

SH6LC Direct operated proportional servo valve

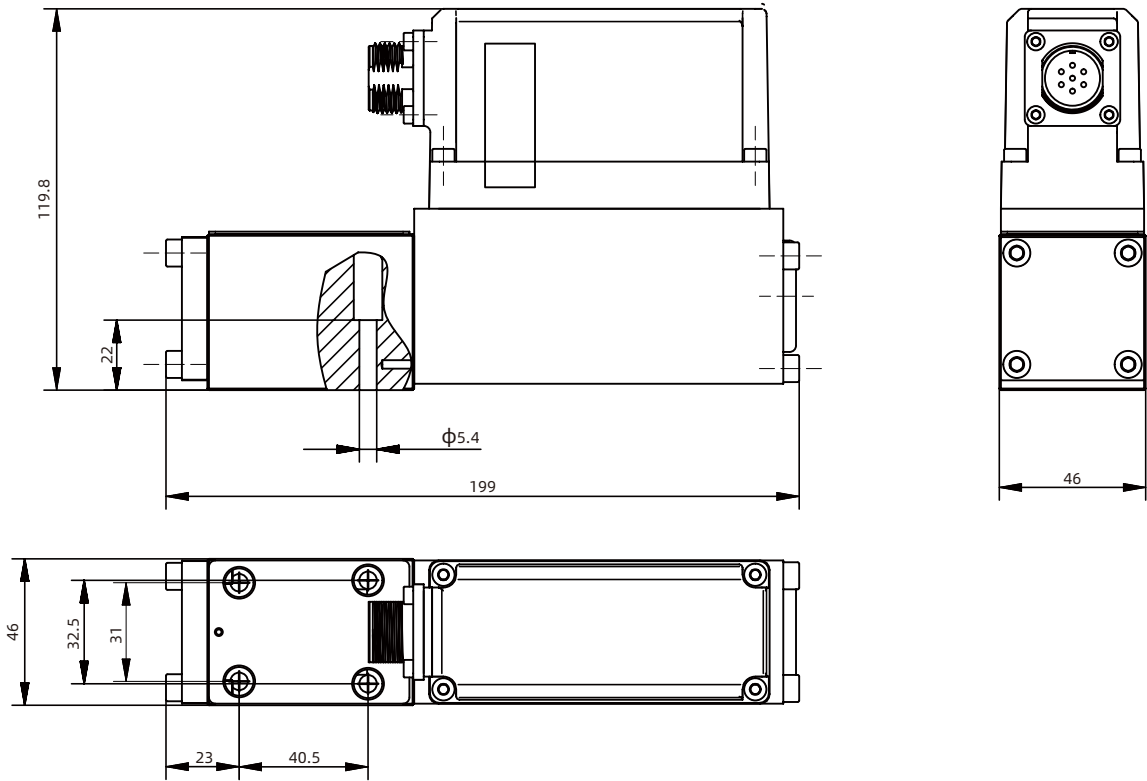
SH6LC proportional servo valve, directly operated,
with electrical position feedback and on-board electronics (OBE)

Size 6
Maximum working pressure P, A, B 315 bar
Nominal flow 40 l/min (Δp 70 bar)

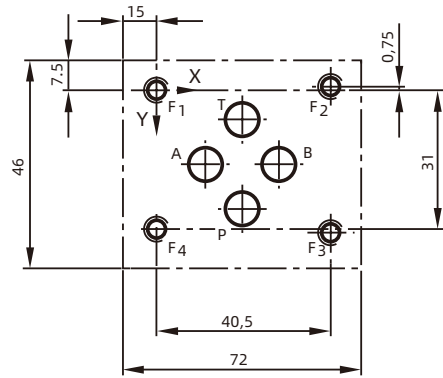


- Direct operated proportional servo valve, with control piston and sleeve in servo quality
- Actuated on one side, 4/4 fail-safe position when switched off
- Electrical position feedback and on-board electronics (OBE), calibrated at the factory
- Electrical connection 6P+PE
 - Signal input differential amplifier with interface A1 ± 10 V or interface S1 4...20 mA (Rsh = 200 Ω)
- Used in electrohydraulic controllers in production and testing systems

Unit dimensions (mm)



Mechanical Installation Interface Drawing



Symbols

	L: Linear	P: kink
	Y, O	Y, O

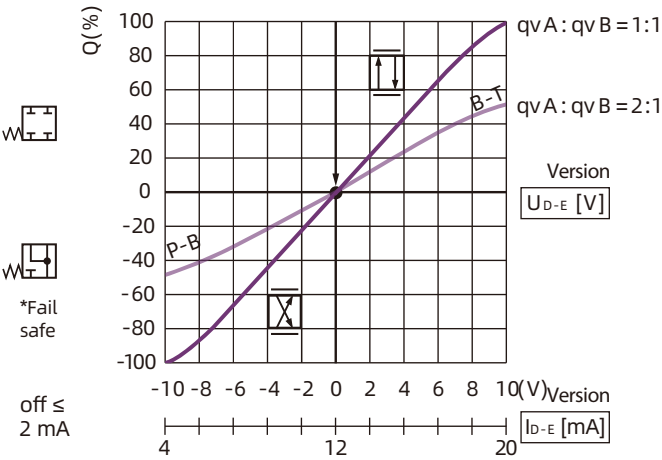
The mounting manifold must conform ISO 4401-03-02-0-94								
	P	A	B	T	F1	F2	F3	F4
Diameter mm	8	8	8	8	M5	M5	M5	M5
X	21.5	12.7	30.2	21.5	0	40.5	40.5	0
Y	25.9	15.5	15.5	5.1	0	-0.75	31.75	31

Characteristic curves (measured with HLP 46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)

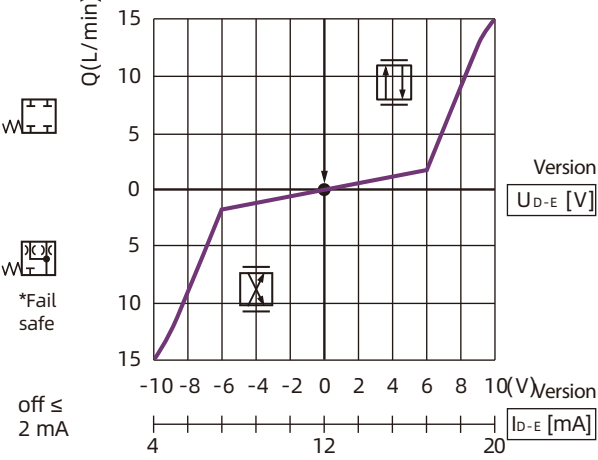
Flow rate – signal function

$Q = f(U_{D-E})$
 $Q = f(I_{D-E})$

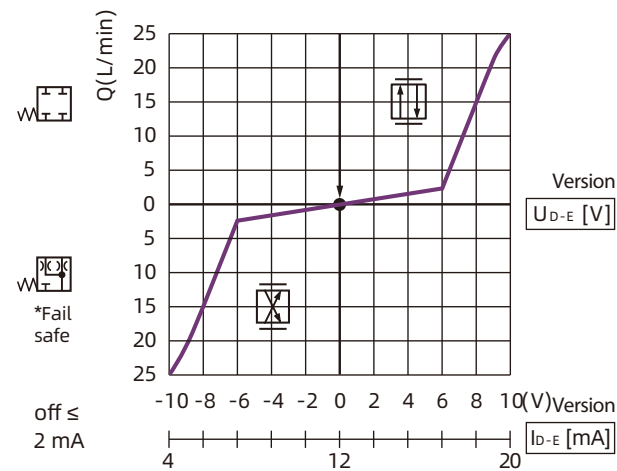
L: Linear



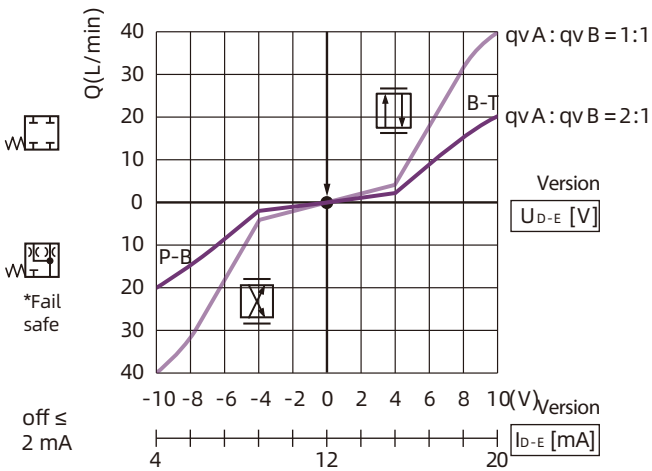
P: (kink 60 %) 15 L/min



P: (kink 60 %) 25 L/min



P: (kink 40 %) 40 L/min



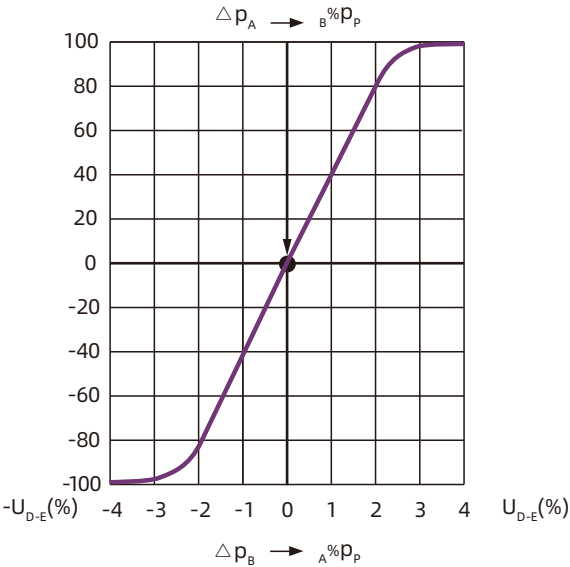
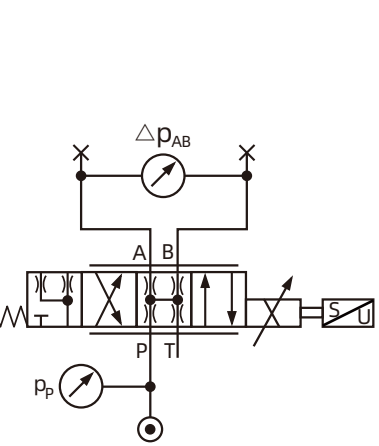
* Fail safe: $U_B \leq 18\text{ V DC}$
(Version U_{D-E})

* Fail safe: $U_B \leq 18\text{ V DC} / I_{D-E} \leq 2\text{ mA}$
(Version $I_{D-E} 4...20\text{ mA}$)

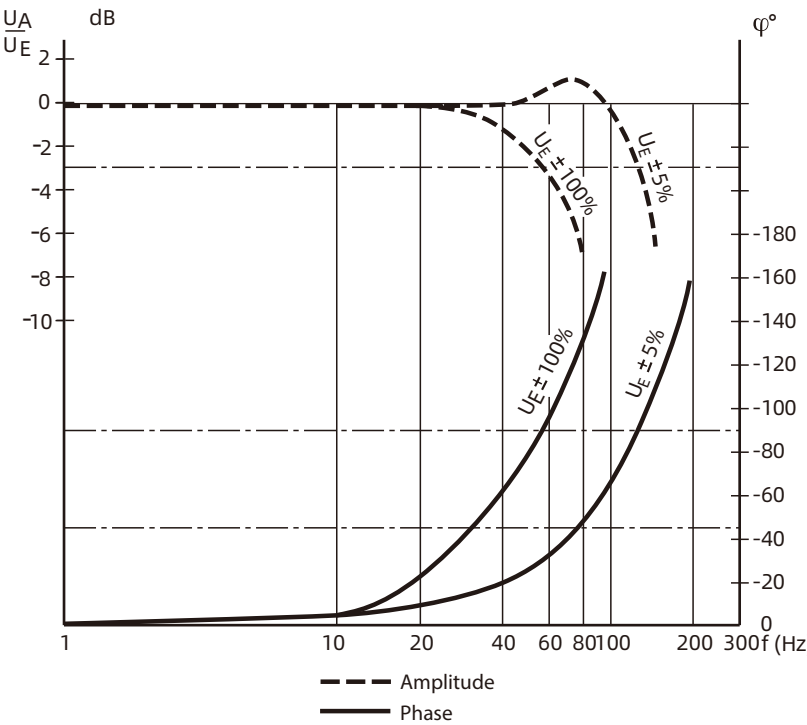
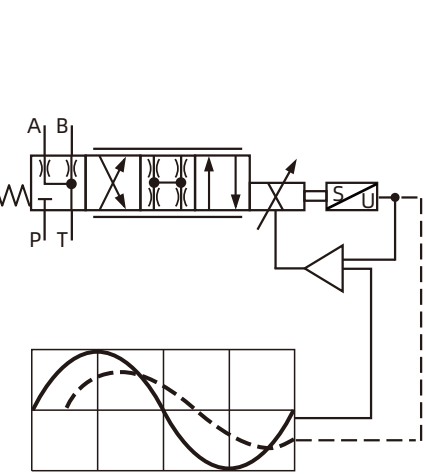
Calibration $\pm 1\%$

Characteristic curves (measured with HLP 46, $\vartheta_{oil} = 40\text{ °C} \pm 5\text{ °C}$)

Pressure gain



Bode diagram



Electric connection

On-board electronics

Technical notes on the cable

- Version:
- Multi-wire cable
 - Extra-finely stranded wire to VDE 0295, Class 6
 - Protective conductor, green/yellow
 - Cu braided screen
- No. of wires:-
- Determined by type of valve, plug types and signal assignment
- Cable Ø:
- 8 to 12.5 mm length

Note

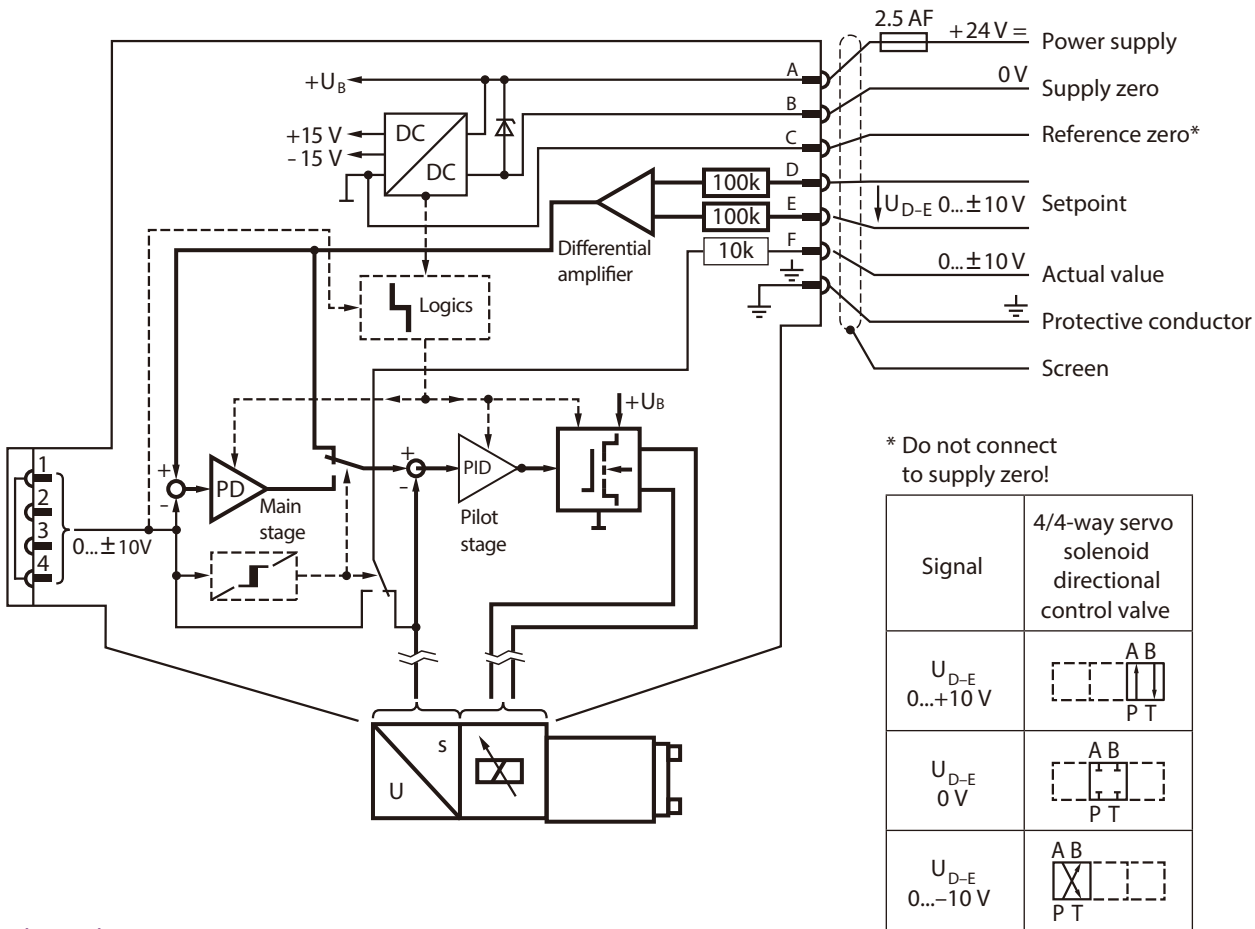
Voltage supply 24 V DCnom.

if voltage drops below 18 V DC, rapid shutdown resembling “Enable OFF” takes place internally.

Electrical signals emitted via the trigger electronics (e.g. actual values) must not be used to shut down safety-relevant machine functions! (See European Standard, “Technical Safety Requirements for Fluid-Powered Systems and Components - Hydraulics”, EN 982.)

Block diagram/pin assignment

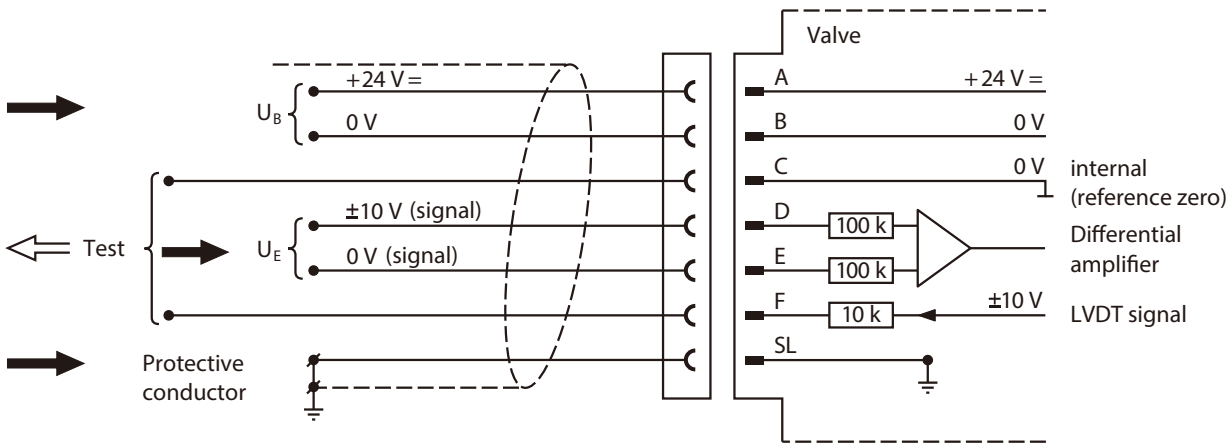
Version A1: $U_{D-E} \pm 10\text{ V}$



Pin assignment 6P+PE

Version A1: $U_{D-E} \pm 10\text{ V}$

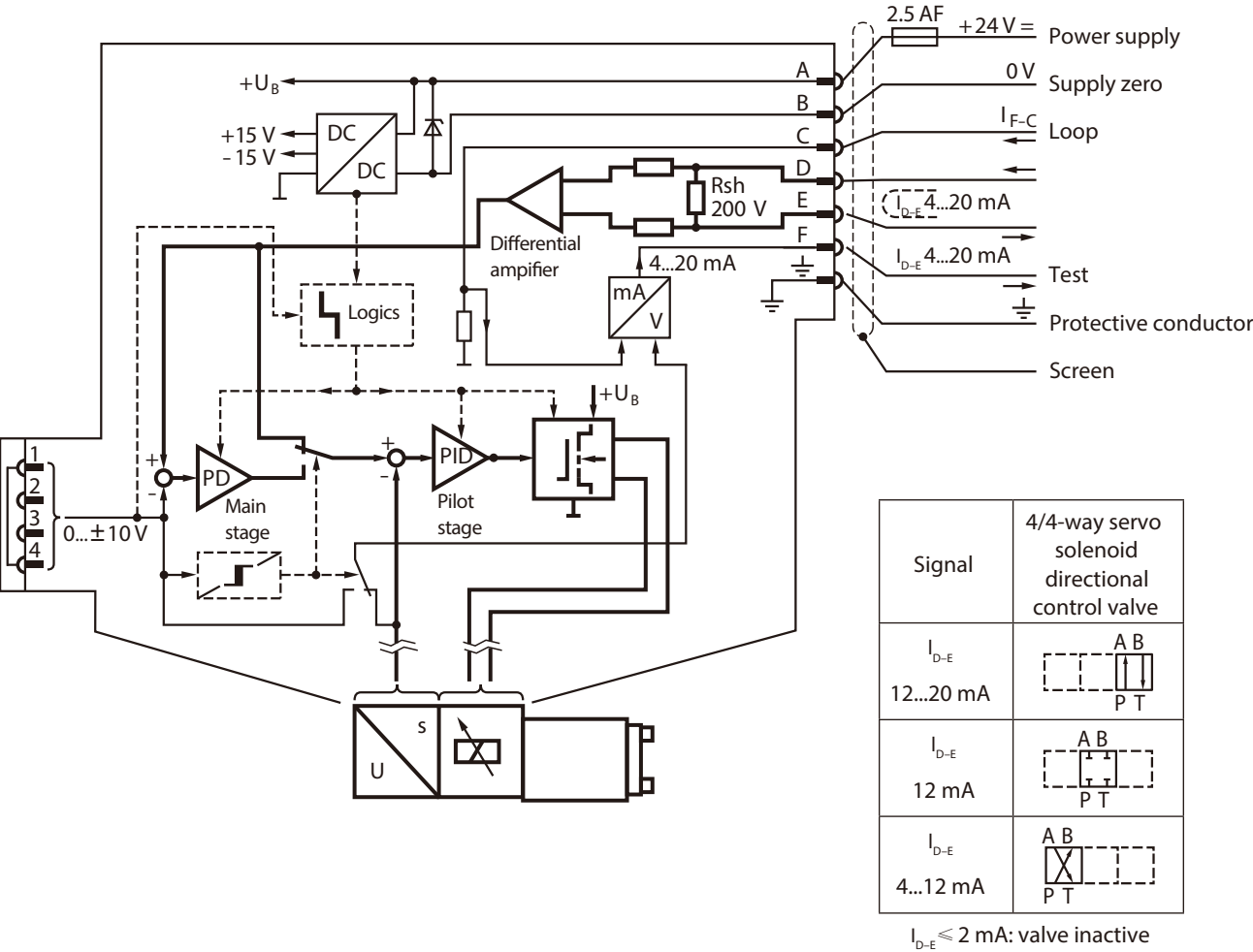
($R_i = 100\text{ k}\Omega$)



On-board electronics

Block diagram/pin assignment

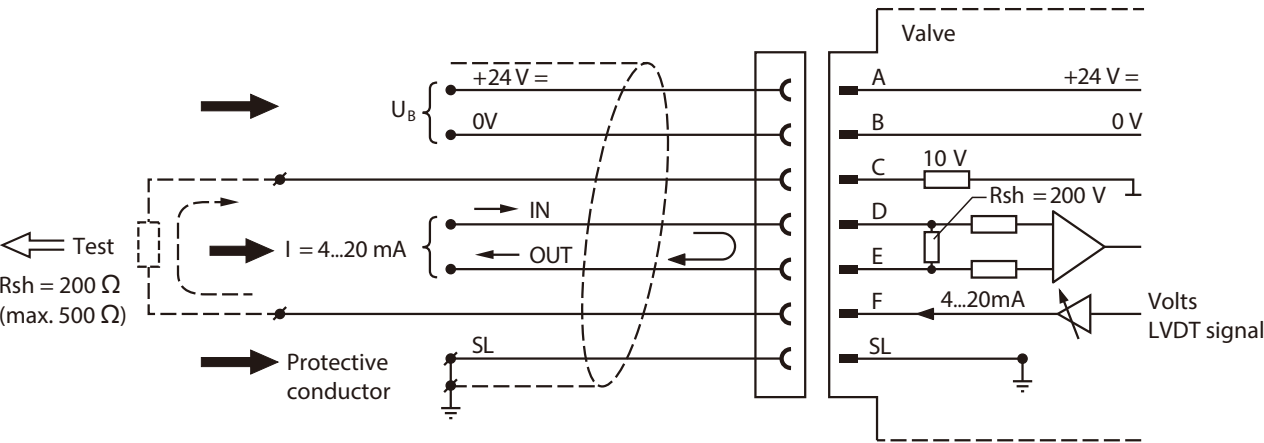
Version S1: I_{D-E} 4...12...20 mA



Pin assignment 6P+PE

Version S1: I_{D-E} 4...12...20 mA

($R_{sh} = 200 \Omega$)



Technical data

General						
Construction		Spool-type valve, directly operated, with steel sleeve				
Actuation		Control solenoid with position control, OBE				
Type of mounting		Subplate, mounting hole configuration (ISO 4401-03-02-0-05)				
Installation position		Optional				
Ambient temperature range		-20 ... +50 °C				
Weight		2.7 Kg				
Dimensions		199 X 46 X 119.8 mm				
Vibration resistance, test condition		Max. 25 g, shaken in 3 dimensions (24 h)				
Hydraulic (measured with HLP 46, $\vartheta_{oil} = 40^{\circ}\text{C} \pm 5^{\circ}\text{C}$)						
Pressure fluid		Conforming to DIN 51524, Parts 1 to 3				
Viscosity range	recommended max. permitted	20...100 mm²/s 10...800 mm²/s				
Pressure fluid temperature range		-20...+70°C				
Maximum permissible degree of contamination of pressure fluid Purity class to ISO 4406 (c)		Class 18/16/13 1)				
Direction of flow		See symbol				
Nominal flow[l/min] at $\Delta p = 35$ bar per notch*		2	4	12	15	24 40
Max. working pressure		Ports P, A, B: 315 bar				
Max. pressure		Port T: 250 bar				
Operating limits at Δp Pressure drop at valve[bar] $q_{vnom} \cdot \rightarrow q_N$ valves		315	315	315	315	315 160
		315	315	315	280	250 100
Max. recommended nominal flow at 100 bar[cm³/min]		<150	<180	<300	-	<500 <900
		-	-	-	<180	<300 <450
Static/Dynamic						
Hysteresis		≤ 0.2%				
Manufacturing tolerance for Q_{max}		< 10%				
Response time for signal change 0...100 %		< 10ms				
Thermal drift		Zero point displacement < 1 % at $\Delta T = 40^{\circ}\text{C}$				
Zero adjustment		Factory-set ± 1 %				

1) The purity classes stated for the components must be complied with in hydraulic systems. Effective filtration prevents problems and also extends the service life of components. For a selection of filters, See samples RE 50 070, RC 50 076 and RC 50 081.

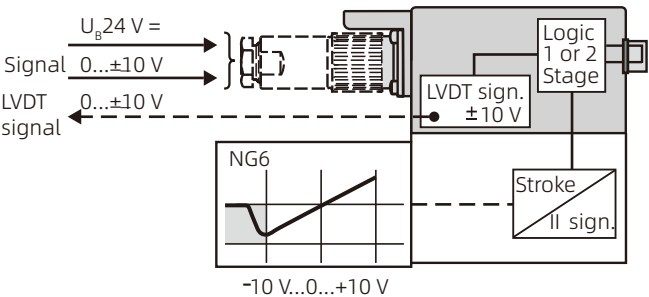
*Flow rate at a different: $q_x = q_{nom} \sqrt{\frac{\Delta p_x}{35}}$

Technical data

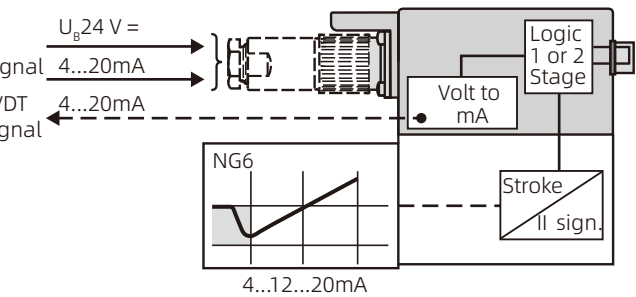
Electrical, trigger electronics integrated in the valve

Cyclic duration factor	100% ED
Degree of protection	IP 65 to EN 60529 and IEC 14434/5
Connection	Plug-in connector 6P+PE, DIN 43563
Power supply Terminal A: Terminal B: 0 V	24 V DC nom. min. 19 V DC/max. 36 V DC Ripple max. 2 V DC
Max. power consumption	40 V
External fuse	2.5 A _F
Input, version A1 Terminal D: U _E Terminal E:	Differential amplifier, R _i = 100 kΩ 0...±10V 0V
Input, version S1 Terminal D: I _{D-E} Terminal E: I _{D-E}	Burden, R _{sh} = 200Ω 4...(12) ... 20 mA Current loop I _{D-E} feedback
Max. differential input voltage at 0 V	D → B } max. 18 V DC E → B }
Test signal, version A1 Terminal F: U _{Test} Terminal C:	LVDT 0 ... ±10 V Reference 0V
Test signal, version S1 Terminal F: I _{F-c} Terminal C: I _{F-c}	LVDT signal 4...20 mA at external load 200...500 Ω max. 4...20 mA output Current loop I _{F-c} feedback
Protective conductor and screen	See pin assignment (CE-compliant installation)
Recommended cable	See pin arrangement 20 m 7×0.75 mm ² 40 m 7×1 mm ²
Calibration	Calibrated at the factory, see characteristic curve of the valve

Version A1:
Standard



Version S1:
Standard



Ordering information

Model-Number	Type designation
SH6LC	
Factory code assigned at the factory	Seal material D NBR F Fluororubber X For other requirements, please consult
Control spool symbols 4/4-way version Y O	Input signal A +/- 10V S 4-20mA X For other requirements, please consult
Q _N /Rated flow at ΔP=35 bar per land(500 psi) 04 12 24 40 X	Flow characteristic L Linear X For other requirements, please consult

Regular Model

Model	Factory code	Type	Rate flow	Input signal
SH6LC	04A	Y04LAD	04 L/min	+/- 10V
SH6LC	12A	Y12LAD	12 L/min	+/- 10V
SH6LC	24A	Y24LAD	24 L/min	+/- 10V
SH6LC	40A	Y40LAD	40 L/min	+/- 10V
SH6LC	04B	O04LAD	04 L/min	+/- 10V
SH6LC	12B	O12LAD	12 L/min	+/- 10V
SH6LC	24B	O24LAD	24 L/min	+/- 10V
SH6LC	40B	O40LAD	40 L/min	+/- 10V