HYDAC INTERNATIONAL

4/3 proportional directional valves direct-acting with Onboard Electronic and transducer
P4WERE 10

DESCRIPTION

HYDAC proportional directional valves of the P4WERE series combines directional control with speed control of the consumer.

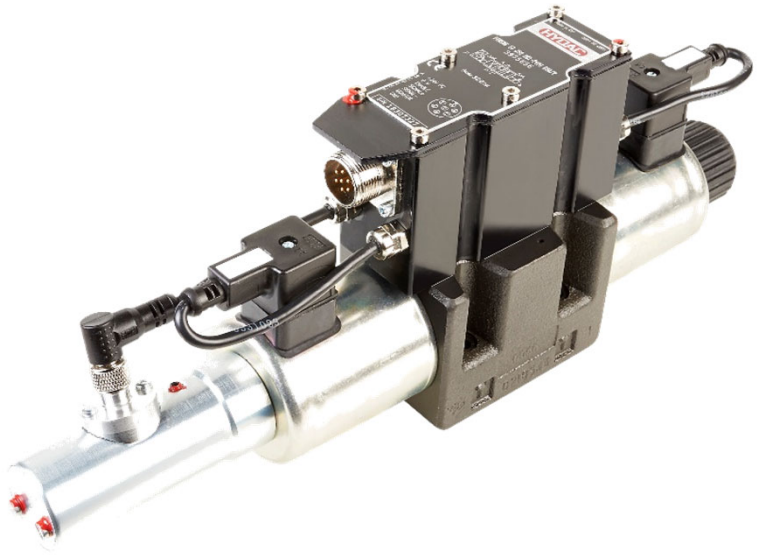
The controlled volume flow is proportional to the electrical input signal on valve electronics.

The integrated digital electronics in combination with the transducer allows improved performance and function due to

- regulation of size and direction of a volume flow
- short response times
- low hysteresis
- high repeatability

FEATURES

- High flow capacity due to optimized, cast casing
- Low hysteresis due to precision machining of moving parts
- With integrated Onboard Electronic and transducer
- Easy interchangeability due to internationally standardised interface according to ISO 4401



Nominal size 10
up to 180 l/min
up to 320 bar

CONTENT

MODEL CODE

P4WERE 10 E 50 D01 – 24 PG E0 A /V

Type
Proportional directional valve
with Onboard Electronic (OBE) and transducer

Nominal size
10

Symbol
see page 2

Nominal flow (at Δp = 10 bar, P → T)
50 = 50 l/min
50/25 = 50 l/min (P → A) /25 l/min (B → T)
70/35 = 70 l/min (P → A) /35 l/min (B → T)
75 = 75 l/min

Series
D01 = standard with manual override

Power supply
24 = 24 VDC

Coil Type
PG = DIN connector to EN175301-803

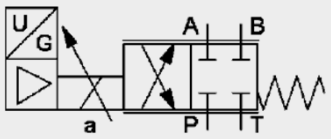
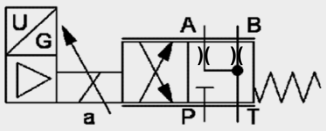
Input signal
E0 = ±10 V
E1 = 4 – 20 mA

Pin C Function
see „Diagramms Pin C Function“ on page 7

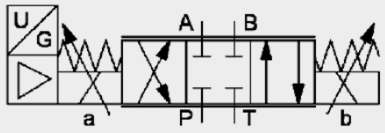
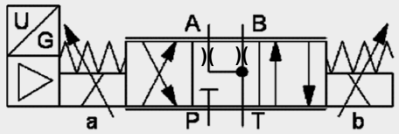
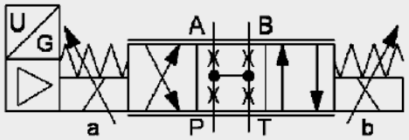
Sealing material
V = FKM (standard)
N = NBR

SPOOL TYPES / SYMBOLS

4/2 DIRECTIONAL SPOOL VALVES

Type	Basic symbol
EA	
QA	

4/3 DIRECTIONAL SPOOL VALVES

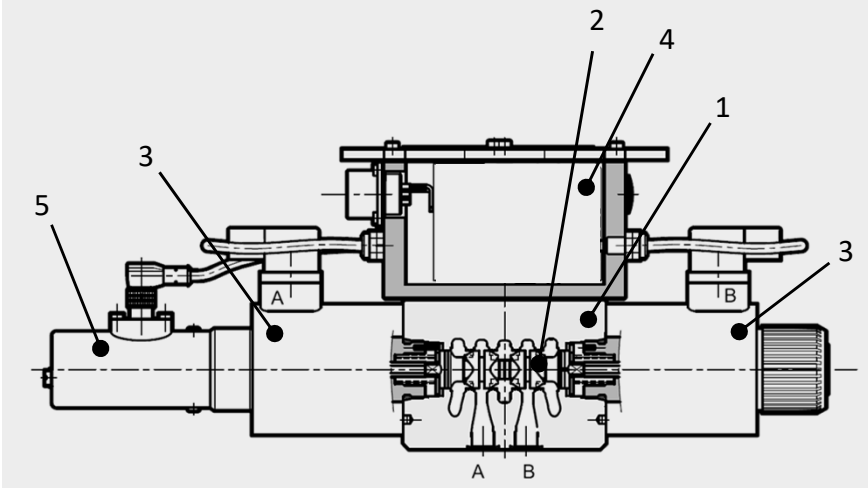
Type	Basic symbol
E	
Q	
Z	

FUNCTION

The proportional valves of the P4WERE series are direct-acting valves with integrated Onboard Electronic.
The volume flow is controlled continuously (proportionally) to the electrical input signal at the solenoid coil.
The valve constists of a valve casing (1), a control piston (2), as well as a transducer (5) and two proportional solenoids (3).
The proportional solenoid coils are controlled via the integrated Onboard electronic (OBE) (4).

According to the input signal, the solenoid generates a force and shifts the piston against a spring. This releases cross-sections, which define the size of the volume flow, depending on the pressure difference at the relevant control element.

SECTION VIEW



ACCESSORIES

	Designation	Part no.
Seal kits (4-part set)	12,42 x 1,78-NBR -90Sh	3524438
	12,4 2x 1,78-FKM -90Sh	3524439
Mounting screws (4 pcs)	DIN EN ISO 4762 - M6 x 40 – 10.9	3524314
Main connector	6+PE EN175201 Part 804	6080324
Electronic	Lin-Bus Interface	3648934

TECHNICAL DATA [1]

General specifications		
$MTTF_d$		150 - 1200 years, according to DIN EN ISO 13849-1:2016; Table C.1, confirmation of ISO 13849-2:2013; Tables C.1 and C.2
Ambient temperature	[°C]	-20 to +60
Installation position		beliebig
Weight	[kg]	5,6 with one solenoid; 7,1 with two solenoids
Material		Valve casing: Cast iron Name plate: Aluminium
Surface coating		Valve casing: Phosphatiert
Hydraulic specifications		
Operating pressure	[bar]	Port P, A, B: p_{max} = 320 Port T: p_{max} = 210
Flow (at Δp 10 bar p-T)	[l/min]	25 – 35 – 50 – 70 – 75
Operating fluid		Hydraulic oil to DIN 51524 part 1, 2 and 3
Media operating temperature range	[°C]	-20 to +80
Viscosity range	[mm²/s]	10 to 400
Permitted contamination level of operating fluid		class 18/16/13 to ISO 4406
Hysteresis	[%]	< 0,2 of Q_{max}
Repeatability	[%]	< 0,1 of Q_{max}
Sealing material		FKM (standard), NBR
Electrical specifications		
Switching time (0 → 100%)	[ms]	see performance on page 4
Switching time (100% → 0)	[ms]	
Type of voltage		DC
Rated voltage	[V]	24
Protection class to DIN EN 60529		with electrical connection “G“ IP65[2]/ IP67[2]

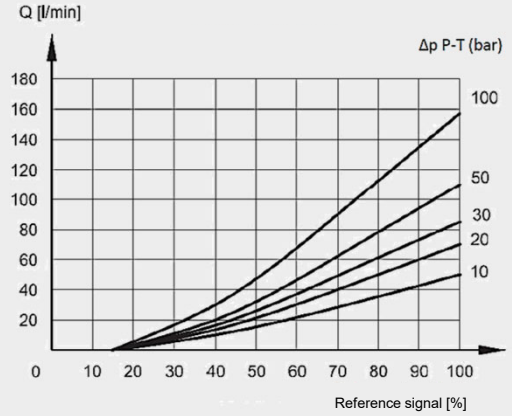
[1] see „Conditions and Instructions for Valves“ in brochure 53.000
[2] if installed correctly

PERFORMANCE

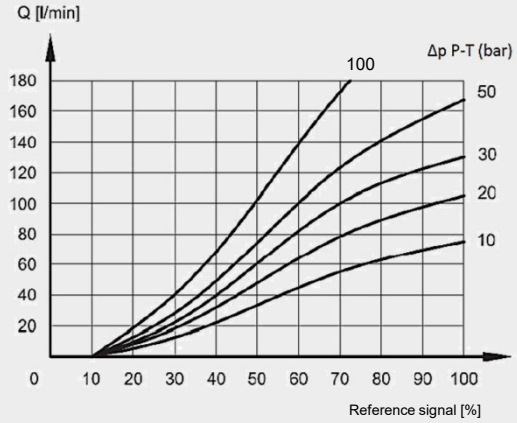
measured at T_{oil} = 50°C and 36 mm²/s, p = 140 bar

The performance represent typical curves for the various available valve pistons, at a constant Δp, depending on the current supplied by the solenoid coil.
The total valve pressure drop (Δp) was measured between port P and T of the valve.

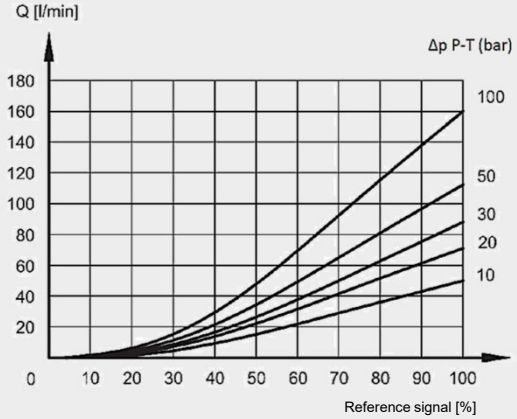
E / Q 50 spool



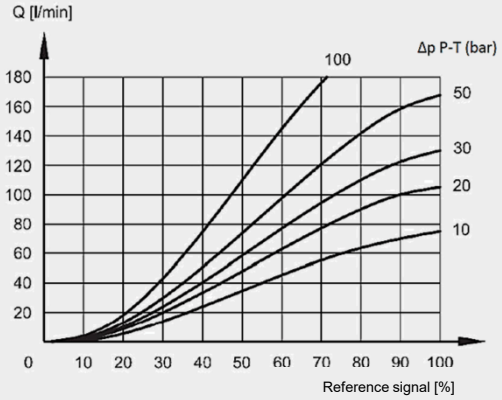
E / Q 75 spool



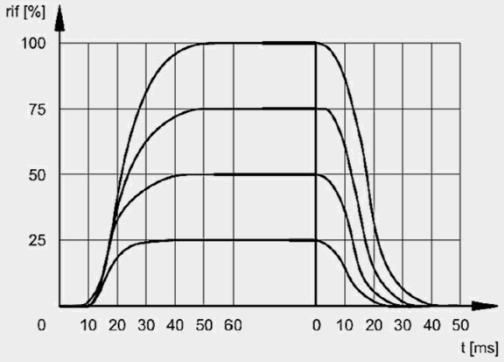
Z 50 spool



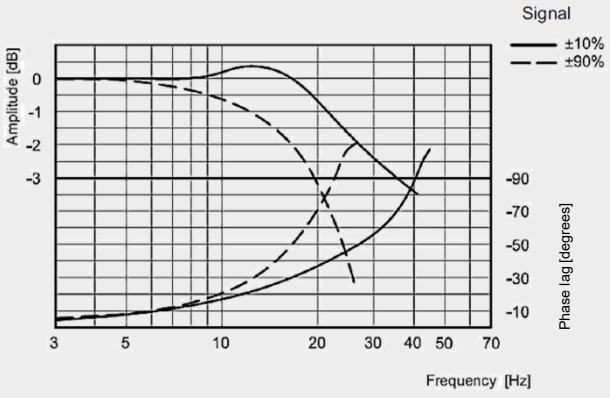
Z 75 spool



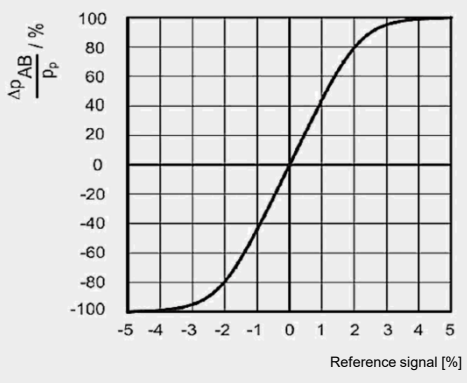
Switching time



Frequency response Z spool



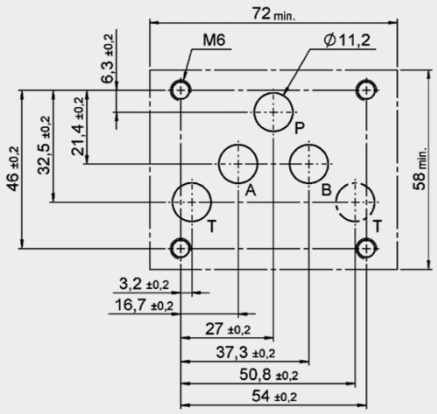
Pressure gain Z spool

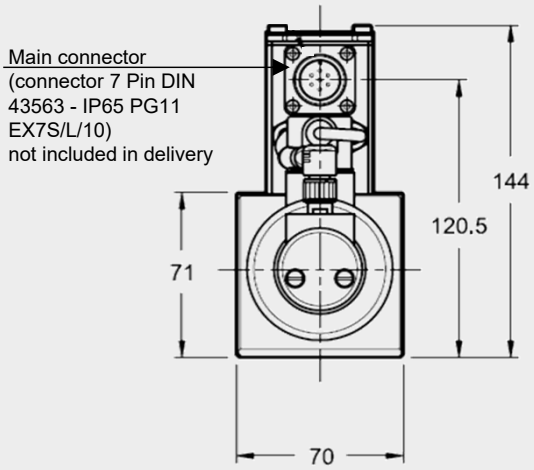


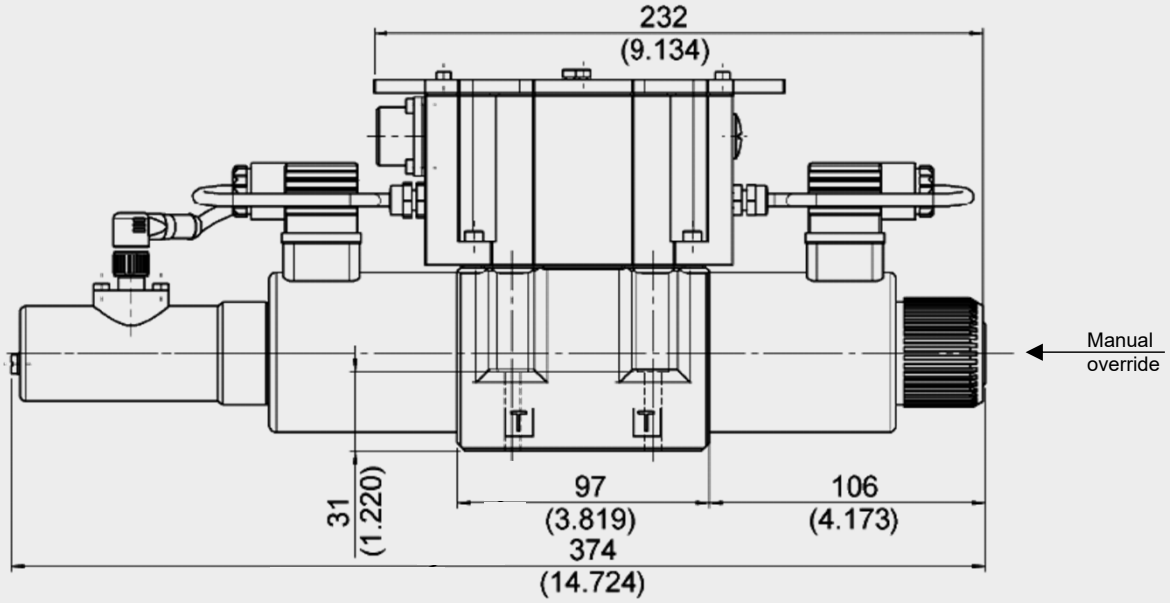
DIMENSIONS

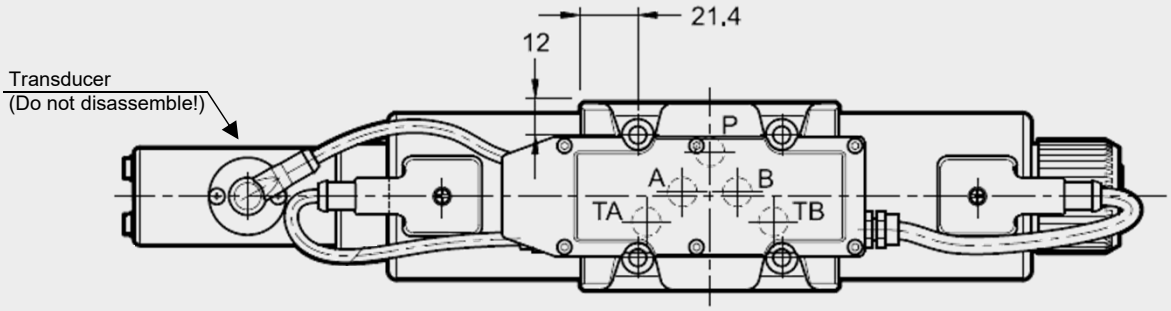
INTERFACE

ISO 4401-05-04-0-05



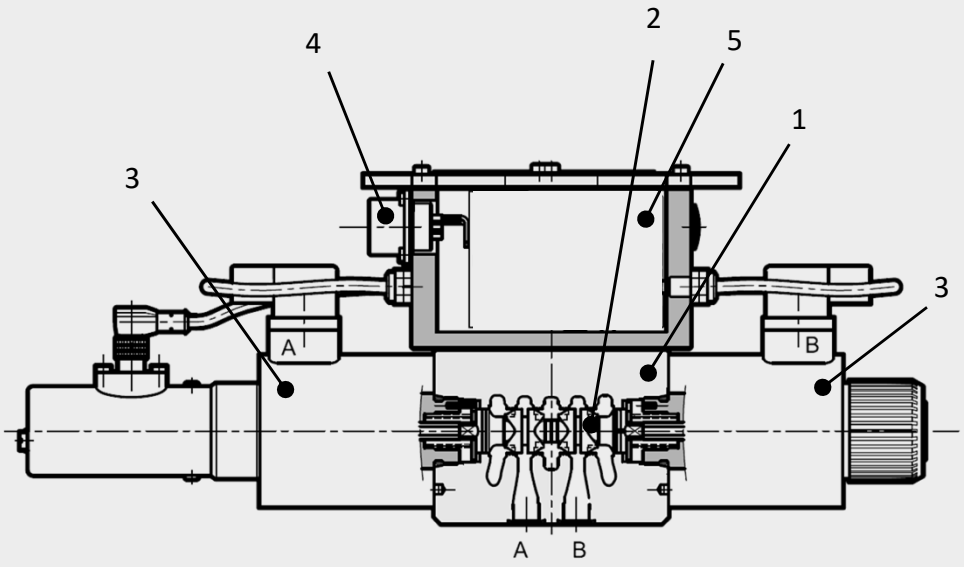






Mounting screws (ISO 4762): 4 pcs M6 x 40 A10.9 (not included in delivery)
Torque: 8 Nm

INTEGRATED ELECTRONIC



Parameterisable only via LIN bus

1) Valve with proportional solenoids
2) Valve piston
3) Proportional solenoid
4) Main connector
5) Electronic housing

General specifications	
Power consumption:	40 W
Current consumption:	max. 2,8 A
Rated voltage:	24 V DC (19 – 30 V DC, ripple max. 3 Vpp)
Duty cycle:	100% ED (continuous)
Control signal E0:	Voltage signal ±10 VDC
Control signal E1:	Current signal 4 – 20 mA
Alert signale:	Overload and overheating of electronics
Communication:	LIN-Bus ISO 11898 LIN-Bus Interface
Electronical connection:	7-pin MIL-C-5015-G (DIN-EN 175201-804)
LIN-Bus connection:	M12-IEC 60947-5-2
EMC EN61000-6-4:	According to 2014/30/EU standard
EMC EN61000-6-2:	According to 2014/30/EU standard
Type of protection:	IP65 / IP67 (CEI EN 60529 standard)

ELECTRONIC

Standard version with reference signal voltage E0

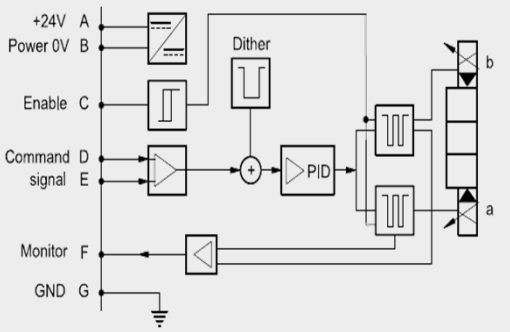
PIN	Value	Version A	Version B	Version C
A	24 V DC	Supply voltage		
B	0 V			
C		release 24 V DC	unoccupied	PIN F reference 0 V
D	+/- 10 V	control (differential input)		
E	0 V	PIN D reference		
F	+/- 10 V	monitor (0V reference PIN B)		monitor
PE	GND	earth (mass)		

Standard version with reference signal current E1

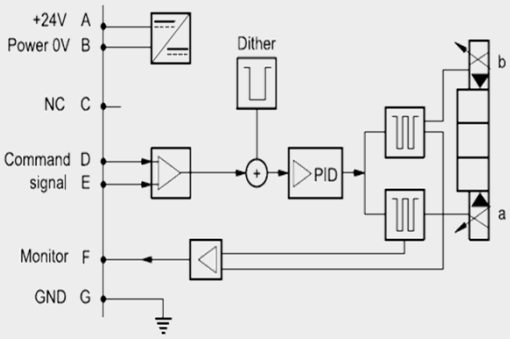
PIN	Value	Version A	Version B	Version C
A	24 V DC	Supply voltage		
B	0 V			
C		release 24 V DC	unoccupied	PIN F reference 0 V
D	4 - 20 mA	control		
E	0 V	PIN D reference		
F	4 - 20 mA	monitor (feedback) (0V reference PIN B)		monitor (feedback)
PE	GND	earth (mass)		

Diagramme PIN C Function

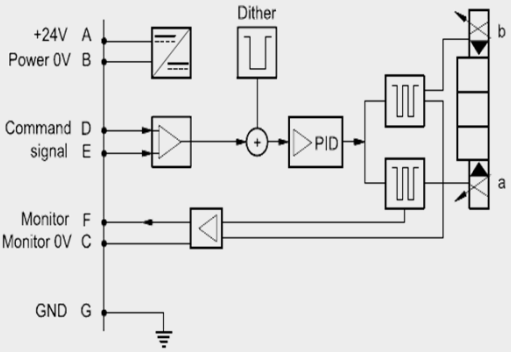
Version A: External release (on request)



Version B: Internal release (standard)



Version C: 0V Monitor (on request)



Hint 1

- Voltage signal (0V centring position)
  - -10V to 0 V: flow direction P – B and A – T
  - 0V to +10V: flow direction P – A und B – T
- Current signal (12 mA centring position)
  - 4 mA to 12 mA: flow direction P – B and A – T
  - 12 mA to 20 mA: flow direction P – A and B – T

Pin D and Pin E must always be contacted.

Hint 2

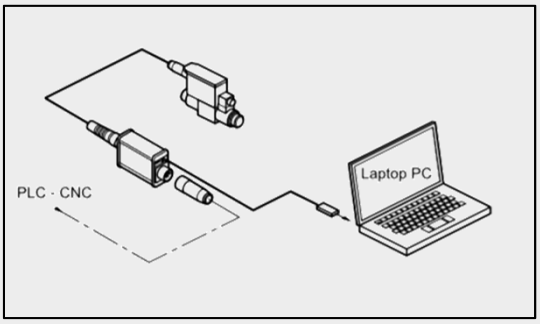
PIN C function A and B: Nominal input value measured between pin F and pin B.

Hint 3

We recommend to provide an external protection at pin A (24 V DC) for protection of the electronics: 5A/50V fast fuse.

LIN-BUS INTERFACE

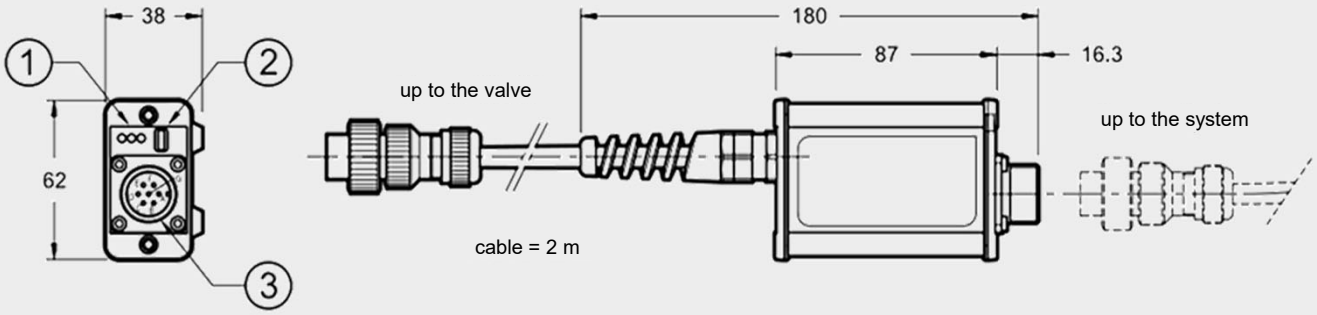
Is also required for parameterisation of Onboard electronic

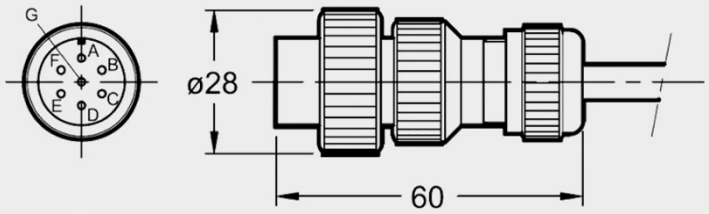


- The kit contains a test device with embedded connection cable 7 pin and a USB cable for connection to the PC. The dedicated software are available for download from our website.
- The device is suitable for troubleshooting and functional testing of HYDAC proportional valves with LIN-bus interface.
- The software allow the check of settings, display the diagnostic and permit to make changes on the standard parameter setting made in factory, adapting it to your system.
- No additional power supply is required: the device uses the supply source from the 7 PIN system cable.

Content*: Parameterize-software, adapter and PC connection cable

* On request (not included in delivery)





1) LED
2) USB Micro B socket
(cable with – length = 2 m - in delivery)
3) Main connector with 7 Pin

In the casing of electronics, a 7-pole port for connecting with external devices is integrated.

The cable diameter for the main connector (cable and connector are not included in delivery) has to be min. 8 mm and should be max. 10 mm.

Hint
We recommend the use of a metal connector to ensure electromagnetic compatibility (EMC) and to avoid electromagnetic disturbances.

Note
The information in this brochure relates to the operating conditions and applications described. For applications not described, please contact the relevant technical department.
All technical details are subject to change without notice.

HYDAC Fluidtechnik GmbH
Justus-von-Liebig-Str.
D-66280 Sulzbach/Saar
Tel: 0 68 97 /509-01
Fax: 0 68 97 /509-598
E-Mail: valves@hydac.com