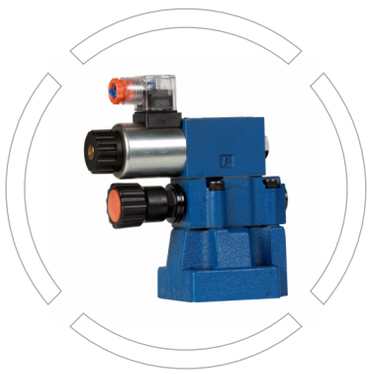
DB / DBW / DBWS

Sizes 10 to 30
Max. Pressure upto 350bar
Max. Flow upto 650 L/min.



Index

Features

- Pilot operated pressure relief valve
- Threaded in-line, or subplate mounting
- For subplate mounting:
  - Mounts on standard ISO 6264-06,08,or10,interface Porting pattern to DIN 24 340 form E, ISO 6264 and CETOP–RP 121 H,
- Five pressure ranges available, to 350 bar
- Four pressure adjustment options:
  - Screw adjustment with locknut and protective cap
  - Hand knob
  - Hand knob with scale
  - Key lock hand knob with scale
- Optional solenoid venting with directional control valve (Model 3 WE 6)
- Optional time delay available for unloading Model DBW

Function Description, Section, Symbols

General

DB, DBW and DBWS pressure valves are pilot operated pressure relief valves. They limit the maximum pressure in a system. Additionally, a solenoid venting option (DBW) is available to unload system pressure.

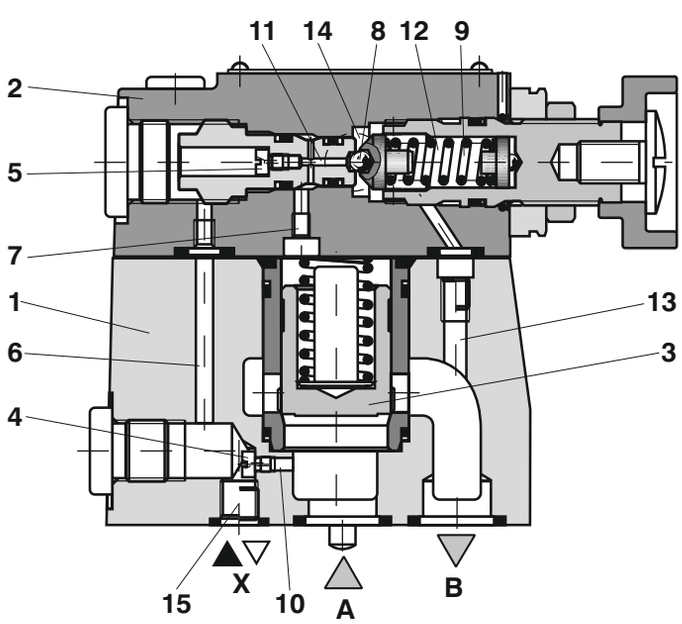
These pressure relief valves consist of main valve housing (1) with main poppet assembly (3), and pilot valve (2) with a manually set pressure adjustment mechanism.

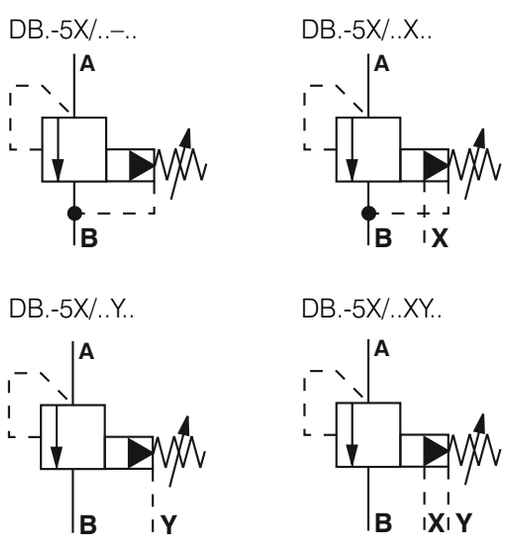
Pressure relief valve model DB

Pressure at port A acts on the lower surface area of main poppet (3). Simultaneously (internally piloted model), pressure from port"A" acts via control passages (10), (6), (7) and orifices (4), (5) on the spring loaded side of main poppet (3) plus pilot poppet (8). In the externally piloted model, pilot pressure may originate from port "X" (15) via passages (6), (7) and orifices (4) and (5).

As pressure exceeds force on spring (9), pilot poppet (8) opens. This allows fluid in main poppet spring chamber and pilot passages, to drain via spring chamber (12) and passage (13) to port "B" (internally drained model) or via port "Y" (14) to tank (externally drained model). The pilot flow creates a pressure drop across orifices (4 and 5), allowing main poppet (3) to open. Fluid flows from port A to B and the valve modulates to maintain a pressure set value.

The design permits flexibility. Via the "X" port (15), the valve can be unloaded or remotely set at one or several pressures with a stepped pilot circuit. Also the "Y" port (14) permits back pressure for load sensing.

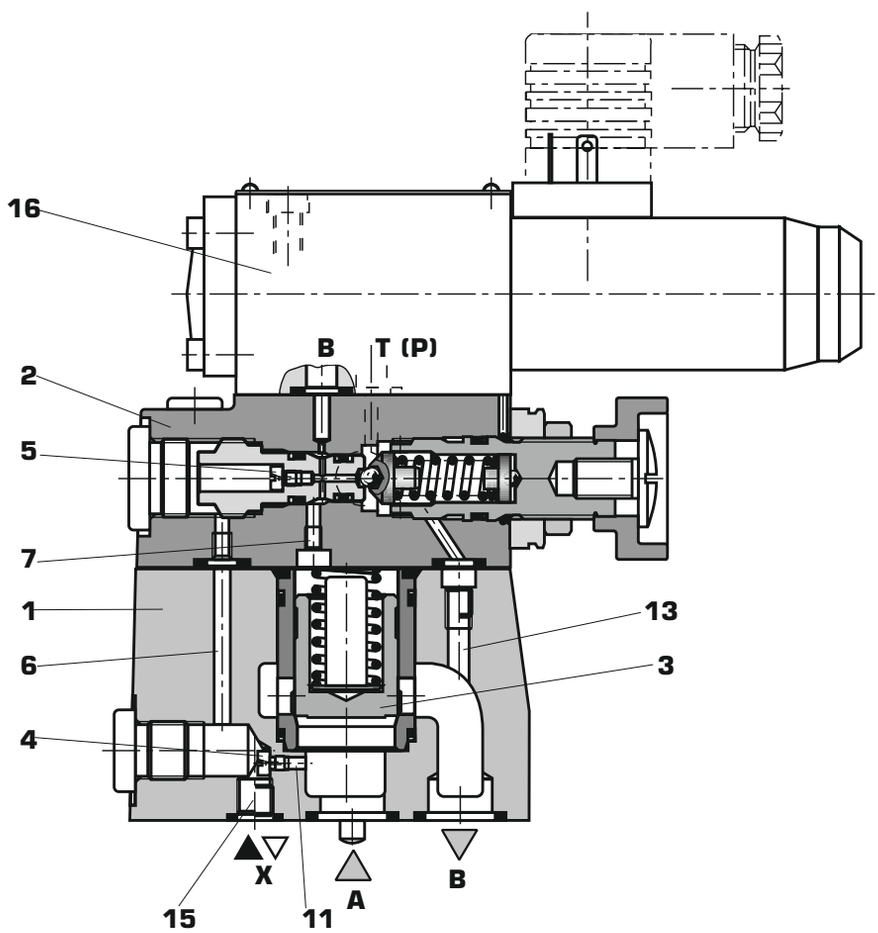


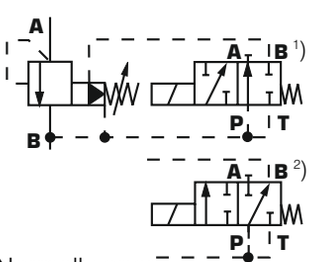
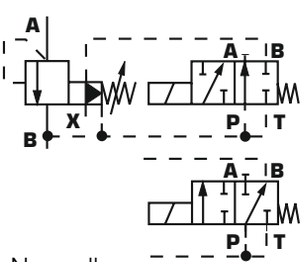
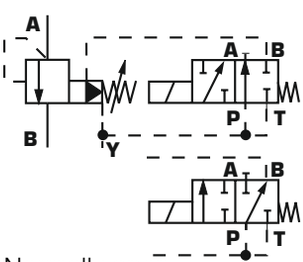
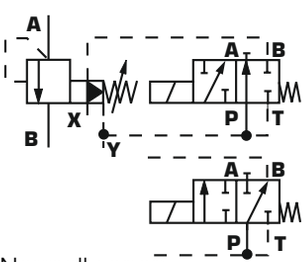


Functional description, section, symbols

- **Pressure relief valve model DBW**

The function of this valve is basically the same as the valve model DB. The unloading at the main spool (3) however,

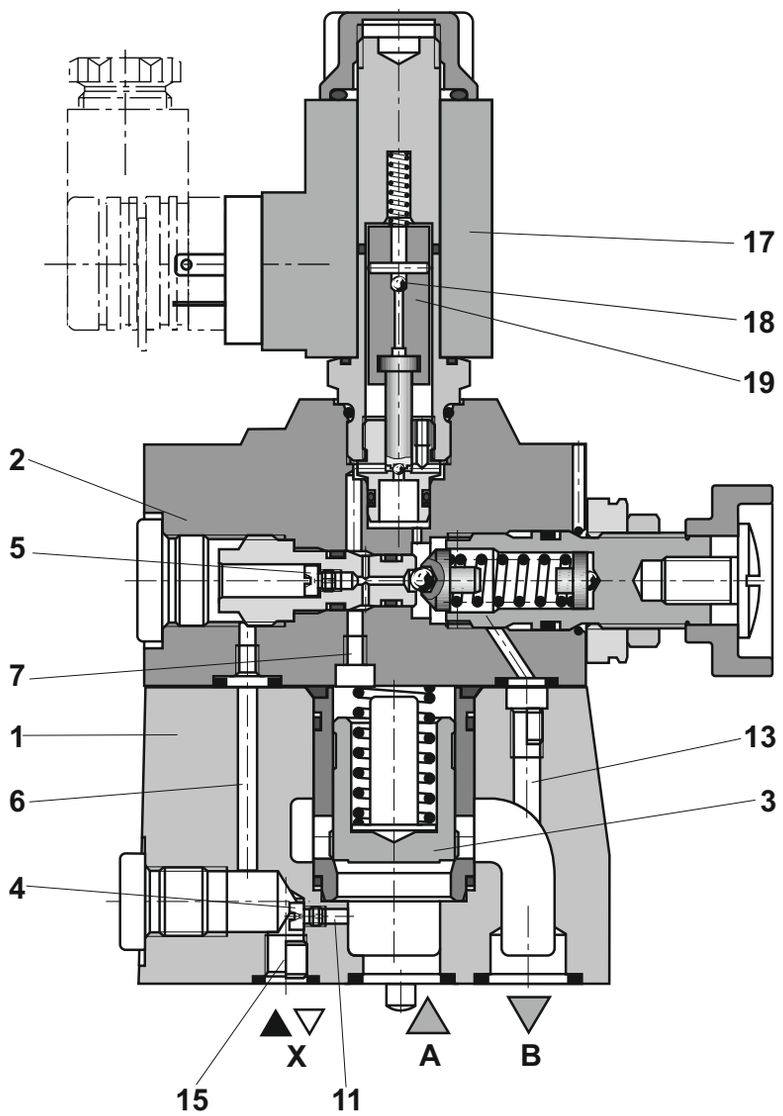


DBW.-5X/..–.. Normally closed	DBW.-5X/..X.. Normally closed	DBW.-5X/..Y... Normally closed	DBW.-5X/..XY... Normally closed
			
Normally open	Normally open	Normally open	Normally open

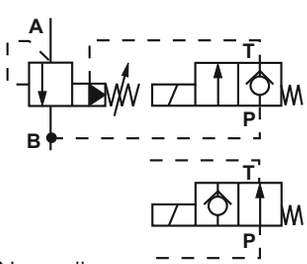
Functional description, section, symbols

- **Pressure relief valve model DBWS**

The function of this valve is basically the same as the valve model DBW. The unloading at the main spool (3) however, is achieved by actuating the built-on directional poppet valve (17). By fitting a ball (18) in the actuating element (19) of the poppet valve the pressure relief valve has a delayed opening. Due to this, pressure peaks and unloading shocks in the return line are minimized.

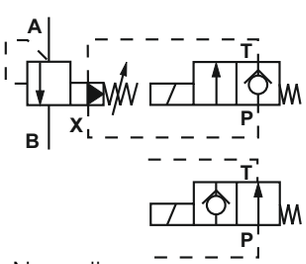


DBWS.5X/.-..
Normally closed



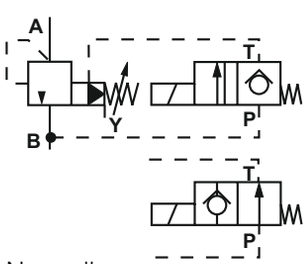
Normally open

DBWS.-5X/..X..
Normally closed



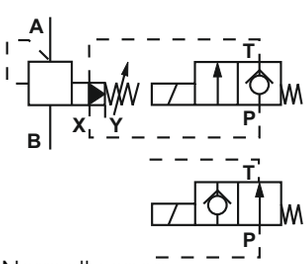
Normally open

DBWS.-5X/..Y..
Normally closed



Normally open

DBWS.-5X/..XY..
Normally closed



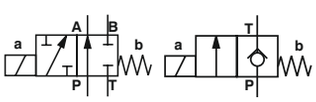
Normally open

Ordering code

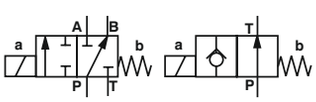
Without directional valve = No code
With built-on directional spool valve = W
With built-in directional poppet valve = WS

Pilot operated valve (complete) = No code
Pilot valve without main spool assembly = C
(Do not enter size)
Pilot valve with main spool assembly = C
(enter valve sizes 10 or 30)
Pilot valve without main spool assembly = T[1)]
for subplate mounting (do not enter size)

Nominal Size	Valve for	
	Subplate mounting "No code"	Threaded Conn. "G"
	Ordering details	
10	= 10	= 10 (G1/2)
16		= 15 (G3/4)
22	= 20	= 20 (G1)
25		= 25 (G1 1/4)
32	= 30	= 30 (G1 1/2)



Normally closed = A[2)]



Normally open = B[2)]

For sub plate mounting = No code
For threaded connections = G

Adjustment elements
Rotary knob = 1
Sleeve with hexagon and protective cap = 2
Lockable rotary knob with scale = 3[3)]
Rotary knob with scale = 7

With main spool Ø 0.945 inches (24 mm) (only in sizes 10, 15, 25 and model DBC 30) = -
With main spool Ø 1.102 inches (28 mm) (only in size 30; not with model DBC 30) = N

Series 50 to 59 = 5X
(50 to 59: unchanged installation and connection dimensions)

Settable pressure up to 50 bar = 50
Settable pressure up to 100 bar = 100
Settable pressure up to 200 bar = 200
Settable pressure up to 315 bar = 315
Settable pressure up to 350 bar = 350[4)]

Ordering code (continued)

Further details in clear text

Threads for Y Port

no desig. = G (BSP)
12 = SAE (preferred)

No code = NBR seals suitable for petroleum oils (HM, HL, HLP
V = FPM seals (standard) suitable for phosphate ester fluids (HF (other seals on request)

Electrical connections[2)]

K4 = Without plug-in connector
Z45 = angled plug
Z55 = large angled plug
Z55L = large angled plug with light

Central solenoid connections

DA = Terminal box with 2 1/2" NPT conduit conn.
DAL = Terminal box with two 1/2" NPT conduit connections and light(s)
DZA = Terminal box with angled plug
DZAL = Terminal box with angled plug and light(s)

No code = Without manual override with rubber boot
N[2)] = With manual override with rubber boot
N9[2)] = With protected override (not with model DBWS) with rubber boot

AC voltage

W 120-60* = W 120-60* = 120 Volts AC 60 Hz
W 110 R [2; 5)] = W 110 R 2; 5) = DC solenoid with rectifier for AC operation (only for voltages [3] 110 V and with Z55 plug-in connector)

DC voltage

G + voltage [2; 6)] = G + voltage 2; 6) = DC solenoid (ex.: 24 V DC = G 24)
* for other available voltages and frequencies

No code = [2)] Without directional valve
6E [2; 4)] = With directional spool valve (3WE6…6X/E 7)) settable pressure up to 350 bar
1SC [2)] = With directional poppet valve settable pressure up to 350 bar

S = With switching shock damping (only with model DBWS)

No code = Standard version
U [5; 8)] = Valve for minimum opening pressure

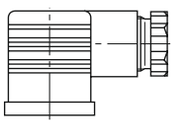
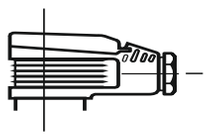
Pilot oil supply and drain line

– [9)] =
X = Ordering details
Y = to symbols
XY = pages 1 to 3

1) DBT/DBWT are the same as DBC/DBWC, except that the central drilling is closed.
2) Ordering details only required for the version with directional valve (DBW / DBWS).
3) H-key with part no. 008158 is included within the scope of supply.
4) With the version DBW…/350… the high performance directional valve “6E” has to be ordered.2
5) DC solenoids only for version with directional poppet valve (DBWS).
6) For the connection to an AC supply a DC solenoid must be used which is controlled via a rectifier (see table Right).
For single connections a large plug-in connector with integrated rectifier can be used .
8) Not possible with the version without the main spool assembly and cross-line relief!
9) DBW / DBWS valves with code “U” require external drain “Y”.

AC supply (permissible voltage tolerance – 10%)	Nominal voltage of the DC solenoid when used with AC voltage & rectifier	Order code
110 V - 50/60 Hz 120 V - 60 Hz	96 V	**G96**
220 V - 50/60 Hz	196 V	**G196**

Ordering details for plug-in connectors (single connection)

		Plug-in connector DIN 43 650 ISO 4400	Large plug-in connector			
						
			Without indicator lamp	With indicator lamp	With rectifier	With lamp and protective circuit
Valve side **a**, color grey	**Order no.**	**074683**	**008616**	**313923**/24V **313926**/180-240V	**313932**	**310994**

Ordering details for design tested pressure relief valves model DB../..B, series 5X†

Size	Description	Component code		Flow G in L/min	Settable over pressure *p* in bar
10	DB 10	2 3 –5X/ 4 5 B	TÜV.SV.89–851.12.F.G.p	200 250	30 to170 171 to 350
	DBW 10	1 2 3 –5X/ 4 5 6 * B	TÜV.SV.89–851.12.F.G.p		
25	DB 20	2 3 –5X/ 4 5 B	TÜV.SV.89–852.22.F.G.p	250 350 450	30 to 60 61 to 110 111 to 350
	DBW 20	1 2 3 –5X/ 4 5 6 * B	TÜV.SV.89–852.22.F.G.p		
32	DB 30	2 3 N5X/ 4 5 B	TÜV.SV.89–853.22.F.G.p	600 650 650 650	30 to 60 61 to 110 111 to 170 171 to 350
	DBW 30	1 2 3 N5X/ 4 5 6 * B	TÜV.SV.89–853.22.F.G.p		

The ordering details of design tested pressure relief valves consists of description and component code.

1 ☐	Directional valve, normally closed normally open	= A = B
2 ☐	For subplate mounting For threaded connection	= No code = G
3 ☐	Adjustment element	= 1 = 2
4 ☐	Pressure must be entered by customer, e.g.	= 150
5 ☐	Pilot oil supply (ordering details to symbols on page 4)	= –1) = X = Y = XY
*	Ordering details of electric data (see page 6) e.g.	= AG24NK4

1) Ordering details only required for model fitted with directional valve (DBW / DBWS).
† All design tested pressure relief valves are ordered as complete units from factory.
DB…/…B valves are not typical stock.

Technical data

General								
Designation			Pressure relief valve					
Symbols			See pages 2 to 4					
Model code			See pages 5 to 7					
Mounting style			Sub plate mounting, threaded connections or cartridge valve					
Model of connection			Direct via threads; indirect via sub plate or manifold, porting pattern to DIN 24 340 form A, ISO 4401 and CETOP-RP 121 H					
Nominal size			10	15	25		30	
weight			DB 10	DB 15	DB 20	DB 25	DB 30	
Subplate mounting	DB...	Kg	2.6	-	3.5	-	4.4	
	DBW...[1]	Kg	4.07	-	4.97	-	5.87	
	DBWS...	Kg	2.8	-	3.7	-	4.6	
	DBC...	Kg	1.2					
	DBWC...	Kg	2.67					
	DBC10 or 30...	Kg	1.5					
	DBWC10 or 30...[1]	Kg	2.97					
	DBWSC...	Kg	1.5					
Threaded connection	DB..G..	Kg	5.3	5.2	5.1	5.0	4.8	
	DBW..G...[1]	Kg	6.87	6.67	6.57	6.47	6.27	
	DBWS...G...	Kg	5.5	5.4	5.3	5.2	5.0	
Installation			Optional					
Direction of flow			See graphical symbols on pages 2 to 4					
Ambient temperature		°C	-30 to +50					

Hydraulic							
Nominal pressure		bar	350				
Max. operating pressure at ports A, B, X		bar	350				
Max. back pressure at port Y	DB...	bar	315				
	DBW...	bar	210 (high performance DC solenoid) (3WE6...6X/E)				
		bar	160 (high performance AC solenoid) (3WE6...6X/E)				
	DBWS...	bar	≤ pressure at port A or X				
Pressure fluid			Mineral oil (HL, HLP) to DIN 51 524 [2]; Fast bio-degradable pressure fluids to VDMA 24 568 HETG (rape seed oil) [2]; HEPG (polyglycol) [3]; HEES (synthetic ester) [3]; other fluids on request				
Pressure fluid- temperature range		°C	-30 to +80 with NBR seals				
Data		°C	-20 to +80 with FPM seals				
Viscosity range		mm^2/s	10 to 800				
Max. flow			DB. 10	DB. 15	DB. 20	DB. 25	DB. 30
Subplate mounting		l/min	250	-	500	-	650
Threaded connection		l/min	250	500	500	500	650
Degree of contamination			Maximum permissible degree of contamination of the fluid is to NAS 1638 class 9. We, therefore, recommend a filter with a minimum retention rate of ß10³ 75.				
Settable pressure	minimum	bar	flow dependent				
	maximum	bar	50; 100; 200; 315; 350				

Electrical Technical data

Design		high performance directional valve
Voltage		DC
Nominal voltage	V	12; 24; 42; 60; 96; 110; 180; 205; 220
Voltage tolerance	%	-10
Nominal power	W	30
Protection		IP65
Permissible switching frequency	1/h	15000
Connection model		Plug connection or conduit box
Design		high performance directional valve
Voltage		AC
Nominal voltage	V	110; 220; 50/60 Hz
Voltage tolerance	%	-10
Holding power	W	50
Switching power	W	220
Protection		IP65
Permissible switching frequency	1/h	7200
Connection model		Plug connection or conduit box
Design		2/2 way poppet valve
Voltage		DC
Nominal voltage	V	12; 24; 42; 60; 96; 110; 180; 205; 220
Voltage tolerance	%	-10
Nominal power	W	26
Protection		IP65
Permissible switching frequency	1/h	15000
Connection model		plug connection (single connection)

1) The values stated refer to the version fitted with directional spool valve "6E" .
2) suitable for NBR and FPM seals
3) only suitable for FPM seals

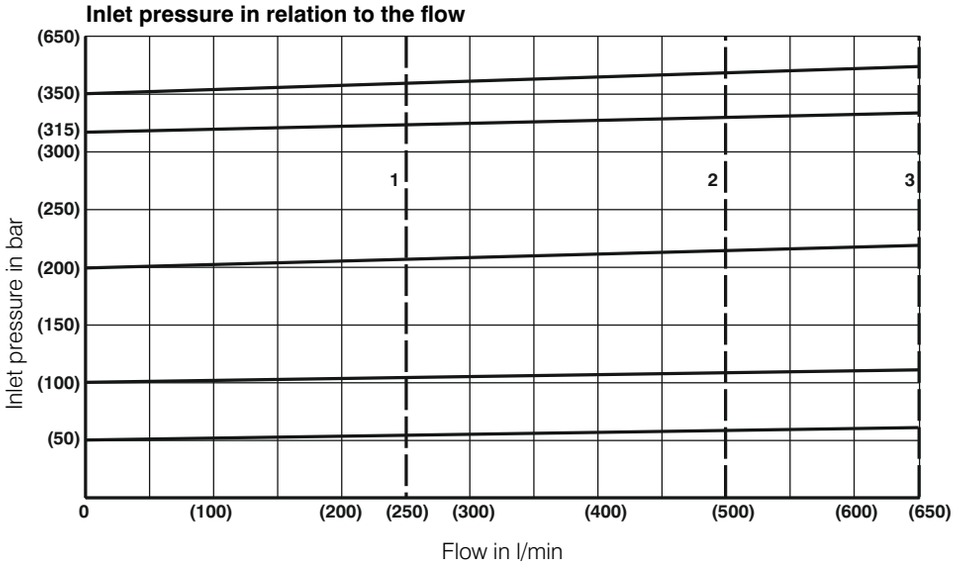
Supply voltages for high performance directional valves fitted with AC solenoids:

Ordering details	Supply voltages
W110	110 V, 50 Hz 110 V, 60 Hz 120 V, 60 Hz
W222	220 V, 50 Hz 220 V, 60 Hz

Characteristic curves

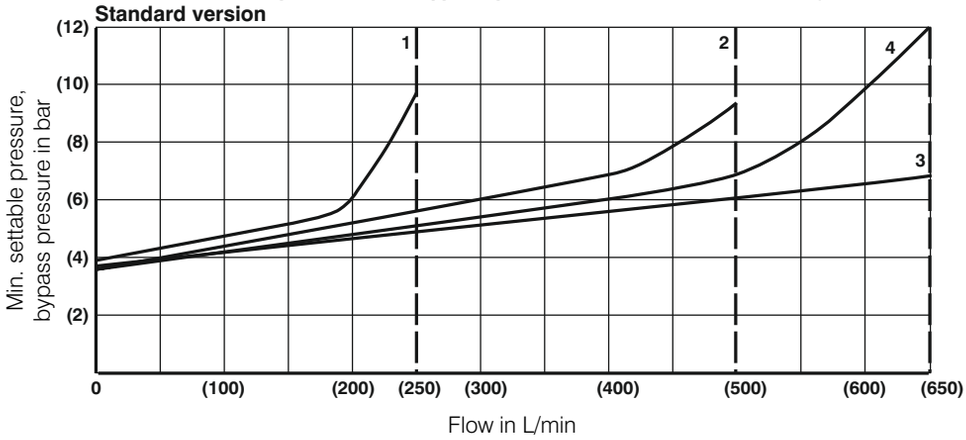
- The characteristic curves were measured with **external, zero pressure pilot oil drain**.
  With internal pilot oil drain in inlet pressure increases by the outlet pressure present at port B.

Inlet pressure in relation to the flow



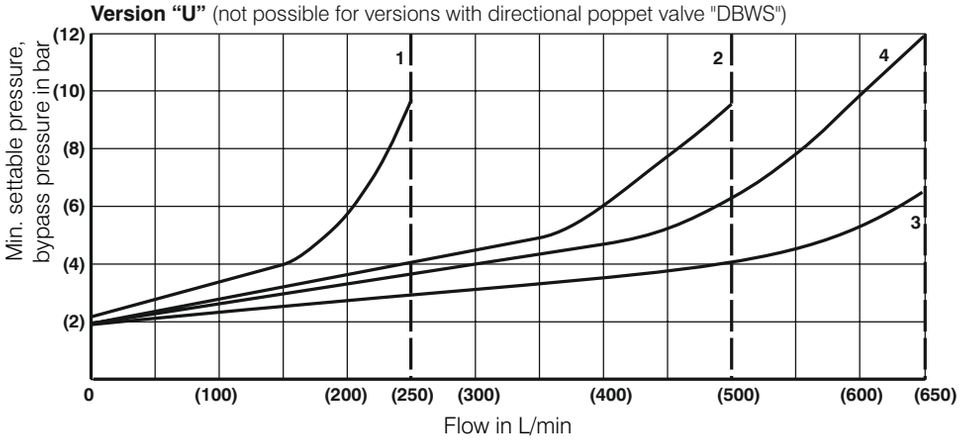
1 Size 10
2 Size 20
3 Size 30

Minimum settable pressure and bypass pressure in relation to the flow 1)
Standard version



1 Size 10
2 Size 20
3 Size 30
4 DBC 30/ DBW(S)C 30

Minimum settable pressure and bypass pressure in relation to the flow 1)
Version "U" (not possible for versions with directional poppet valve "DBWS")

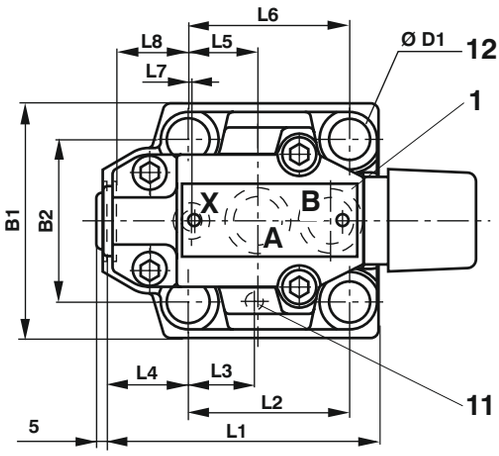


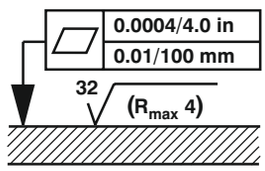
1 Size 10
2 Size 20
3 Size 30
4 DBC 30/ DBWC 30

1) The characteristic curves are valid for pB = 0 (0 outlet pressure) over the entire flow range

Unit dimensions

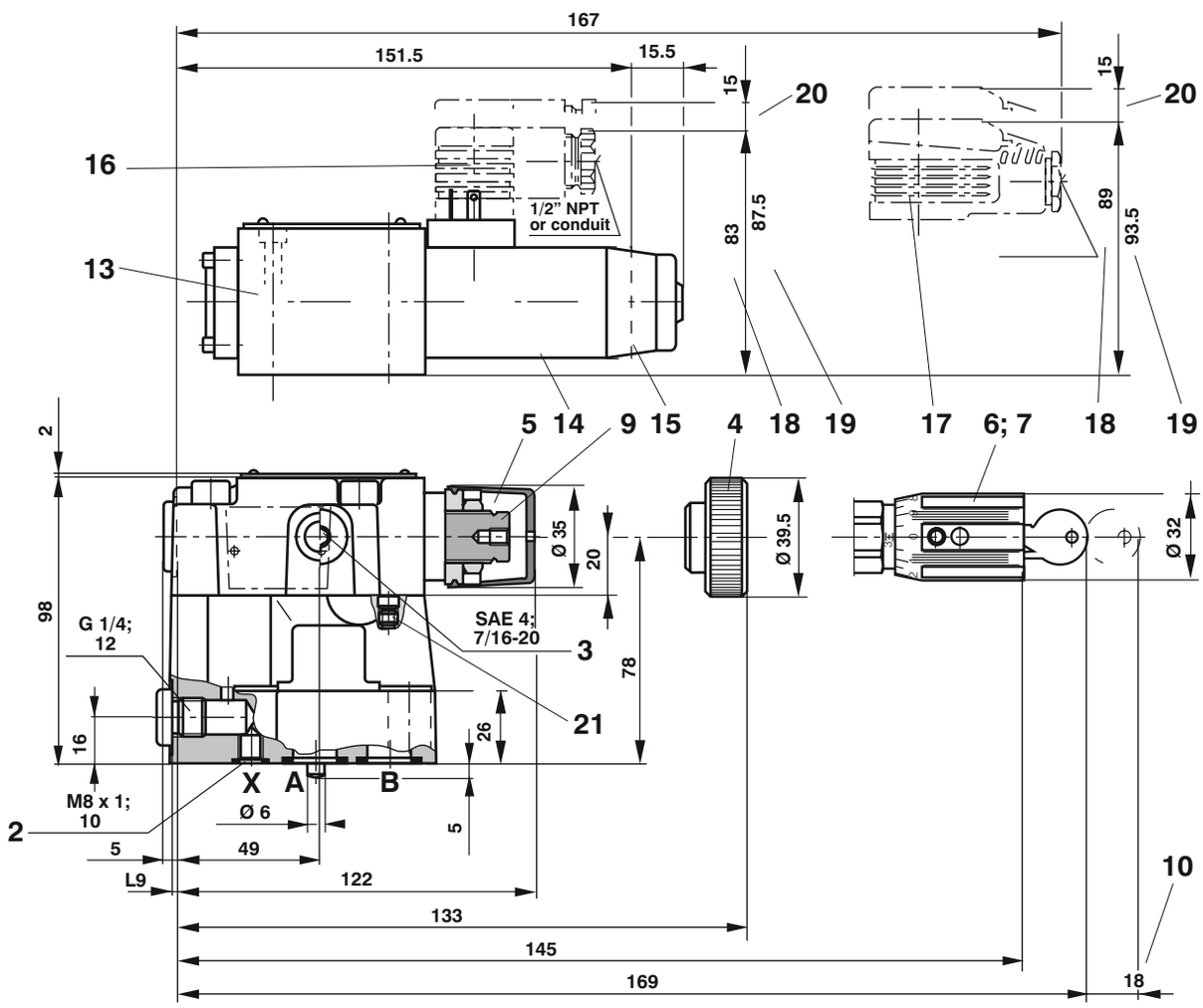
- Model DB/DBW for subplate mounting: dimensions in millimeters





Required surface finish of mating piece

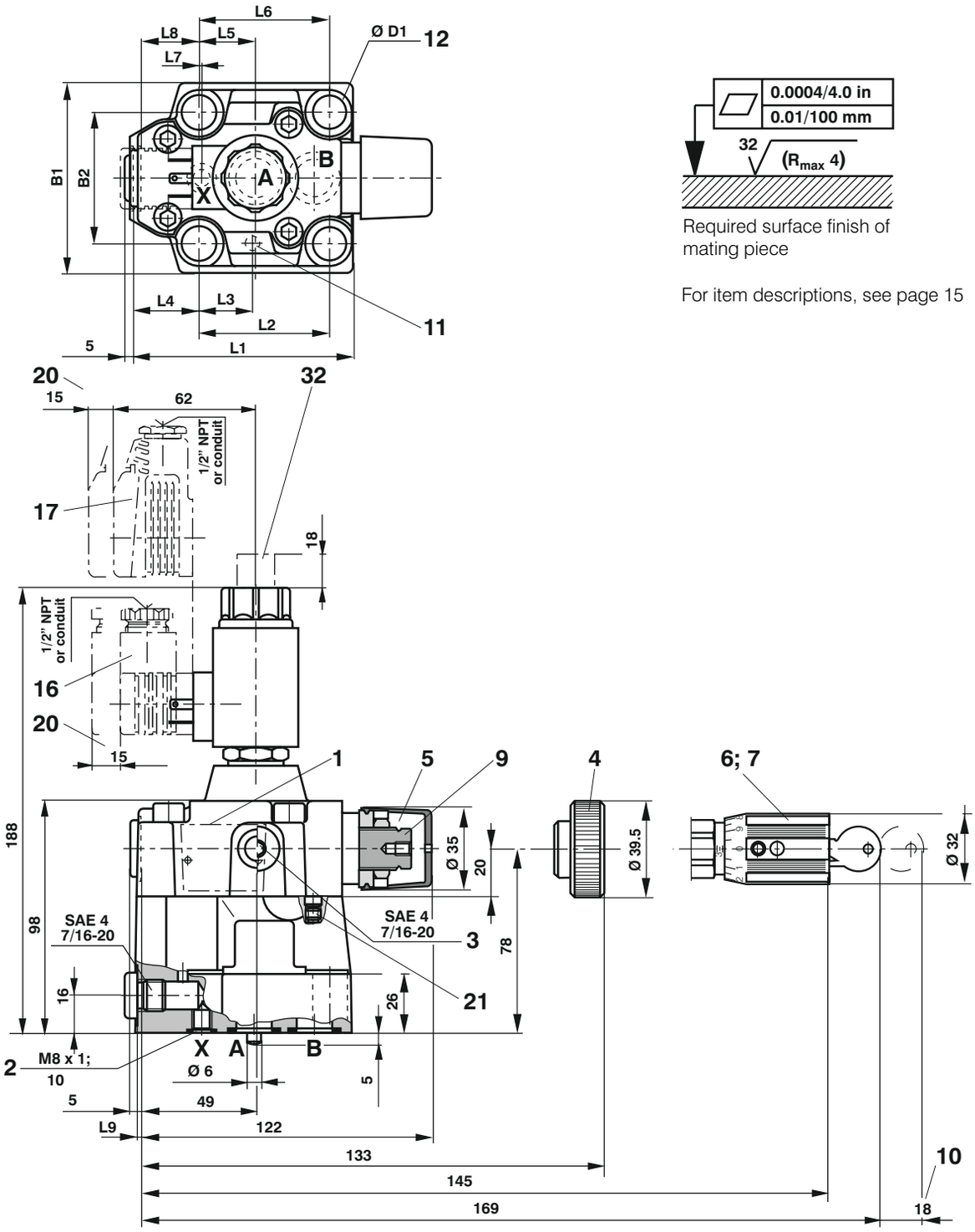
For item descriptions, see page 15



Model	L1	L2	L3	L4	L5	L6	L7	L8	L9	B1	B2	ØD1	R-ring ports A, B	R-ring port X
DB/DBW 10	91	53·8	22·1	27·5	22·1	47·5	0	25·5	2	78	53·8	14	17.56 x 2.4 x 2.62	9.81 x 1.5 x 1.78
DB/DBW 20	116	66.7	33.4	33.3	11.1	55.6	23.8	22.8	10.5	100	70	18	28.43 x 3.4 x 3.53	9.81 x 1.5 x 1.78
DB/DBW 30	147.5	88.9	44.5	41	12.7	76.2	31.8	20	21	115	82.6	20	34.52 x 3.53 x 3.53	9.81 x 1.5 x 1.78

Unit dimensions

- Model DBWS for subplate mounting: dimensions in millimeters



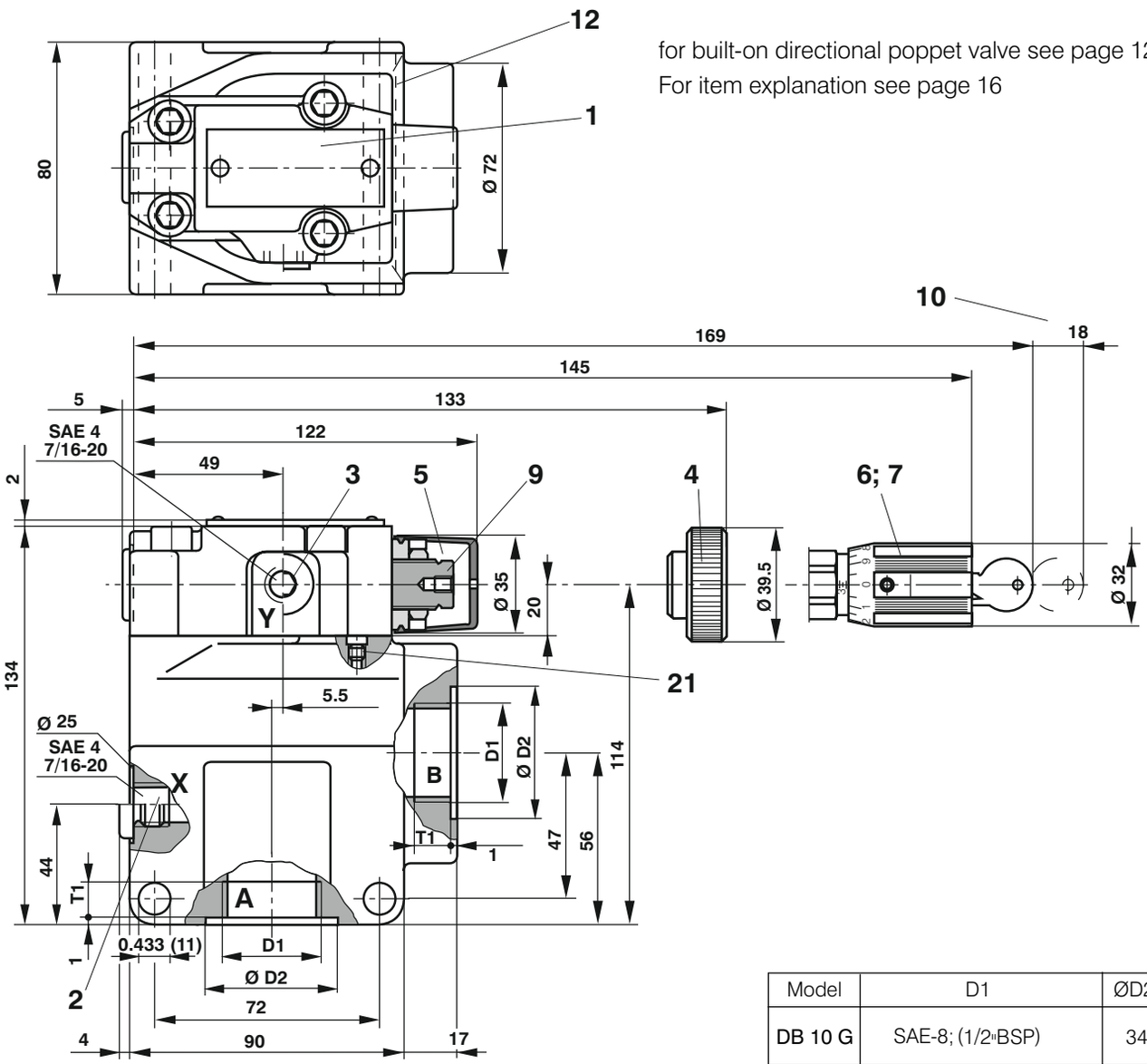
Required surface finish of mating piece

For item descriptions, see page 15

Model	L1	L2	L3	L4	L5	L6	L7	L8	L9	B1	B2	ØD1	R-ring ports A, B	R-ring port X
DBWS 10	91	53·8	22·1	27·5	22·1	47·5	0	25·5	2	78	53·8	14	17.56 x 2.4 x 2.62	9.81 x 1.5 x 1.78
DBWS 20	116	66·7	33·4	33·3	11·1	55·6	23·8	22·8	10·5	100	70	18	28.43 x 3.4 x 3.53	9.81 x 1.5 x 1.78
DBWS 30	147·5	88·9	44·5	41	12·7	76·2	31·8	20	21	115	82·6	20	34.52 x 3.53 x 3.53	9.81 x 1.5 x 1.78

Unit dimensions

- For threaded connections: dimensions in inches (millimeters)



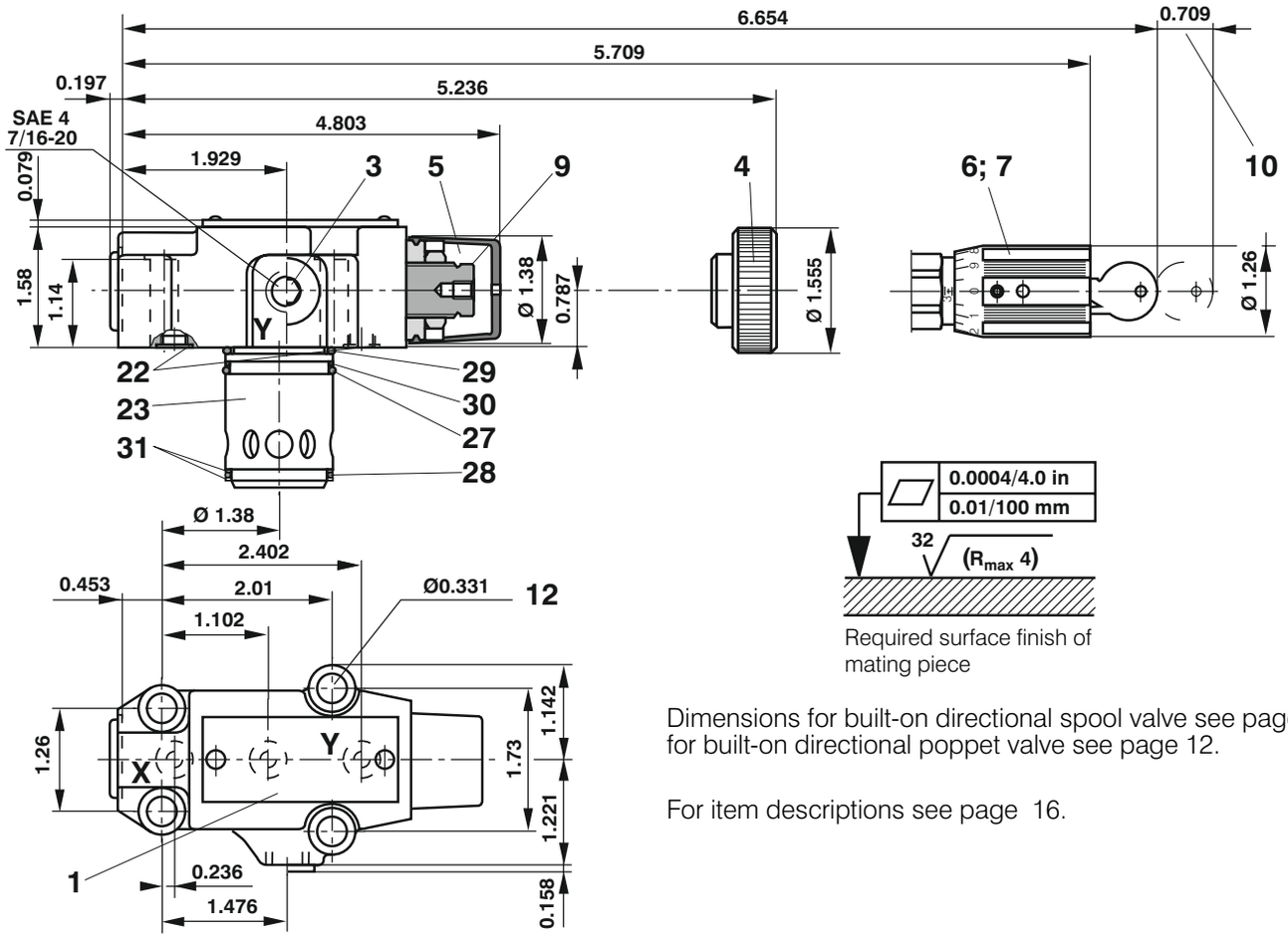
for built-on directional poppet valve see page 12.
For item explanation see page 16

Model	D1	ØD2	T1
DB 10 G	SAE-8; (1/2"BSP)	34	14
DB 15 G	SAE-12; (3/4"BSP)	42	16
DB 20 G	SAE-16; (1"BSP)	47	18
DB 25 G	SAE-20; (1 1/4"BSP)	58	20
DB 30 G	SAE-24; (1 1/2"BSP)	65	22

BSP pipe thread to ISO 228/1

Unit dimensions

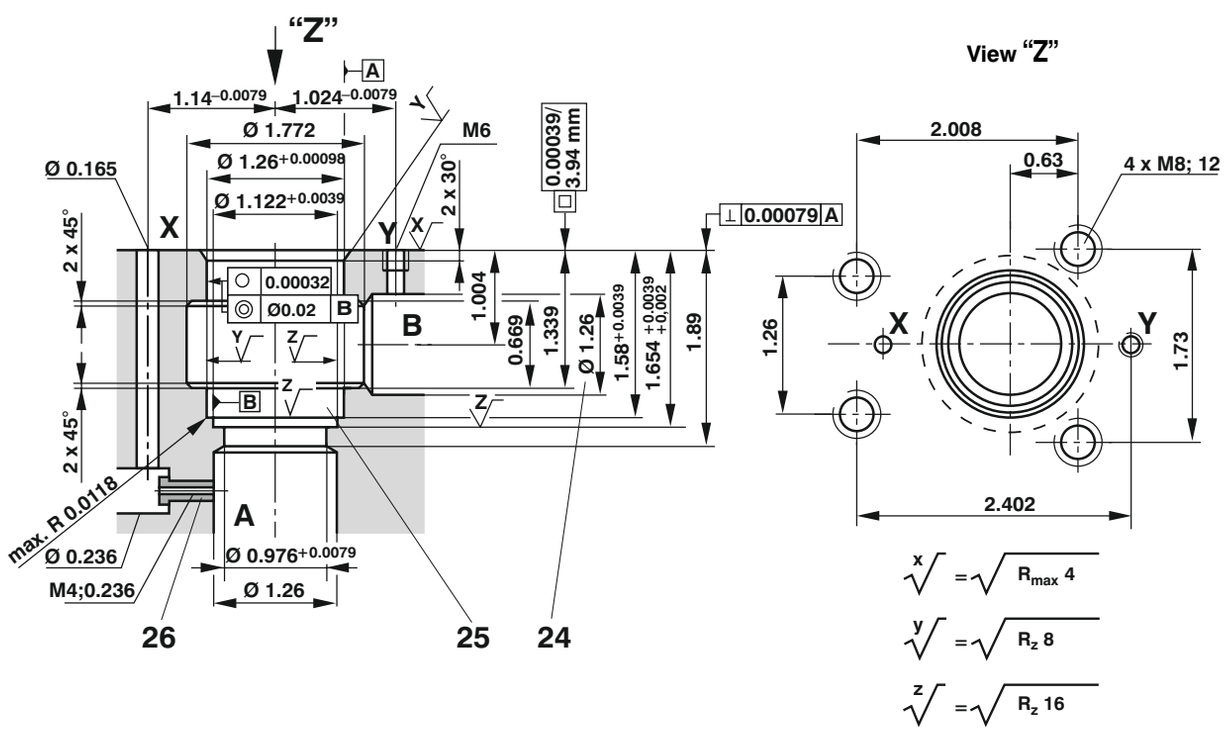
- Pilot valve with (DBC 10 or 30) or without (DBC, DBT) main spool cartridges: dimensions in inches



Required surface finish of mating piece

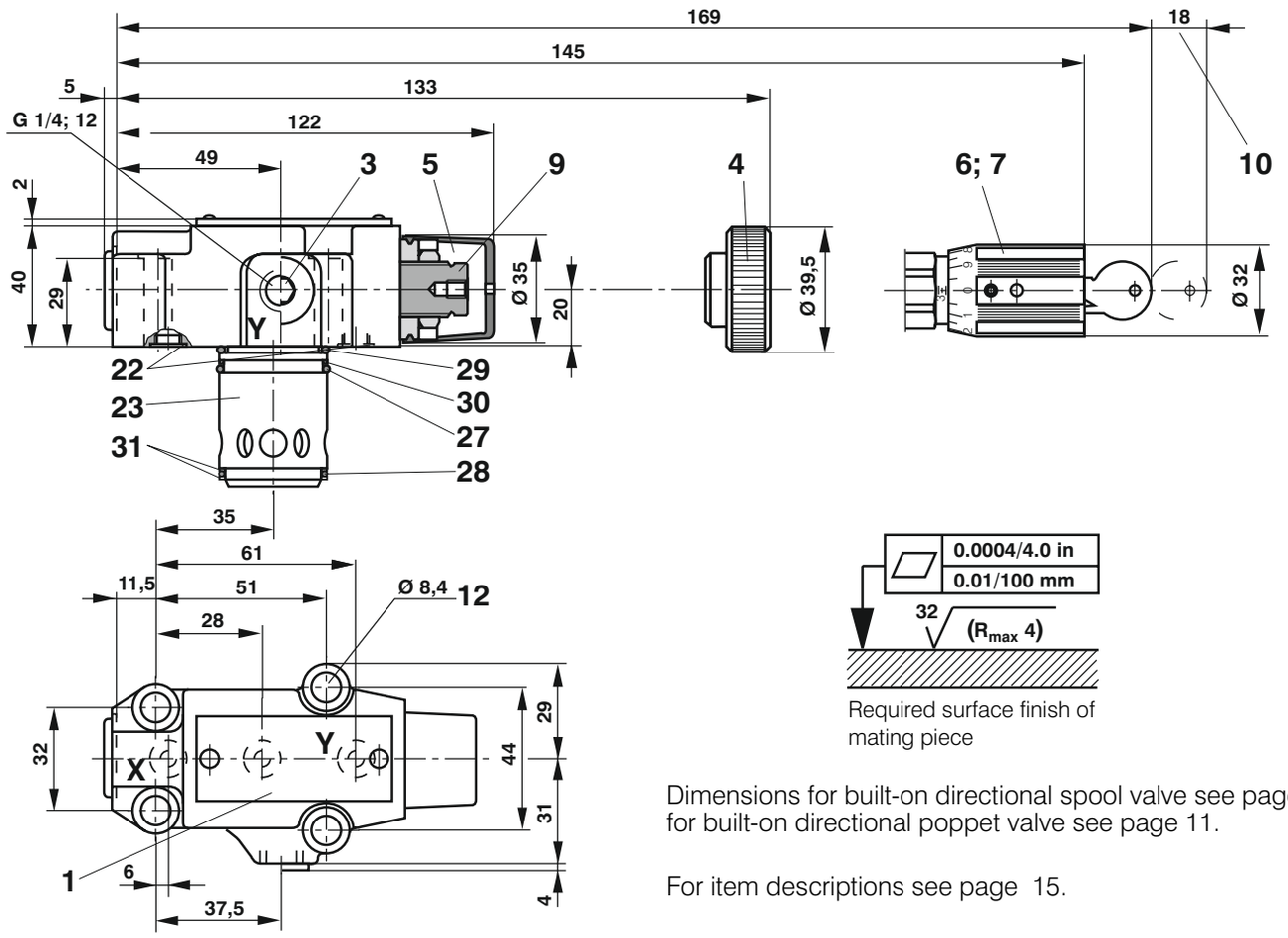
Dimensions for built-on directional spool valve see page 11, for built-on directional poppet valve see page 12.

For item descriptions see page 16.



Unit dimensions

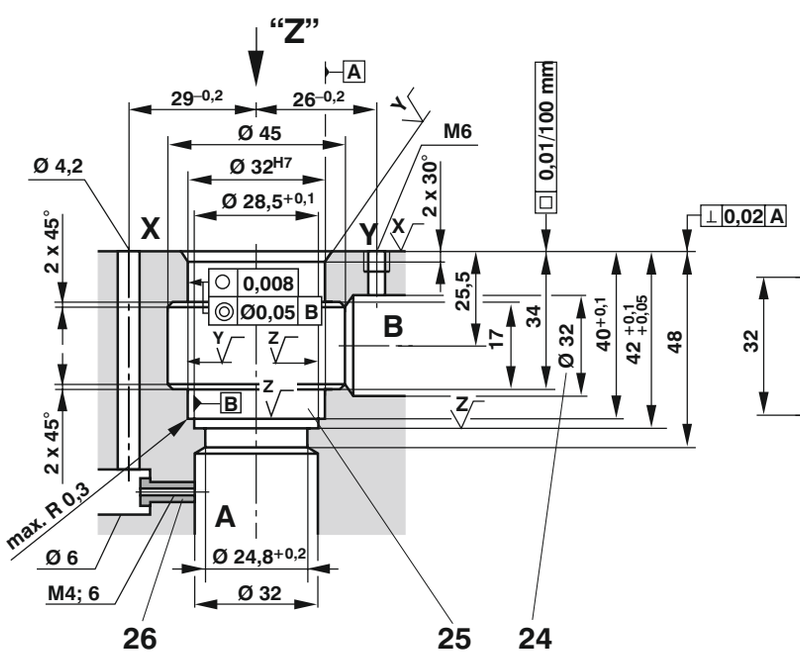
- Pilot valve with (DBC 10 or 30) or without (DBC, DBT) main spool cartridges: dimensions in millimeters

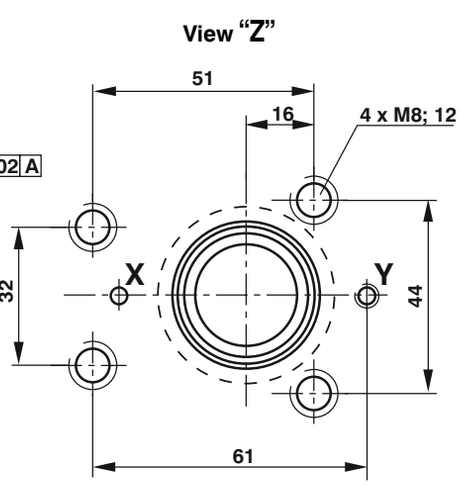


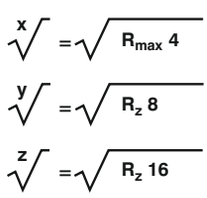
Required surface finish of mating piece

Dimensions for built-on directional spool valve see page 10, for built-on directional poppet valve see page 11.

For item descriptions see page 15.







Item descriptions

1 Name plate
2 Port X for pilot oil supply external
3 Port Y for pilot oil drain external
4 Adjustment element “1”
5 Adjustment element “2”
6 Adjustment element “3”
7 Adjustment element “7”
9 Hexagon 10 A/F
10 Space required to remove key
11 Locating pin
12 Valve mounting holes
13 Directional spool valve size 6
14 Solenoid "a" with hand override "N"
15 Solenoid without hand override, optional
16 Plug-in connector to DIN 43 650
17 Large plug-in connector
18 Dimensions for standard valve "6A"
19 Dimensions () for high performance valve "6E"
20 Space required to remove plug-in connector
21 Omittted with pilot oil drain internal
22 R-ring 9.81 mm x 1.5 mm x 1.78 mm
23 Main spool assembly
24 Bore Ø 32 mm may connect the Ø 1.77 in (45 mm) bore at any position. Please take are that the connection hole X and the mounting holes are not damaged.
25 Back-up ring and O-ring must be inserted into this bore before assembling the main spool.
26 Orifice must be ordered separately
27 O-ring 28.3 mm in x 1.78 mm in
28 O-ring 27.3 mm in x 2.4 mm in
29 O-ring 28.24 mm in x 2.62 mm in
30 Back-up ring 8–024 29.03 mm in x 1.35 mm in
31 Back-up ring 28.4 mm in x 32 mm in x 0.7 mm in
32 Pulling action hand override; actuating force is pressure dependent, ***F***max. = 200 N (only with version DBWS.**A**…)

SHCS SAE Grade 8 or better
valve mounting bolts must be ordered separately

Subplates for:

DB/DBW(S) 10 G 3/8, SAE-6; 9/16-18
G 1/2, SAE-8; 3/4-16

DB/DBW(S) 20 G 3/4, SAE-12; 1-1/16-12
G 1, SAE-16; 1-5/16-12

DB/DBW(S) 30 G 1 1/4, SAE-20; 1-5/8-12
G 1 1/2, SAE-24; 1-7/8-12

DBT/DBW(S) T G 1/4,SAE-4; 7/16-20

Valve mounting bolts for:

DB/DBW(S) 10
(4) M12 x 1.97 (50) DIN 912–10.9;
(4) 1/2"-13 x 2" UNC
M_A = 130 Nm

DB/DBW(S) 20
(4) M16 x 1.97 (50) DIN 912–10.9;
(4) 5/8"-11 x 2" UNC
M_A = 310 Nm

DB/DBW(S) 30
(4) M18 x 1.97 (50) DIN 912–10.9;
(4) 3/4"-10 x 2" UNC
M_A = 430 Nm

DBC/DBW(S)C and Model DBC 30/DBW(S)C 30
(4) M8 x 1.58 (40) DIN 912–10.9;
(4) 5/16"-18 x 1-1/2" UNC
M_A = 37 Nm

DBT/DBW(S)T
(4) M8 x 1.58 (40) DIN 912–10.9;
(4) 5/16"-18 x 1-1/2" UNC
M_A = 37 Nm

1. Standard valve "6A"
2. High perfaormance valve "6E"
3. Must be ordered separately, see page 7.

The specified data is for product description purposes only and may not be deemed to be guaranteed unless expressly confirmed in the contract.

THM Huade Hydraulics Pvt Ltd
F-127, Phase-VIII, Focal Point,
Ludhiana-141010, Punjab (INDIA)
PH: 0161-2672777, 0161-2672778
E-mail: sales@thmhuade.com
Website: www.thmhuade.com

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