Pilot Operated Proportional Relief Valve

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





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

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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.

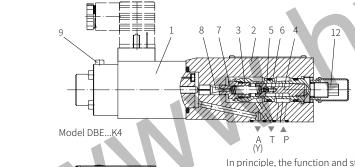
The valve mainly consists of proportional solenoid (1), valve body (2), valve components (3), valve spool (4) and pilot cone head (8). The proportional solenoid converts the current into mechanical force proportionally. The increase in current intensity correspondingly causes an increase in the magnetic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

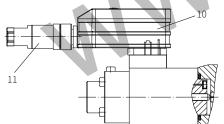
The system pressure is set by the proportional solenoid (1) according to the command value. The pressure in port P acts on the right side of the valve spool (4). At the same time, the system pressure acts on the spring-loaded side of the valve spool (4) through the control line (6) with orifice (5). 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)



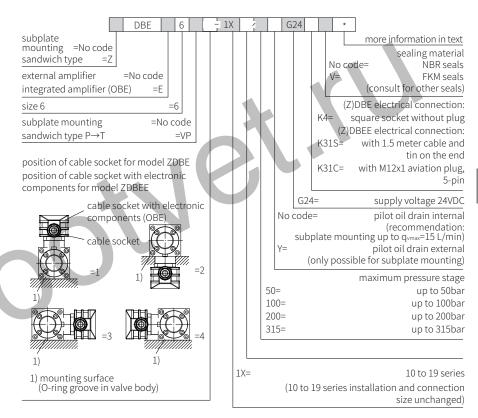


In principle, the function and structure of this valve is similar to the valve DBE and ZDBE, but just take a connector (10) with integrated electronic (OBE) on the proportional solenoid.

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



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Functional symbols

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

Model DBE6...



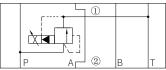
Model DBE6...Y...



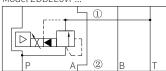




Model ZDBE6VP...



Model ZDBEE6VP...



Technical parameters

Electrical						
Voltage type V		24VDC				
Minimum control current mA		mΑ	100			
Maximum control current mA		mΑ	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 connection	DBF and 7DBF		With component plug to DINEN 175301-803			
			With cable plug to DINEN 175301-803 ²⁾			
	DBFF and 7DBFF		With component plug to DINEN 175201-804			
	DREE AND ADREE		With cable plug to DINEN 175201-8042			
Valve protection to EN60529			JP65, plug installed and locked			

Technical parameters

Overview				
Weight	DBE and ZDBE	kg	2.4	
Weight	DBEE and ZDBEE	kg	2.5	
Installation position	DDLL and ZDDLL	6	Optional	
Storage temperature range °C			-20 to +80	
Environment	DBF and 7DBF	°C.	-20 to +70	
temperature range	DBFF and 7DBFF	°C	-20 to +50	
Hydraulic (Measured	when using HLP46, $artheta_{ ext{ iny oil}}$ =40)°C ± !	5°C)	
Maximum working	Port P; P1-P2			
pressure	A1- A2; B1-B2	bar	315	
	Port T	bar	50	
Maximum adjustable		bar	50	
pressure	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			Separate and at zero pressure to tank	
return (Y)				
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)	
Oil temperature range °C			-20 to +80	
Viscosity range	m	nm²/s	15 to 380	
The maximum allowable pollution degree of oil to ISO4406(c)			Class 20 / 18 / 15	
Hysteresis %			\pm 1.5 of the maximum setting pressure	
Repeatability		%	$<\pm 2$ of the maximum setting pressure	
Linearity %			± 3.5 of the maximum setting pressure	
Manufacturing tolerance of DBE and ZDBE %			± 2.5 of the maximum setting pressure	
command value press characteristic curve, according to the hyste characteristic curve w pressure increasing.	oure DBEE and ZDBI eresis	EE %	\pm 1.5 of the maximum setting pressure	
Step response Tu+ Tg	10 %→ 90 %	ms	about 80 Dependent on equipment	
	90 %→ 10 %	ms	about 50 Dependent on equipment	

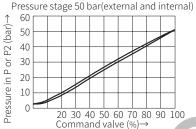
The oil must meet the cleanliness degree requested by the components in the hydraulic system. Effective oil filtration can prevent failure and increase the service life of the components

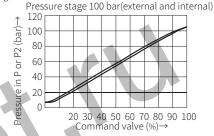
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Characteristic curve

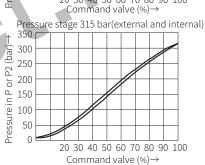
(Measured when using HLP46, ϑ_{oi} =40°C \pm 5°C)

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

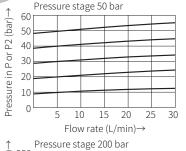


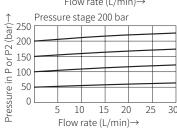


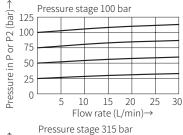
Pressure stage 200 bar(external and internal) (pg 200 <u>2</u> 160 o 120 Pressure in P 10 20 30 40 50 60 70 80 90 100 Command valve (%)→

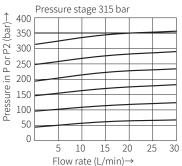


Pressure in port P or P2 depending on the flow q.



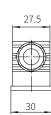


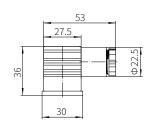




The characteristic curve is measured without back pressure in ports A (external control oil return) and T (internal control oil return). When the internal control oil returns, the pressure in port P or P2 will increase by the outlet pressure value in port T.

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





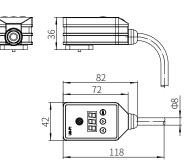
Connection at component plug



Connection at plug-in connector

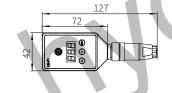


Model (Z)DBEE...1XJ/...K31S



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

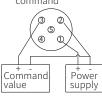




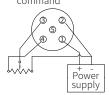
Terminal identification

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

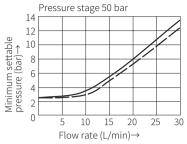


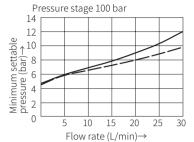
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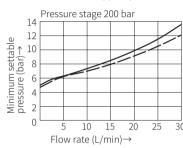
Characteristic curve

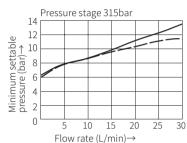
(Measured when using HLP46, ϑ_{eff} =40°C \pm 5°C)

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

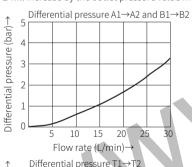


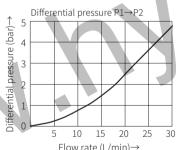


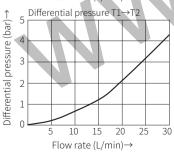


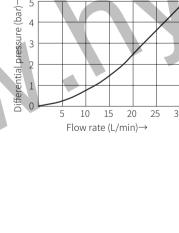


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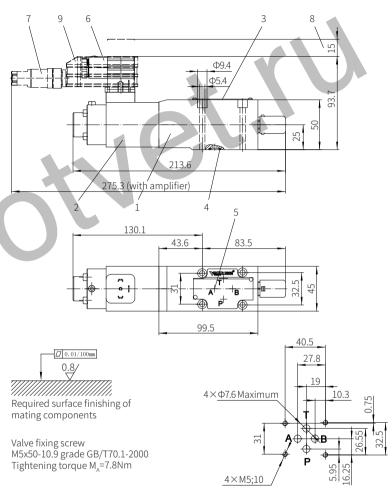






Model DBE, DBEE

Component size



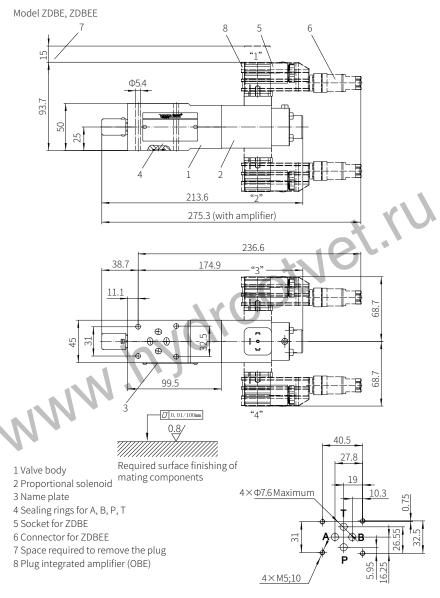
- 1 Valve body
- 2 Proportional solenoid
- 3 Name plate
- 4 Sealing rings for A, B, P, T
- 5 With version Y, pilot oil return external through port A (Y)

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- 6 Socket for DBE
- 7 Connector for DBEE
- 8 Space required to remove the plug
- 9 Plug integrated amplifier (OBE)

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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