

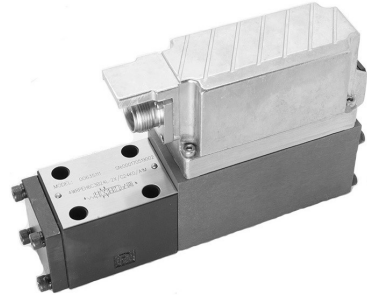
# AH-4WRPEH10...type Servo Valve

AH-4WRPEH10...20S...type

Size 10

Max. Working Pressure: 315 bar

Max. Flow: 100 L/min



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## Features

- Directly actuated controlled directional valve, with control spool and sleeve in servo quality
- Single-side operated, 4/4 fail-safe position in deactivated state
- Electric position feedback and integrated electronics (OBE), calibrated in the factory
- Electric port 6P+PE Signal input of differential amplifier with interface A1:  $\pm 10$  V or interface F1: 4...20mA (Rsh=200 $\Omega$ )
- Subplate mounting, porting pattern to ISO 4401-05-04

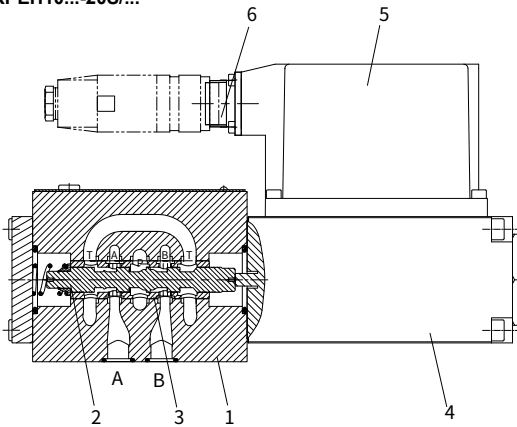
## Function and configuration

AH-4WRPEH type high-response valve is a pilot-operated directional control valve with electrical position feedback and integrated electronics (OBE). The valves consists of thehousing(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 untensioned to a maximum and the valve is in fail-safe position. 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. It must be taken into account in system designs.

Type AH-4WRPEH10...-20S/...



# Ordering code

	AH-4WRP	E	H	10		B		-20S/G24	/	V	*
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Directional control valve  
direct operated

With integrated electronics =E

Control spool/sleeve =H

NG 10 =10

Spool symbols

AB
a o b
PT

	=C3,C5
	=C4,C1
	=C

Transitional symbols

With symbols C5 and C1:  
P→A: qv    B→T: qv/2  
P→B: qv/2    A→T: qv

Installation side of the inductive  
position transducer

AB
a o b
PT

=B (standard)

Further information  
in plain text

V = FKM Seals  
No code = NBR Seals

Interface of the  
control electronics  
A1= Command/  
actual value ±10 V  
F1 = Command/  
actual value 4 to 20 mA

K31= Without plug-in connector  
Z31= With plug-in connector

Supply voltage of the control electronics  
G24 = +24V direct current

20S= Component series 20S to 29S

Flow characteristics  
L= Linear  
P= Inflected characteristic curve

Rated flow at 70 bar valve pressure difference  
50= 50L/min  
100= 100L/min

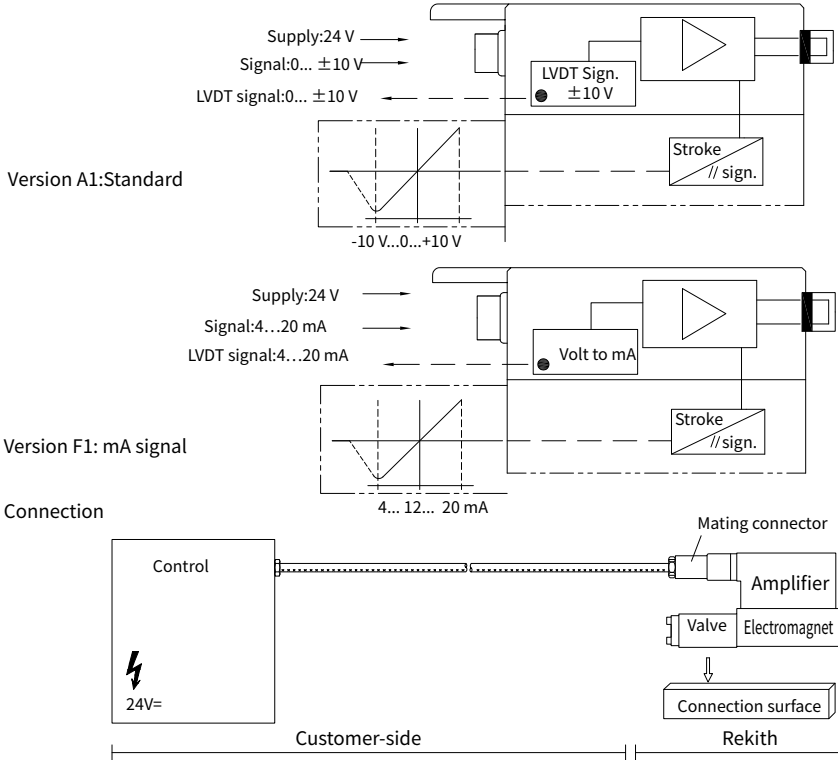
# Symbols

	L: Linear	P: Inflection 40%						
<table border="1" style="border-collapse: collapse; width: 100%;"> <tr><td style="padding: 2px;"></td><td style="padding: 2px;">C4,C1</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;">C3,C5</td></tr> <tr><td style="padding: 2px;"></td><td style="padding: 2px;">C</td></tr> </table>		C4,C1		C3,C5		C		
	C4,C1							
	C3,C5							
	C							

## Technical data

<b>General</b>			
Design		Spool valve, directly operated, with steel sleeve	
Actuation		Proportional solenoid with position control, OBE	
Connection type		Plate port, porting pattern (ISO 4401-05-04-0-05)	
Installation position		Any	
Ambient temperature range		°C	-20...+50
Weight		Kg	7.1
Maximum vibration resistance (test condition)		Max. 25 g, space vibration test in all directions (24h)	
<b>Hydraulic (measured with HLP 46, <math>\theta_{\text{oil}}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}</math>)</b>			
Hydraulic fluid		Hydraulic oil according to DIN 51524...535	
Viscosity range	Recommended	mm <sup>2</sup> /s	20...100
	Max. admissible	mm <sup>2</sup> /s	10...800
Hydraulic fluid temperature range		°C	-20 to +70
Max. 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	50                      100
Maximum operating pressure		bar	Port P, A, B: 315
Maximum operating pressure		bar	Port T: 250
Leakage flow at 100 bar	Linear	cm <sup>3</sup> /min	<1200                      <1500
	Nonlinear	cm <sup>3</sup> /min	<600                      <600
<b>Static/Dynamic</b>			
Hysteresis		%	≤ 0.2
Actuating time for signal step 0 ... 100%		ms	25
Temperature drift		Zero shift < 1% at $\Delta T=40^{\circ}\text{C}$	
Zero compensation		Ex factory $\pm 1\%$	
<b>Electric, control electronics integrated in the valve</b>			
Relative duty cycle		%	100ED
Protection class		IP 65 (with mating connector mounted and locked)	
Connection		Mating connector 6P+PE, DIN 43563	
Supply voltage		24VDC <sub>nom</sub>	
Terminal A		min. 21VDC / max. 40VDC	
Terminal B: 0V		Ripple max. 2 VDC	
Fuse protection, external		A <sub>F</sub>	2.5
Input, version "A1"		Differential amplifier, R <sub>i</sub> = 100 kΩ	
Terminal D (U <sub>d</sub> )		0... ± 10V	
Terminal E		0V	
Input, version "F1"		Load, R <sub>sh</sub> = 200 Ω	
Terminal D (I <sub>D,E</sub> )		4...12...20mA	
Terminal E (I <sub>D,E</sub> )		Current loop I <sub>D,E</sub> return	
Test signal, version "A1"		LVDT	
Terminal F (U <sub>Test</sub> )		0... ± 10V	
Terminal C		Reference 0 V	
Test signal, version "F1"		LVDT	
Terminal F (I <sub>F,C</sub> )		4...20 mA output	
Terminal C (I <sub>F,C</sub> )		Current loop I <sub>F,C</sub> feedback	

## 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 mm<sup>2</sup> to 20 m of length
  - 1.0 mm<sup>2</sup> to 40 m of length Outer Ø: - 9.4...11.8 mm
  - 12.7...13.5 mm

**Note:**  
Supply voltage 24 V DC<sub>nom</sub>

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

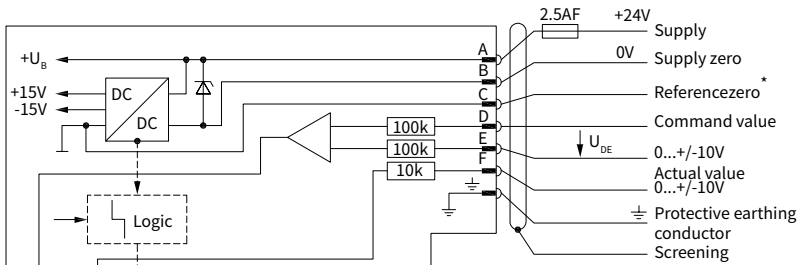
Additionally for version F1:  
I<sub>D,E</sub> ≥ 3mA - valve is active  
I<sub>D,E</sub> ≤ 2mA - valve is deactivated.

Electric signals taken out via control electronics may not be used for the switch-off of safety-relevant machine functions!

# Integrated electronics

## Block diagram/pin assignment

Version A1:  $U_{D-E} 0... \pm 10V$

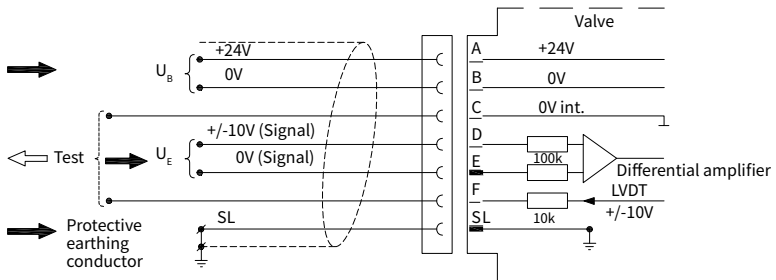


\* Do not connect with supply zero !

Signal	4/4 controlled directional valve
$U_{D-E}$ 0...+10V	
$U_{D-E}$ 0V	
$U_{D-E}$ 0...-10V	

## Pin assignment 6P+PE

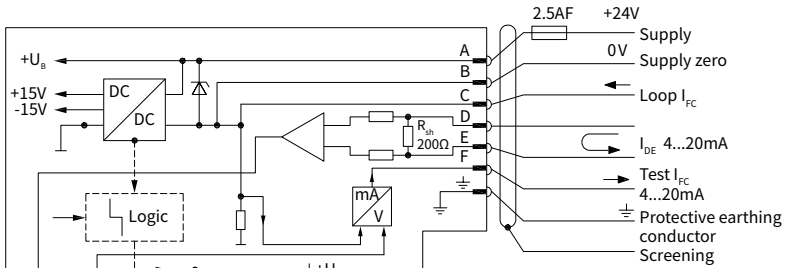
Version A1:  $U_{D-E} 0... \pm 10V$



# Integrated electronics

## Block diagram/Pinout

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

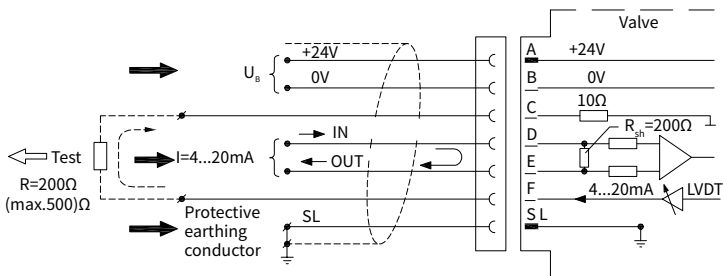


Signal	4/4 controlled directional valve
$I_{D-E}$ 12...20mA	
$I_{D-E}$ 12mA	
$I_{D-E}$ 4...12mA	

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

## Pin assignment 6P+PE

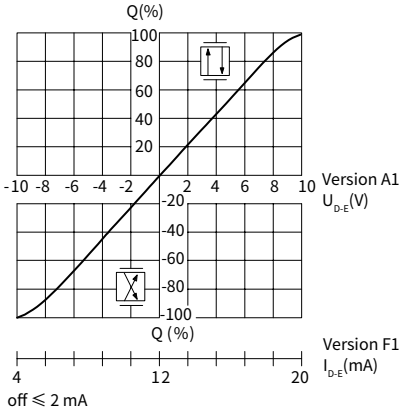
Version F1:  $I_{D-E}$  4...20mA



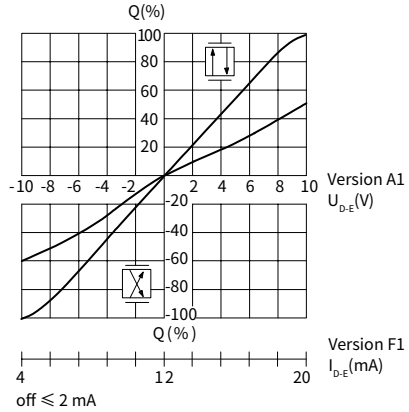
# Characteristic curves (measured with HLP46, $\vartheta_{oil}=40^{\circ}\text{C} \pm 5^{\circ}\text{C}$ )

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

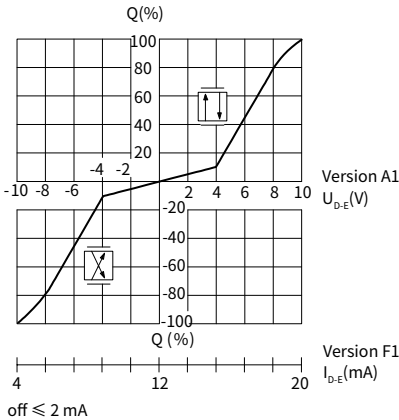
Linear characteristic curve (version "L", 1 : 1)



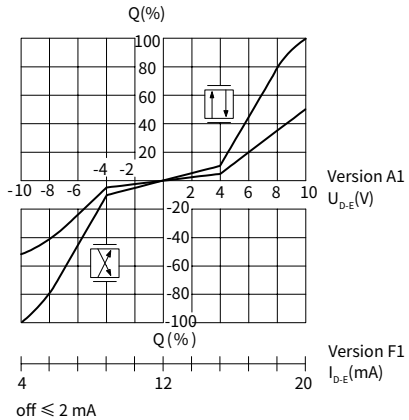
Linear characteristic curve (version "L", 2 : 1)



Inflected characteristic curve "P",  
inflection at 40%, 1 : 1

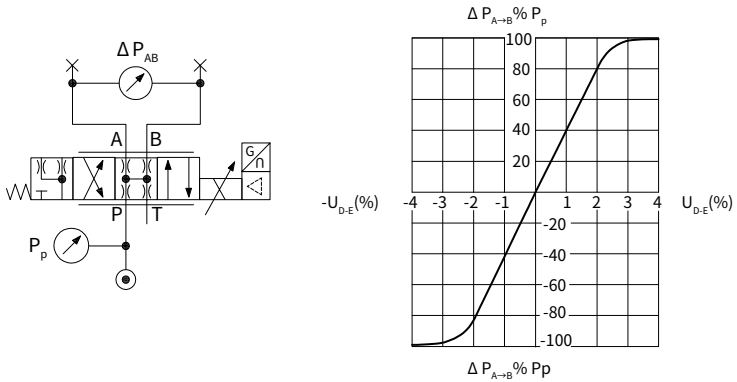


Inflected characteristic curve "P",  
inflection at 40%, 2 : 1

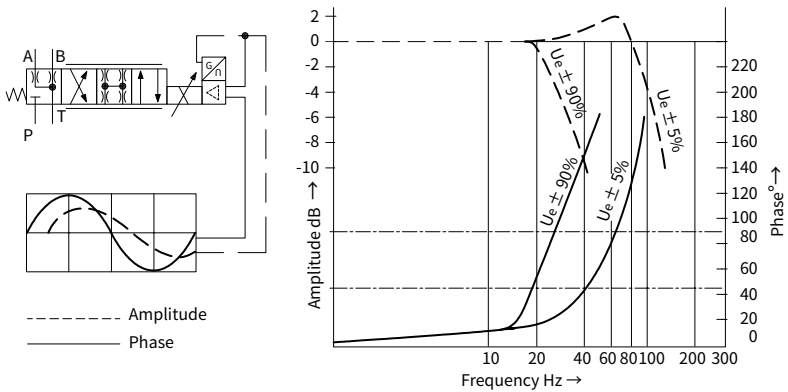




**Characteristic curves:** Pressure amplification (measured with HLP46,  $\vartheta_{oil} = 40^\circ\text{C} \pm 5^\circ\text{C}$ )



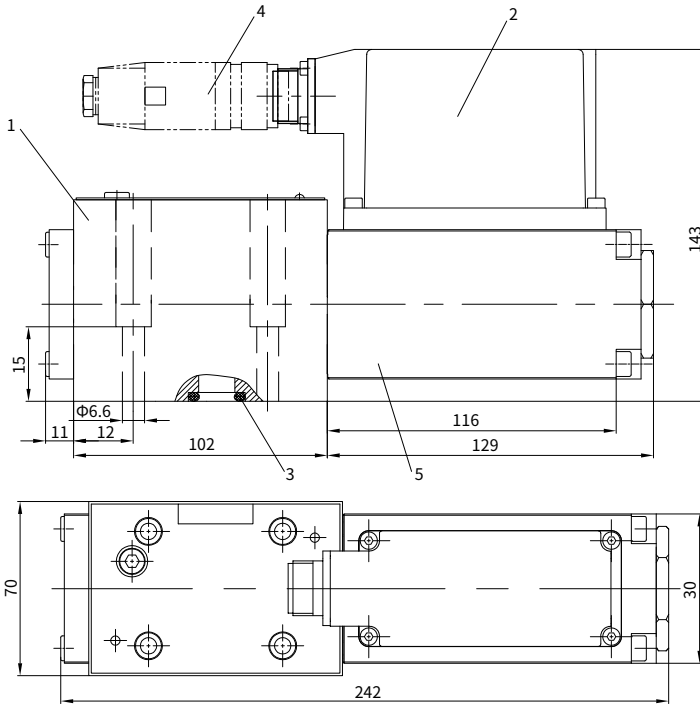
**Characteristic curves:** Bode diagram



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# Unit dimensions

(nominal dimensions in mm)



- 1 Valve housing
- 2 Integrated electronics
- 3 Identical seal rings for ports A, B, P and T (O-ring 12×2)
- 4 Plug-in connector
- 5 Proportional solenoid with inductive position transducer

