04

Pilot Operated Proportional Relief Valve

Model: (Z)DBE/(Z)DBEE...1XJ

- Size 6
- Maximum working pressure 315bar
- Maximum working flow 30 L/min

Contents

Features

- For limiting system pressure
- Operation by proportional solenoids
- Subplate mounting or sandwich plate connection
- Both valves and proportional amplifiers from the same supplier
- Model DBEE and ZDBEE with integrated amplifier:
- Low manufacturing tolerance of the command value-pressure characteristic curve
- The ramp signal generation time can be adjusted separately when the pressure increases or decreases

Function description, sectional drawing

Model DBE/ZDBE

The DBE and ZDBE proportional relief valves are operated by a proportional solenoid. These valves are used to limit the system pressure. It can adjust the system pressure steplessly to be limited based on the electrical command value.

The valve mainly consists of proportional solenoid (1), valve body (2), valve components (3), valve spool (4) and pilot cone head (8). The proportional solenoid converts the current into mechanical force proportionally. The increase in current intensity correspondingly causes an increase in the magnetic force. The armature cavity of the solenoid is filled with oil and maintains pressure balance.

The system pressure is set by the proportional solenoid (1) according to the command value. The pressure in port P acts on the right side of the valve spool (4). At the same time, the system pressure acts on the spring-loaded side of the valve spool (4) through the control line (6) with orifice (5). The system pressure acts on the pilot cone head (8) through another orifice (7) in relative to the mechanical force of the proportional solenoid (1). When the system pressure reaches the pre-set value, the pilot cone head (8) is lifted from the valve seat. Then the control oil can drain (according to the model) externally via port A(Y) or internally into the tank to limit the pressure on the spring-loaded side of the valve spool (4). If the system pressure continues to increase slightly, the higher pressure on the right will push the valve spool to the left to the control position P to T. At the minimum control current(corresponds to the command value of zero), the minimum setting pressure will be set.

Note:

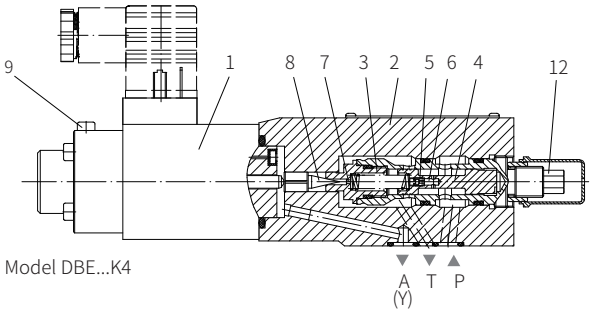
In order to ensure optimum valve function of the valve, it should be bled when valve used:

—Remove the bleed bolt (9),

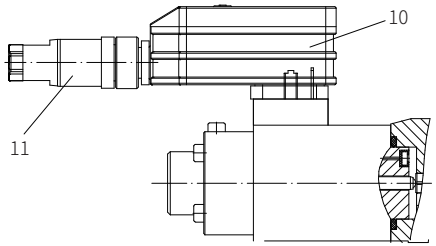
—Fill the oil into the screw hole at position 9,

—Re-screw the position 9 when no more bubbles appear.

—It must be avoided the emptying running of the tank. In some installation conditions, a back pressure valve is to be installed (back pressure about 2bar)



Model DBE...K4



In principle, the function and structure of this valve is similar to the valve DBE and ZDBE, but just take a connector (10) with integrated electronic (OBE) on the proportional solenoid.

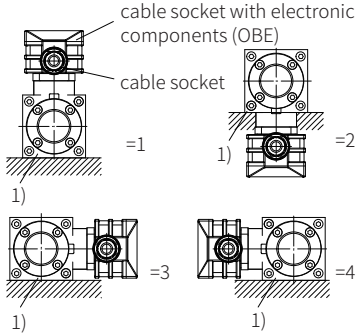
Both the supply power and command value voltage are configured on the cable socket (11).

Model DBEE...K31..and ZDBEE...K31...(with integrated electronic OBE)

Models and specifications

DBE | 6 | – | 1X | J | | G24 | | | *

- subplate mounting =No code / sandwich type =Z
- external amplifier =No code / integrated amplifier (OBE) =E
- size 6 =6
- subplate mounting =No code / sandwich type P→T =VP
- position of cable socket for model ZDBE
- position of cable socket with electronic components for model ZDBEE



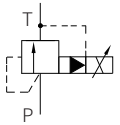
1) mounting surface (O-ring groove in valve body)

- more information in text
- sealing material: No code= NBR seals; V= FKM seals (consult for other seals)
- (Z)DBE electrical connection: K4= square socket without plug
- (Z)DBEE electrical connection: K31S= with 1.5 meter cable and tin on the end; K31C= with M12x1 aviation plug, 5-pin
- G24= supply voltage 24VDC
- No code= pilot oil drain internal (recommendation: subplate mounting up to q_{vmax}=15 L/min); Y= pilot oil drain external (only possible for subplate mounting)
- maximum pressure stage: 50= up to 50bar; 100= up to 100bar; 200= up to 200bar; 315= up to 315bar
- J= Rekith
- 1X= 10 to 19 series (10 to 19 series installation and connection size unchanged)

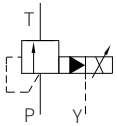
Functional symbols

Symbols for sandwich type valve: (①= Valve side, ②= Subplate side)

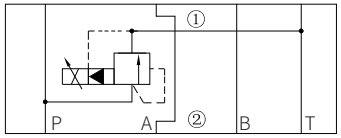
Model DBE6...



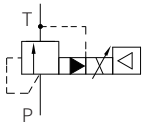
Model DBE6...Y...



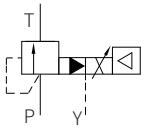
Model ZDBE6VP...



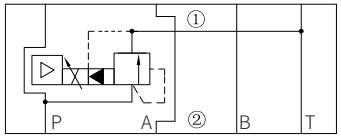
Model DBE6...



Model DBE6...Y...



Model ZDBEE6VP...



Technical parameters

Electrical			
Voltage type		V	24VDC
Minimum control current		mA	100
Maximum control current		mA	800 or 1600
Coil resistance	- Cold value at 20°C	Ω	19.5 (800mA), 5.4 (1600mA)
	- Maximum warm value	Ω	31 (800mA), 7.8 (1600mA)
Duty		%	100
Electrical connections	DBE and ZDBE		With component plug to DINEN 175301-803
			With cable plug to DINEN 175301-803[2)]
	DBEE and ZDBEE		With component plug to DINEN 175201-804
			With cable plug to DINEN 175201-804[2)]
Valve protection to EN60529			IP65, plug installed and locked

Technical parameters

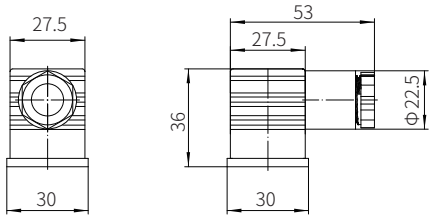
Overview			
Weight	DBE and ZDBE	kg	2.4
	DBEE and ZDBEE	kg	2.5
Installation position			Optional
Storage temperature range		°C	-20 to + 80
Environment temperature range	DBE and ZDBE	°C	-20 to +70
	DBEE and ZDBEE	°C	-20 to + 50

Hydraulic (Measured when using HLP46, ϑ_{oil}=40°C ± 5°C)			
Maximum working pressure	Port P; P1-P2 A1- A2; B1-B2	bar	315
	Port T	bar	50
Maximum adjustable pressure	Pressure stage 50	bar	50
	Pressure stage 100	bar	100
	Pressure stage 200	bar	200
	Pressure stage 315	bar	315
Minimum setting pressure at command value zero		bar	See characteristic curve on page 8
Return oil pressure at port A; external control oil return (Y)			Separate and at zero pressure to tank
Control oil flow rate		L/min	0.6 to 1.2
Maximum flow		L/min	30
Pressure medium			Mineral oil (HL, HLP)[1)] in accordance with DIN 51524; Fast living organisms degraded oil according to VDMA 24568; HETG (Rapeseed oil)[1)]; HEPG(Polyethyleneglycol)[2)] ; HEES (Synthetic Fats)[2]
Oil temperature range		°C	-20 to ＋80
Viscosity range		mm^2/s	15 to 380
The maximum allowable pollution degree of oil to ISO4406(c)			Class 20 / 18 / 15
Hysteresis		%	± 1.5 of the maximum setting pressure
Repeatability		%	＜ ±2 of the maximum setting pressure
Linearity		%	± 3.5 of the maximum setting pressure
Manufacturing tolerance of command value pressure characteristic curve, according to the hysteresis characteristic curve when pressure increasing.	DBE and ZDBE	%	± 2.5 of the maximum setting pressure
	DBEE and ZDBEE	%	± 1.5 of the maximum setting pressure
Step response Tu+ Tg	10 %→ 90 %	ms	about 80] Dependent on equipment
	90 %→ 10 %	ms	about 50]

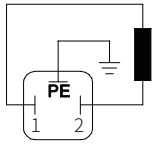
The oil must meet the cleanliness degree requested by the components in the hydraulic system. Effective oil filtration can prevent failure and increase the service life of the components

Electrical connections

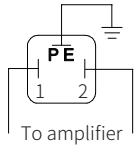
Model (Z) DBE...1XJ/...K4
Plug to DINEN 175301-803



Connection at component plug

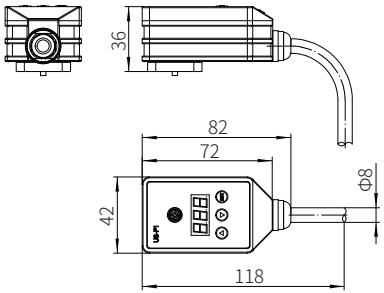


Connection at plug-in connector

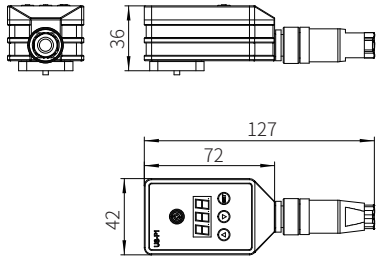


To amplifier

Model (Z)DBEE...1XJ/...K31S



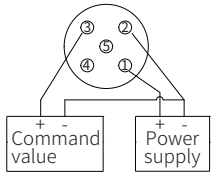
Model (Z)DBEE...1XJ/...K31C



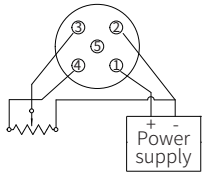
Terminal identification

M12 plug terminal number (K31C type)	Cable color (K31S type)	Terminal identification
1	Red	Power supply+
2	Black	Power supply -/ command value -
3	Yellow	Command value+
4	Blue	Reference voltage 5V
5	Green	-

Connection example:
PLC example input command



Connection example:
Potentiometer input command

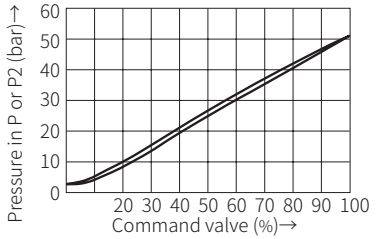


Characteristic curve

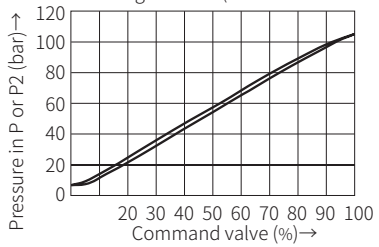
(Measured when using HLP46, ϑ_{oil}=40°C ± 5°C)

Pressure in port P or P2(q_v=5L/min) depending on the command value

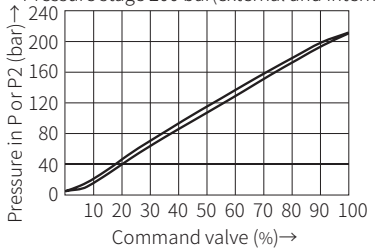
Pressure stage 50 bar(external and internal)



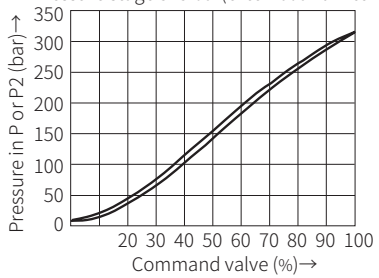
Pressure stage 100 bar(external and internal)



Pressure stage 200 bar(external and internal)

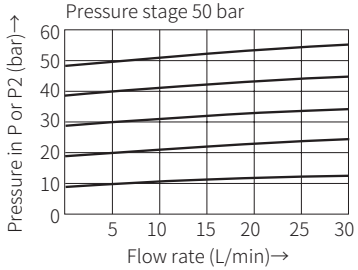


Pressure stage 315 bar(external and internal)

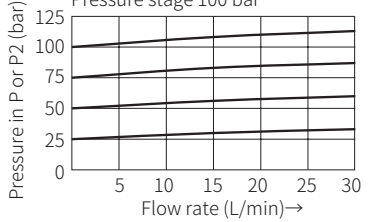


Pressure in port P or P2 depending on the flow q_v

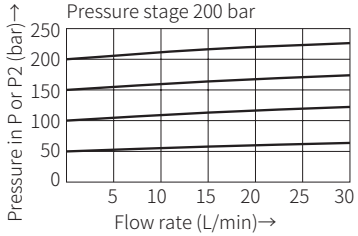
Pressure stage 50 bar



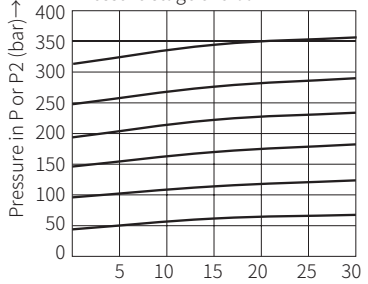
Pressure stage 100 bar



Pressure stage 200 bar



Pressure stage 315 bar



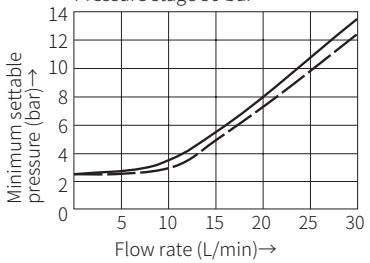
The characteristic curve is measured without back pressure in ports A (external control oil return) and T (internal control oil return). When the internal control oil returns, the pressure in port P or P2 will increase by the outlet pressure value in port T.

Characteristic curve

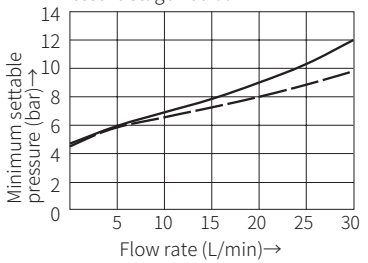
(Measured when using HLP46, ϑ_{oil}=40°C ± 5°C)

Minimum settable pressure in port P or P2 with command value 0 Control oil return——internal ---external

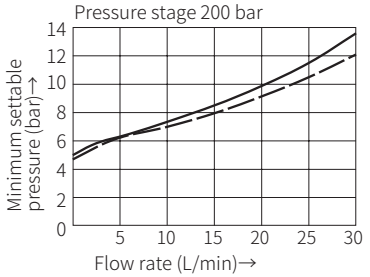
Pressure stage 50 bar



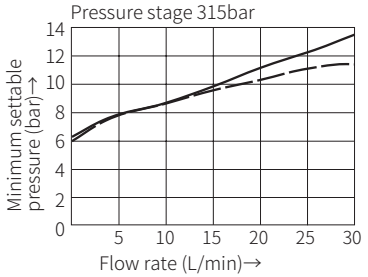
Pressure stage 100 bar



Pressure stage 200 bar

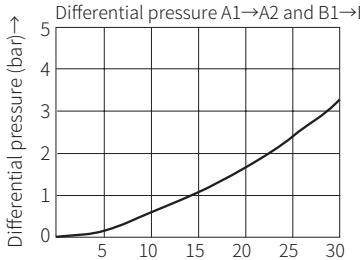


Pressure stage 315bar

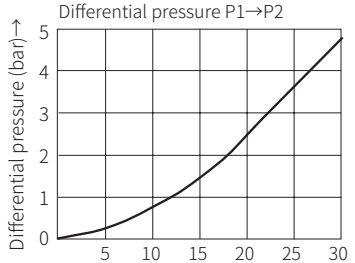


The characteristic curve is measured without back pressure in ports A (external control oil return) and T (internal control oil return). When the internal control oil returns, the pressure in port P or P2 will increase by the outlet pressure value in port T.

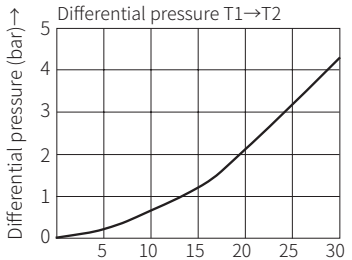
Differential pressure A1→A2 and B1→B2



Differential pressure P1→P2



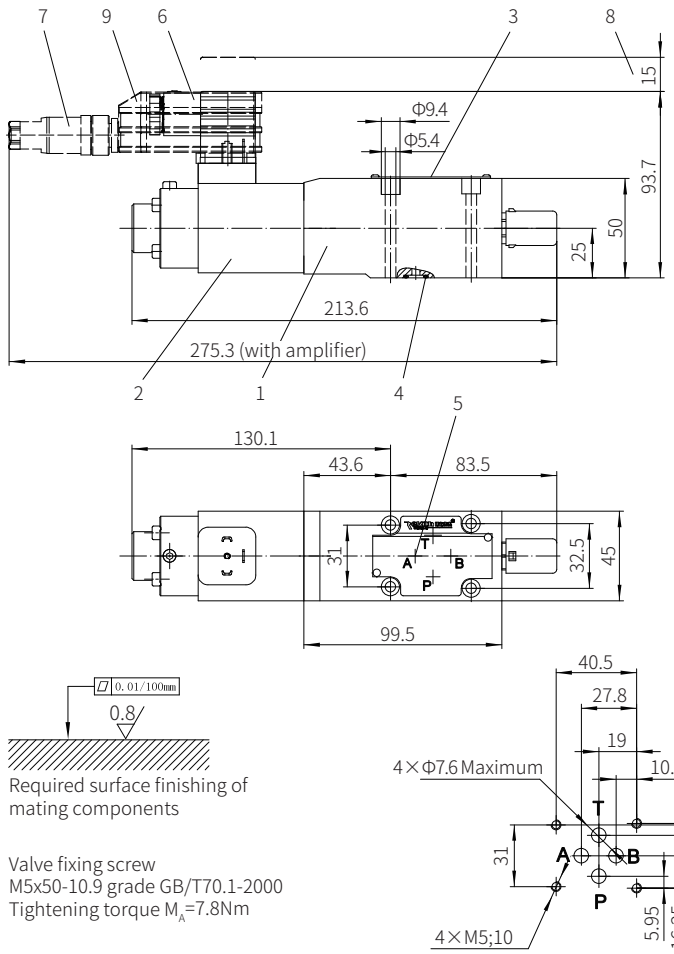
Differential pressure T1→T2



Component size

Size unit: mm

Model DBE, DBEE



Required surface finishing of mating components

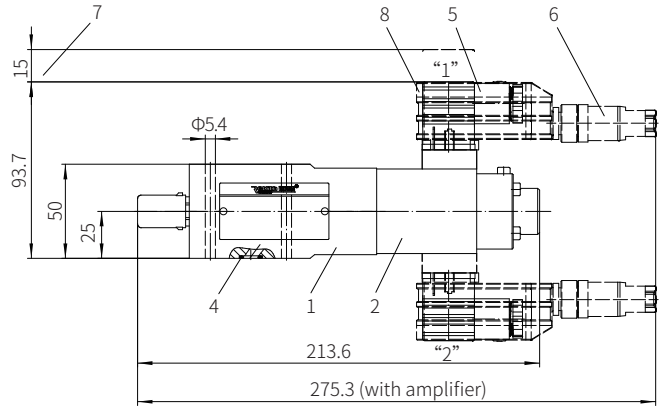
Valve fixing screw
M5x50-10.9 grade GB/T70.1-2000
Tightening torque M_A=7.8Nm

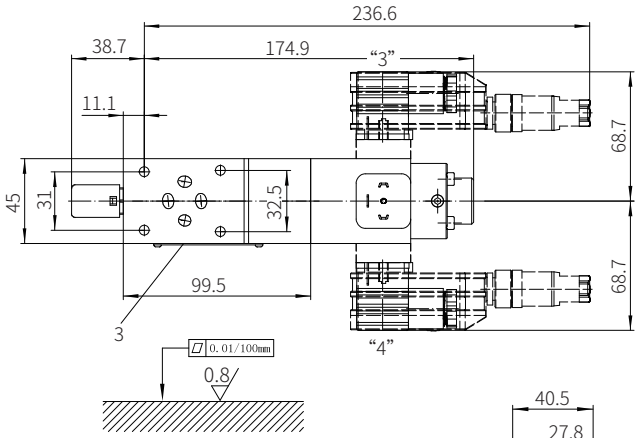
1 Valve body
2 Proportional solenoid
3 Name plate
4 Sealing rings for A, B, P, T
5 With version Y, pilot oil return external through port A (Y)
6 Socket for DBE
7 Connector for DBEE
8 Space required to remove the plug
9 Plug integrated amplifier (OBE)

Component size

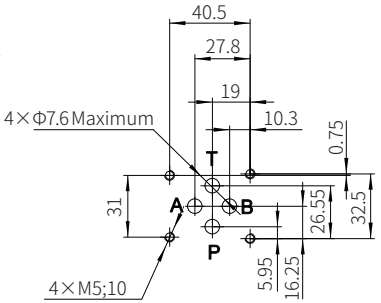
Size unit: mm

Model ZDBE, ZDBEE





Required surface finishing of mating components



1 Valve body
2 Proportional solenoid
3 Name plate
4 Sealing rings for A, B, P, T
5 Socket for ZDBE
6 Connector for ZDBEE
7 Space required to remove the plug
8 Plug integrated amplifier (OBE)

Valve fixing screw
M5x50-10.9 grade GB/T70.1-2000
Tightening torque M_A=7.8Nm

Note: "1" to "4" is position for cable sockets or integrated amplifiers

3-Way Proportional Pressure Reducing Valve

Model: 3DREP(E)6...2XJ

- Size 6
- Maximum working pressure 100 bar
- Maximum working flow 15 L/min

Contents

Features

- Direct operated proportional valves for the control of the pressure and direction of a flow
- Operation by proportional solenoid with central thread and detachable coil
- For subplate mounting
- Spring centred control spool
- Model 3DREPE with integrated amplifier
- Model 3DREP with external amplifier
- Manual emergency operation, optional