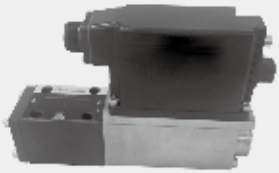
6.15

Proportional directional valves

Type 4WRPEH6...L2X

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



Contents

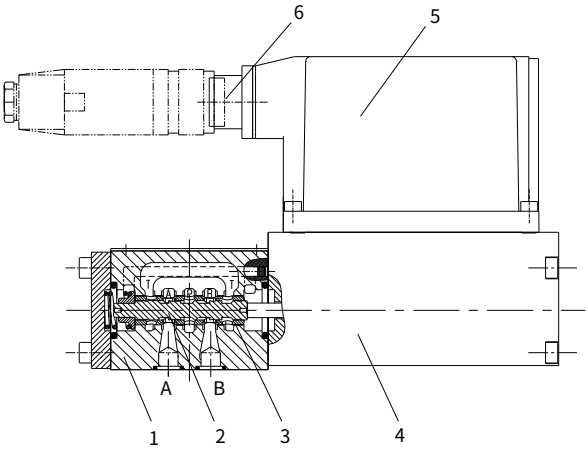
Features

- 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": ±10V or interface"F1": 4...20mA (R_{sh} =200Ω)
- 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 0V, the electronics adjusts the control spool against the spring to central position. In deactivated condition, the spring is untensioned 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				–L2X	/G24	/		/Q	*

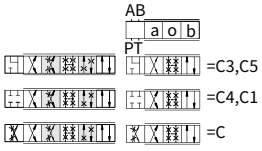
Directional control valve direct operated

With integrated electronics

Control spool/sleeve =H

NG 6 =6

Spool symbols



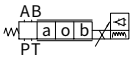
Transitional symbols

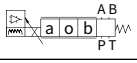
With symbols C5 and C1:

P→A:qv B→T:qv/2

P→B:qv/2 A→T:qv

Solenoid position





Rated flow of with 70 bar pressure differential (35bar/control edge)

2L/min=02 4L/min=04 12L/min=12

24L/min=24 40L/min=40

Further information in plain text

No code= Without enable function

Q = With enable function

V = FKM Seals

No code = NBR Seals

A1= Command/actual value ±10 V

F1 = Command/actual value 4 to 20 mA

K31= With component plug, Without plug-in connector

Z31= With component plug and plug-in connector

Supply voltage of the control electronics

G24= + 24 V DC

L2X= L20 to L29: unchanged installation and connection dimensions

Flow characteristics:

L= Linear

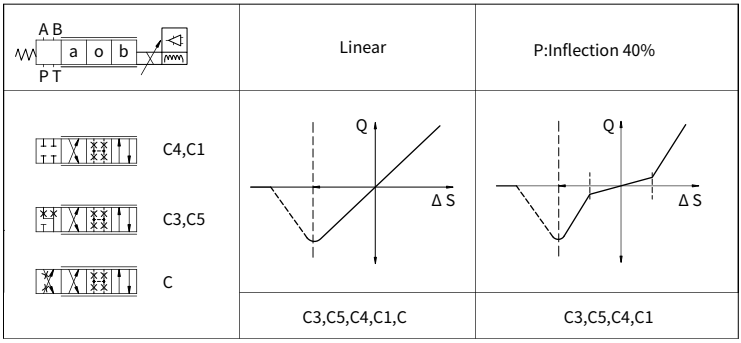
P= Inflected characteristic curve

Note:

Option /Q, the safety option, which allows the valve power amplifier to start or stop working without cutting off the power supply. An enable signal (DC24V) is required to start the amplifier.

06

Symbols



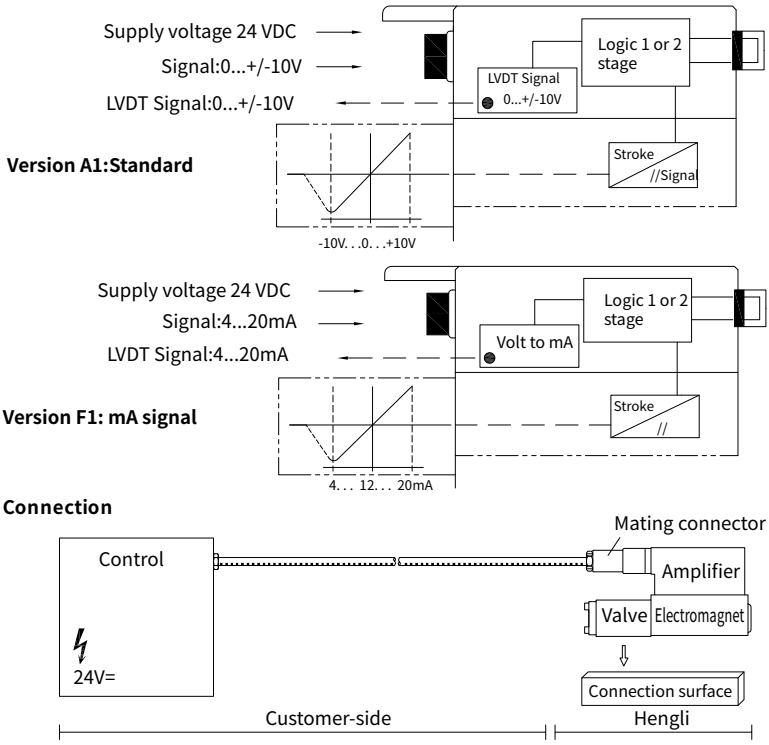
Technical data

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 ϑ_{oil} = 40°C ±5°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 (Δp = 35bar 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 ΔT=40°C				
Zero compensation			Ex factory ±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_E)		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 200 ... 500 Ωmaximum
Terminal F (I_{F-C})		4 ... (12) ... 20mA (output)
Terminal C (I_{F-C})		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}

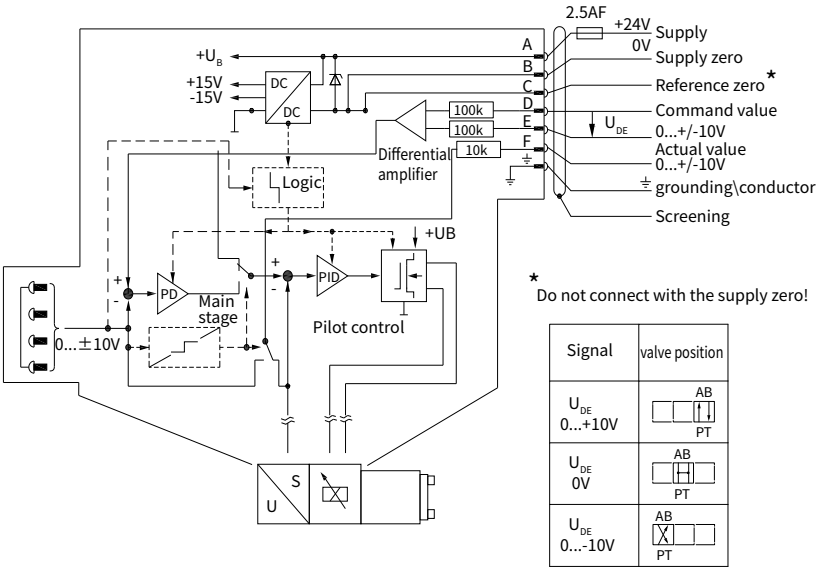
if the value falls below 18V = an internal fast switch-off is effected which can be compared with "Release OFF".

Additionally for version F1:
$I_{D-E} \geqslant$ 3mA - valve is active
$I_{D-E} \leqslant$ 2mA - valve is deactivated.

Electric signals taken out via control electronics (e.g. actual value) may not Abe 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)

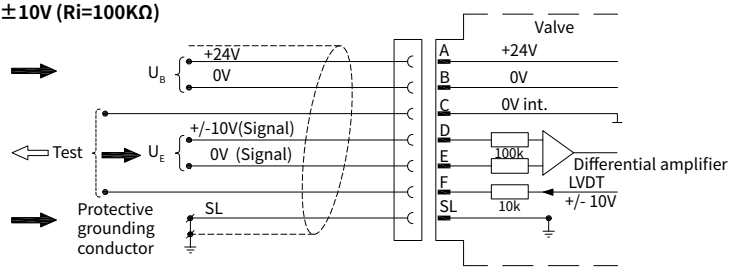
Block diagram/pin assignment
A1:U_{D-E} 0...±10V



* Do not connect with the supply zero!

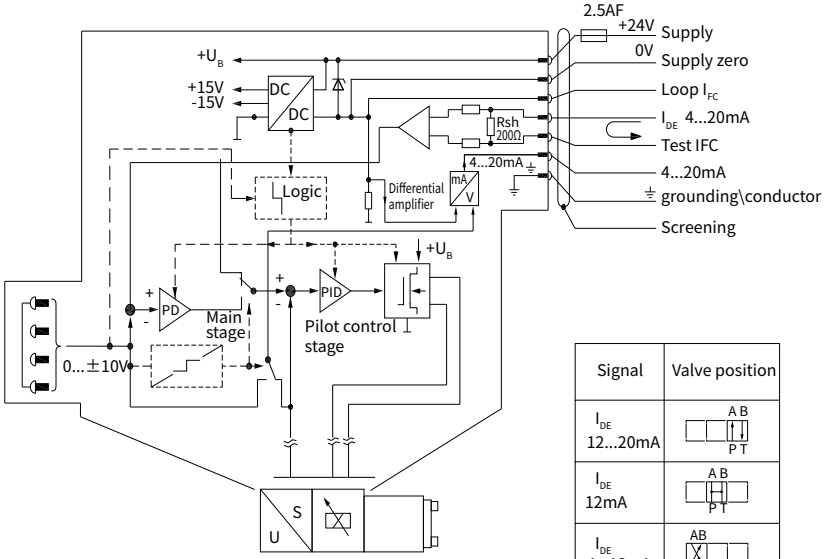
Signal	valve position
U_{DE} 0...+10V	AB PT
U_{DE} 0V	AB PT
U_{DE} 0...-10V	AB PT

In assignment 6P+PE
A1:U_{D-E} ±10V (Ri=100KΩ)



Integrated electronics (OBE)

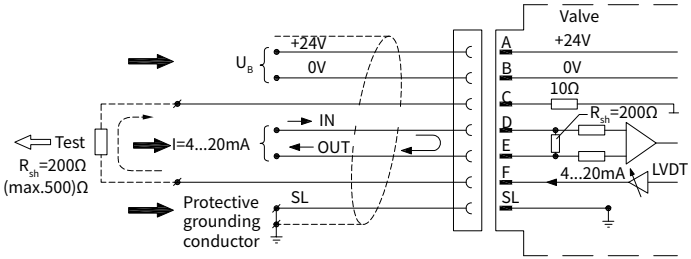
Block diagram/pin assignment
F1: $I_{D\text{-}E}$ 4...20mA



Signal	Valve position
I_{DE} 12...20mA	A B / P T
I_{DE} 12mA	A B / P T
I_{DE} 4...12mA	AB / PT

$I_{DE} \leqslant$ 2mA,Valve inactive

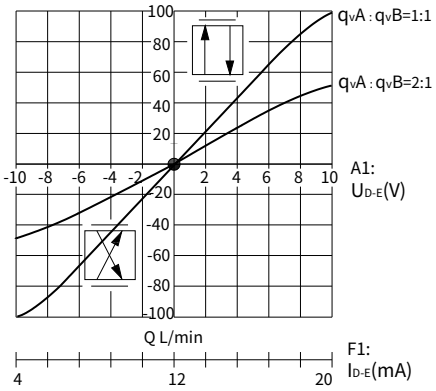
In assignment 6P+PE
F1: $I_{D\text{-}E}$ 4...20mA (Rsh =200 Ω)



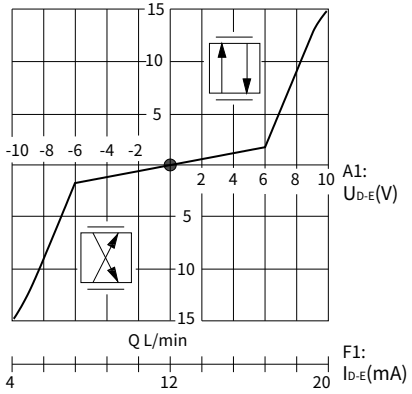
Characteristic curves (measured at p =100bar, with HLP46, ϑ_{oil}=40°C ±5°C)

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

Linear characteristic curve (version "L")

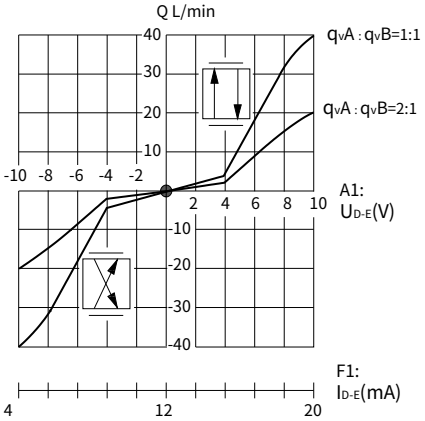


off ⩽ 2mA



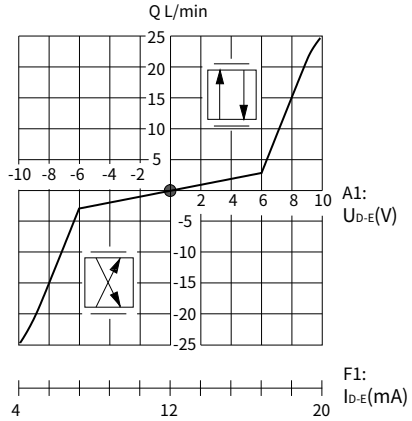
off ⩽ 2mA

Inflected characteristic curve"P", inflection at 40%



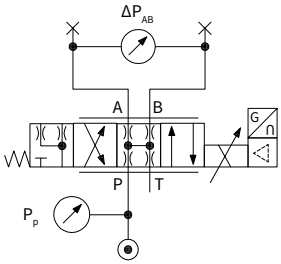
off ⩽ 2mA

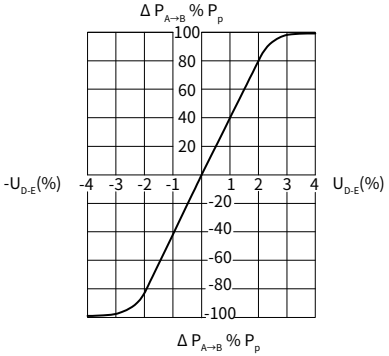
Inflected characteristic curve"P", inflection at 60%



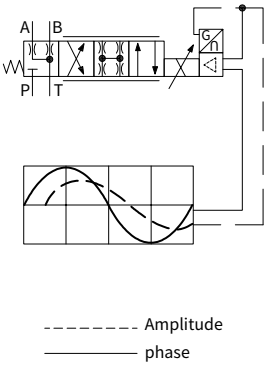
off ⩽ 2mA

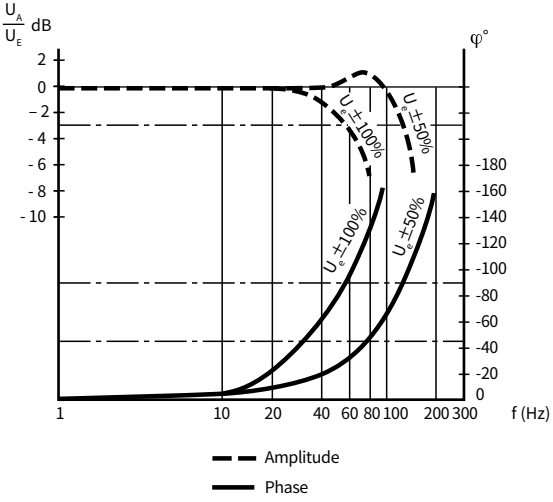
Characteristic curves: Pressure amplification (measured at p =100bar, with HLP46, ϑ_{oil} =40°C ±5°C)





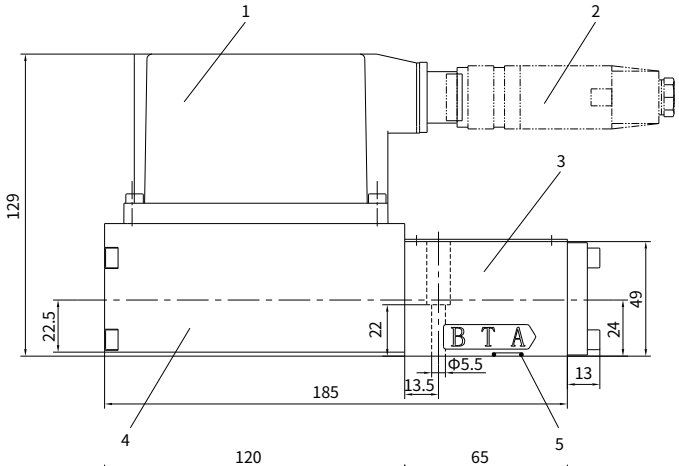
Characteristic curves: Bode diagram (measured at p =100bar, with HLP46, ϑ_{oil} =40°C ±5°C)

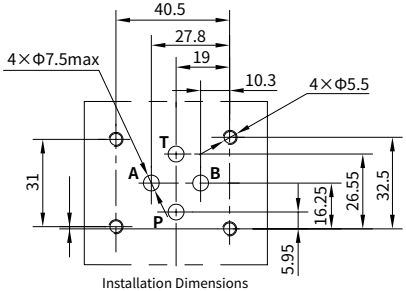




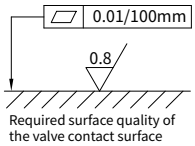
Unit dimensions

(Dimensions in mm)





Installation Dimensions
Mounting surface



Required surface quality of
the valve contact surface

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 Nm±10%