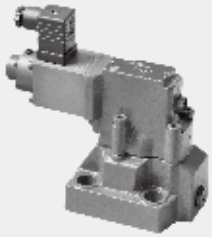
6.4

Proportional pressure relief valve

Type DBE(E)/DBEM(E)...30

Sizes 10, 25 and 32
Up to 315 bar
Up to 600 L/min



Contents

Features

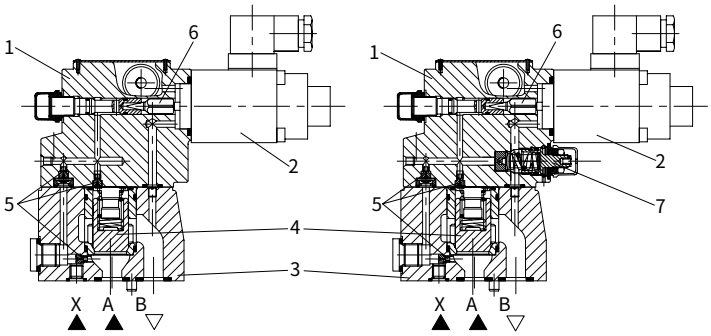
-Sub-plate mounting:
- Porting pattern to DIN 24 340 form E and ISO 6264
- For installation in manifolds
- 4 pressure ratings
- Max. pressure limitation , optional
- Amplifier type VT-2000 (must be ordered separately)

Function and configuration

DBE valves are pilot operated pressure relief valves. They are used to continuously set the pressure in hydraulic systems by electrical signal.
Basically these valves consist of a pilot valve (1) with proportional solenoid (2) and the main valve (3) with main spool insert (4).

Type DBE...
The pressure limit is in relation to the electrical current value and set by the proportional solenoid (2). The system pressure is applied to the main spool (4). At the same time the pressure is applied to the spring loaded side of the main spool (4) and the pilot poppet (6) via orifice (5) at the pilot valve (1). If the hydraulic force exceeds the solenoid force, the pilot poppet (6) opens. Pilot fluid can flow back to tank and pressure drop caused by the orifices effects the main spool (4). Then main spool (4) opens the channel from pump to tank.

Type DBEM···
Optionally the valve can be supplied with an additional spring loaded pilot control valve (7) for maximum pressure safety (redundant pressure safety).



Type DBE **Type DBEM**

Ordering code

DBE | | | | – 30 / | | G24 | / / | | *

Without maximum pressure safety =No code
With maximum pressure safety =M

Pilot operated =No code
Pilot operated valve with main spool (enter nom. size 30) =C
Pilot operated valve without main spool (do not enter nom. size) =C
Pilot operated valve for remote controlling =T

For external control electronics =No code
With integrated electronics (OBE) =E

Nominal size 10 = 10
Nominal size 25 = 20
Nominal size 32 = 30

Series 30 = 30

Max. pressure 50 bar = 50
Max. pressure 100 bar = 100
Max. pressure 200 bar = 200
Max. pressure 315 bar = 315

Y= Pilot oil supply internal and drain external
Not for DBE(M)(E)C and DBE(M)(E)T without main spool
XY= Pilot oil supply external and drain external (only for with the pilot valve and main spool)

For type DBE(M)E, Supply voltage:
G24= +24VDC

For type DBE(M) :
K4= Without plug-in connector
Z4= With plug-in connector
For type DBE(M)E:
K31= Without plug-in connector
Z31= With plug-in connector

For type DBE(M)E:
A1= Command/ actual value 0 to 10V
F1= Command/ actual value 4 to 20 mA

Pilot oil drain port Y
No code= Inch threaded
2 = Metric threaded

V= FKM seals
No code=NBR seals

Further information in plain text

Symbols

10
DBE20-30/...Y
30
DBEC30-30/...Y

10
DBE20-30/...XY
30

DBE C/T -30/

10
DBEM20-30/...Y
30
DBEMC30-30/...Y

10
DBEM20-30/...XY
30

DBEM C/T -30/

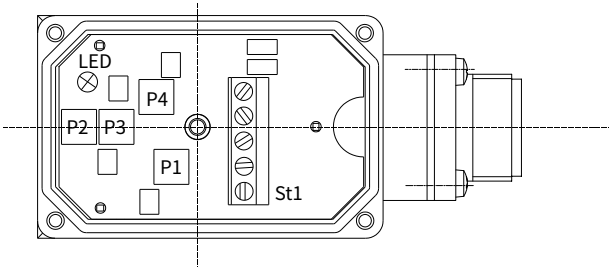
Technical data

Fluid		Mineral oil suitable for NBR and FKM seal		
		Phosphate ester for FKM seal		
Fluid temperature range	°C	-30 to +80 (NBR seal)		
		-20 to +80 (FKM seal)		
Viscosity range	mm^2/s	2.8 to 380		
Degree of contamination		Maximum permissible degree of fluid contamination: Class 9. NAS 1638 or 20/18/15, ISO4406		
Max.operating pressure Port A, B, X	bar	315		
Max.setting pressure	bar	50; 100; 200; 315		
Min.setting pressure		In relation to Flow (Q), see characteristic curves		
Pressure at zero command value		= min.setting pressure		
Return oil pressure port Y	bar	Separate and at zero pressure to tank		
Max. pressure safety (infinitely adjustable)		setting pressure	Pressure range under Max. safety pressure	
		50 bar	10-60^{+20} bar	
		100 bar	10-120^{+20} bar	
		200 bar	10-220^{+20} bar	
		315 bar	10-340^{+20} bar	
Max. pressure safety setting condition		When rated pressure is 50 bar, between 60 bar and 80 bar		
		When rated pressure is 100 bar, between120 bar and 140 bar		
		When rated pressure is 200 bar, between 220 bar and 240 bar		
		When rated pressure is 315 bar, between 340 bar and 360 bar		
Nominal size		10	25	32
Max. flow-rate	L/min	200	400	600
Pilot oil (for pilot valve)	L/min	0.7 to 2		
Linearity		±3.5%		
Repeatability		<±2%		
Hysteresis		with shimmy		without shimmy
		±1.5% P max (200Hz, amplitude 200mAssl)		±4.5% P max
Shifting time		30~150ms (undependent with the system)		

Electrical		
Power source		DC
Min. solenoid current	mA	100
Max. solenoid current	mA	800
Coil resistance		19.5Ω at 20°C , Max. warm value : 28.8Ω
Working status		Continuous
Max. working enviromental temperature		+50°C
Electrical connection		Plug-in connector to DIN EN 175301-803/ISO 4400
Insulation to DIN 40 050		IP 65
Ampilfier		VT2000

Proportional amplifier (Can be ordered separately)

·Connections and adjustment



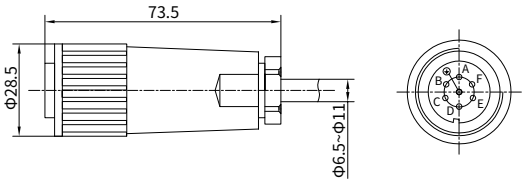
P1 – Ramp time
P2 – Sensitivity
P3 – Zero point
P4 – Dither frequency
St 1 – Connection terminal
LED – Display U_B

Electrical connections, plug-in connectors

·For type DBE(M)E-30 (with integrated electronics (OBE))

For pin allocation also
see block circuit diagram.

Plug-in connector to DIN EN 175201-804



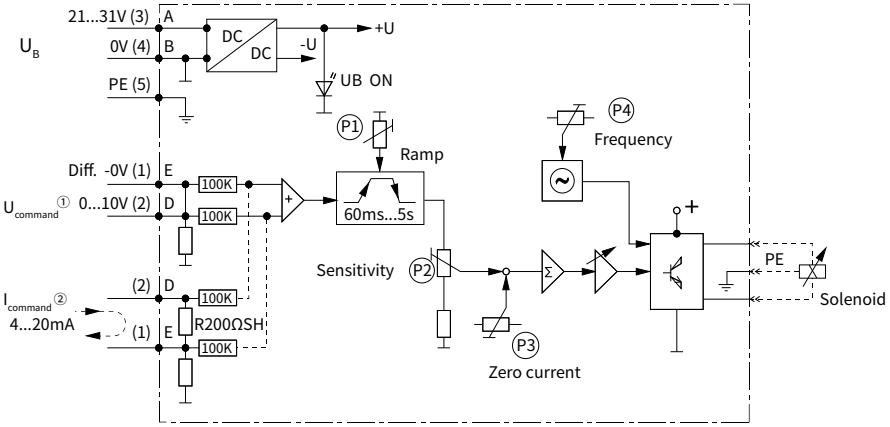
· Component plug allocation

	Contact	Interface A1 signal	Interface F1 signal
Supply voltage	A	24 VDC(U(t)=21V to 31V)	
	B	GND	
	C	n.c. [1)]	
Differential amplifier input	D	±10V， Re>50KΩ	4 to 20mA， Re>100Ω
	E	reference potentional command value	
	F	n.c. [1)]	

[1)]Contacts C and F must not be connected!

Electrical connections, plug-in connectors

· Block diagram and pin assignment



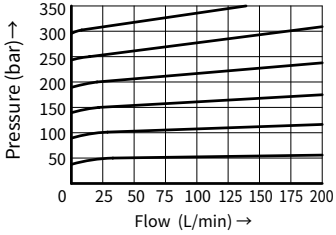
① Version with 0...+10 V signal
② Version with 4...20 mA signal

Characteristic curves

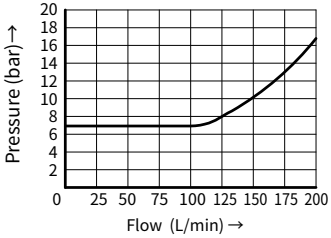
(Measured at ϑ_{oil}=40°C ±5°C , using HLP46)

Operating pressure in relation to the flow

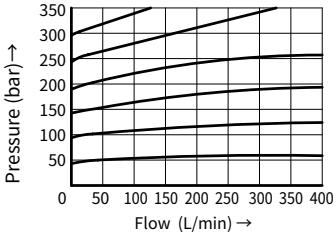
DBE10

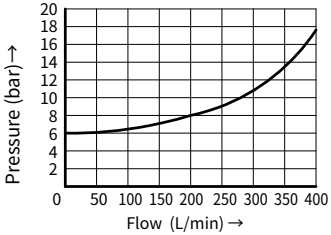


Min. setting pressure in relation to the flow

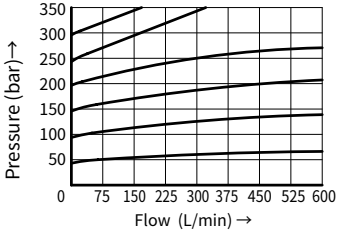


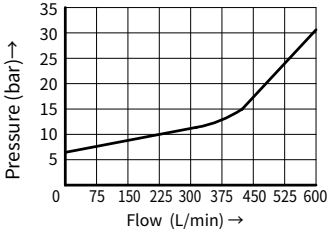
DBE20





DBE30

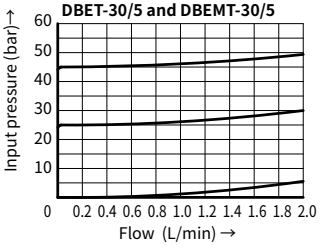




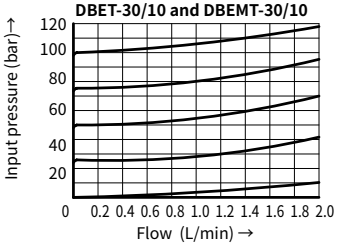
Characteristic curves

(Measured at ϑ_{oil}=40°C ±5°C , using HLP46)

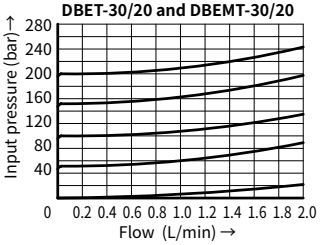
DBET-30/5 and DBEMT-30/5



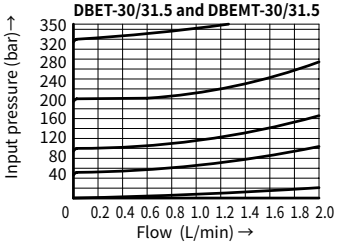
DBET-30/10 and DBEMT-30/10



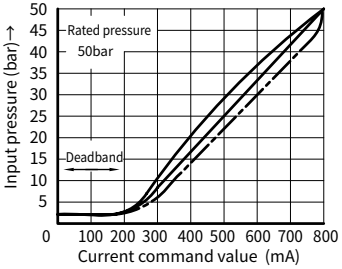
DBET-30/20 and DBEMT-30/20

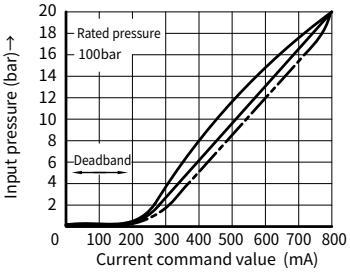


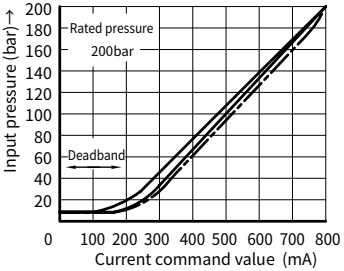
DBET-30/31.5 and DBEMT-30/31.5

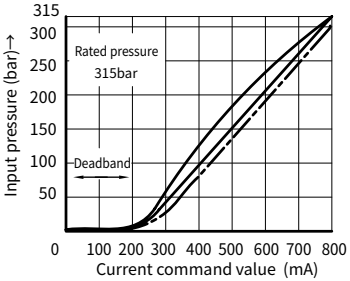


Inputting pressure/current demand curve type DBE10, 20 and 30/DBET









Measured under flow 27L/min of type DBE10, 20 and 30.
Measured under flow 0.8L/min of type DBET.

Note: To get min. preset pressure,
pilot current is not permitted to exceed 100mA .

Hysteresis

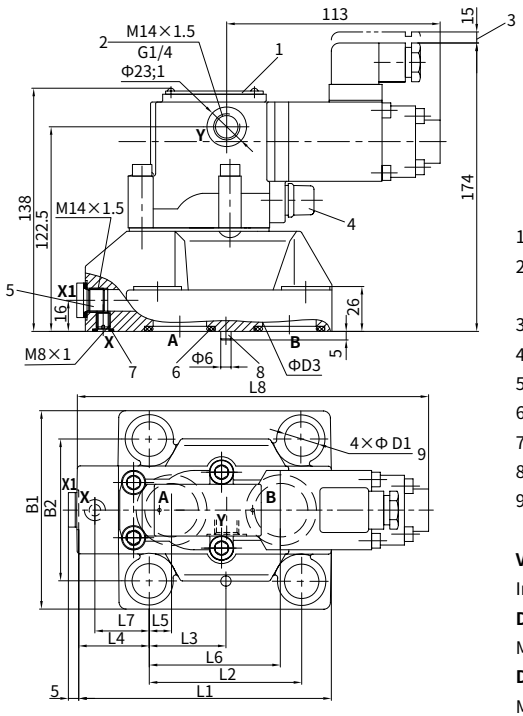
Without shimmy ————

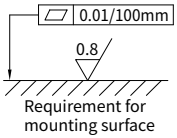
With shimmy —·—·—

Unit dimensions

(Dimensions in mm)

Pressure relief valve of type DBE/DBEM





1 Name plate
2 (Port Y)pilot oil drain always external and separate to tank at zero pressure.
3 Space required to remove plug-in connector.
4 Max. pressure limitation
5 External pilot supply (X and X1, optional)
6 O-ring (port A and B)
7 O-ring 9.25×1.78(port X)
8 Locating pin
9 Fixing screw hole

Valve fixing screws:

Internal hexagon screw GB/T 70.1-10.9,

DBE/DBEM10: M12×45, tightening torque, M_A=130 Nm

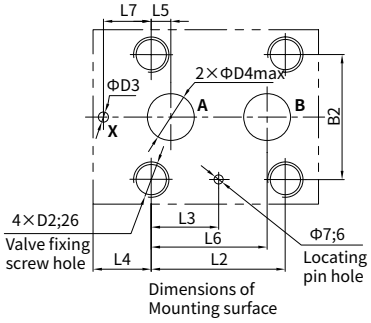
DBE/DBEM20: M16×50, tightening torque, M_A=310 Nm

DBE/DBEM30: M18×50, tightening torque, M_A=430 Nm

Type		B1	B2	Weight	O-ring (Port A and port B)
DBEM DBE	10	78	53.8	4.4kg	17.12×2.62
DBEM DBE	20	100	70	4.8kg	28.17×3.53
DBEM DBE	30	115	82.6	7.1kg	34.52×3.53

Type		L1	L2	L3	L4	L5	L6
DBEM DBE	10	91	53.8	22.1	27.5	22.1	47.5
DBEM DBE	20	116	66.7	33.4	33.3	11.1	55.6
DBEM DBE	30	147.5	88.9	44.5	41	12.7	76.2

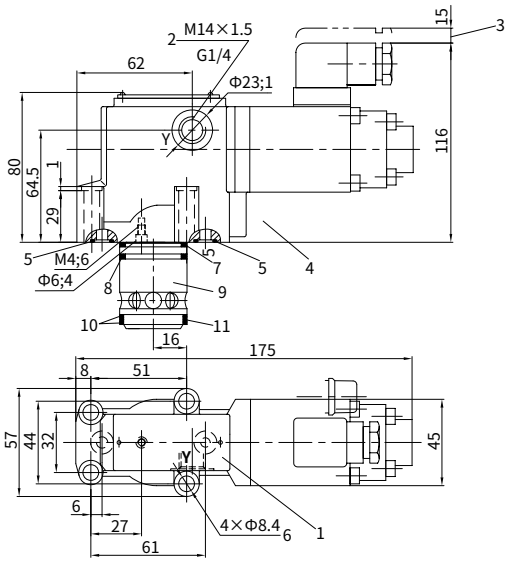
Type		L7	L8	D1	D2	D3	D4
DBEM DBE	10	0	176.5	14	M12	6	12
DBEM DBE	20	23.8	190	18	M16	6	22
DBEM DBE	30	31.8	200	20	M18	7	30



Unit dimensions

(Dimensions in mm)

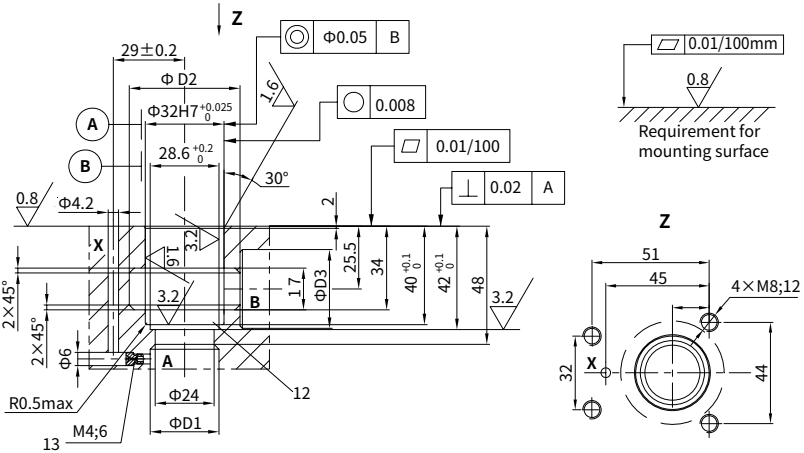
Plug-in valve



1 Name plate
2 (Port Y) pilot oil drain always External and separate to tank at zero pressure
3 Space required to remove plug-in connector
4 Max. pressure limitation
5 O-ring 9.25×1.78(port X and Y)
6 Fixing screw hole
7 O-ring 28×2.65
8 O-ring 28×1.8
9 Main spool assembly
10 Retaining ring 28.4×32×0.8
11 O-ring 27.3×2.4
12 Retaining ring and O-ring shall be fixed onto the hole before fixing the main spool
13 The throttle shall be ordered separately

06

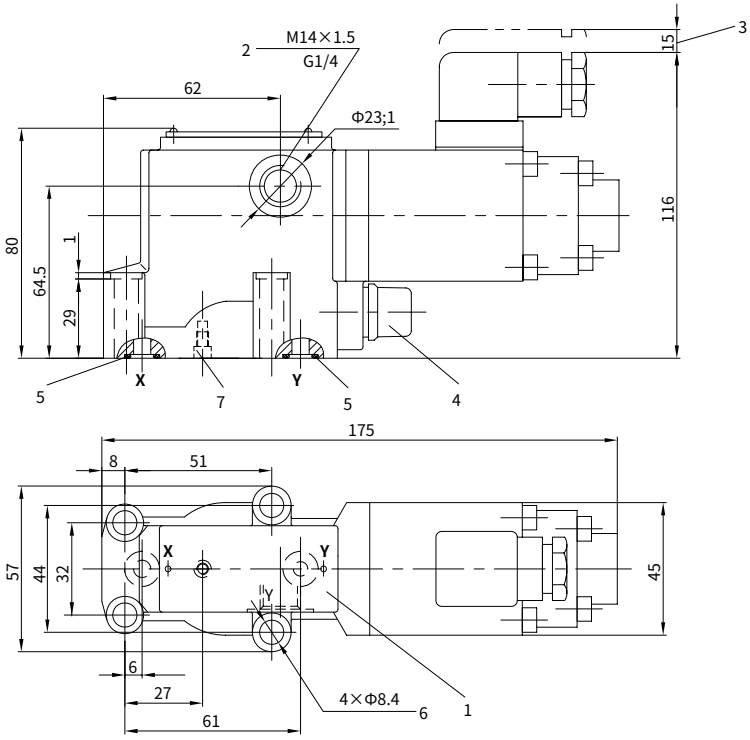
Size	D1	D2	D3	Main spool assembly code		Valve fixing screw	Tighting touque	Weight
10	10	40	10	307341 (NBR)	307342 (FKM)	4-M8×40 internal hexagon GB/T70.1-10.9	20Nm	2.9kg
20	25	45	25					
30	32	45	32					



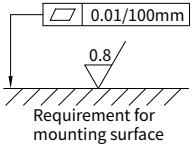
Unit dimensions

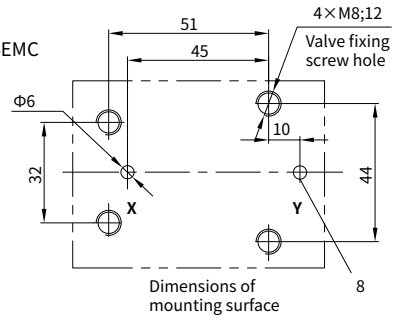
(Dimensions in mm)

Pressure relief valve as remote controller of valve type DBET/DBEMT
Pilot valve without main spool assembly of valve type DBEC/DBEMC



1 Name plate
2 Pilot oil drain port, optional
3 Space required to remove plug-in connector
4 Max. pressure limitation
5 O-ring 9.25×1.78 (port X and Y)
6 Fixing screw hole
7 Blocked up in valve type DBET/DBEMT
Fixed with throttle hole in valve type DBEC/DBEMC
8 Pilot oil drain port, optional





Valve fixing screws:
Internal hexagon screw
GB/T 70.1-10.9, 4-M8×40
Tightening torque M_A=20Nm