

Proportional Pressure Reducing valve

Model: (Z)DRE(E)6-1X



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Features

- Pilot operated valve for pressure reducing in ports A and P1 with pressure limitation
 - Operated by proportional solenoids
 - Subplate mounting or sandwich plate connection
 - Low manufacturing tolerance of the command value-pressure characteristic curve due to electrical compensation to the proportional solenoids
 - The minimum adjustable pressure at port A and P1 is 2bar
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- ◆ Size 6
 - ◆ Maximum working pressure 210bar
 - ◆ Maximum working flow 30 L/ min

Function description, sectional drawing

The DRE and ZDRE are pilot operated electrically 3-way reducing valve with pressure limitation of the actuator. It is used to reduce the pressure of the system.

Structure:

The valve is consist of 3 main parts:

- Pilot control valve (1)
- Proportional solenoid (2)
- Main valve (3) with main valve spool (4)

Function:

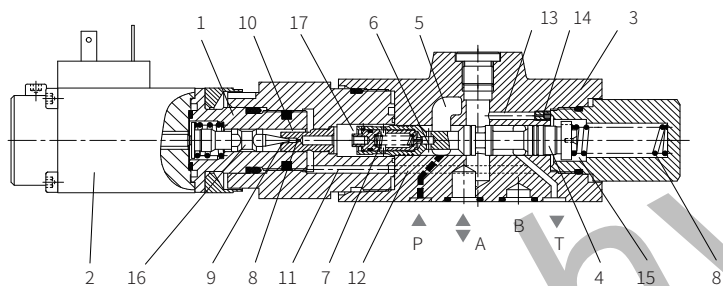
- The set value is achieved by adjusting the proportional solenoid (2) to adjust the pressuredrop at port A
- When depressurized at port P, the spring (18) holds the main valve spool (4) in the initial position
- The port A and T connected but P and A closed
- Pressure connection from port P to the ring channel (5)
- The pilot oil flows from the orifice (6) to port T through the flow controller (7), pilot valve (1) and throttle (8), throttle gap(9), longitudinal groove (10) and orifice (11, 12)

Pressure reduction:

- Establish pilot pressure in control chamber (17) based on the set value
 - The main valve spool (4) moves to the right to allow the flow from port P to A
 - The pressure of the actuator side at port A acts on the spring chamber (15) via channel (13) and throttle (14)
 - When the pressure at port A increases to the set value of the pilot valve (1), the main valve spool (4) moves to the left, the pressure at port A is almost identical with the pressure set value of pilot valve (1)
- Pressure limitation:
- If the pressure at port A exceeds the adjust pressure of pilot valve (1), the main valve spool moves to the left
 - Port A and T connected, the pressure at port A is limited to the set value

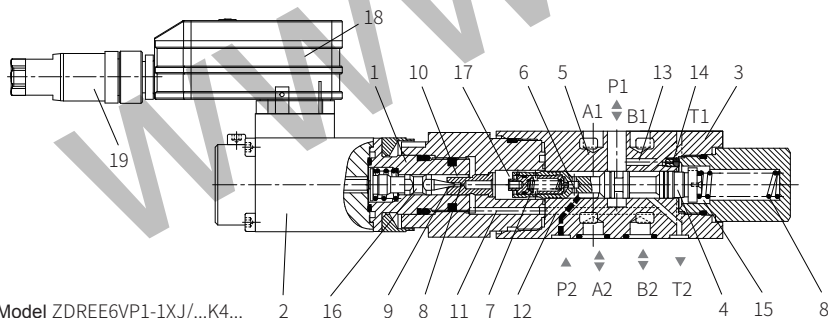
Model ZDRE6:

In principle, the function of this valve is the same as that of the valve DRE6 but pressure reduction at port P1



Model DRE6-1XJ/...K4...

In the function and structure, this valve is equivalent to the valve DRE and ZDRE, but adding a plug-in amplifier (18) with integrated electronic component(OBE) to the proportional solenoid. Supply and command value voltage are applied to the connector (19).



Model ZDRE6VP1-1XJ/...K4...

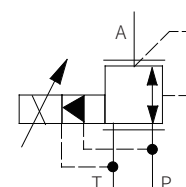
Models and specifications

subplate mounting =no code	DRE	6	1X	M	G24	*
sandwich type =Z						
proportional reduction valve						
external amplifier =no code						
integrated amplifier(OBE) =E						
size 6 =6						
pressure reducing at port A (subplate mounting) =no code						
pressure reducing at port P1 (sandwich type) =VP						
position of cable socket (subplate mounting simplified drawing)						
						more information in text
						sealing material
						no code= NBR seals
						V= FKM seals
						(consult for other seals)
						no code= (Z)DRE
						A1= control value 0...10V
						F1= control value 4...20mA
						(Z)DRE electrical connection
						K4= square socket without plug
						(Z)DRE electrical connection
						K31S= with 1.5M cable and tin on the end
						K31C= with M12×1 aviation plug, 5-pin
						G24= voltage 24V DC
						M= without check valve
						maximum pressure stage
						50= up to 50bar
						100= up to 100bar
						210= up to 210bar
						1X= 10 to 19 series
						(10 to 19 series installation and connection size unchanged)

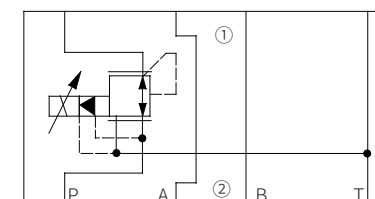
Functional symbols

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

Model DRE6...



Model ZDRE6VP...



Technical parameters

Overview

Installation position		Optional	
Storage temperature range	°C	-20 to +80	
Environment temperature range	°C	-20 to +70	
Weight	DRE6	Kg	1.96
	ZDRE6	Kg	1.90

Hydraulic (Measured when using HLP46, $t_o = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)

Maximum working pressure	P and P2	bar	350
	P1, A and B	bar	210
	T	bar	Separate and at zero pressure to tank
Max. setting pressure in port P1 and A	Pressure stage 50	bar	50
	Pressure stage 100	bar	100
	Pressure stage 210	bar	210

Min.setting pressure in port P1 and A at zero command value	bar	See characteristic curve
Pilot oil flow	L/min	0.65
Max.flow	L/min	30
Fluid	Mineral oil (HL , HLP) according to DIN51524	
The maximum allowable pollution degree of oil	ISO 4406 (C)20/18/15 ¹⁾	

Oil temperature range	°C	- 20 to +80	
Viscosity range	mm ² /s	15 to 380	
Hysteresis	%	± 2 of the max. pressure adjustment value	
Repeatability	%	$< \pm 2$ of the max. pressure adjustment value	
Linearity	%	± 3.5 of the max. pressure adjustment value	
Manufacturing tolerance of command value-pressure characteristic curve, according to the hysteresis characteristic curve when pressure increasing	%	± 2.5 of the max. pressure adjustment value	
Step response $T_u + T_g$ (measured at standard flow rate of 0.2 to 5L)	10 % $\rightarrow$ 90 % 90 % $\rightarrow$ 10 %	ms ms	200 (No pressure pulsation) 200 (No pressure pulsation)

Electrical

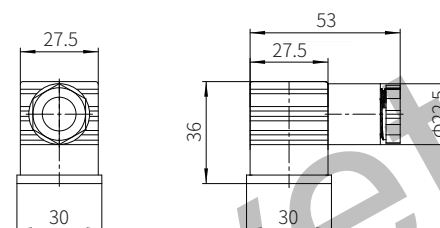
Voltage type	24 VDC		
Minimum pilot current	mA	100	
Maximum pilot current	mA	1600	
Coil resistance	Cold value at 20 °C	Ω	5
	Maximum value	Ω	7.5
Duty	100%		
Valve protection to DIN 40050	IP65(plug installed and locked)		

¹⁾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

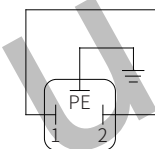
Electrical connection

Model (Z)DRE...1XJ/...K4

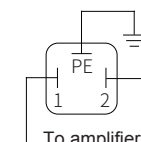
Plug-in connector to DIN EN 175301-803



Connection at component plug

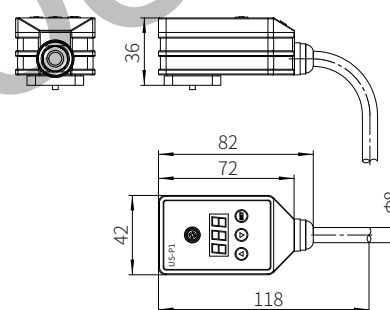


Connection at plug-in connector

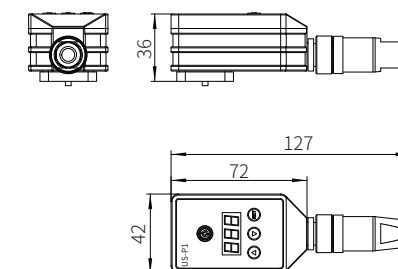


To amplifier

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



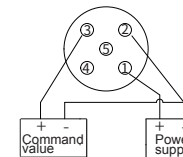
Model (Z)DRE...1XJ/...K31C



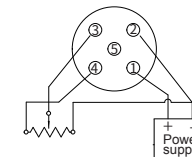
Terminal identification

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

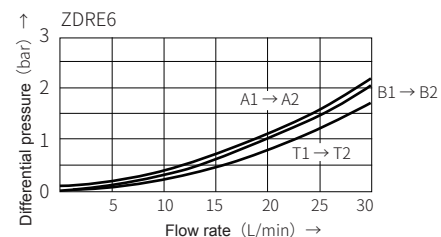
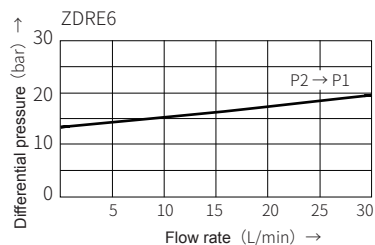
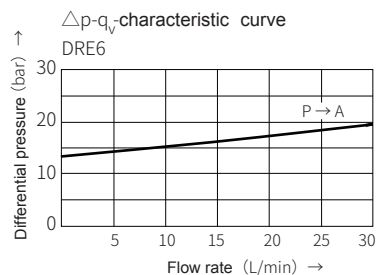


Connection example:
Potentiometer inout command

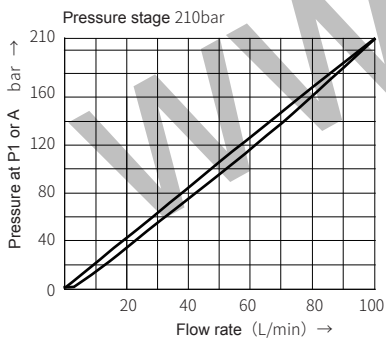
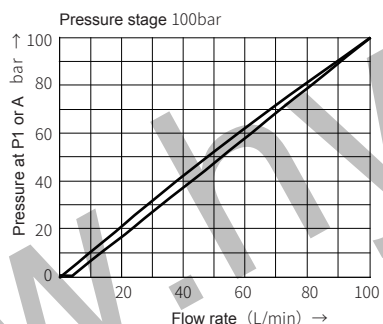
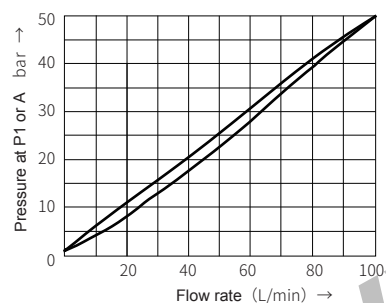


Characteristic curve

(Measures when using HLP46, $t_o = 40^\circ\text{C} \pm 5^\circ\text{C}$)



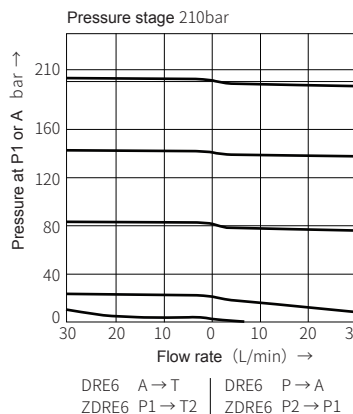
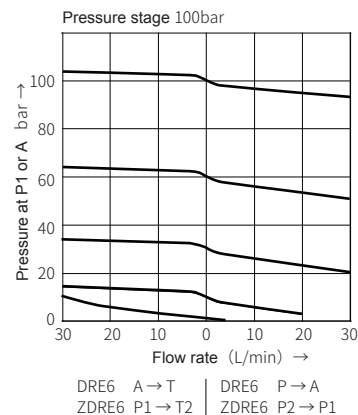
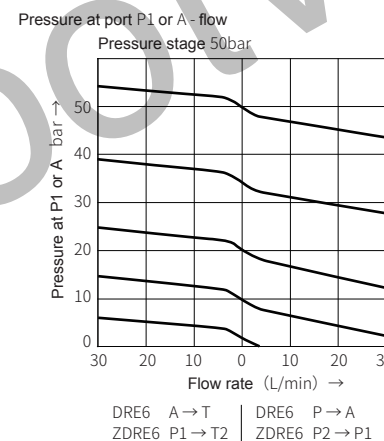
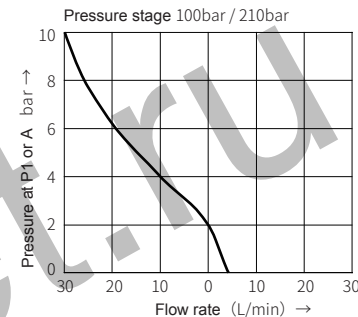
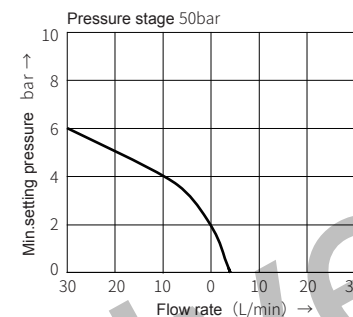
Pressure at port P1 or A dependent on the command value
Pressure stage 50bar



Characteristic curve

(Measures when using HLP46, $t_o = 40^\circ\text{C} \pm 5^\circ\text{C}$)

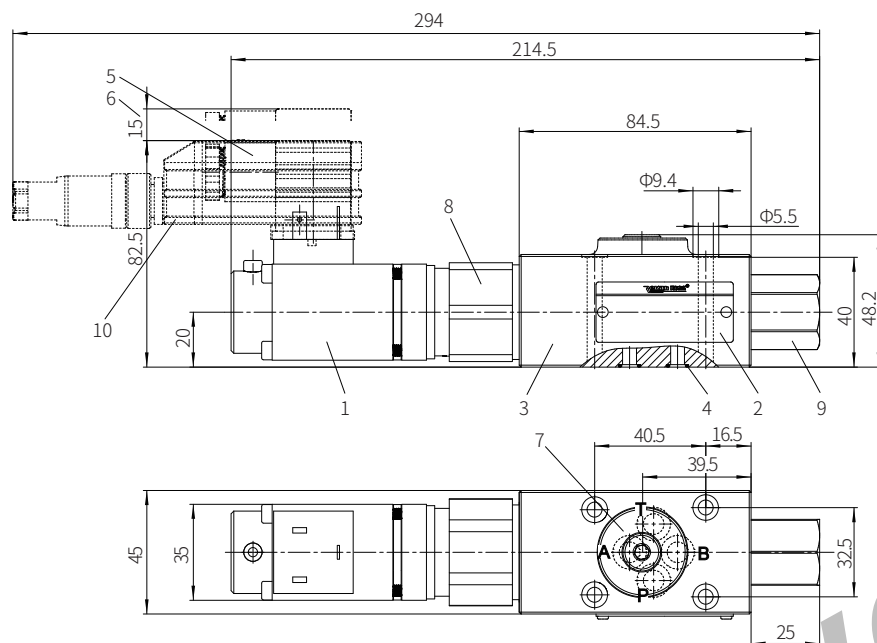
Minimum adjust pressure at port P1 or A with command value 0 V (without back pressure at port T or T1)



Component size

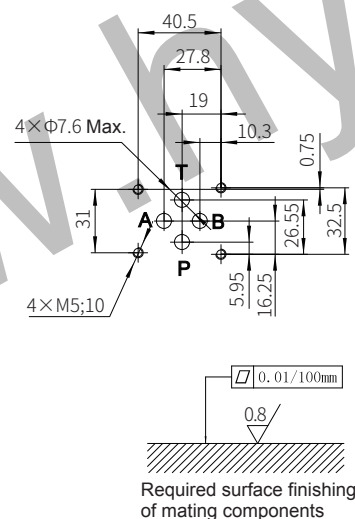
Size unit: mm

Model DRE



- 1 Proportional solenoid
- 2 Valve body
- 3 Name plate
- 4 O-ring 9.25x1.78 for ports A, B, P and T
- 5 Plug
- 6 Space required to remove the plug
- 7 Installation surface to DIN24 340; form A6
- 8 Hexagonal prisms 36A/F(diagonal diameter $\Phi 39$ mm)
- 9 Hexagonal prisms 24A/F
- 10 Plug-in amplifier

Valve fixing screw
M5×50-10.9 grade GB/T70.1-2000
Tightening torque $M_A=7.8$ Nm

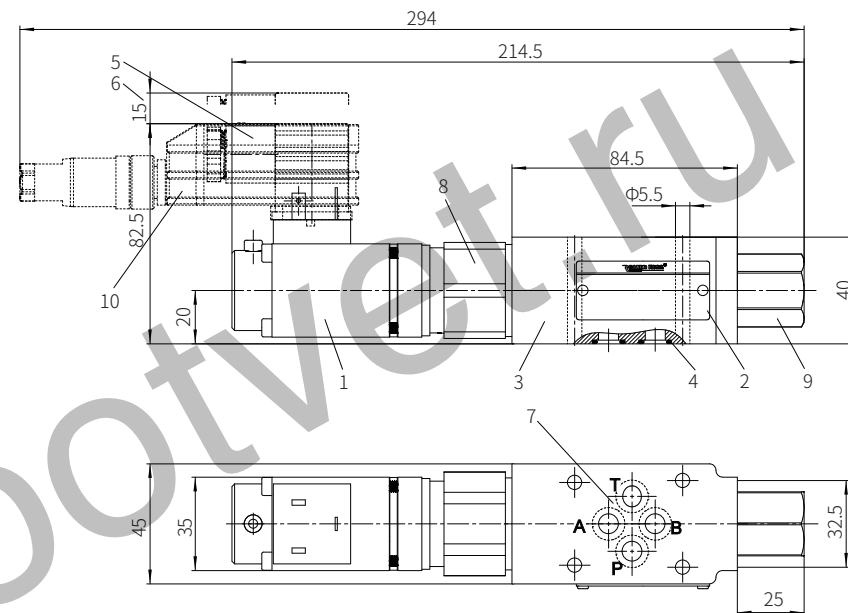


Required surface finishing
of mating components

Component size

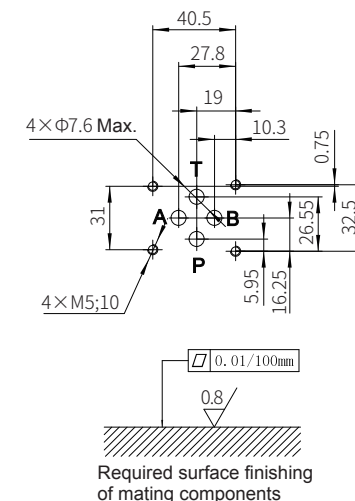
Size unit: mm

Model ZDRE



- 1 Proportional solenoid
- 2 Valve body
- 3 Name plate
- 4 O-ring 9.25x1.78 for ports A, B, P and T
- 5 Plug
- 6 Space required to remove the plug
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