Pilot Operated Proportional Reducing Valve

Model: DRE/DREM...6XJ

- Size 10/25
- Maximum working pressure 315bar
- Maximum working flow 300 L/min

Contents

Features

- Maximum pressure protection, optional
- Optional check valve for freely flow of oil in reverse direction
- For subplate mounting
- For installation in manifolds
- Both valves and proportional amplifiers from the same supplier

Function description, sectional drawing

The DRE (M) valve is a pilot operated pressure reducing valve, it is used to reduce working pressure. The valve mainly consists of pilot valve (1) with proportional solenoids (2), main valve (3) with a main spool insert (4), and an optional check valve (5).

Model DRE

The pressure at port A acts on the surface (7) of the main spool via throttle (6). The pilot oil flows from port B through the throttle (8) to the constant flow controller (9) which can keep the pilot flow constant away from the pressure drop between port A and B. The pilot oil flows from the constant flow controller (9) to the spring chamber (10), via throttles (11 and 12) and valve seat (13) to port Y(14, 15, 16) and from there to the tank. The pressure required in port A is controlled by the relevant amplifier. The proportional solenoid pushes the conical valve (20) towards the valve seat (13) to limit the pressure of the spring chamber (10) to the setting value. If the pressure at Port A is lower than the setting value, the pressure difference in the spring chamber (10) pushes the main spool to the right, thereby the connection from Port B to Port A is opened.

When the required pressure in port A is achieved, the force at the main spool is balanced and the main spool is maintained in the working position.

The pressure in port A X spool area (7)= spring chamber (10) pressure X spool area - spring force (17). If the pressure built up by the pressure liquid column (e.g. cylinder piston to stop) at port A is to be reduced, it need to adjust a lower command value in the relevant amplifier, and then the lower pressure will be built up in the spring chamber (10).

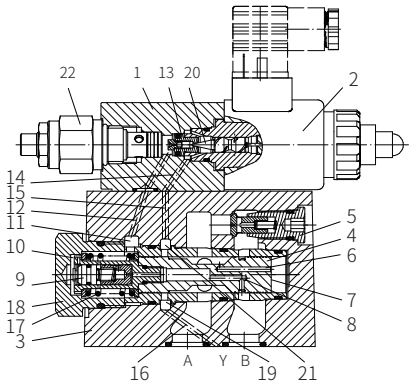
The higher pressure at port A acts on the face (7) of the main spool and pushes the main spool towards the plug (18). The connection from A to B is closed but A to Y is opened. The force of the spring (17) is used to balance the hydraulic pressure acting on the face (7) of the main spool. At this main spool position, the oil flows from port A to port Y through the control edge (19) into the return pipeline.

When the pressure at port A reduces to the pressure of the spring chamber (10) plus the pressure difference Δ p on the spring (17), the main spool at the control edge A to Y closes the large control bores in the socket. The remaining pressure difference about 10 bar for the set pressure at port A can only be unloaded by control channel (21), thus it can achieve a perfect transient response performance without pressure sudden changes.

To ensure the fluid flows freely from port A to port B, a check valve (5) can be selected. Parts of the oil from port A will flow into port Y through the control edge (19) of the main valve spool into the return pipeline.

Model DREM

To prevent the unexpected increase of the control current due to the proportional solenoid, which cause an increase in pressure at port A and may affect the safety of the hydraulic system, it can optionally to install a spring-loaded pressure relief valve as maximum pressure limitation (22) for maximum pressure protection of the system.

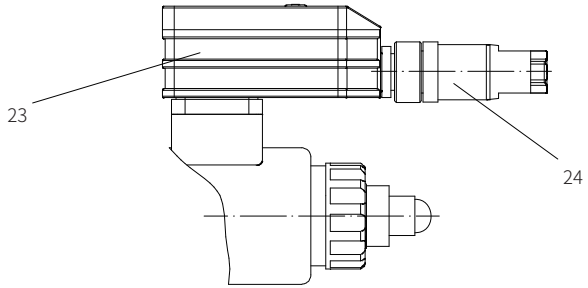


Model DREM- 6XJ/ YG24K24 (with check valve)

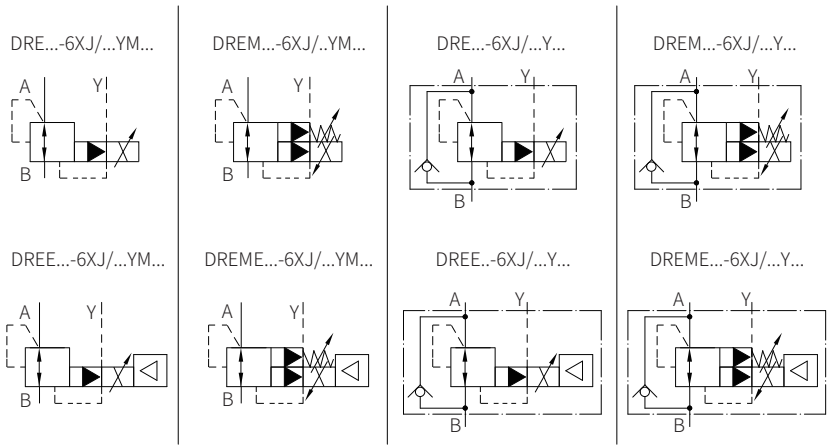
Function description, sectional drawing

Model DRE (M) E (with integrated amplifier)

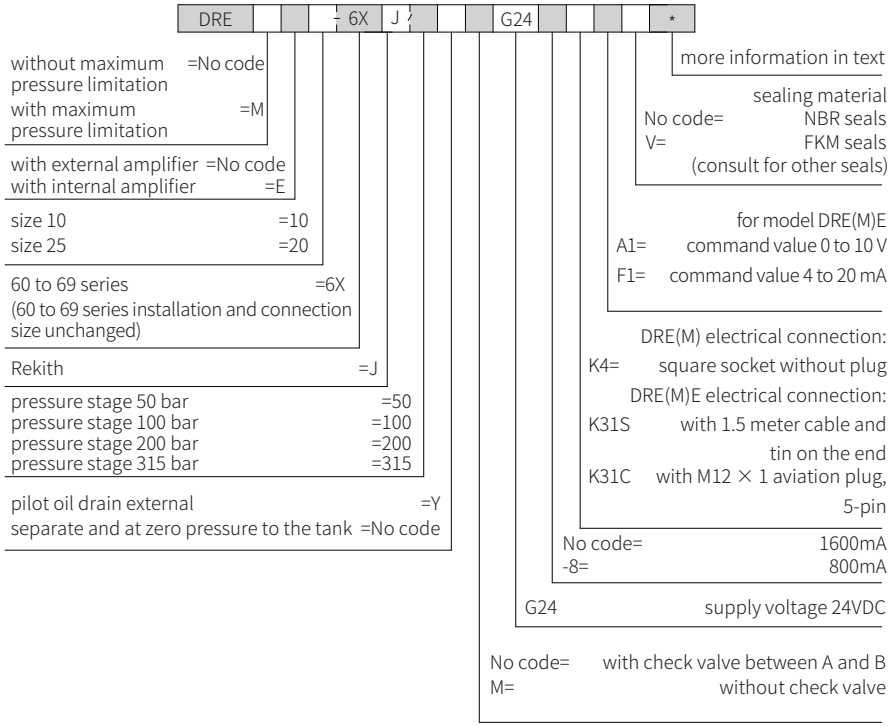
The function and design of this type valve is exactly the same as the DRE (M) valve if without integrated amplifier. The amplifier is located in the connector (23), and supplies power and receives the command value voltage by plug-in type (24). The set value - pressure characteristic curve is pre-set by the manufacturer based on the principle of minimum manufacturing tolerance.



Functional symbols



Models and specifications



Technical parameters

Overview				
Size		Size	10	25
Weight	DRE and DREM	Kg	4.7	6.0
	DREE and DREME	Kg	4.8	6.1
Installation position			Optional	
Storage temperature range		°C	-20 to +80	
Environment temperature range	DRE(M)	°C	-20 to +70	
	DRE(M)E	°C	-20 to +50	

Hydraulic (Measured when using HLP46, ϑ_{oil}=40°C ± 5°C)				
Size		Size	10	25
Working pressure	Oil ports A and B	bar	315	
	Oil port Y	bar	Separate and at zero pressure to tank (Internal pipe O ⩾ 5 mm, pipe length <2500 mm)	
Max. setting pressure in oil port A	Pressure stage 50	bar	50	
	Pressure stage 100	bar	100	
	Pressure stage 200	bar	200	
	Pressure stage 315	bar	315	
Min. setting pressure in port A at zero command value		bar	2	
Max. setting pressure limitation			Factory setting:	
	Pressure stage 50	bar	to 70 bar	
	Pressure stage 100	bar	to 130 bar	
	Pressure stage 200	bar	to 230 bar	
	Pressure stage 315	bar	to 350 bar	
Max. permissible flow of main valve		L/min	200	300
Pilot oil flow		L/min	0.8	
Fluid			Mineral oil (HL, HLP) according to DIN51524 phosphate ester (HFD-R)	
Oil temperature range		°C	-20 to +80	
Viscosity range		mm^2/s	15 to 380	
Hysteresis		%	±3.5 of Max. setting pressure	
Repeatability		%	<+2 of Max. setting pressure	
Linearity		%	+2 of Max. setting pressure	
Manufacturing tolerance of command value pressure characteristic curve, related to the hysteresis characteristic curve when pressure increasing	DRE(M)	%	±3.5 of Max. setting pressure	
	DRE(M)E	%	±1.5 of Max. setting pressure	
Step response Tu+Tg	10→90 %	ms	~130 measured when the fluid with 1L at port A	
	90→10 %	ms	~160	
Step response Tu+Tg	10→90 %	ms	~150 measured when the fluid with 5L at port A	
	90 →10 %	ms	~150	

Electrical			"G24"	"G24-8"
Minimum solenoid current		mA	⩽ 100	⩽ 100
Maximum solenoid current		mA	1600±10 %	800±5%
Coil resistance	Measured at 20°C	Ω	5.5	20.6
	Maximum value	Ω	8	33
Duty			100	100

Technical parameters

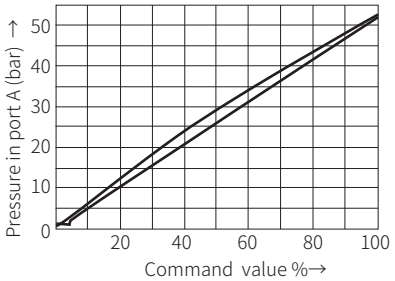
Electronic control unit (OBE)			
Supply voltage	Nominal voltage	VDC	24
	Lower limit value	VDC	21
	Upper limit value	VDC	35
Current consumption		A	⩽1.5
Required power		A	2, time interval
Input	Voltage	V	0 to 10
	Current	mA	4 to 20
Output	Measuring current	mA	1 mV ≙ 1 mA
Valve protection to EN60529			IP65

Characteristic curve

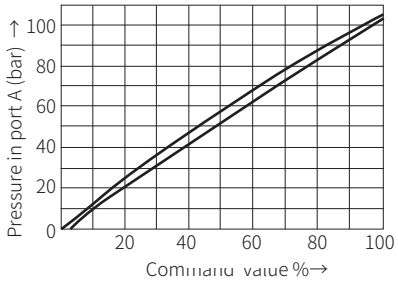
(Measured when using HLP46, ϑ_{oil}=40°C ± 5°C)

Pressure in port A -command value

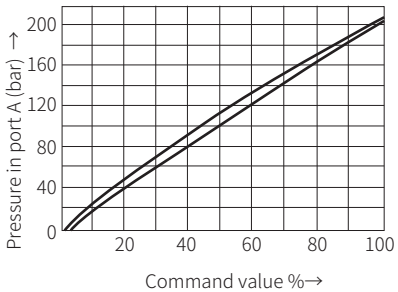
Pressure stage 50 bar



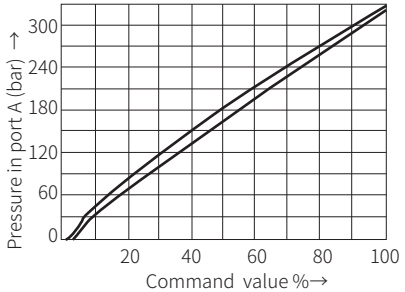
Pressure stage 100 bar



Pressure stage 200 bar



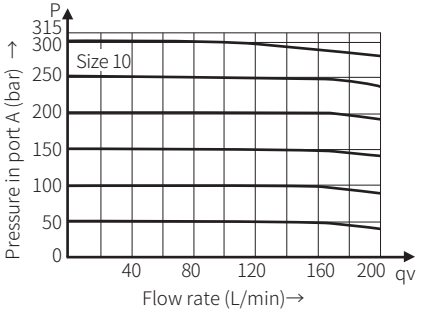
Pressure stage 315bar

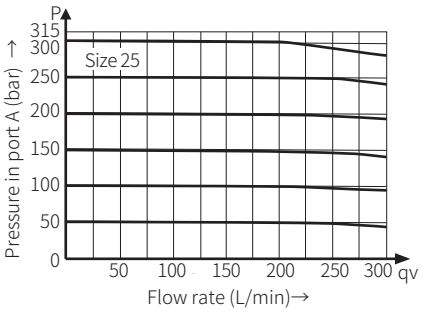


Characteristic curve

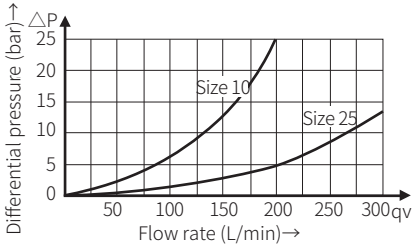
(Measured when using HLP46, ϑ_{oil}=40°C ± 5°C)

Pressure in port A - flow qv

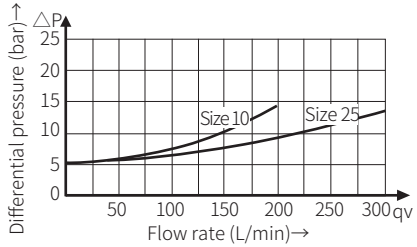




The pressure difference via the check valve from port A to port B



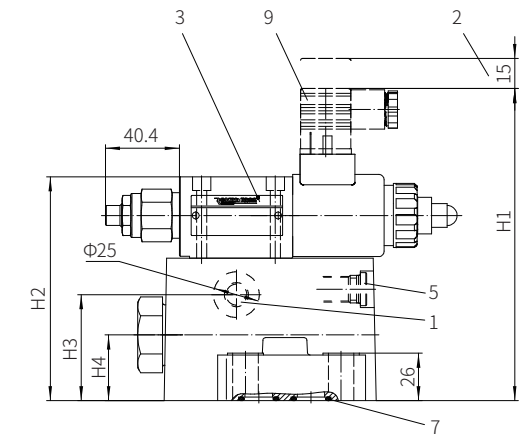
The pressure difference from port B to port A

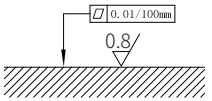


Component size

Size unit: mm

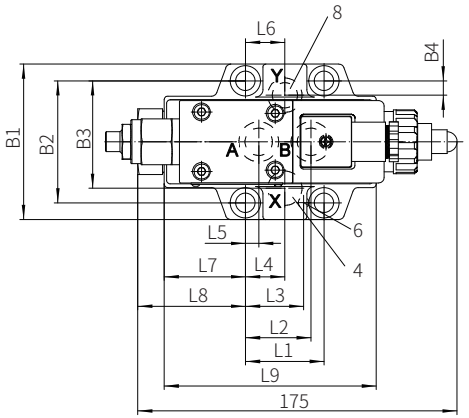
Model DRE(M)

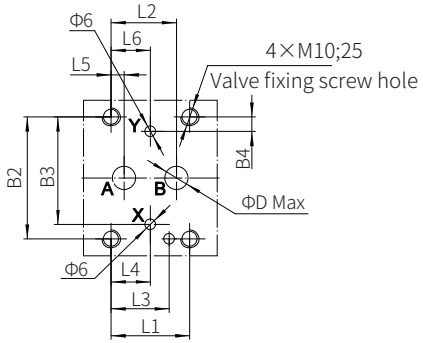




Required surface finishing of mating components

1 The oil port is closed. After removing the sealing plug, if the external pilot oil needs to be returned to the oil tank at zero pressure, this oil port can also be used to drain the oil
2 Space required to remove the plug
3 Name plate
4 Blind hole
5 Optional check valve
6 Locating pin hole
7 O-ring
8 Pilot oil always drain external separately and at zero pressure to the oil tank
9 Plug to DINEN175301-803





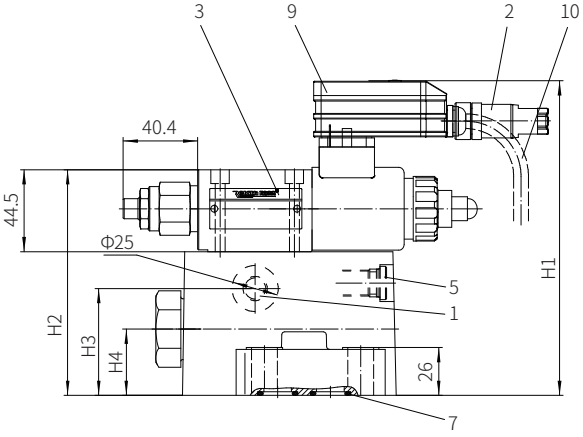
size	L1	L2	L3	L4	L5	L6	L7	L8	L9
10	42.9	35.8	31.8	21.5	7.2	21.5	44.5	59	116
25	60.3	49.2	44.5	20.6	11.1	39.7	27.3	41.8	116

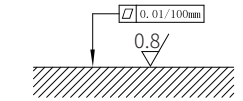
size	B1	B2	B3	B4	H1	H2	H3	H4	D
10	85	66.7	58.8	7.9	170.8	122.5	58	36	13
25	102	79.4	73	6.4	184.5	136.5	64	44	22

Component size

Size unit: mm

Model DRE(M)E





Required surface finishing of mating components

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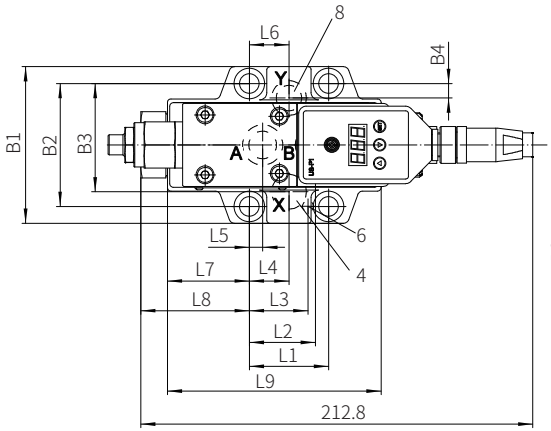
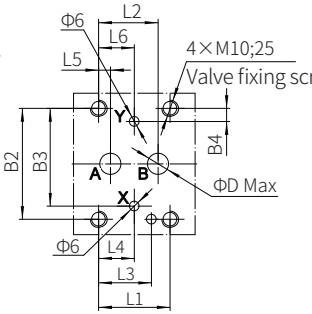
2 Plug
3 Name plate
4 Blind hole
5 Optional check valve
6 Locating pin hole
7 O-ring
8 Pilot oil always drain external separately and at zero pressure to the oil tank
9 Amplifier
10 Cable





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