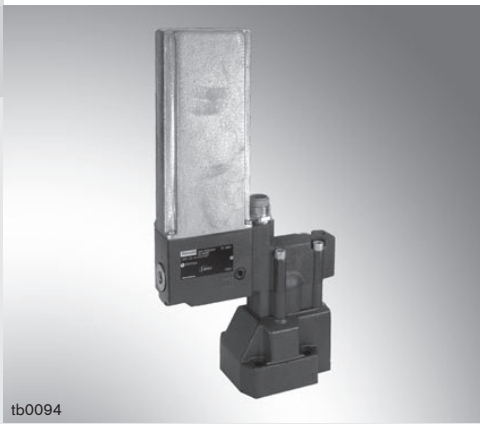
Rexroth
Bosch Group

Pressure relief valve with DC motor operation, pilot operated

RE 29139/06.07 1/12
Replaces: 01.00

Type DBG


tb0094

Size 8 to 32
Component series 1X
Maximum operating pressure 315 bar
Maximum flow 600 l/min

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Features

- Operation by DC motor with reducing gear
- For subplate mounting:
  Porting pattern to ISO 6264-AR-06-2-A (size 10),
  ISO 6264-AS-08-2-A (size 25),
  ISO 6264-AT-10-2-A (size 32)
- For threaded connection
- For block installation
- 5 pressure ratings
- With actual value potentiometer or limit switch
- Self-locking in the event of a power failure
  (system pressure constant on variant with limit switch)

Further information:

Subplates according to RE 45064

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

Ordering code

DBG | | | **–1X/** | | | | *

Pressure relief valve with DC motor operation

Pilot operated valve (complete) **= No code**
Pilot valve **without** main spool insert (do **not** enter valve size) **= C**
Pilot valve **with** main spool insert (enter valve size 30) **= C**
Separate pilot valve as remote control valve (do **not** enter valve size) **= T**

Size	Ordering code	
	Subplate mounting "No code"	Threaded connection "G"
8	–	**= 8** (G3/8)
10	**= 10**	**= 10** (G1/2)
16	–	**= 15** (G3/4)
20	–	**= 20** (G1)
25	**= 20**	**= 25** (G1 1/4)
32	**= 30**	**= 30** (G1 1/2)

For subplate mounting and block installation **= No code**
For threaded connection **= G**

1X = Component series 10 to 19 (10 to 19: unchanged installation and connection dimensions)

Pressure rating, max
50 = Set pressure up to 50 bar
100 = Set pressure up to 100 bar
200 = Set pressure up to 200 bar
315 = Set pressure up to 315 bar
400 = (DBGT only) Set pressure up to 400 bar

Pilot oil flow
No code = Internal pilot oil supply / drain
X = External pilot oil supply, Internal pilot oil drain
Y = Internal pilot oil supply, External pilot oil drain
XY = External pilot oil supply / drain

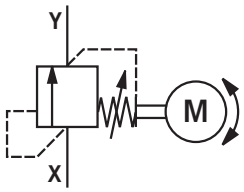
Seal material
No code = NBR seals
V = FKM seals (other seals on request)
⚠ Attention! Observe compatibility of seals with hydraulic fluid used!

E1 = Limit switch
P2 = Actual value potentiometer

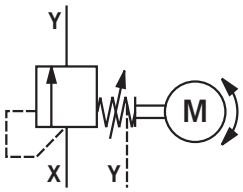
Further details in clear text

Symbols

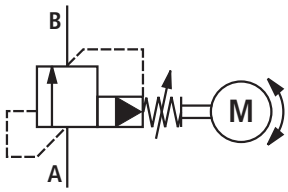
DBG $\frac{C}{T}$–1X/..



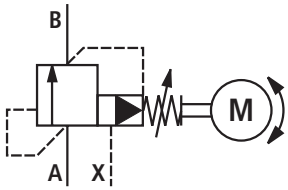
DBGC–1X/..Y..



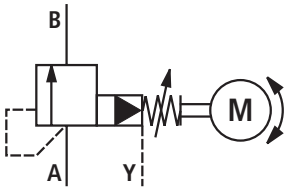
DBG..–1X/..
DBG..G–1X/..



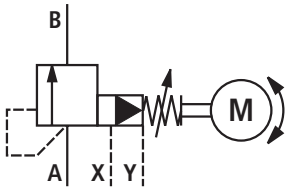
DBG..–1X/..X..
DBG..G–1X/..X..



DBG..–1X/..Y..
DBGC 30–1X/..
DBG..G–1X/..Y..



DBG..–1X/..XY..
DBG..G–1X/..XY..



Function, section

Pressure control valves of type DBG are pilot operated pressure relief valves.

They are used to limit a system pressure.

The pressure relief valves of this series basically consist of a pilot valve with electric motor as pressure adjustment element and a main valve with main spool insert.

The system pressure is adjusted by means of a DC motor (16) with reducing gear (17). The output shaft of reducing gear (17) rotates cam (14), which changes the tension of spring (8) via spring plate (15) and thus causes a change in pressure.

The pressure present in channel A acts on main spool (1.1). At the same time, the pressure is applied via pilot ports (4) and (5), which are fitted with orifices (2.1, 2.2) and (3), to the spring-loaded side of main spool (1.1) and to pilot poppet (6) in pilot valve (7).

When the system pressure rises above the value set on spring (8), pilot poppet (6) opens. The signal required for this is provided internally – on type DBG..–1X/.. via pilot lines (12) and (4) from channel A; or externally – on type DBG..–1X/..X (XY) via port (13) and pilot line (4). Pilot oil now flows through orifice (2.1), pilot line (4), orifice (2.2) and pilot poppet (6) into the spring chamber, from which it is fed to the tank either internally – on type DBG..–1X/.. via pilot line (10), or externally – on type DBG..–1X/..Y (XY) via pilot line (11)

In the closing direction, compression spring (1.2) acts on main spool (1.1), i.e. a pressure differential occurs between the '"A" side and the spring-loaded side of main spool (1.1). The pilot oil flow is determined by the cross-section of orifices (2.1, 2.2) and the pressure differential across main spool (1.1). When the pressure in "A" has risen by the pressure differential across main spool (1.1) when compared with the cracking pressure of pilot poppet (6), main spool (1.1) opens the connection from "A" to "B".

The oil now flows from channel "A" to channel "B" while maintaining the set operating pressure.

Actual value potentiometer (18) feeds back the position of cam (14).

Optionally, electrical limit switches can be installed instead of actual value potentiometer (18) for limiting the min. and max. pressure.

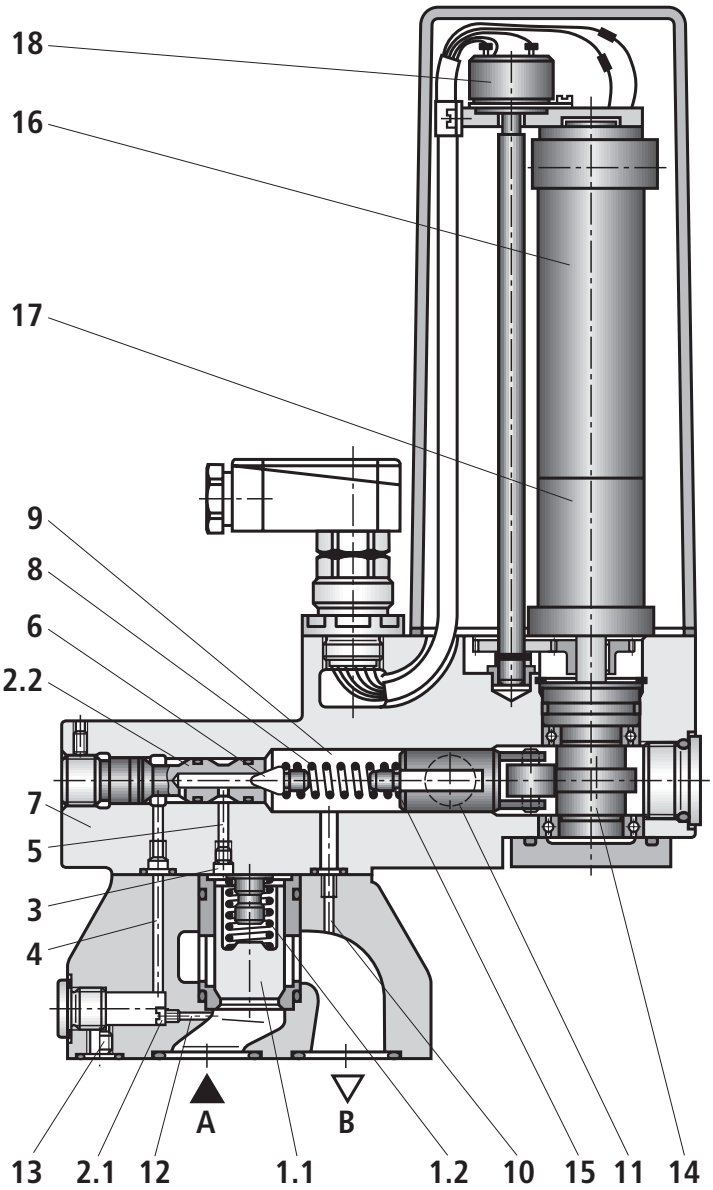
For the variant with limit switch, the min. adjustment time for the pressure range from p_{min} to p_{max} is 12 seconds. The adjustment time of 12 seconds allows gradual reaching of the required pressure in the inching mode.

For the variant with actual value potentiometer the min. adjustment time for the pressure range from p_{min} to p_{max} is 0.65 seconds.

In conjunction with the associated amplifier type VT-VRM1-1 a program control can be realised.

With the help of 2 additional pressure switches, the min. and max. pressures can be limited.

With the variant with limit switch, the pressure setting on the valve is maintained in the event of a power failure (cable break, fuse failure, short-circuit, etc.).



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

General

Size			Size	8	10	16	20	25	32
Weight	– Subplate mounting	DBG...	kg	–	7.4	–	–	8.1	9.4
	– Threaded connection	DBG..G	kg	8.5	8.5	8.5	8.3	9.8	9.5
	– Block installation	DBGC 30..	kg	5.4					
	– Pilot valve without main spool insert	DBGC...	kg	5.1					
	– Remote control valve	DBGT	kg	5.1					
Installation position				Optional					
Ambient temperature range			°C	–20 to +50					

Hydraulic

Maximum operating pressure	– Ports A, X		bar	315					
	– Port B		bar	10 (with internal pilot oil drain)					
				315 (with external pilot oil drain)					
Max. backpressure	– Port Y		bar	10					
Max. set pressure			bar	50; 100; 200; 315; 400 [1]					
Min. set pressure				Depending on q_V (see Characteristic curves on pages 6 and 7)					
Maximum flow	– Subplate mounting		l/min	–	200	–	–	400	600
	– Threaded connection		l/min	100	200	200	400	400	600
	– DBGT		l/min	12					
Pilot oil flow			l/min	1					
Hydraulic fluid				Mineral oil (HL, HLP) to DIN 51524 [2]; fast bio-degradable hydraulic fluids to VDMT 24568 (see also RE 90221); HETG (rape seed oil) [2]; HEPG (polyglycols) [3]; HEES (synthetic esters) [3]; other hydraulic fluids on request					
Hydraulic fluid temperature range			°C	–20 to +70					
Viscosity range			mm^2/s	2.8 to 380					
Permissible max. degree of contamination of the hydraulic fluid - cleanliness class to ISO 4406 (c)				Class 20/18/15 [4]					

Electrical, drive motor

Type of voltage			DC voltage	
Supply voltage		V–	24	
Rated power	– With limit switch	W	18	
	– With actual value potentiometer	W	24	
Electrical connection			Mating connector DIN 43651, 6-pin + PE	
Type of protection to EN 60529			IP 65 with mating connector mounted and locked	

[1] Pressure rating of 400 bar only with variant DBGT

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

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

[4] 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 and RE 50088.

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

Adjustment with limit switch in the inching mode: Ordering code “E1“

Adjustment time, p_{min} to p_{max}		s	12				
Limit switch variant:	– Micro-switch		30 V; 2 A DC				
	– Electric load		250 V; 5 A AC				
Pressure lag:	– Pressure rating	bar	50	100	200	315	400
	– Without short-circuit bridge	bar	1	2.5	5	7.5	10
	– With short-circuit bridge	bar	0.5	1	1.5	2	2.5

Adjustment with actual value potentiometer for cam position feedback function: Ordering code “P2“

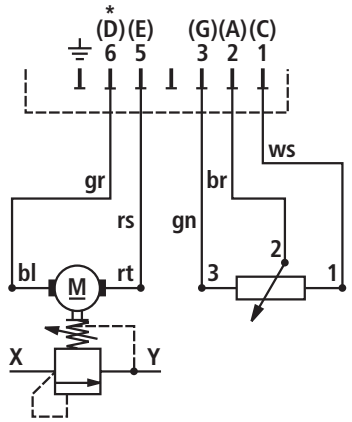
Adjustment time, p_{min} to p_{max}		s	0.65				
Potentiometer	– Resistance	kΩ	5				
	– Power	W	1.75				
Adjustment hysteresis: Start-up pressure – deviation > 10 bar from nominal pressure							
	– Pressure rating	bar	50	100	200	315	400
	– Hysteresis	bar	< 0.5	< 1	< 2.5	< 4	< 5
Adjustment hysteresis: Start-up pressure – deviation > 20 bar from nominal pressure							
	– Pressure rating	bar	50	100	200	315	400
	– Hysteresis	bar	< 0.3	< 0.5	< 1	< 1.5	< 2
Repeatability		bar	< 0.5	< 1	< 1.3	< 1.7	< 2

Amplifier

Electrical amplifier	VT-VRM1-1, component series 1X – see RE 30405-D

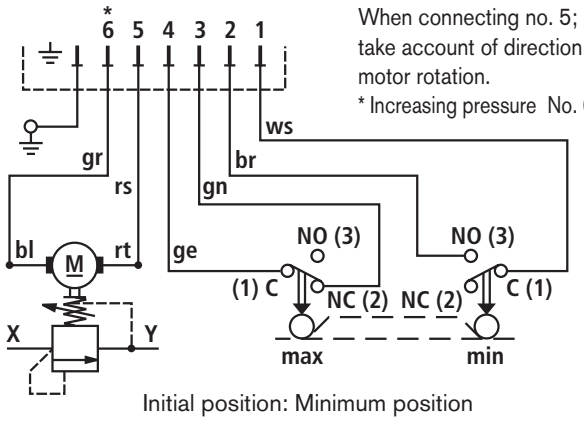
Electrical connection

Plug connection on DBG valve with actual value potentiometer



When connecting no. 5; 6 take account of direction of motor rotation.
* Increasing pressure No. 6 “+“

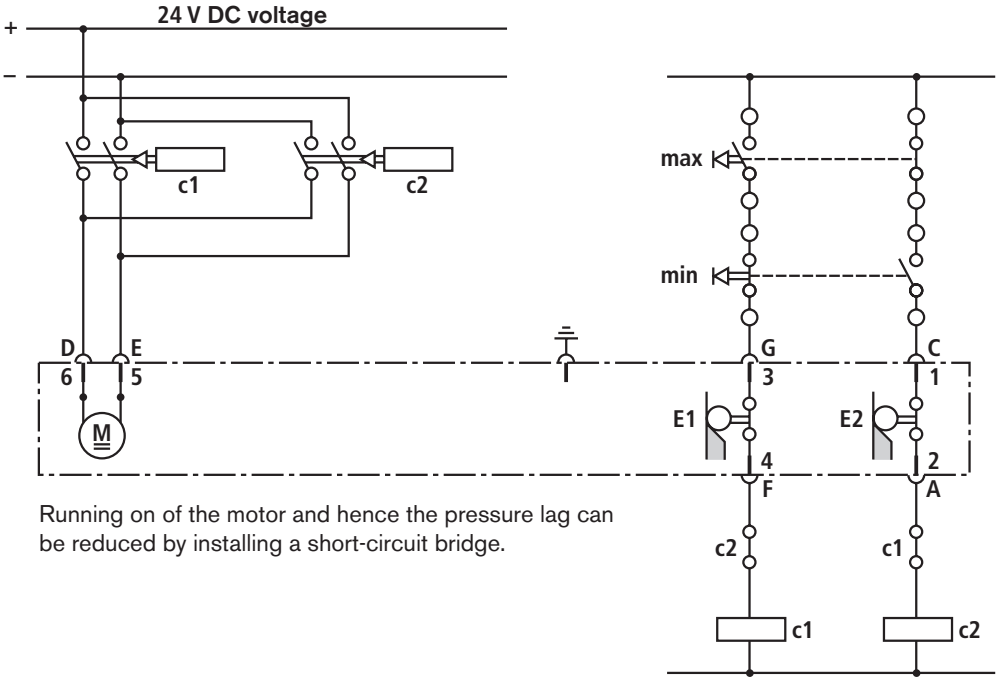
Plug connection on DBG valve with limit switch



When connecting no. 5; 6 take account of direction of motor rotation.
* Increasing pressure No. 6 “+“

Initial position: Minimum position

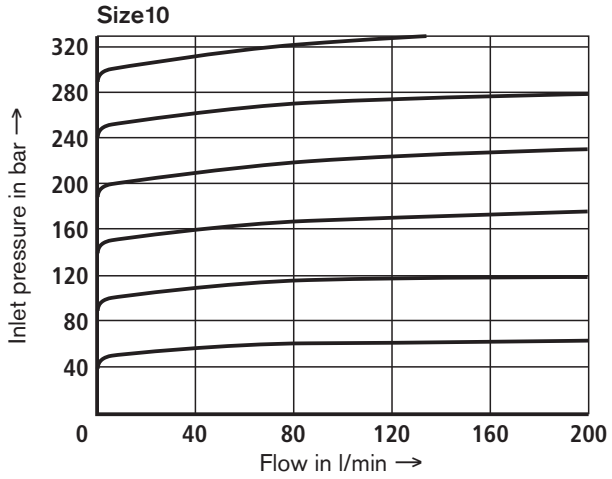
Circuit example: DBG valve with limit switch

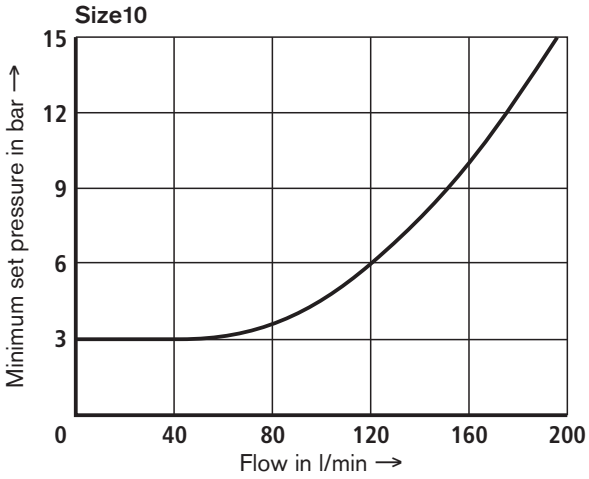


Running on of the motor and hence the pressure lag can be reduced by installing a short-circuit bridge.

Characteristic curves (measured at $\nu = 36$ mm²/s and $\vartheta_{oil} = 50$ °C)

The characteristic curves were measured with external, pressureless pilot oil drain. With internal pilot oil drain, the inlet pressure increases by the output pressure present in port B.

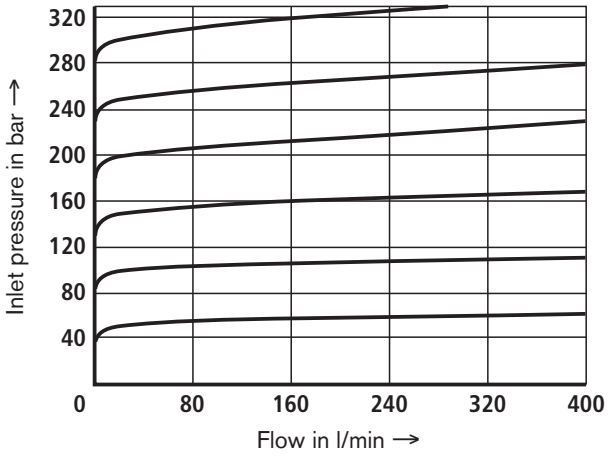




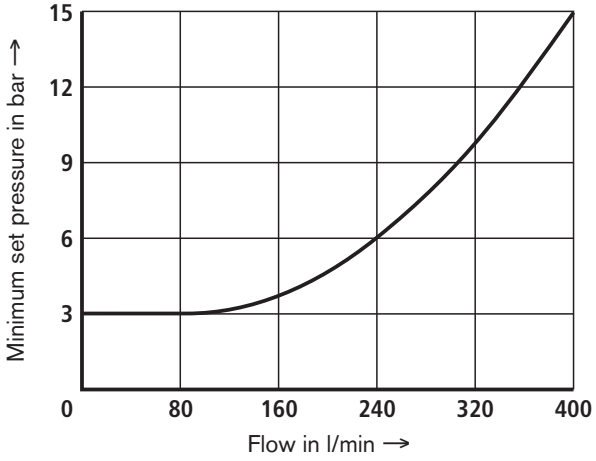
Characteristic curves (measured at $\nu = 36\ mm^2/s$ and $\vartheta_{oil} = 50\ °C$)

The characteristic curves were measured with external, pressureless pilot oil drain. With internal pilot oil drain, the inlet pressure increases by the outlet pressure present in port B.

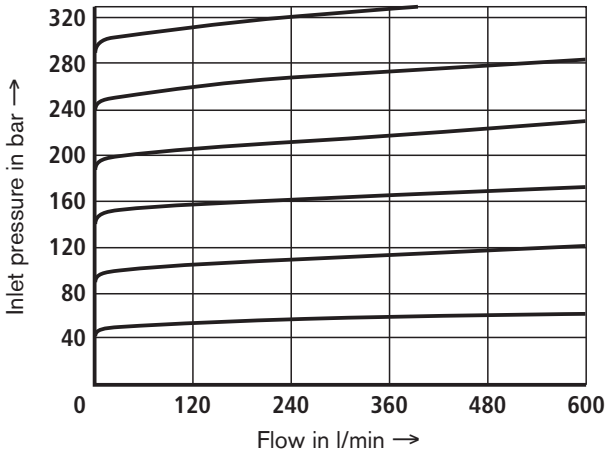
Size 25



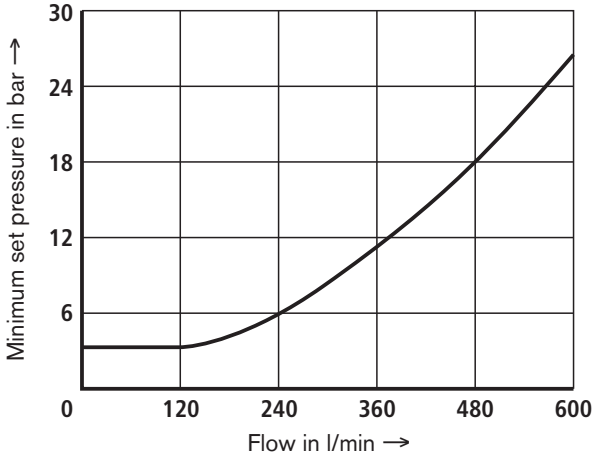
Size 25



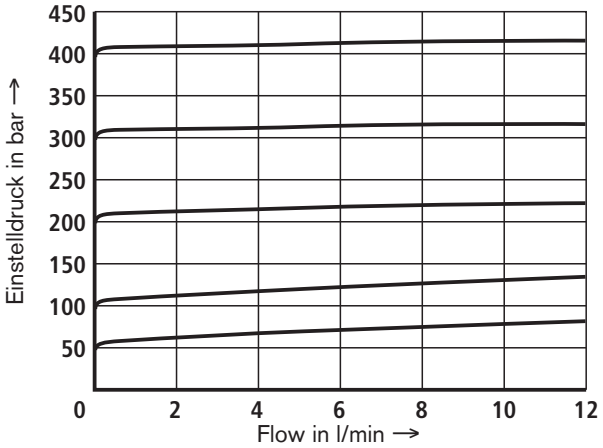
Size 32



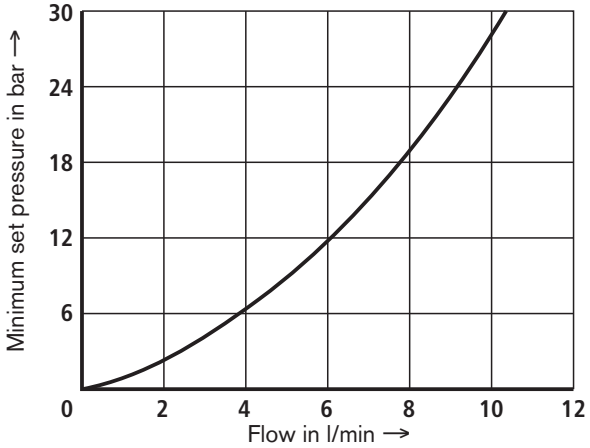
Size 32



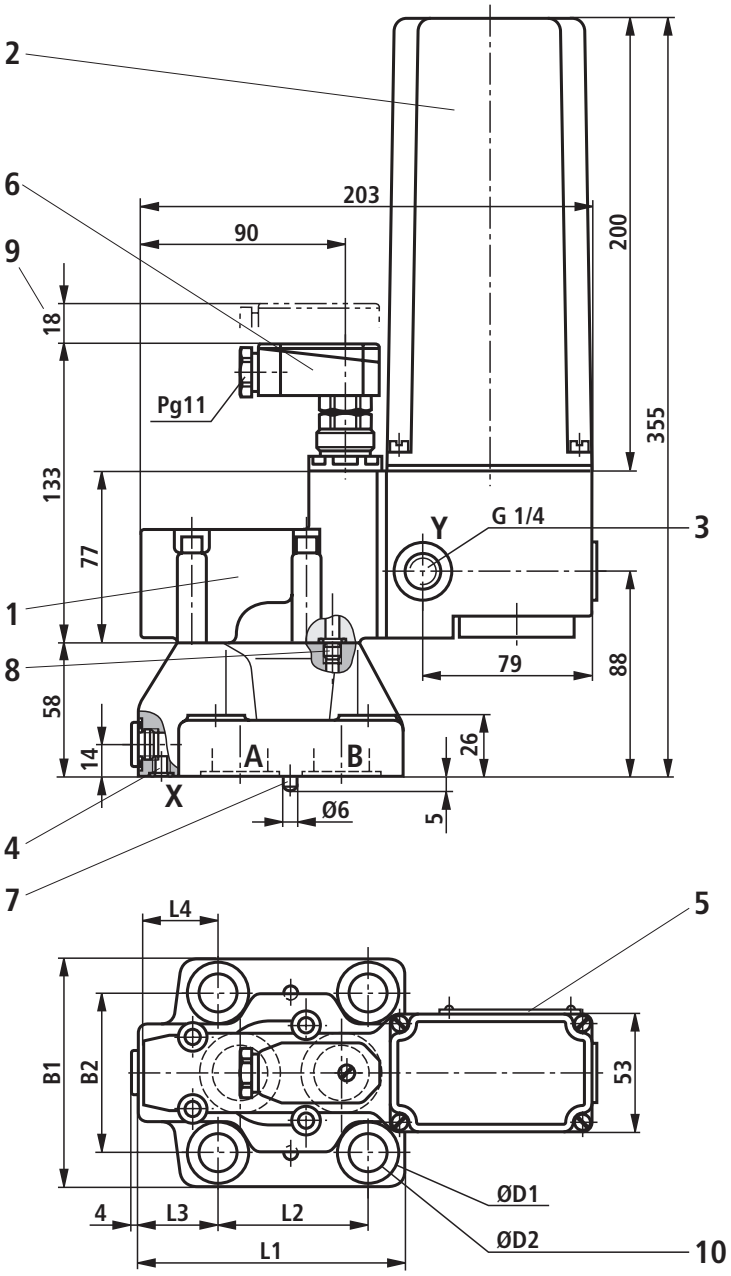
DBGT../400 Pressure rating 400 bar

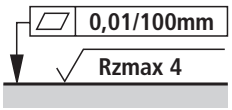


DBGT../400 Pressure rating 400 bar



Unit dimensions: Subplate mounting (dimensions in mm)





Required surface quality of valve mounting face

Tolerances according to:
– General tolerances ISO 2768-mK

1 Pilot valve
2 DC motor
3 Port “Y“
for external pilot oil drain
4 Port “X“
for external pilot oil supply
5 Nameplate
6 Mating connector (included in scope of supply)
7 Locating pin
8 Not required with internal pilot oil drain
9 Space required to remove mating connector
10 Valve mounting bore

Subplates to data sheet RE 45064
(separate order)

– Size 10	G 545/01	(G3/8)
	G 546/01	(G1/2)
– Size 25	G 408/01	(G3/4)
	G 409/01	(G1)
– Size 32	G 410/01	(G1 1/4)
	G 411/01	(G1 1/2)

Valve fixing screws (separate order)

For strength reasons, only the following valve fixing screws may be used:

– Size 10
4 hexagon socket head cap screws ISO 4762 - M12 x 50 - 10.9-flZn-240h-L to VDA 235-101
Friction coefficient μ_{total} = 0.09 to 0.14,
tightening torque M_T = 75 Nm ± 10%,
Material no. **R913000283**

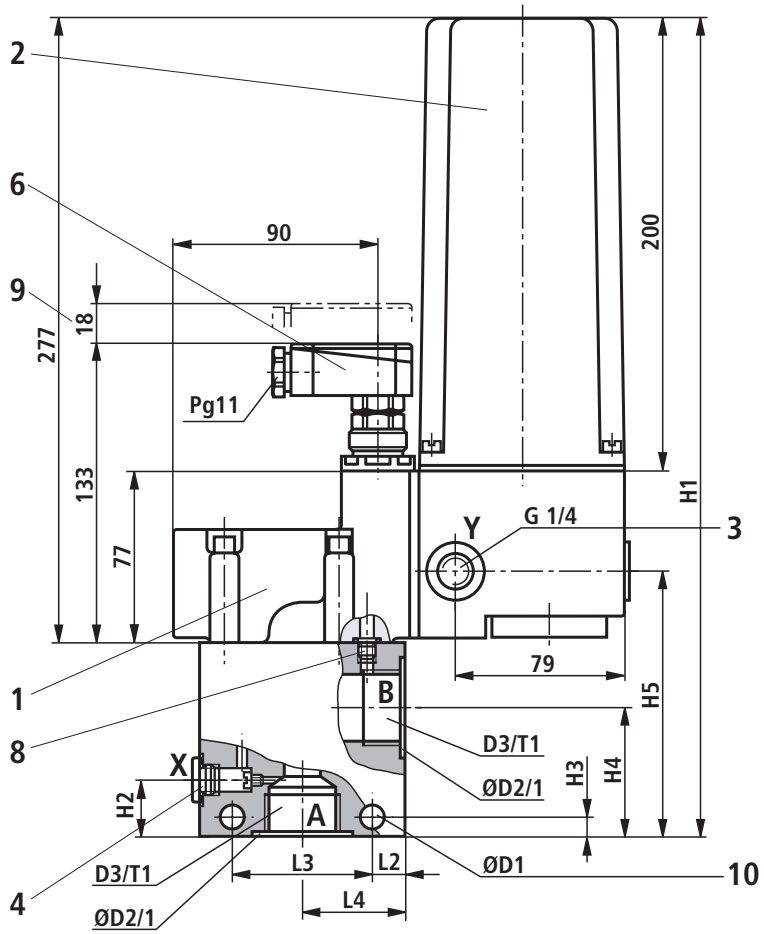
– Size 25
4 hexagon socket head cap screws ISO 4762 - M16 x 50 - 10.9-flZn-240h-L to VDA 235-101
Friction coefficient μ_{total} = 0.09 to 0.14,
tightening torque M_T = 185 Nm ± 10%,
Material no. **R913000378**

– Size 32
4 hexagon socket head cap screws ISO 4762 - M18 x 50 - 10.9-flZn-240h-L to VDA 235-101
Friction coefficient μ_{total} = 0.09 to 0.14,
tightening torque M_T = 248 Nm ± 10%,
Material no. **R900002245**

The tightening torques given are guidelines when screws of the specificied friction coefficients and a torque wrench (tolerance ±10 %) are used.

Size	B1	B2	ØD1	ØD2	L1	L2	L3	L4	O-ring - port X	O-ring - ports A, B
10	78	54	20	14	90	54	23.5	37	9.25 x 1.78	17.12 x 2.62
25	100	69.8	26	18	117	66.7	34	34	9.25 x 1.78	28.17 x 3.53
32	115	82.5	30	20	148	89	41.5	31.5	9.25 x 1.78	34.52 x 3.53

Unit dimensions: Threaded connection (dimensions in mm)

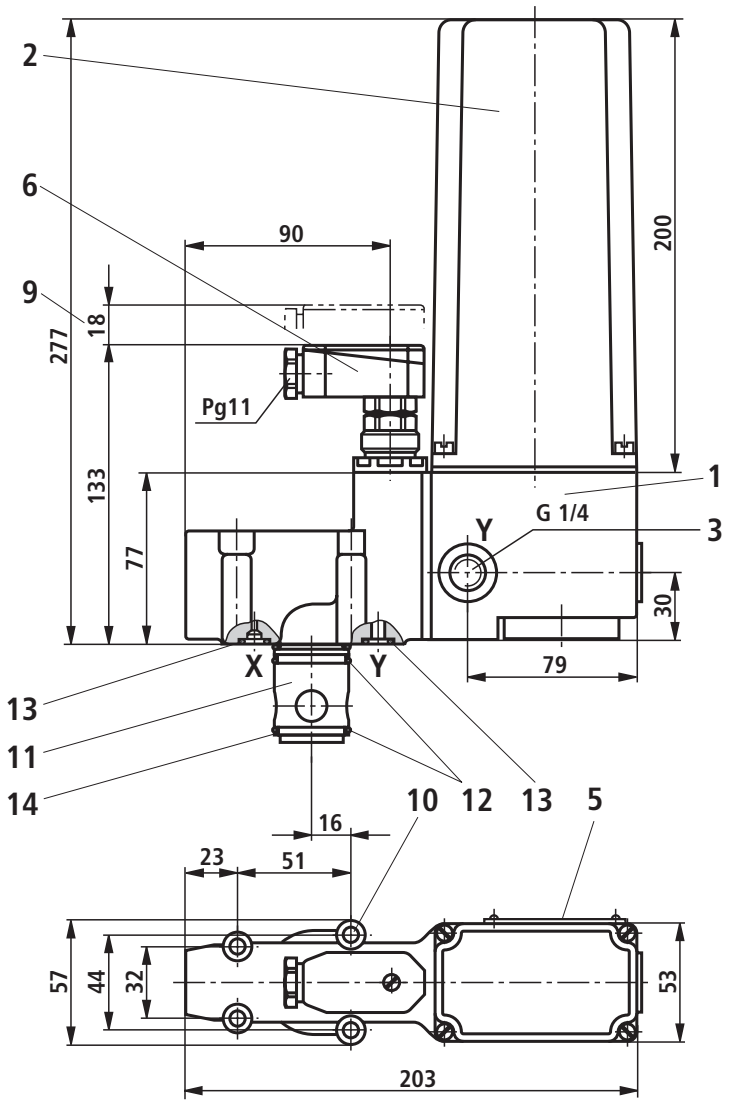


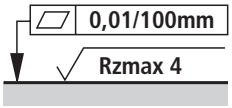
1 Pilot valve
2 DC motor
3 Port "Y" for external pilot oil drain
4 Port "X" for remote control
5 Nameplate
6 Mating connector (included in scope of supply)
8 Not required with internal pilot oil drain
9 Space required to remove mating connector
10 Valve mounting bore

Tolerances according to:
– General tolerances ISO 2768-mK

Size	B1	ØD1	ØD2	D3	H1	H2	H3	H4	H5	L1	L2	L3	L4	L5	T1
8	63	9	28	G3/8	362	27	10	62	115	85	14	62	45	100	12
10			34	G1/2											14
16			42	G3/4											16
20			47	G1				57							18
25	70	11	56	G1 1/4	375	42	13	66	128	100	18	72	54	109	20
32			61	G1 1/2											22

Unit dimensions: Block installation (dimensions in mm)





Required surface quality of valve mounting face

Tolerances according to:
– General tolerances ISO 2768-mK

1 Pilot valve
2 DC motor
3 Port “Y“ for external pilot oil drain
5 Nameplate
6 Mating connector (included in scope of supply)
9 Space required to remove mating connector
10 Valve mounting bores
11 Main spool insert
12 O-ring 27.3 x 2.4
13 O-ring 9.25 x 1.78
14 Back-up ring 32/28.4 x 0.8

Valve fixing screws (separate order)

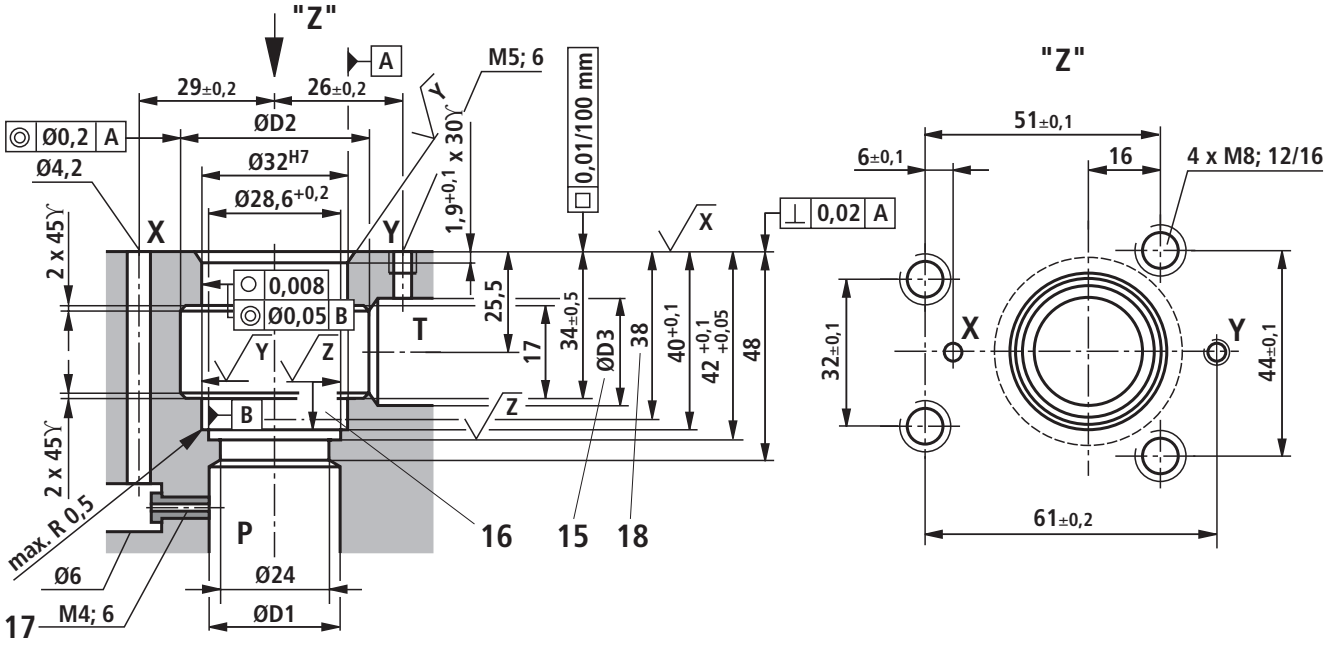
For strength reasons, only the following valve fixing screws may be used:

– Size10, 32
4 hexagon socket head cap screws ISO 4762 - M8 x 50 - 10.9-flZn-240h-L to VDA 235-101
Friction coefficient $\mu_{total} = 0.09$ to 0.14,
tightening torque $M_T = 31$ Nm ± 10%,
Material no. **R913000543**

The tightening torques given are guidelines when screws of the specificied friction coefficients and a torque wrench (tolerance ±10 %) are used.

Unit dimensions: Block installation (dimensions in mm)

Mounting cavity



Tolerances according to:
– General tolerances ISO 2768-mK

√X = √Rzmax 4 √Y = √Rzmax 8 √Z = √Rz 16

Size	ØD1	ØD2	ØD3
10	10	40	10
32	32	45	32

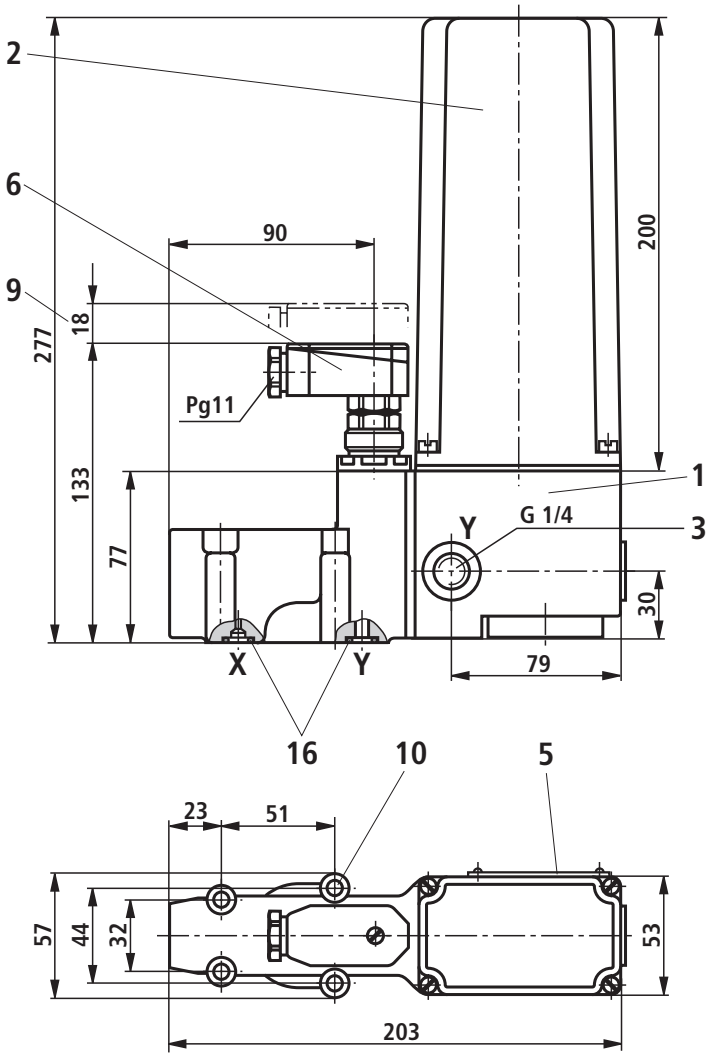
15 Bore ØD3 can intersect ØD2 at any point. However, care must be taken that connection bore X and the mounting bore are not damaged.

16 The back-up ring and the O-ring must be inserted in this bore before the main spool is installed.

17 Mounting kit includes orifice and main spool insert

18 Depth of fit

Unit dimensions: As remote control valve type DBGT (dimensions in mm)



1 Pilot valve
2 DC motor
3 Port "Y" for external pilot oil drain
5 Nameplate
6 Mating connector (included in scope of supply)
9 Space required to remove mating connector
10 Valve mounting bores
16 O-ring 9.25 x 1,78

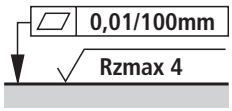
Subplates to data sheet RE 45064
(separate order)
G 51/01 (G1/4)

Valve fixing screws
(separate order)

For strength reasons, only the following valve fixing screws may be used:

4 hexagon socket head cap screws ISO 4762 - M8 x 50 - 10.9-flZn-240h-L to VDA 235-101
Friction coefficient $\mu_{total} = 0.09$ to 0.14,
Tightening torque $M_T = 31$ Nm ± 10%,
Material no. **R913000543**

The tightening torques given are guidelines when screws of the specificied friction coefficients and a torque wrench (tolerance ±10 %) are used.



Required surface quality of valve mounting face

Tolerances according to:
– General tolerances ISO 2768-mK

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