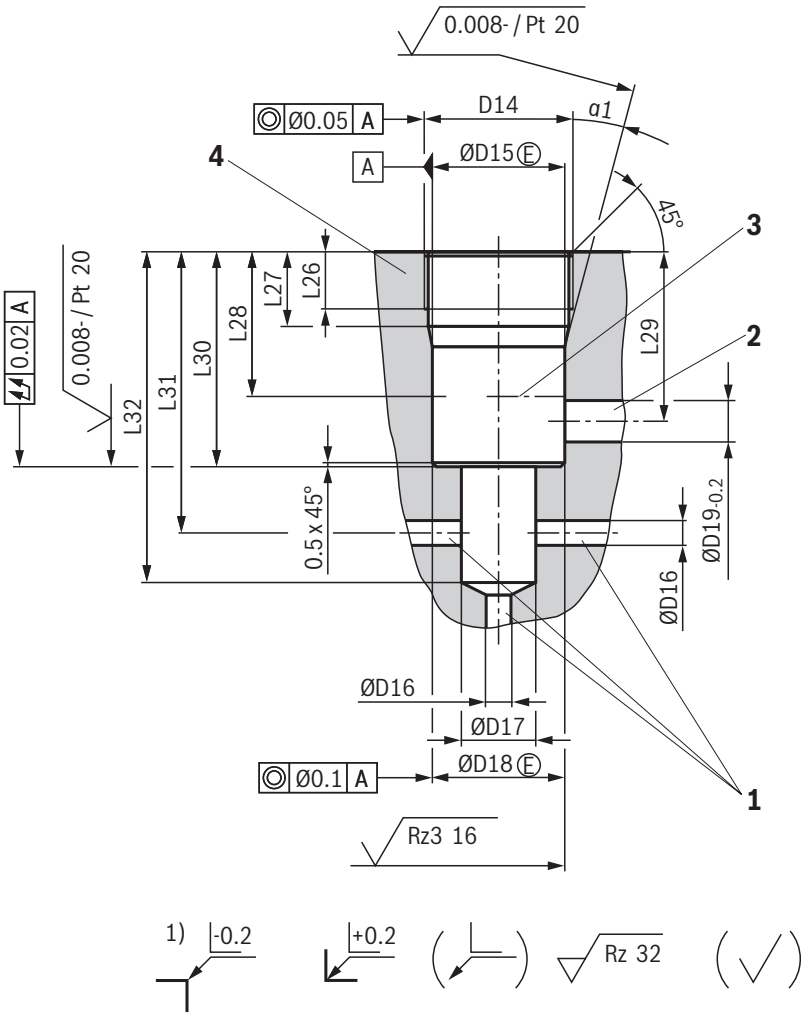
NG	L4	L5	L6	L18	Port P		**Weight,** approx. in kg
					"no code"	**„12"**	
6	55	40	20	15	G1/4	7/16"-20 UNF	1.5
10	70	45	21	15	G1/2	3/4-16 UNF	3.7
20	100	65	34	15	G3/4	1 5/16"-12 UN	6.4
30	130	85	35	15	G1 1/4	1 7/8-12 UN	13.9

Valve mounting screws (separate order)

Size	Quantity	Hexagon socket head cap screws	Material number
6	4	**ISO 4762 - M6 x 50 - 10.9-CM-Fe-ZnNi-5-Cn-T0-H-B** Friction coefficient μ_{total} = 0.09 ... 0.14; tightening torque M_A = 12.5 Nm ≤10%	**R913048088**
10	4	**ISO 4762 - M8 x 70 - 10.9-FlZn/nc/480h/C** Tightening torque M_A = 28 Nm ≤10%	**R913014548**
20	4	**ISO 4762 - M8 x 90 - 12.9-flZn/nc/480h/C** Tightening torque M_A = 28 Nm ≤10%	**R913069227**
30	4	**ISO 4762 - M10 x 110 - 12.9-flZn/nc/480h/C** Tightening torque M_A = 56 Nm ≤10%	**R913059433**

☞ **Notice:**
- For reasons of stability, exclusively the specified valve mounting screws shall be used.
- As replacement, you can use screws specified according to DIN 912.

Dimensions: Installation bore (dimensions in mm)



1 Port P, at any place at the circumference or at the front side

2 Port T, at any place at the circumference

3 Depth of fit

4 Minimum stability of the housing materials, see Technical data page 5.

[1] All seal ring insertion faces are rounded and free of burrs
Tolerance for all angles ±0.5°

NG	D14	ØD15	ØD16	ØD17	ØD18	ØD19
6	M28 x 1.5	25H9	6	15	$24.9^{+0.152}_{-0.2}$	12
10	M35 x 1.5	32H9	10	18.5	$31.9^{+0.162}_{-0.2}$	15
20	M45 x 1.5	40H9	20	24	$39.9^{+0.162}_{-0.2}$	22
30	M60 x 2	55H9	30	38.75	$54.9^{+0.174}_{-0.2}$	34

NG	L26	L27	L28	L29	L30	L31	L32	a1
6	15	19	30	36	45	$56.5^{\pm 5.5}$	65	15 °
10	18	23	35	41.5	52	$67.5^{\pm 7.5}$	80	15 °
20	21	27	45	55	70	$91.5^{\pm 8.5}$	110	20 °
30	23	29	45	63	84	$113,5^{\pm 11,5}$	140	20 °

Type-examination tested safety valves

The functionality of these valves corresponds to that of the standard series (see page 4). Valves of type DBD..1X/..E are, however, type-examination tested pressure relief valves according to the Pressure Equipment Directive 2014/68/EU and intended for use as safety valves.
At the factory, the response pressure is set to a fixed maximum value using the adjustment type. Afterwards, the safety valve is sealed and/or secured using a safety cap which cannot be disassembled in non-destructive manner.

The safety valves are available with graded response pressures (in 5 bar steps). The valve version provided with a safety cap can no longer be adjusted. With valve versions equipped with rotary knob or hand wheel, the valve spring can be unloaded by the user. This way, a response pressure lower than the factory setting can be set without the need of removing the lead seal.

Deviating technical data: Type-examination tested safety valves type DBD [1)]

General		
Ambient temperature range	°C	-10 ... +80

Hydraulic		
Set response pressure	bar	see last figure of the component marking page 15
Maximum counter pressure in the discharge line	bar	see characteristic curves page 19 ... 23
Maximum flow	l/min	The last but one figure of the component marking attached at the safety valve is always binding, see page 15. For valve types which have a variable maximum flow depending on the response pressure, the discharge coefficient is specified at this place (see page 16).
Hydraulic fluid		Hydraulic fluids according to DIN 51524: Hydraulic oils HL and HLP are suitable for safety valves with NBR or FKM seals.
Hydraulic fluid temperature range	°C	-10 ... +60
Viscosity range	mm^2/s	12 ... 230
Conformity		CE according to Pressure Equipment Directive 2014/68/EU

1) Component series 1X, according to the Pressure Equipment Directive 2014/68/EU

Ordering code: Type-examination tested safety valves type DBD [1)]

NG	Designation	Component marking
6	DBD ☐ 6 ☐ –1X/ ☐ ☐ ☐ ☐ E (1 2 3 4 5 6)	TÜV.SV.☐–849.5.F. $\frac{\alpha_w}{G}$ .p.
10	DBD ☐ 10 ☐ –1X/ ☐ ☐ ☐ ☐ E (1 2 3 4 5 6)	TÜV.SV.☐–850.6.F. $\frac{\alpha_w}{G}$ .p. TÜV.SV.☐–390.4,5.F.30.p. [2)]
20	DBD ☐ 20 ☐ –1X/ ☐ ☐ ☐ ☐ E (1 2 3 4 5 6)	TÜV.SV.☐–361.10.F.α_w.p.
30	DBD ☐ 30 ☐ –1X/ ☐ ☐ ☐ ☐ E (1 2 3 4 5 6)	TÜV.SV.☐–362.15.F.α_w.p.

☐ Value entered at the factory

[1)] Component series 1X, according to the Pressure Equipment Directive 2014/68/EU

[2)] Component marking for DBD. 10.1X/...; 400 bar < ***p*** ≤ 630 bar

Adjustment type for pressure adjustment

1 ☐		NG6	NG10	NG20	NG30	
	Bushing with hexagon and protective cap	✓	✓	✓	✓	**S**
	Rotary knob	✓	✓	✓	–	**H**
	Hand wheel	–	–	–	✓	**H**

Type of connection

2 ☐		NG6	NG10	NG20	NG30	
	As screw-in cartridge valve (cartridge)	✓	✓	✓	✓	**K**
	For threaded connection	✓	✓	✓	✓	**G**
	For subplate mounting	✓	✓	✓	✓	**P**

Pressure rating [3)]

3 ☐	Pressure in the type designation is to be entered by the customer, pressure adjustment ≥ 30 bar and possible in 5-bar steps.	

Corrosion resistance (for availability see table below)

4 ☐	None	**no code**
	Improved corrosion protection (240 h salt spray test according to EN ISO 9227)	**J3**
	High corrosion protection (720 h salt spray test according to EN ISO 9227)	**J5**

Seal material (observe compatibility of seals with hydraulic fluid used, see page 6)

5 ☐	NBR seals	**no code**
	FKM seals	**V**

Line connection

6 ☐	Pipe thread according to ISO 228/1	**no code**

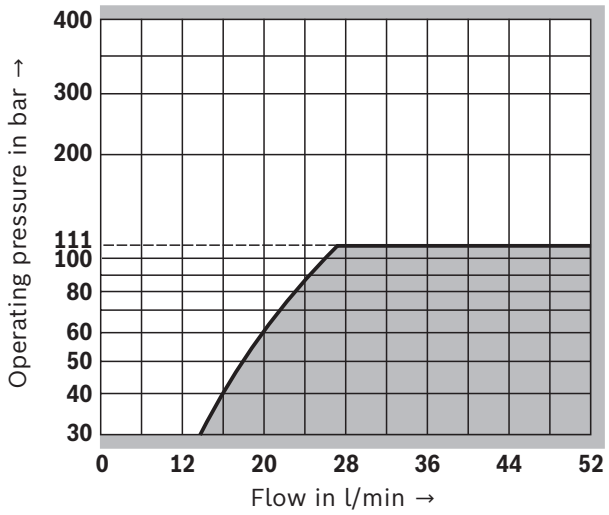
[3)] When selecting the pressure rating, please observe the characteristic curves and notices on page 16.

Availability corrosion resistance (With type-examination procedure)

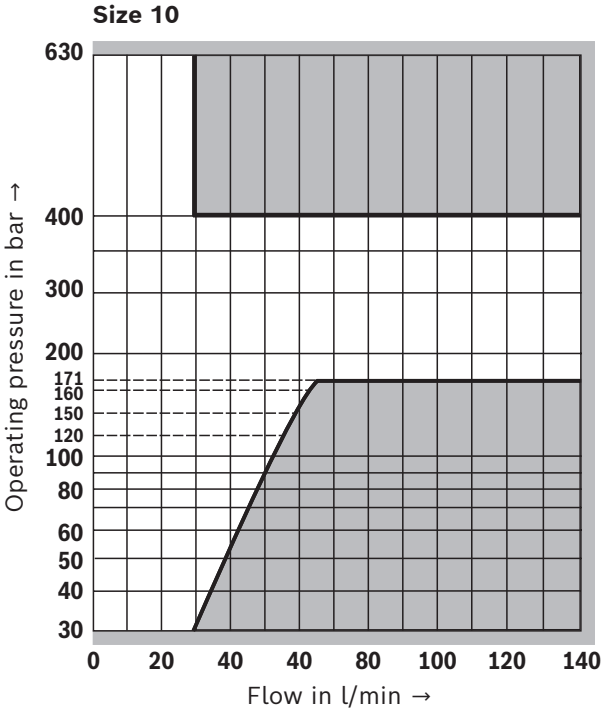
Type of connection	NG6	NG10	NG20	NG30
As screw-in cartridge valve "K"	no code, J5	no code, J5	no code, J5	no code, J5
For threaded connection "G"	no code, J3	no code, J3	no code, J3	no code, J3

Characteristic curves: Type-examination tested safety valves type DBD [1)]

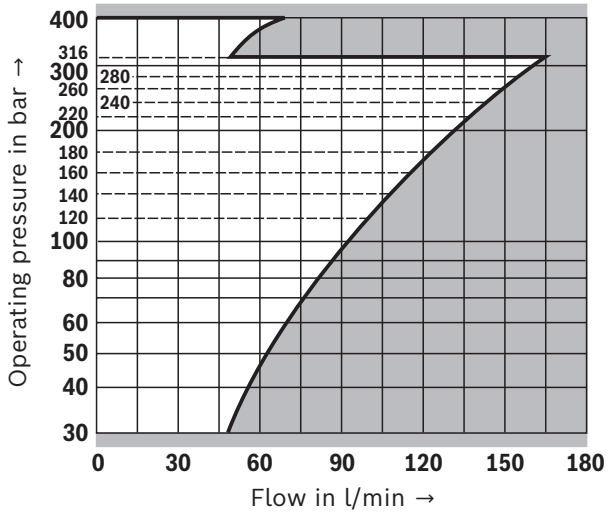
Size 6



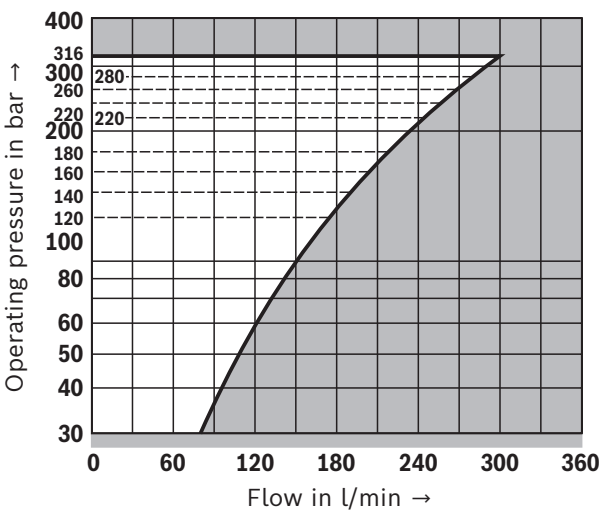
Size 10



Size 20



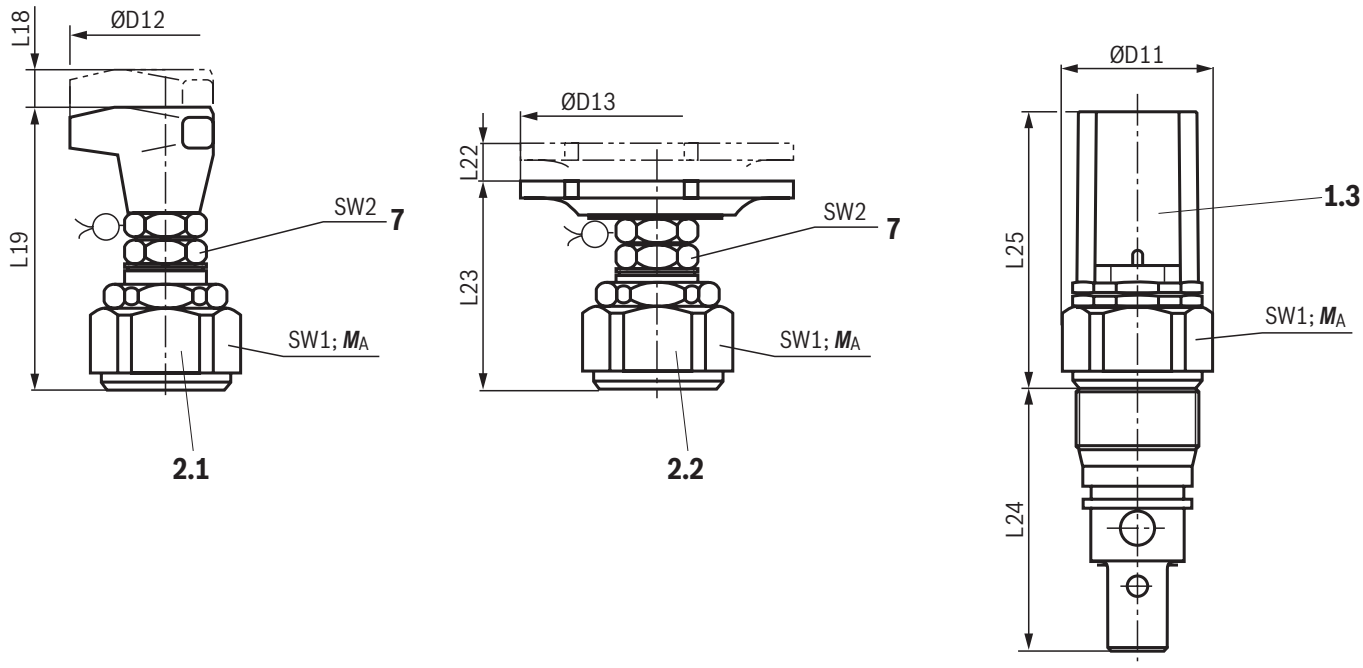
Size 30



☞ **Notice:**
Value pairs located in the areas of the characteristic curves with gray background can not be realized with the safety valve.
The characteristic curves shown here are only valid for a counter pressure of 0 bar in the discharge line.

1) Component series 1X, according to the Pressure Equipment Directive 2014/68/EU

Deviating dimensions: Screw-in cartridge valve as type-examination tested safety valve type DBD [1] (dimensions in mm)



NG	ØD11	ØD12	ØD13	L18	L19	L22	L23	L24	L25
6	34	60	40	11	83	11	63	64.5	80
10	38	60	40	11	79	11	59	78.5	76.5
20	48	60	40	11	77	11	57	107	72.5
30	63	–	80	–	–	11	87	134	93

NG	SW1	SW2	**Tightening torques M_A** in Nm **for screw-in cartridge valves** [2] Pressure rating in bar up to 200	up to 400	up to 630	**Weight**, approx. in kg
6	32	19	$50^{\pm 5}$	$80^{\pm 5}$	–	0.4
10	36	19	$100^{\pm 5}$	$150^{\pm 10}$	$200^{\pm 10}$	0.5
20	46	19	$150^{\pm 10}$	$300^{\pm 15}$	–	1
30	60	19	$350^{\pm 20}$	$500^{\pm 30}$	–	2.2

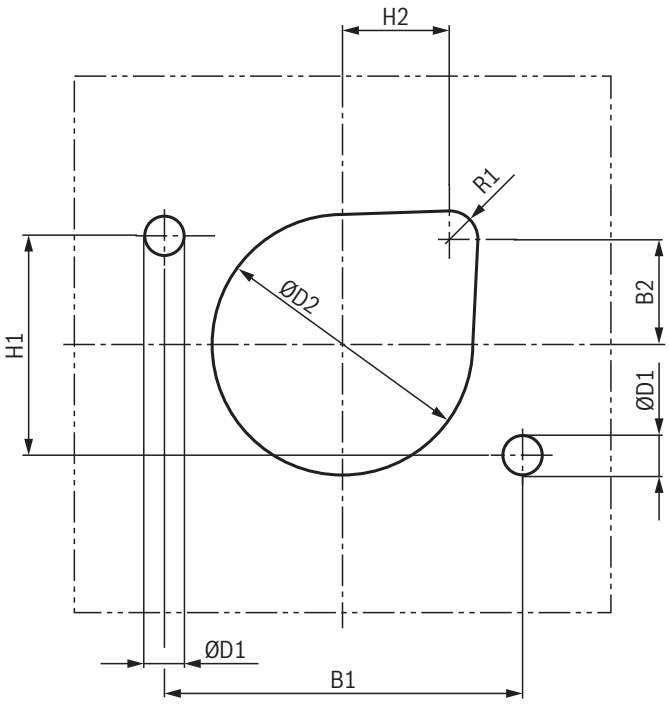
1.3 Adjustment type "S" – hexagon with safety cap
2.1 Adjustment type "H" – rotary knob (see table below)
2.2 Adjustment type "H" – hand wheel (see table below)
7 Lock nut, tightening torque $M_A = 10^{+5}$ Nm

[1] Component series 1X, according to the Pressure Equipment Directive 2014/68/EU
[2] The tightening torques are guidelines with a friction coefficient $\mu_{total} = 0.12$ and when using a manual torque wrench.

Adjustment type for corrosion resistance

	NG6	NG10	NG20	NG30
Without corrosion protection	2.1	2.1	2.1	2.2
Version "J3" and "J5"	2.2	2.2	2.2	2.2

Dimensions: Sheet cut-out for front panel mounting with type-examination tested safety valves type DBD [1] (dimensions in mm)



NG	B1	B2	H1	H2
6	45	12.5	25	22.5
10	60	20.5	40	20.5
20	70	24	50	24
30	100	29.5	60	29.5

NG	ØD1H13	ØD2H13	R1
6	7	40	8
10	9	44	8
20	9	55	8
30	11	73	8

☞ **Notice:**
With valves type DBDH.K..1X/..E, the hand wheel must be removed before the front panel assembly of the screw-in cartridge valve and reassembled afterwards.

[1] Component series 1X, according to the Pressure Equipment Directive 2014/68/EU

Safety instructions: Type-examination tested safety valves type DBD [1)]

- Before ordering a type-examination tested safety valve, it must be observed that for the desired **response pressure** p, the maximum admissible **flow** q_{Vmax} of the safety valve must be larger than the maximum possible flow of the system/accumulator to be secured. According to the Pressure Equipment Directive **2014/68/EU,** the increase in the system pressure due to the flow must not exceed 10% of the set response pressure (see component marking page 15).
- The maximum admissible flow q_{Vmax} stated in the component marking must not be exceeded.
- Discharge lines of safety valves must end in a risk-free manner. An accumulation of fluids in the discharge system must **not** be possible (see data sheet AD2000 A2).

☞ **Application notes must always be observed**

- In the plant, the response pressure specified in the component marking is set with a flow of 2 l/min.
- The maximum flow stated in the component marking applies for applications without counter pressure in the discharge line (port T).
- By removing the lead seal at the safety valve, the approval according to the Pressure Equipment Directive becomes void!
- Basically, the requirements of the Pressure Equipment Directive and of data sheet AD 2000 A 2 have to be observed.
- It is recommended to secure type-examination tested safety valves against inadmissible disassembly by means of wiring and sealing with the housing/block (bore available in the adjustment type).

☞ **Notice:**
The system pressure increases by the counter pressure in the discharge line (port T) due to the increasing flow. (Observe the data sheet AD 2000 A 2, point 6.3)
To ensure that this increase in system pressure caused by the flow does not exceed the value of 10% of the set response pressure, the admissible flow has to be reduced dependent on the counter pressure in the discharge line (port T) (see characteristic curves page 19 ... 23).

1) Component series 1X, according to the Pressure Equipment Directive 2014/68/EU

Characteristic curves: Counter pressure in the discharge line

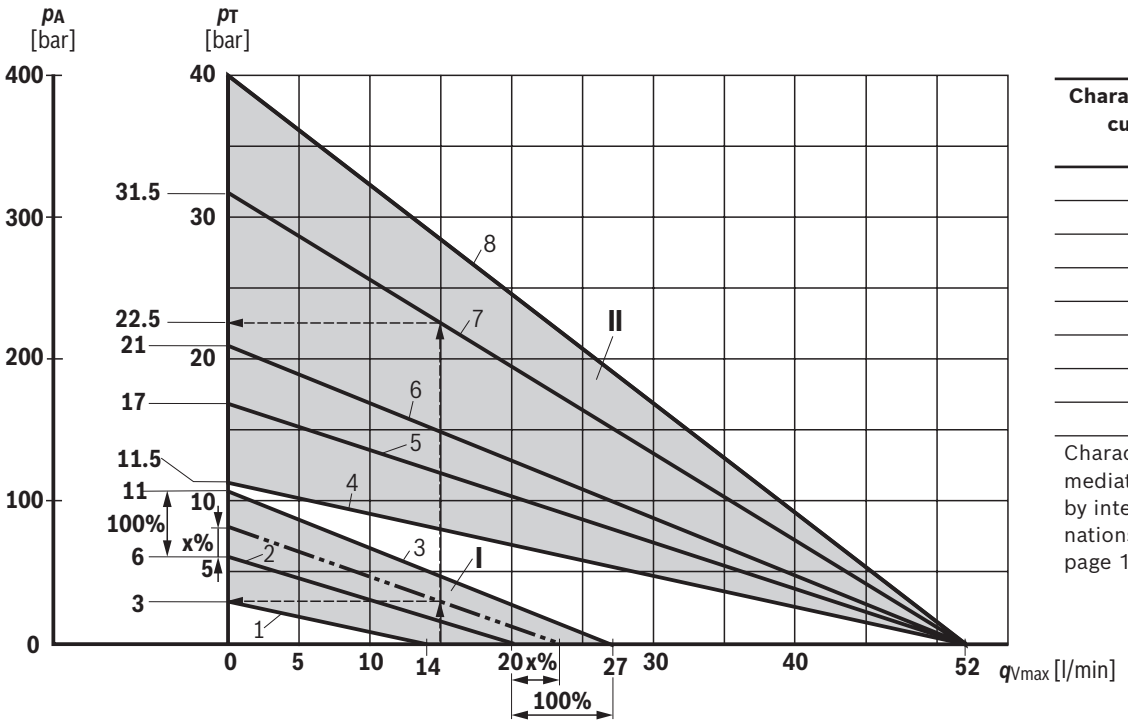
In principle, the valve should be operated without counter pressure in the discharge line, if possible. In case of counter pressure in the discharge line, the maximum possible flow is reduced. There is a relationship between maximum counter pressure p_T in the discharge line and flow q_V, which can be seen from the following characteristic curve. Characteristic curves for intermediate values of the response pressure which are not listed must be determined by means of interpolation.
When the flow approaches zero, the maximum counter pressure p_T is in each case 10% of the response pressure. With increasing flow, the maximum counter pressure p_T decreases.

Interpolation of intermediate values from the diagram

1. At the axis p_T, mark 1/10 of the value of p_A.
2. Determine the next lower and the next higher characteristic curve for this point. The point marked at p_T divides the section between lower and higher characteristic curve on the p_T axis with a certain percentage.
3. At the q_{Vmax} axis, divide the section between next lower and next higher characteristic curve in the same percentage as the section at the p_T axis. From the zero position flow on the q_{Vmax} axis determined in that way, draw a straight line to the value on the p_T axis marked before.
4. Mark the system flow to be secured at the q_{Vmax} axis.
5. Read off the maximum counter pressure for this value using the line at the p_T axis drawn before.

Characteristic curves: Counter pressure in the discharge line – size 6

Diagram for determining the maximum counter pressure p_T in the discharge line at port T of the valve dependent on the flow q_{Vmax} for valves DBD. **6**...1X/...E with different response pressures p_A.



Characteristic curves	Response pressure p_A in bar
1	30
2	60
3	110
4	115
5	170
6	210
7	315
8	400

Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 19.

- p_A Response pressure in bar
- p_T Maximum counter pressure in the discharge line (port T) in bar
- q_{Vmax} Maximum flow in l/min
- **I** Interpolation area **I**, for valves with p_A = 30 ... 110 bar and q_{Vmax} = 14 ... 27 l/min
- **II** Interpolation area **II**, for valves with p_A = 115 ... 400 bar and q_{Vmax} = 52 l/min

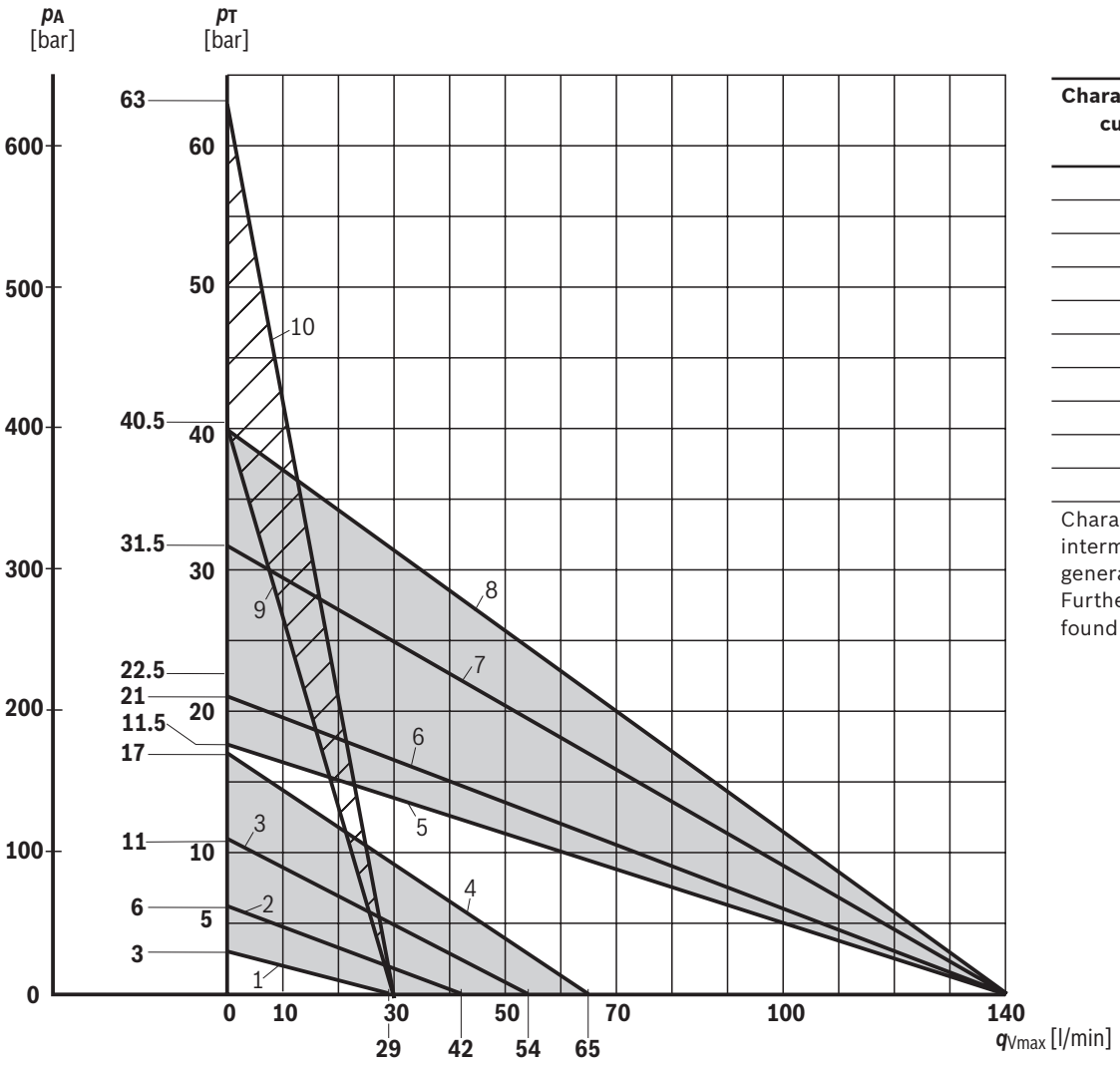
Determination of the maximum counter pressure

Example 1 (with already existing characteristic curve):
Flow of the system / accumulator to be secured: q_{Vmax} = 15 l/min
Safety valve set to: p_A = 315 bar.
Read off the maximum counter pressure p_T of approx. 22.5 bar from the diagram (see arrows, characteristic curve 7).

Example 2 (with interpolated characteristic curve):
Flow of the system / accumulator to be secured: q_{Vmax} = 15 l/min
Safety valve set to: p_A = 80 bar.
Value to be marked at the axis referred to as p_T:
1/10 x 80 bar = 8 bar.
Read off the maximum counter pressure p_T of approx. 3 bar from the diagram (see arrows, dashed characteristic curve).

Characteristic curves: Counter pressure in the discharge line – size 10

Diagram for determining the maximum admissible counter pressure p_T in the discharge line at port T of the valve dependent on the flow q_{Vmax} for valves DBDH **10**...1X/...E with different response pressures p_A.



Characteristic curves	Response pressure p_A in bar
1	30
2	60
3	110
4	170
5	175
6	210
7	315
8	400
9	405
10	630

Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 19.

p_A Response pressure in bar

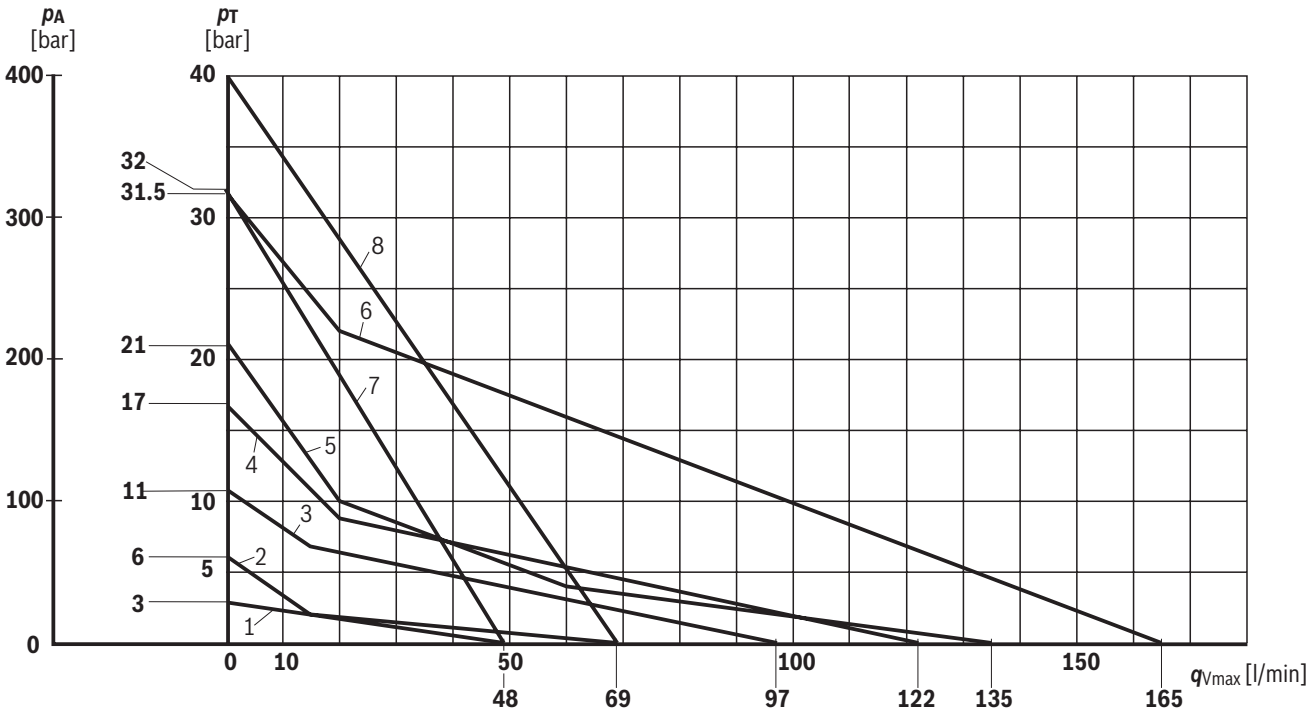
p_T Maximum counter pressure in the discharge line (port T) in bar

q_{Vmax} Maximum flow in l/min

Interpolation areas

Characteristic curves: Counter pressure in the discharge line – size 20

Diagram for determining the maximum admissible counter pressure p_T in the discharge line at port T of the valve dependent on the flow q_{Vmax} for valves DBDH **20**...1X/...E with different response pressures p_A.



p_A Response pressure in bar

p_T Maximum counter pressure in the discharge line (port T) in bar

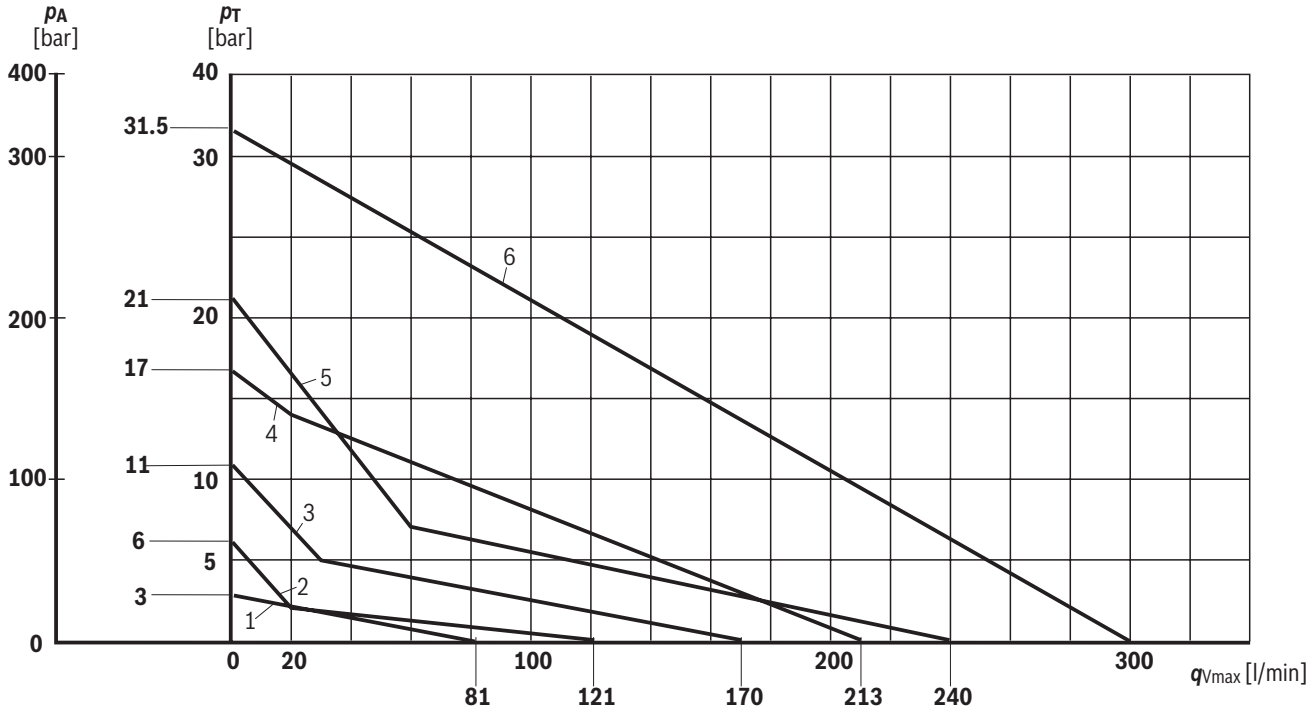
q_{Vmax} Maximum flow in l/min

Characteristic curves	Response pressure p_A in bar
1	30
2	60
3	110
4	170
5	210
6	315
7	320
8	400

Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 19.

Characteristic curves: Counter pressure in the discharge line – size 30

Diagram for determining the maximum admissible counter pressure p_T in the discharge line at port T of the valve dependent on the flow q_{Vmax} for valves DBDH **30**...1X/...E with different response pressures p_A.



p_A Response pressure in bar

p_T Maximum counter pressure in the discharge line (port T) in bar

q_{Vmax} Maximum flow in l/min

Characteristic curves	Response pressure p_A in bar
1	30
2	60
3	110
4	170
5	210
6	315

Characteristic curves for intermediate values can be generated by interpolation. Further explanations can be found on page 19.

Further information

▶ Safety equipment against excessive pressure – safety valves	Data sheet AD 2000 A 2
▶ Subplates	Data sheet 45100
▶ Hydraulic fluids on mineral oil basis	Data sheet 90220
▶ Environmentally compatible hydraulic fluids	Data sheet 90221
▶ Flame-resistant, water-free hydraulic fluids	Data sheet 90222
▶ Flame-resistant hydraulic fluids - containing water (HFAE, HFAS, HFB, HFC)	Data sheet 90223
▶ Reliability characteristics according to EN ISO 13849	Data sheet 08012
▶ Use of non-electrical hydraulic components in an explosive environment (ATEX)	Data sheet 07011
▶ Hydraulic valves for industrial applications	Operating instructions 07600-B
▶ Selection of filters	www.boschrexroth.com/filter

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Spare parts list

Bosch Rexroth AG
Service Hydraulics
Bgm.-Dr.-Nebel-Str. 8
97816 Lohr
Germany

Material number: R900500255
Drawing: RA59950582
Designation: PRESSURE REDUCING VALVE
DR20-4-5X/200YM

Status of version: 02/2022

Date: **13.06.2022**
Page: **1**

Pos.	Material number	Designation		Quantity	
9997	R900722852	SEAL KIT		1 UNIT	L
		SEAL KIT	DAC/DBC/DRC/DZC.-5X/		
9998	R900722854	SEAL KIT		1 UNIT	L
		SEAL KIT	DA/DB/DR/DZ-5X/ HK		
9999	R900722858	SEAL KIT		1 UNIT	L
		SEAL KIT	DA/DB/DR/DZ 20-5X/ HV		

L = Assembly group D = Sealing element

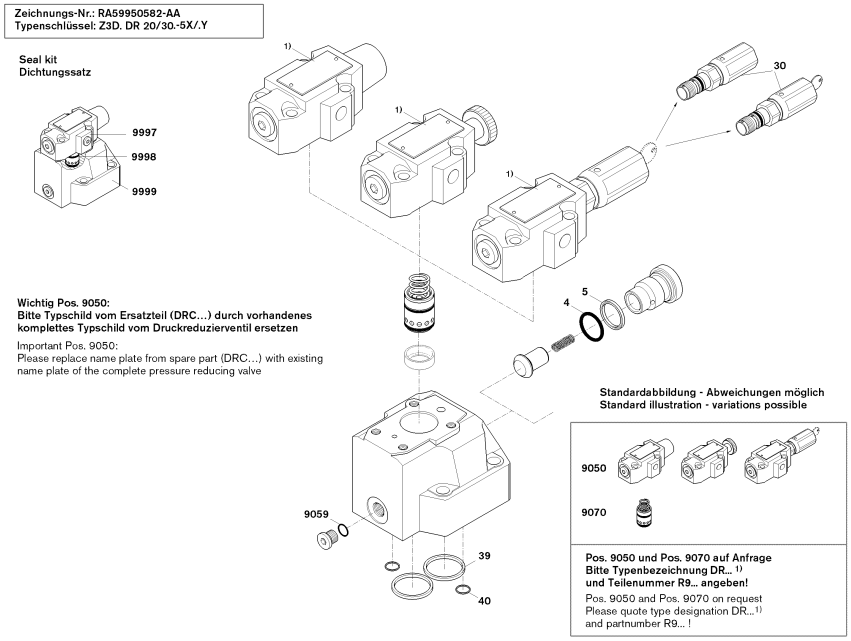
Firmensitz / Headquarters: Stuttgart, Registrierung / Registration: Amtsgericht Stuttgart HRB 23192
Vorstand / Executive Board: Rolf Najork (Vorsitzender / President), Dr. Markus Forschner, Dr. Heiner Lang, Reinhard Schäfer, Dr. Marc Wucherer
Vorsitzender des Aufsichtsrats / Chairman of the Supervisory Board: Christoph Kübel

Spare parts list

Bosch Rexroth AG
Service Hydraulics
Bgm.-Dr.-Nebel-Str. 8
97816 Lohr
Germany

Material number:	R900500255
Drawing:	RA59950582
Designation:	PRESSURE REDUCING VALVE DR20-4-5X/200YM
Status of version:	02/2022

Date: **13.06.2022**
Page: **2**



L = Assembly group D = Sealing element

Security notice:

Assembly, commissioning and operation, disassembly, service (including maintenance and repair) require basic mechanical/electrical/hydraulic/pneumatic knowledge, as well as knowledge of the appropriate technical terms. In order to ensure operating safety, these activities may therefore only be carried out by qualified technical personnel or an instructed person under the direction and supervision of qualified personnel. Qualified personnel are those who can recognize possible hazards and institute the appropriate safety measures due to their professional training, knowledge, and experience, as well as their understanding of the relevant conditions pertaining to the work to be done. Qualified personnel must observe the rules relevant to the subject area. Also observe the generally applicable, legal or otherwise binding regulations of the European or national legislation and the rules for the prevention of accidents and for environmental protection applicable in your country. The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The given information does not release the user from the obligation of own judgement and verification. It must be remembered that our products are subject to a natural process of wear and aging.

rexroth
A Bosch Company

Spare parts list

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97816 Lohr
Germany

Material number: R900722852
Drawing: R961002871
Designation: SEAL KIT
SEAL KIT DAC/DBC/DRC/DZC.-5X/

Status of version: 02/2022

Date: **13.06.2022**
Page: **3**

Pos.	Material number	Designation	Quantity
31		PROFILE SEALING RING	1 UNIT
32		BACKUP RING	2 UNIT
33		BACKUP RING	1 UNIT
35		O-RING	1 UNIT
36		O-RING	1 UNIT
37		O-RING	1 UNIT
38		R-RING	3 UNIT
58		PROFILE SEALING RING	1 UNIT
58		O-RING	1 UNIT
117		BACKUP RING	1 UNIT
120		O-RING	1 UNIT
130		CORRUGATED CARD BOARD BOX	1 UNIT

L = Assembly group D = Sealing element

Security notice:

Assembly, commissioning and operation, disassembly, service (including maintenance and repair) require basic mechanical/electrical/hydraulic/pneumatic knowledge, as well as knowledge of the appropriate technical terms. In order to ensure operating safety, these activities may therefore only be carried out by qualified technical personnel or an instructed person under the direction and supervision of qualified personnel. Qualified personnel are those who can recognize possible hazards and institute the appropriate safety measures due to their professional training, knowledge, and experience, as well as their understanding of the relevant conditions pertaining to the work to be done. Qualified personnel must observe the rules relevant to the subject area. Also observe the generally applicable, legal or otherwise binding regulations of the European or national legislation and the rules for the prevention of accidents and for environmental protection applicable in your country. The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The given information does not release the user from the obligation of own judgement and verification. It must be remembered that our products are subject to a natural process of wear and aging.

rexroth
A Bosch Company

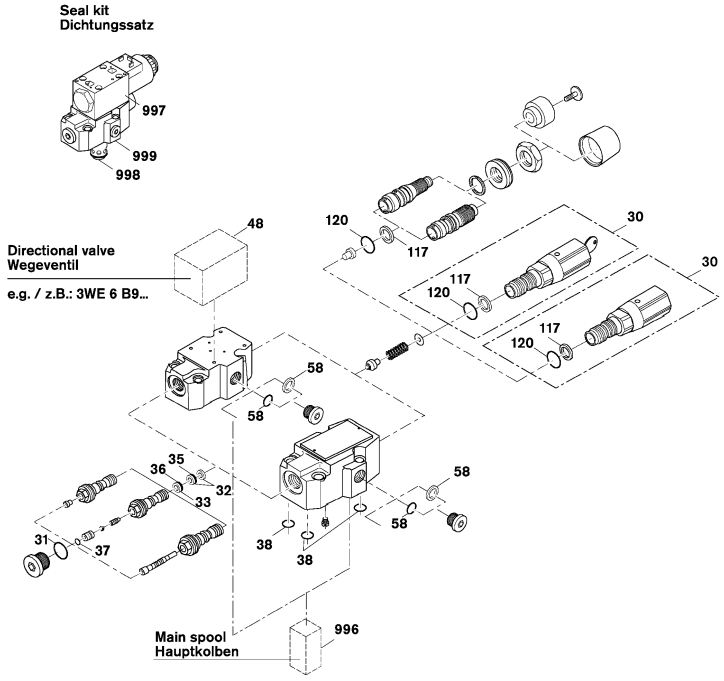
Spare parts list

Bosch Rexroth AG
Service Hydraulics
Bgm.-Dr.-Nebel-Str. 8
97816 Lohr
Germany

Material number:	R900722852	
Drawing:	R961002871	
Designation:	SEAL KIT	
	SEAL KIT	DAC/DBC/DRC/DZC.-5X/
Status of version:	02/2022	

Date: 13.06.2022

Zeichnungs-Nr.: R961002871-A
Typenschlüssel: Z3D. DAC/DBC/DRC/DZC.-5X/



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Spare parts list

Bosch Rexroth AG
Service Hydraulics
Bgm.-Dr.-Nebel-Str. 8
97816 Lohr
Germany

Material number: R900722854
Drawing: R961002872
Designation: SEAL KIT
SEAL KIT DA/DB/DR/DZ-5X/ HK

Status of version: 02/2022

Date: **13.06.2022**
Page: **5**

Pos.	Material number	Designation	Quantity
73		BACKUP RING	2 UNIT
74		BACKUP RING	1 UNIT
75		O-RING	1 UNIT
76		O-RING	1 UNIT
77		O-RING	1 UNIT
80		CORRUGATED CARD BOARD BOX	1 UNIT

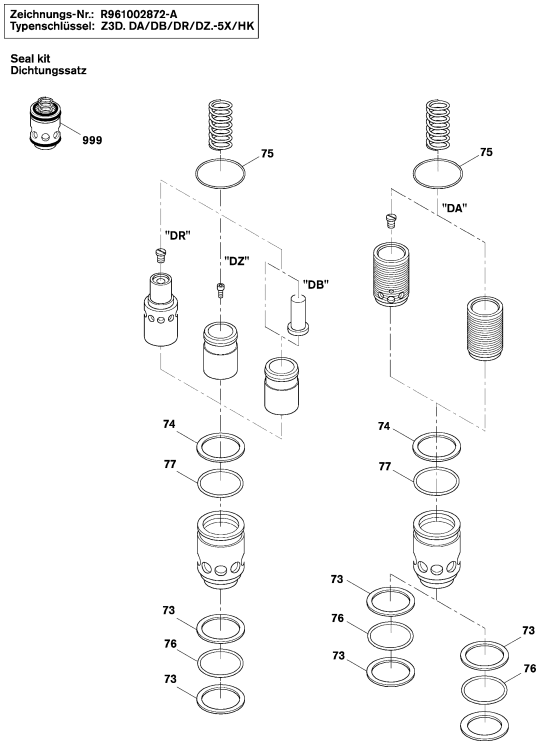
L = Assembly group D = Sealing element

Bosch Rexroth AG
Service Hydraulics
Bgm.-Dr.-Nebel-Str. 8
97816 Lohr
Germany

Spare parts list

Material number:	R900722854	
Drawing:	R961002872	
Designation:	SEAL KIT	
	SEAL KIT	DA/DB/DR/DZ-5X/ HK
Status of version:	02/2022	

Date: 13.06.2022
Page: 6



L = Assembly group D = Sealing element

Security notice:

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Firmensitz / Headquarters: Stuttgart, Registrierung / Registration: Amtsgericht Stuttgart HRB 23192
Vorstand / Executive Board: Rolf Najork (Vorsitzender / President), Dr. Markus Forschner, Dr. Heiner Lang, Reinhard Schäfer, Dr. Marc Wucherer
Vorsitzender des Aufsichtsrats / Chairman of the Supervisory Board: Christoph Kübel

rexroth
A Bosch Company

Spare parts list

Bosch Rexroth AG
Service Hydraulics
Bgm.-Dr.-Nebel-Str. 8
97816 Lohr
Germany

Material number: R900722858
Drawing: R961002875
Designation: SEAL KIT
SEAL KIT DA/DB/DR/DZ 20-5X/ HV

Status of version: 02/2022

Date: **13.06.2022**
Page: **7**

Pos.	Material number	Designation	Quantity
4		O-RING	1 UNIT
5		BACKUP RING	1 UNIT
35		R-RING	2 UNIT
36		R-RING	2 UNIT
59		O-RING	1 UNIT
59		PROFILE SEALING RING	1 UNIT
60		CORRUGATED CARD BOARD BOX	1 UNIT

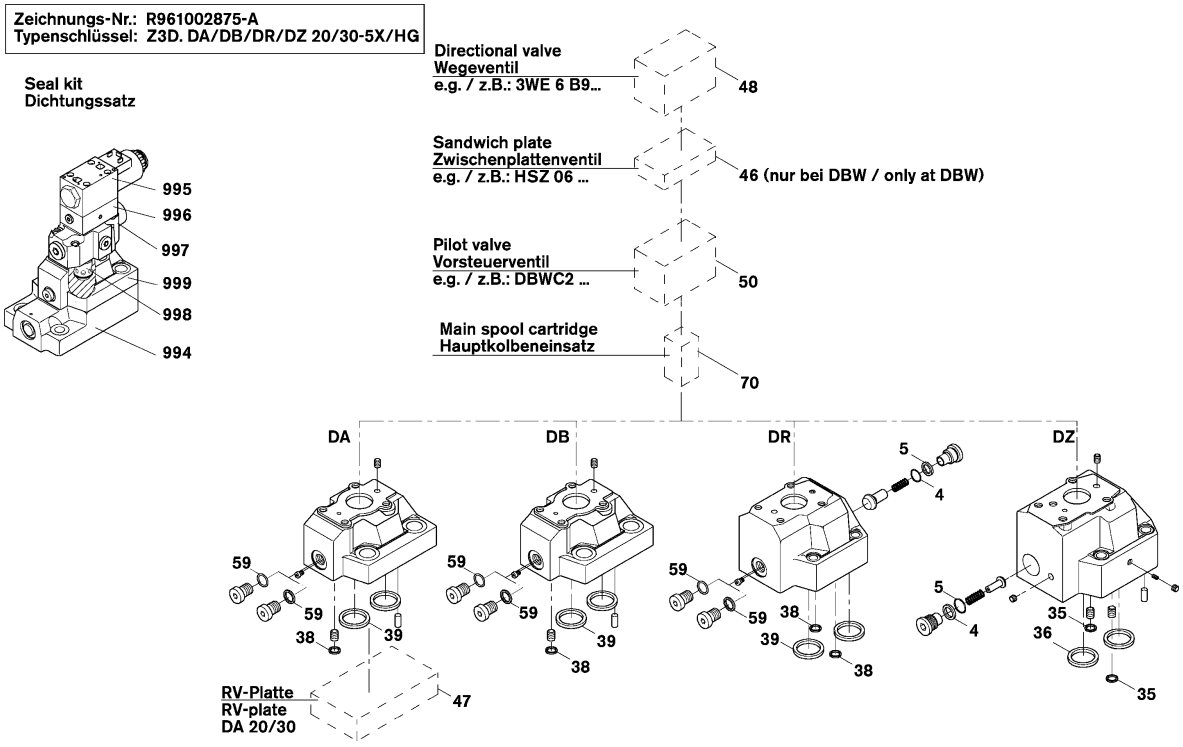
L = Assembly group D = Sealing element

Spare parts list

Bosch Rexroth AG
Service Hydraulics
Bgm.-Dr.-Nebel-Str. 8
97816 Lohr
Germany

Material number:	R900722858	
Drawing:	R961002875	
Designation:	SEAL KIT	
	SEAL KIT	DA/DB/DR/DZ 20-5X/ HV
Status of version:	02/2022	

Date: 13.06.2022
Page: 8



L = Assembly group D = Sealing element

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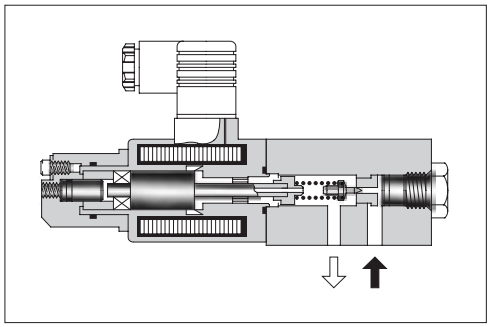
Proportional Electro-Hydraulic Pilot Relief Valves

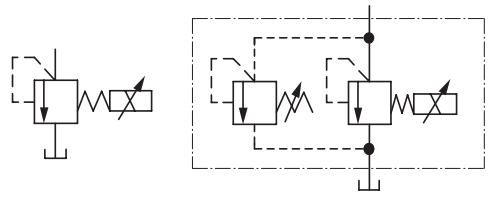
This valve consists of a small DC solenoid and a direct-acting relief valve. It serves as a pilot valve for a low flow rate hydraulic system or a proportional electro-hydraulic control valve and controls the pressure in proportion to the input current. Note that this valve is used in conjunction with the applicable power amplifier.



Specifications

Description \ Model Numbers	EDG-01
Max. Operating Pres.	24.5 MPa (3550 PSI)
Max. Flow	2 L/min (.53 U.S.GPM)
Min. Flow	0.3 L/min (.08 U.S.GPM)
Pressure Adj. Range MPa (PSI)	Refer to Model Number Designation
Rated Current	EDG-01∗-B: 800 mA EDG-01∗-C: 900 mA EDG-01∗-H: 950 mA
Coil Resistance	10 Ω
Hysteresis	3% or less
Repeatability	1% or less
Approx. Mass	2 kg (4.4 lbs.)

Graphic Symbols



Without Safety Valve With Safety Valve

Model Number Designation

F-	ED	G	-01	V	-C	-1	-PN	T13	-51	∗
Special Seals	Series Number	Type of Mounting	Valve Size	Applicable Control ★1	Pressure Adj. Range MPa (PSI)	Safety Valve	P-Line Orifice	T-Line★2 Orifice	Design Number	Design Standards
F: Special Seals for Phosphate Ester Type Fluid (Omit if not required)	**ED**: Proportional Electro-Hydraulic Pilot Relief Valve	**G**: Sub-plate Mounting	**01**	**None**: General use **V**: Vent Control of Relief Valve (Omit if not required)	**B**: 0.5 - 6.9 (70 - 1000)	**None**: Without Safety Valve **1**: With Safety Valve	**PN**: Without Orifice (Standard)	**T15**	**51**	Refer to ★3
					C: 1.0 - 15.7 (145 - 2275)			**T13**		
					H: 1.2 - 24.5 (175 - 3550)			**T11**		

★1. When the valve is to be used for vent control purpose, orifice adjustment is required due to piping capacity limitations. Therefore, consult your Yuken representative in advance.
★2. The orifice used as the pilot valve may differ from the standard orifice.
★3. Design Standards: None ..... Japanese Standard "JIS" and European Design Standard
90 ..... N. American Design Standard

Attachment

Mounting Bolts

Four socket head cap screws in the table below are included.

Descriptions	Soc. Hd. Cap Screw
Japanese Standard "JIS" European Design Standard	M5 × 45 Lg.
N. American Design Standard	No. 10 - 24 UNC × 1-3/4 Lg.

Applicable Power Amplifier

For stable performance, it is recommended that Yuken's applicable power amplifiers be used (for details see page 767, 771, 780).

Model Numbers : AME-D-10-∗-20
AME-D2-1010-11
SK1022-∗-∗-11
SK1015-11 (For DC power supply)
AMN-D-10 (For DC power supply)

Sub-plate

Piping Size	Japanese Standard "JIS"		European Design Standard		N. American Design Standard		Approx. Mass kg (lbs.)
	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	Sub-plate Model Numbers	Thread Size	
1/8	DSGM-01-31	Rc 1/8	DSGM-01-3180	1/8 BSP.F	DSGM-01-3190	1/8 NPT	0.8 (1.8)
1/4	DSGM-01X-31	Rc 1/4	DSGM-01X-3180	1/4 BSP.F	DSGM-01X-3190	1/4 NPT	0.8 (1.8)
3/8	DSGM-01Y-31	Rc 3/8	—	—	DSGM-01Y-3190	3/8 NPT	0.8 (1.8)

- Sub-plates are available. Specify the sub-plate model number from the table above. When sub-plates are not used, the mounting surface should have a good machined finish.
- Sub-plates are those for 1/8 solenoid operated directional valves. For dimensoins, see page 356.

Instructions

Tank-Line Back Pressure

Check that the tank line back pressure does not exceed 0.2 MPa (29 PSI).

Vent Control

When the valve is used for vent control of relief valves or others, use the pipes of 6 mm (.24 in.) ID. 300 mm (11.8 in.) or less length for connection.

If the pressure is instable, provide a 1.0 to 1.5 mm (.04 to .06 in.) diameter orifice to the vent port of the relief valves or others.

Circuit Pressure Control

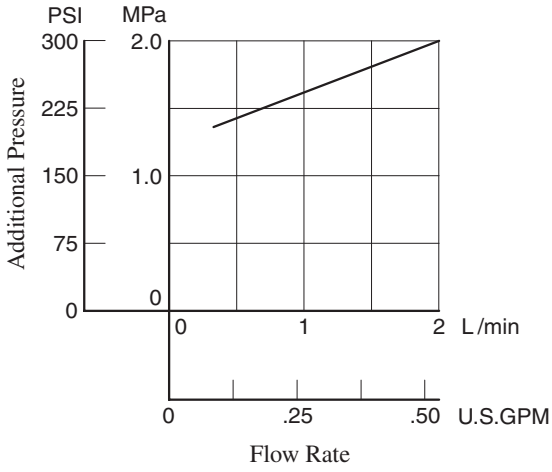
When the pressure in a circuit is directly controlled with this valve, set the trapped oil volume being more than 40 cm^3 (2.44 cu. in.).

Safety Valve Pressure Setting

The pressure of the safety valve at the maximum flow is preset at the value equal to the upper limit of the pressure adjustment range plus 2 MPa (290 PSI).

In case where the upper limit of operating pressure is low or the upper limit of flow rate to be used is different from the specified maximum flow, please adjust and determine the setting pressure of the safety valve at the value calculated from the following formula.

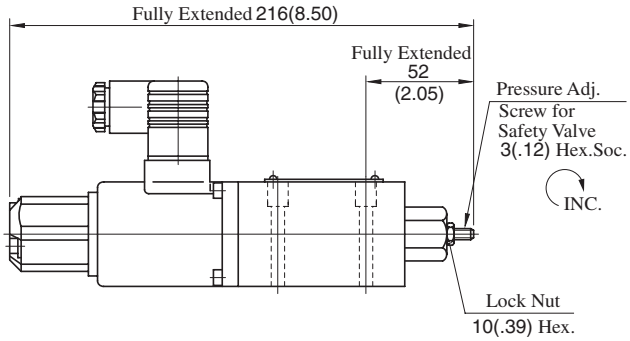
Setting pressure = (Operating pressure upper limit) + (Additional pressure indicated below)



To lower the setting pressure, turn the safety valve pressure adjustment screw anti-clockwise. After adjustment, be sure to tighten the lock nut.

EDG-01∗-∗-1-PNT∗-51/5190

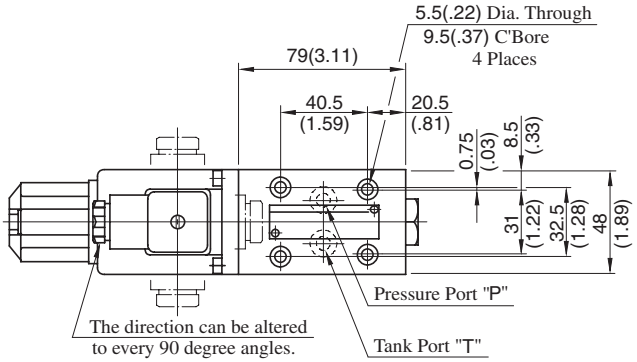
With Safety Valve



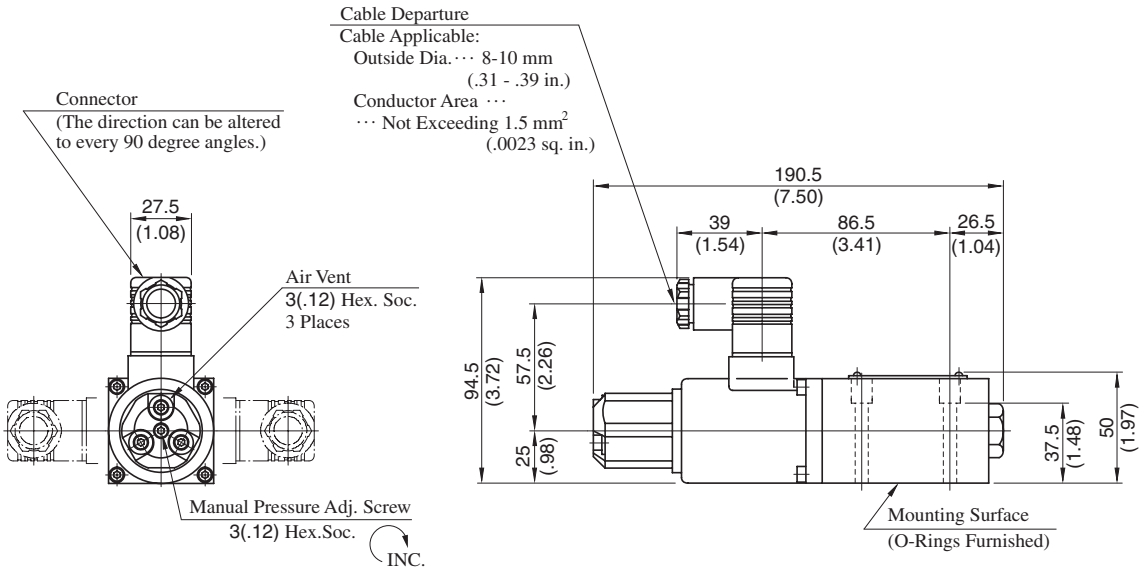
• For other dimensions, refer to the without safety valve.

EDG-01∗-∗-PNT∗-51/5190

Without Safety Valve



DIMENSIONS IN MILLIMETRES (INCHES)

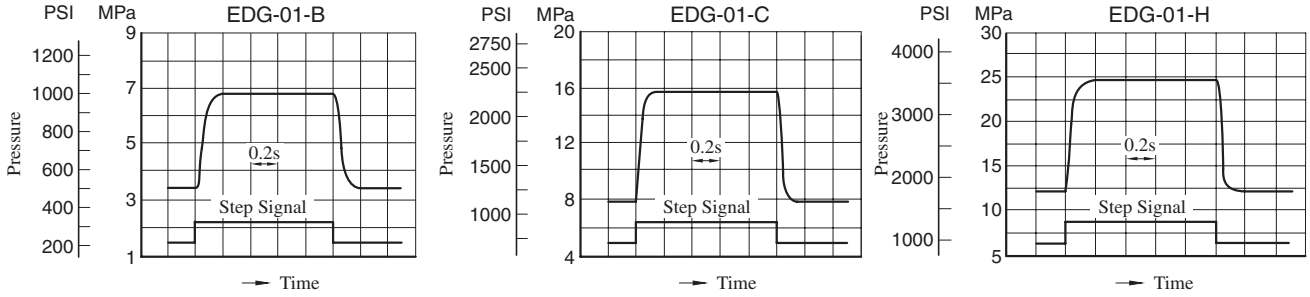


Note: For valve mounting surface dimensions, see the dimensional drawings of sub-plates (P.356) in common use.

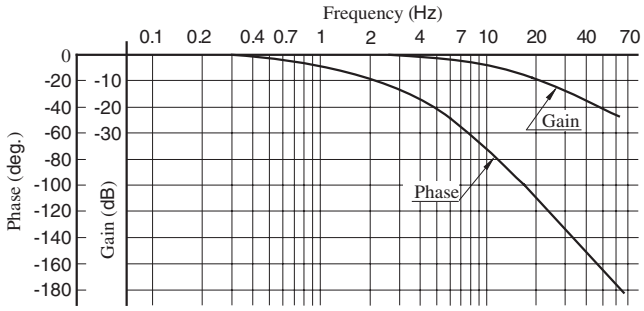
Step Response (Example)

These characteristics have been obtained by measuring on each valve.
Therefore, they may vary according to a hydraulic circuit to be used.

Flow Rate : 2 L/min (.53 U.S. GPM)
Trapped Oil Volume : 40 cm^3(2.44 cu. in.)
Viscocity : 30 mm^2/s (141 SSU)

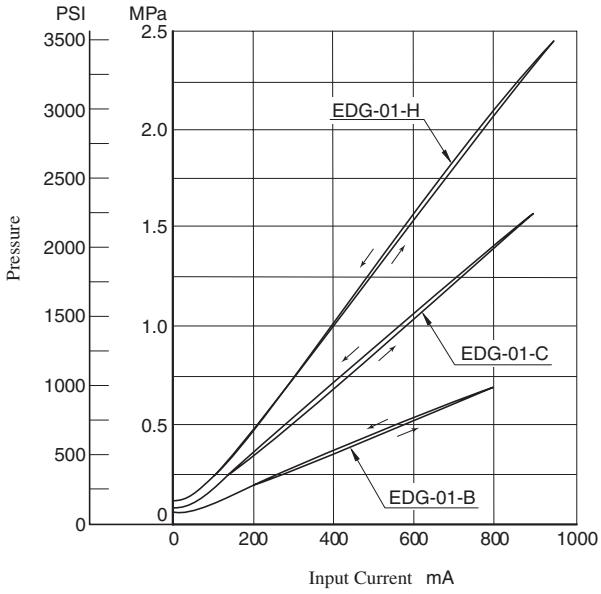


Frequency Response

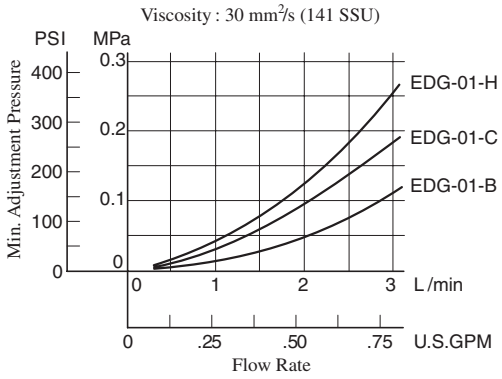


Flow Rate : 2 L/min (.53 U.S. GPM)
Pressure : 7.8 ± 1.6 MPa (1130 ± 230 PSI)
Trapped Oil Volume : 30 cm^3 (1.83 cu. in.)
Viscocity : 30 mm^2/s (141 SSU)

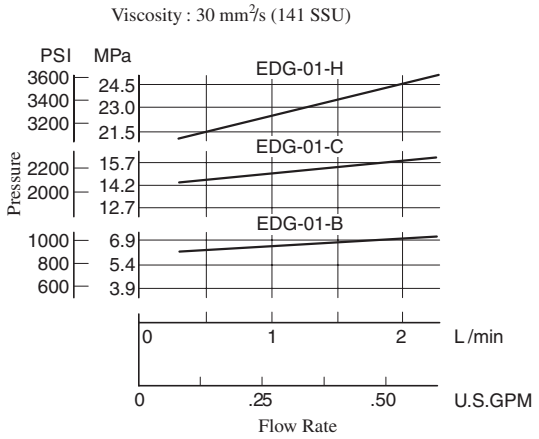
Control Pressure vs. Input Current



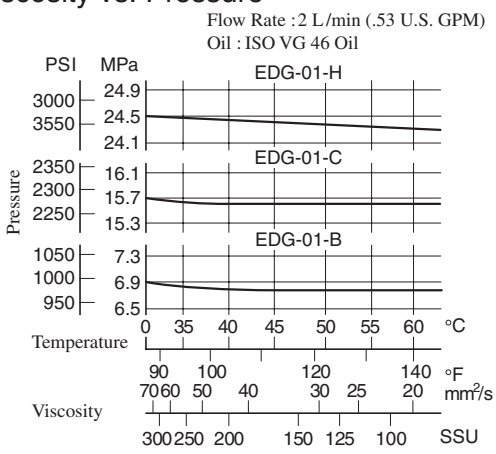
Min. Adjustment Pressure



Flow Rate vs. Pressure



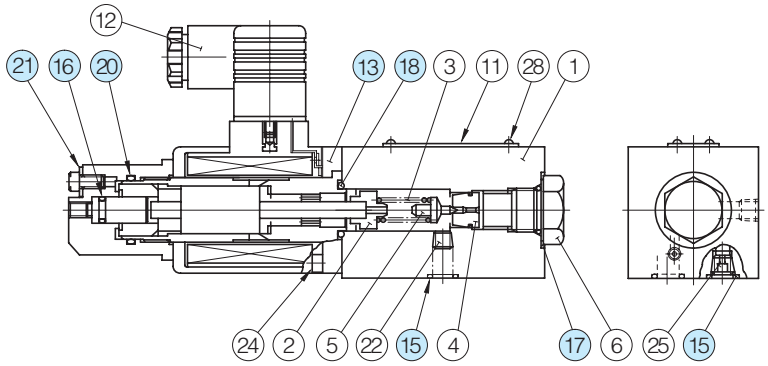
Viscosity vs. Pressure



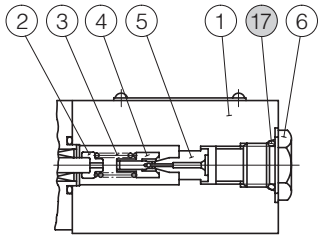
List of Seals and Solenoid Ass'y

Without Safety Valve

EDG-01∗-∗-PNT∗-51/5190
EDG-01V-∗-PNT∗-5103

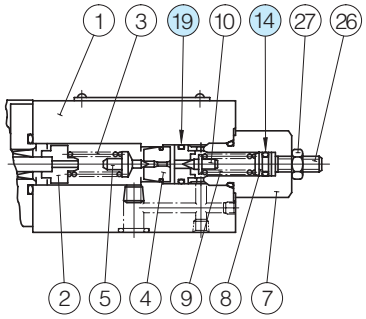


EDG-01-∗-PNT∗-5101



With Safety Valve

EDG-01∗-∗-1-PNT∗-51/5190
EDG-01V-∗-1-P∗T∗-5103/5197



List of Seals

Item	Name of Parts	Part Numbers	Qty.	Remarks
14	O-Ring	SO-NA-P6	1	Included in Seal Kit Kit No.: KS-EDG-01-51
15	O-Ring	SO-NB-P9	2	
16	O-Ring	SO-NB-P7	1	
17	O-Ring	SO-NB-P14	1	
18	O-Ring	SO-NB-P18	1	
19	O-Ring	SO-NB-A013	1	
20	O-Ring	SO-NB-P22	1	
21	Fastener Seal	SG-FCF-4	1	

Note) O-ring (Item 16, 18, 20) and the fastener seal (Item 21) are included in the solenoid assembly.

Solenoid Ass'y

Valve Model Numbers	⑬ Solenoid Ass'y
EDG-01-∗-∗-P∗T∗-51/5190 EDG-01-∗-∗-P∗T∗-5101	E318-Y06M1-28-61
EDG-01V-∗-∗-P∗T∗-51/5190	E318-Y06M1-05-61
EDG-01V-∗-∗-PNT∗-5103	E318-Y06M1-04-61
EDG-01V-∗-1-PNT20-5197	E318-Y06M1-28-61

Note) The connector assembly GDM-211-B-11 (Item 12) is not included in the solenoid assembly.

Interchangeability between Current and New Design

EDG-01 series valve has changed model from 50 to 51 design in line with the solenoid improvement.

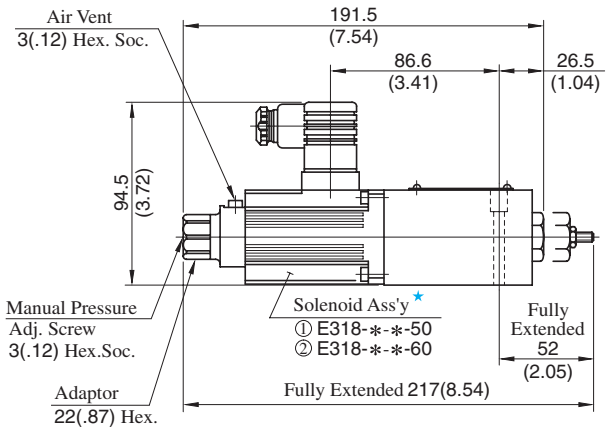
Specifications and Characteristics

No change in specifications and characteristics between current and new design.

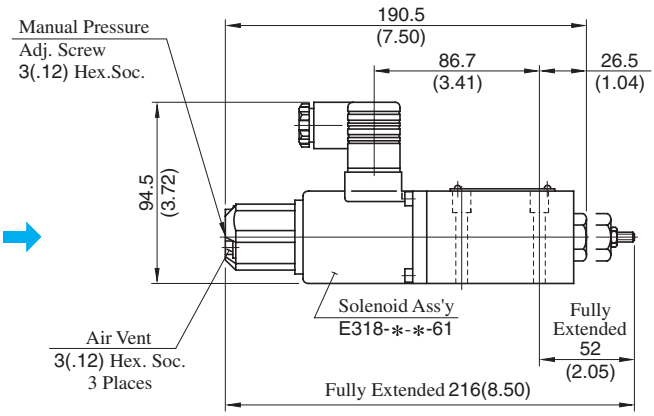
Mounting Interchangeability

There is an interchangeability in the mounting dimensions, however, the outside shape and dimensions are changed as shown below due to solenoid improvement and other modifications.

Current: Design 50



New: Design 51



★The solenoid assembly current design comes in two types: ① E318-50 design and ② 60 design. See the figure on the left for an external view of type ① . See the figure on the right for type ② .

DIMENSIONS IN MILLIMETRES (INCHES)