

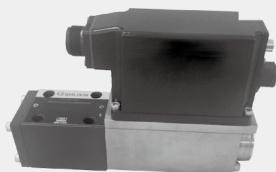


6.12

Proportional directional valves

Type 4WRPEH6...L2X

NG 6
Up to 315 bar
Up to 40L /min



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Features

- With control spool and sleeve in servo quality
- Operated on one side, 4/4-fail-safe position in switched off state
- Electric position feedback and integrated electronics(OBE), calibrated in the factory
- Electrical connection 6P+PE signal input differential amplifier with interface "A1": $\pm 10V$ or interface "F1": 4...20mA ($R_{sh} = 200\Omega$)
- Subplate mounting, porting pattern to ISO 4401-03-02

Function and configuration

The 4WRPEH type high-response valve is a pilot-operated directional control valve with electrical position feedback and integrated electronics (OBE).

The valves basically consists of the housing(1), spool(2), sleeve(3), control solenoid with position transducer(4) and so on.

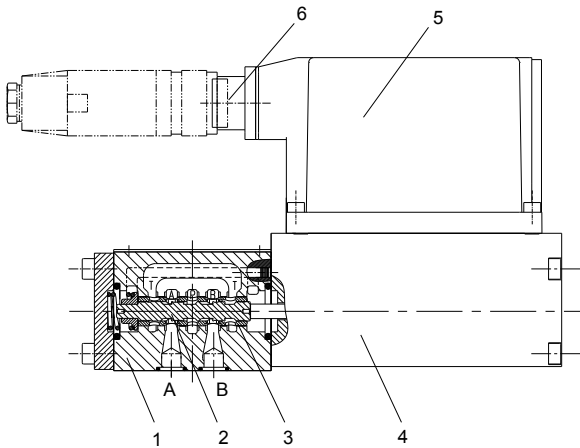
The specified command value is compared with the actual position value in the integrated electronics (OBE). In the event of a control deviation, the stroke solenoid is activated, which adjusts the control spool against the spring due to the change in the magnetic force.

Lifting/control cross-section is proportionally regulated to the command value. In case of a command value presetting of 0 V, the electronics adjusts the control spool against the spring to central position. In deactivated condition, the spring is intensioned to a maximum and the valve is in fail-safe position.

Switch-off behavior





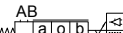
With the electronics switched off, the valve moves immediately into the relevant safe basic position (fail-safe). The switch position P-B/A-T is passed through during this process, which can result in movements on the controlled component. This must be taken into account in system

Type 4WRPEH6...-L2X/G24...

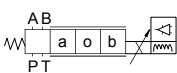
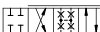

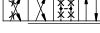
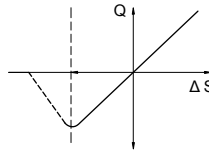
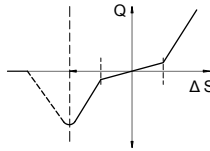


Ordering code

4WRP	E	H	6	B	-L2X	/G24	/	*
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<p>Directional control valve direct operated</p> <p>With integrated electronics</p> <p>Control spool/sleeve =H</p> <p>NG 6 =6</p> <p>Spool symbols</p> <div style="margin-left: 20px;"> <p>AB</p> <p></p> <p>PT</p> <p> =C3, C5</p> <p> =C4, C1</p> <p> =C</p> <p><input type="checkbox"/> Transitional symbols</p> <p>With symbols C5 and C1:</p> <p>P→A:qv B→T:qv/2</p> <p>P→B:qv/2 A→T:qv</p> </div> <p>Solenoid position</p> <div style="margin-left: 20px;"> <p>AB</p> <p> (Standard) =Type B</p> <p>PT</p> </div>	<p>Further information in plain text</p> <p>V = FKM Seals</p> <p>No code = NBR Seals</p> <p>A1= Command/ actual value ±10 V</p> <p>F1= Command/ actual value 4 to 20 mA</p> <p>K31= With component plug, Without plug-in connector</p> <p>Z31= With component plug and plug-in connector</p> <p>Supply voltage of the control electronics G24= + 24 V DC</p> <p>L2X= L20 to L29: unchanged installation and connection dimensions</p> <p>L= Linear</p> <p>P= Inflected characteristic curve</p> <p>Flow characteristics:</p> <p>Linear</p> <p>Inflected characteristic curve</p> <p>Rated flow of with 70 bar pressure differential (35bar/control edge)</p> <table style="width: 100%; text-align: center;"> <tr> <td>02=2 L/min</td> <td>04=4 L/min</td> <td>12=12L/min</td> </tr> <tr> <td></td> <td>24=24L/min</td> <td>40=40L/min</td> </tr> </table>	02=2 L/min	04=4 L/min	12=12L/min		24=24L/min	40=40L/min
02=2 L/min	04=4 L/min	12=12L/min					
	24=24L/min	40=40L/min					

Symbols

	Linear	P:Inflection 40%
<p> C4, C1</p> <p> C3, C5</p> <p> C</p>		
	C3, C5, C4, C1, C	C3, C5, C4, C1

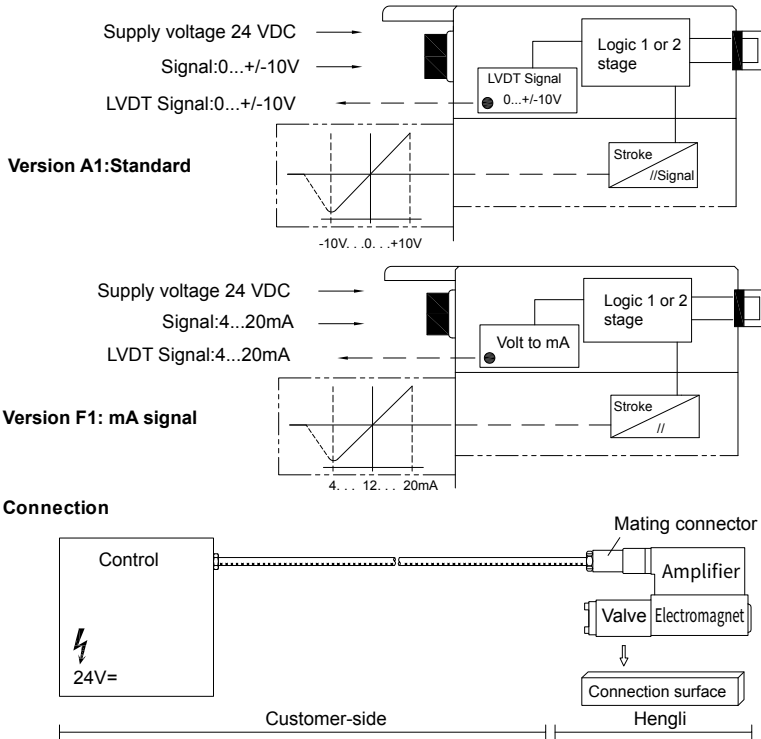
Technical data

General							
Design		Spool valve, direct operated, with steel sleeve					
Actuation		Proportional solenoid with position control, OBE					
Connection type		Subplate mounting, porting pattern according to ISO 4401-03-02-0-05					
Installation position		Any					
Ambient temperature range		°C	-20~+50				
Weight		Kg	~2.75				
Maximum vibration resistance (test condition)		Max. 25 g, space vibration test in all directions (24h)					
Hydraulic (measured at p=100bar, with HLP46 at $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)							
pressure fluid		Mineral oil (HL, HLP)to DIN 51 524					
Viscosity range	Recommended	mm ² /s	20...100				
	Maximum admissible	mm ² /s	10...800				
Hydraulic fluid temperature range		°C	-20 to +70				
Maximum admissible degree of contamination of the hydraulic fluid, cleanliness class according to ISO 4406 (c)		Class 18/16/13					
Rated flow ($\Delta p = 35$ bar per edge)		L/min	2	4	12	24	40
Maximum operating pressure		bar	Port A, B, P: 315				
Maximum operating pressure		bar	Port T: 250				
Leakage flow at 100 bar	Linear	cm ³ /min	< 150	< 180	< 300	< 500	< 900
	Nonlinear	cm ³ /min	—	—	—	< 300	< 450
Static/Dynamic							
Hysteresis		%	≤ 0.2				
Actuating time for signal step 0 ... 100%		ms	10				
Temperature drift		Zero shift < 1% at $\Delta T = 40^{\circ}\text{C}$					
Zero compensation		Ex factory $\pm 1\%$					

Electric, control electronics integrated in the valve						
Relative duty cycle		%	100ED			
Protection class according to EN 60529		IP 65.				
Connection		Plug-in connector 6P+PE, DIN 43563				
Supply voltage		24VDC _{nom}				
Terminal A		min. 21VDC / max. 40VDC				
Terminal B		0V (ripple max. 2)				
Fuse protection, external		A _F	2.5			
Input, version "A1"		Differential amplifier, Ri = 100 kΩ				
Terminal D (U _D)		0... ± 10V				
Terminal E		0V				
Input, version "F1"		Load, R _{sh} = 200 Ω				
Terminal D (I _{D,E})		4...12...20mA				
Terminal E (I _{D,E})		Current loop I _{D,E} return				
Test signal, version "A1"		LVDT				
Terminal F (U _{Test})		0... ± 10V				
Terminal C		Reference 0 V				
Test signal, version "F1"		LVDT signal 4 ... (12) ... 20 mA on external load				
Terminal F (I _{F,C})		200 ... 500 Ω maximum				
Terminal C (I _{F,C})		4 ... (12) ... 20mA (output)				
		Current loop I _{F,C} return				
Adjustment		calibrated before delivery, see characteristic curves				

¹⁾ The cleanliness level of the component must be reached in the hydraulic system. Effective filtering prevents failures and increases the service life of components.

Electrical connection



Technical data for the cable

- Version:**
- Multi-core wire
 - Litz wire structure, extra fine wire according to VDE 0295, class 6
 - Protective earthing conductor, green-yellow
 - Cu shielding braid
- Number of wires:** - Determined by the valve type, connector type and signal configuration
- Line Ø:**
- 0.75 mm² to 20 m of length
 - 1.0 mm² to 40 m of length
- OuterØ:**
- 9.4...11.8 mm
 - 12.7...13.5 mm

Note:
Supply voltage 24 V DC_{nom}

if the value falls below 18V = an internal fast switch-off is effected which can be compared with "Release OFF".

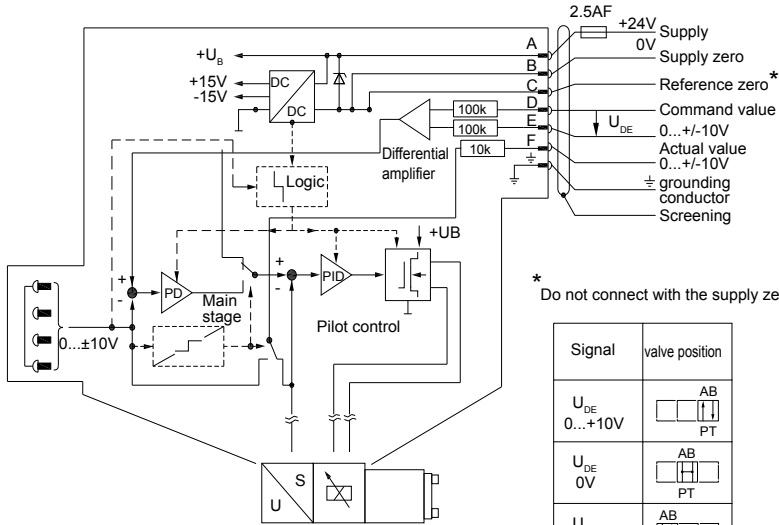
Additionally for version F1:
 $I_{D,E} \geq 3\text{mA}$ - valve is active
 $I_{D,E} \leq 2\text{mA}$ - valve is deactivated.

Electric signals taken out via control electronics (e.g. actual value) may not be used for the switch-off of safety-relevant machine functions! (See also the European standard "Safety requirements for fluid power systems and their components - Hydraulics", EN 982.)

Integrated electronics (OBE)

Block diagram/pin assignment

A1: $U_{D,E} 0 \dots \pm 10V$



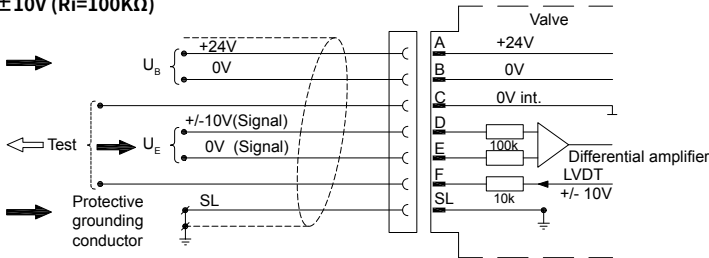
* Do not connect with the supply zero!

Signal	valve position		
U_{DE} $0 \dots +10V$	<table border="1"> <tr><td>AB</td></tr> <tr><td>PT</td></tr> </table>	AB	PT
AB			
PT			
U_{DE} 0V	<table border="1"> <tr><td>AB</td></tr> <tr><td>PT</td></tr> </table>	AB	PT
AB			
PT			
U_{DE} $0 \dots -10V$	<table border="1"> <tr><td>AB</td></tr> <tr><td>PT</td></tr> </table>	AB	PT
AB			
PT			

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In assignment 6P+PE

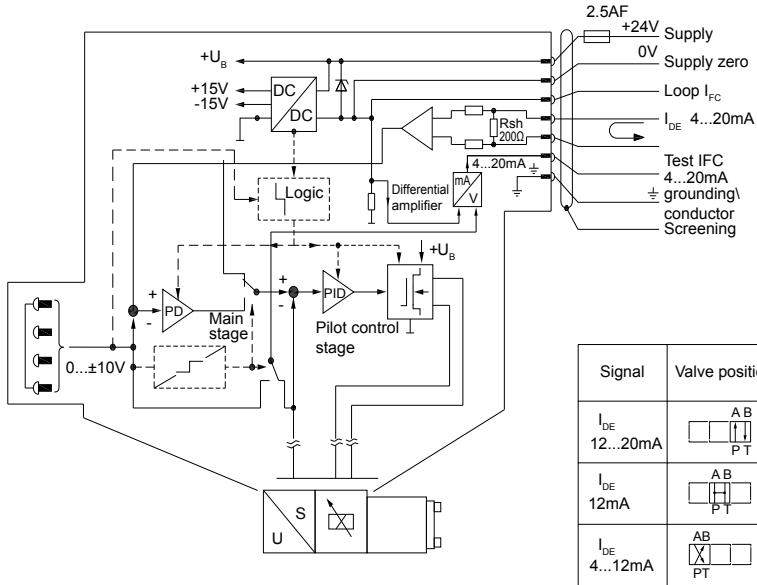
A1: $U_{D,E} \pm 10V$ ($R_i=100K\Omega$)



Integrated electronics (OBE)

Block diagram/pin assignment

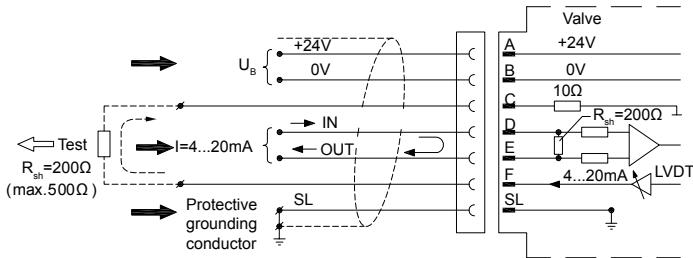
F1: $I_{D,E}$ 4...20mA



$I_{D,E} \leq 2\text{mA}$, Valve inactive

In assignment 6P+PE

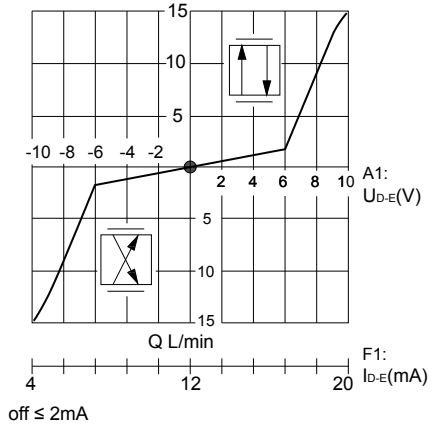
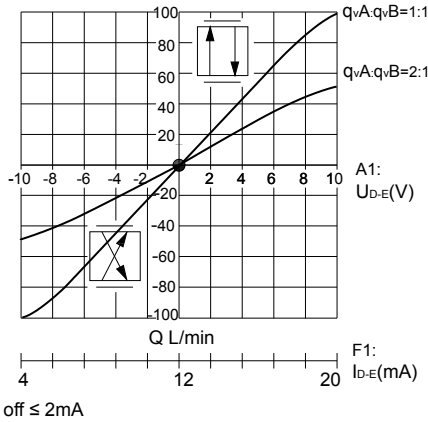
F1: $I_{D,E}$ 4...20mA ($R_{sh} = 200\ \Omega$)



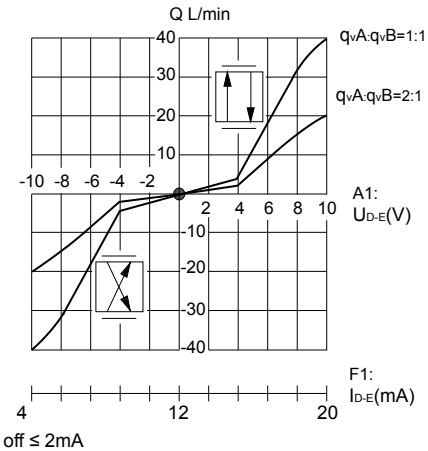
Characteristic curves (measured at p=100bar, with HLP46, $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)

Flow-signal function $q_v=f(U_{D-E}), q_v=f(I_{D-E})$

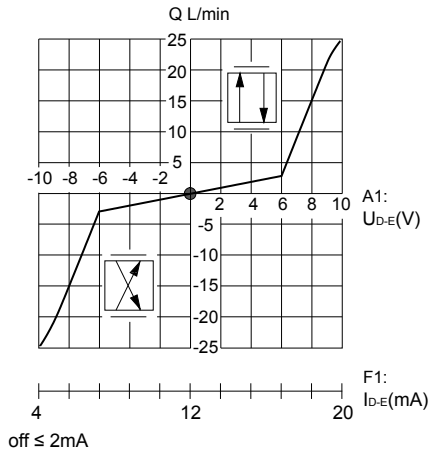
Linear characteristic curve (version "L")



Inflected characteristic curve "P", inflection at 40%

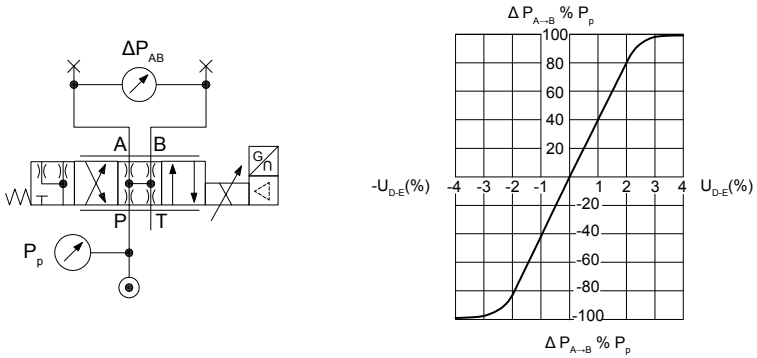


Inflected characteristic curve "P", inflection at 60%

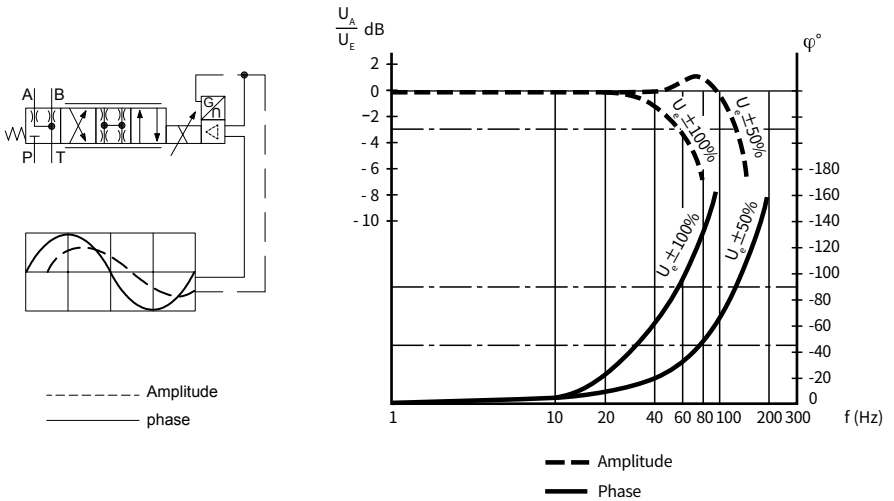


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Characteristic curves: Pressure amplification (measured at $p=100\text{bar}$, with HLP46, $\vartheta_{\text{oil}}=40^\circ\text{C} \pm 5^\circ\text{C}$)



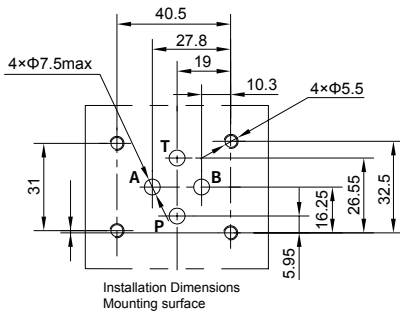
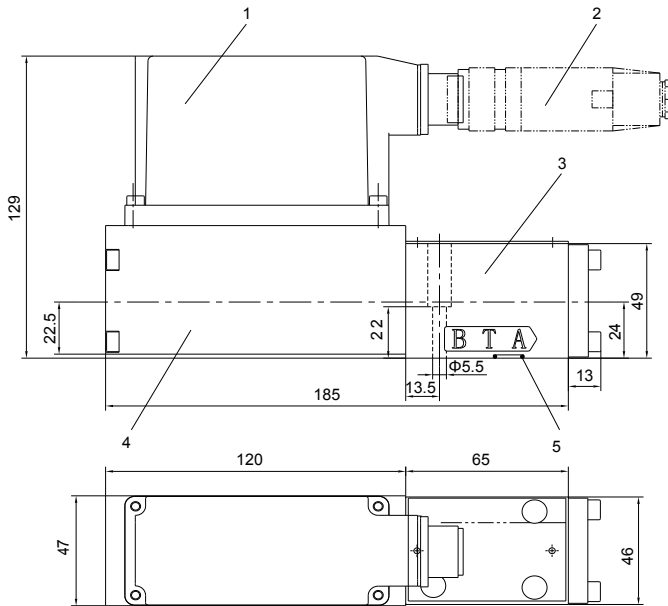
Characteristic curves: Bode diagram (measured at $p=100\text{bar}$, with HLP46, $\vartheta_{\text{oil}}=40^\circ\text{C} \pm 5^\circ\text{C}$)



06

Unit dimensions

(Dimensions in mm)



- 1 Integrated electronics (OBE)
- 2 Mating connectors
- 3 Valve housing
- 4 Control solenoid with position transducer
- 5 O-ring 9.25×1.78 (for ports P, A, B, T)

Valve mounting screws:
 4- M5×30 GB/T 70.1-10.9;
 $M_A = 7.9 \text{ Nm} \pm 10\%$

