

HYDAC INTERNATIONAL

4/2 and 4/3 Proportional Directional Valve
Spool Design, Direct-Acting
P4WE6 A01

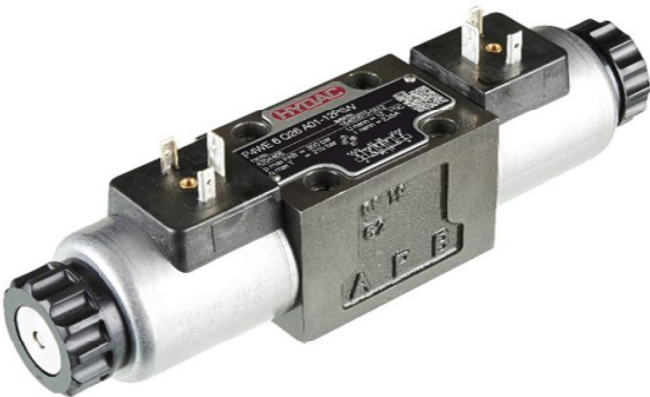
DESCRIPTION

HYDAC 4/2 and 4/3 proportional directional valves from the P4WE series combine directional control with velocity control of the actuator.

The controlled flow rate is proportional to the electric input signal at the solenoid coil.

CHARACTERISTICS

- High flow capacity thanks to optimised cast housing
- Low hysteresis thanks to ultra-fine machining of the moving parts
- Easy to exchange thanks to internationally standardised interface ISO 4401
- Electronic remote control by means of EHCD (see brochure 2.429.2)



Size 6
up to 40 l/min
up to 350 bar

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EN 5.228.1.2/09.24

MODEL CODE

P4WE 6 EA 16 A01 – 24 PG /V

Designation

Proportional spool valve with four main connections, direct-acting

Nominal size

6

Symbol

See page 2

Nominal flow rate (at $\Delta p = 10$ bar, $P \rightarrow T$)

04 = 4 l/min

08 = 8 l/min

16 = 16 l/min

26 = 26 l/min

Series

A01 = specified by manufacturer

A40 = with zinc-nickel coating

Nominal voltage

24 = 24 V DC

12 = 12 V DC

Type of electrical connection (for details see page 7)

PG = Plug connector in acc. with DIN EN175301-803

PN = Deutsch plug connector

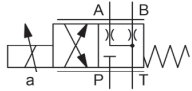
Sealing material

V = FKM (standard)

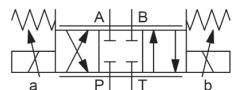
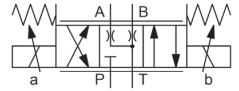
N = NBR

SPOOL TYPE / SYMBOLS

4/2 directional spool valve

Type	Basic symbol
EA	
QA	

4/3 directional spool valve

Type	Basic symbol
E	
Q	

FUNCTION

The proportional valves of series P4WE are direct-acting proportional directional valves. The flow rate is constantly (proportionally) controlled in accordance with the electric input signal at the solenoid coil.

The valve is made up of a valve housing(1), a control spool (2) and the two proportional solenoids (3).

In accordance with the input signal, the solenoid generates a force and moves the spool against the spring. At the same time, the opening areas are released, determining the size of the flow rate, in accordance with the pressure difference at the relevant control edge.

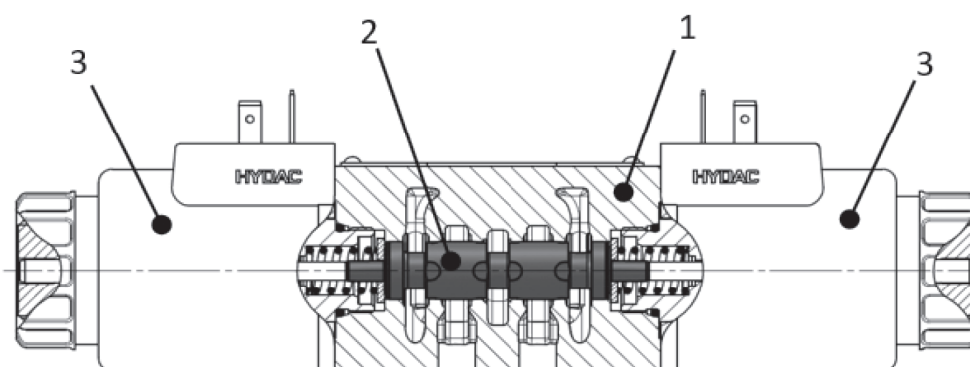
Electronic modules are available for the electronic remote control of the solenoid (see brochure 2.429.2).

Note: Vent the system and valve before initial start-up.

Attention:

The valves are available in 12 V and 24 V coil versions. Electronic controls supplied with 24 V DC enable improved dynamics and hysteresis values in a valve with 12 V coil. Electronic controls supplied with 12 V DC can only be used in combination with a 12 V coil design. The dynamic advantages of the valve are then lost.

SECTION VIEW



TECHNICAL DATA¹⁾

General specifications		
MTTF _D	150 - 1200 years, assessment 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	-20 °C up to +60 °C	
Installation position	User-definable	
Weight	1.5 kg with one solenoid 2.0 kg with two solenoids	
Material	Valve housing: Cast iron Pole tube Steel Coil housing: Steel Type label: Aluminium	
Surface coating	Valve housing: A01: Phosphate-plated A40: ZnNi Pole tube: Zn Coil housing: ZnNi	
Hydraulic specifications		
Operating pressure	Port P, A, B: p _{max} = 350 bar Port T: p _{max} = 210 bar	
Flow rate adjustment range (at Δp A→B min. 10 bar)	See power limits for directional valve	
Operating fluid	Hydraulic oil to DIN 51524 Part 1, 2 and 3	
Temperature range of operating fluid	-20 °C up to +80 °C	
Viscosity range	15 up to max. 400 mm²/s	
Permitted contamination level of operating fluid	ISO 4406 class 18/16/13 acc. to ISO 4406	
Hysteresis in relation to Q _{max}	8 % of Q _{nom}	
Repeatability in relation to Q _{max}	± 1.5 % of Q _{nom}	
Sealing material	FKM (standard), NBR	
Electrical characteristics		
Reaction times (The reaction time specifications are largely dependent on the valve's pressure, flow rate and application)	Opening time: 50 to 100 ms Closing time: 10 to 60 ms	
Type of voltage	DC voltage	
Nominal voltage	12 V	24 V
Max. current	2.25 A	1.6 A
Resistance at 20 °C	2.8 Ω	5.1 Ω
Voltage tolerance	±10%	
Duty cycle	100 %	
Protection class according to DIN EN 60529	With electrical connection "G" IP65 ²⁾ With electrical connection "N" IP67 ²⁾	
Typical PWM and dither settings (optimal settings are dependent on application)	PWM frequency: 3,000 Hz	
	Dither frequency: 100 Hz	
	Dither amplitude: 500 mA	

¹⁾ See "Conditions and Instructions for Valves" in brochure 53.000.

²⁾ If installed correctly.

TYPICAL PERFORMANCE CURVES

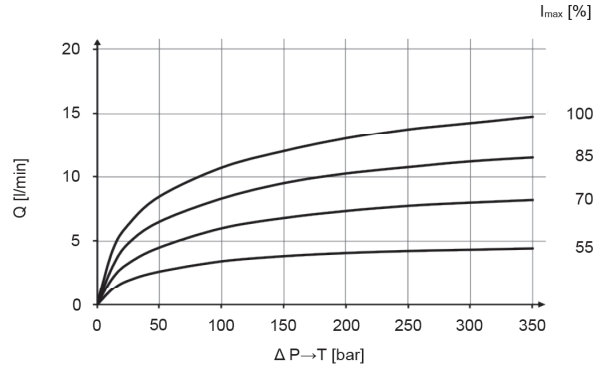
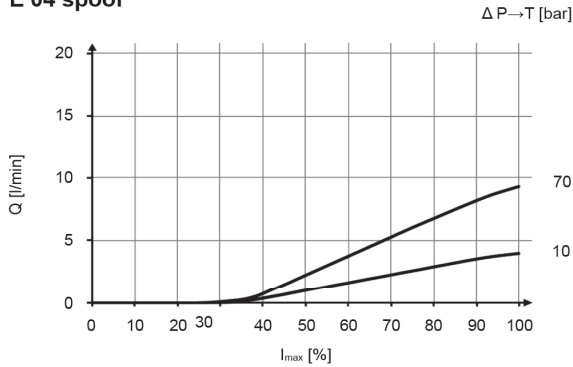
Measured at $T_{oil} = 42\text{ }^{\circ}\text{C}$ and $v = 36\text{ mm}^2/\text{s}$ and two-way flow through the spool (e.g. $P \rightarrow A \rightarrow B \rightarrow T$)

The performance curves constitute typical flow rate curves for the various valve spools. The first curve in each case represents the flow rate value at constant Δp , dependent on the current supply of the solenoid. The second curve represents the relationship between flow rate and Δp with constant solenoid current supply. The total valve pressure loss (Δp) was measured between the valve's P and T lines.

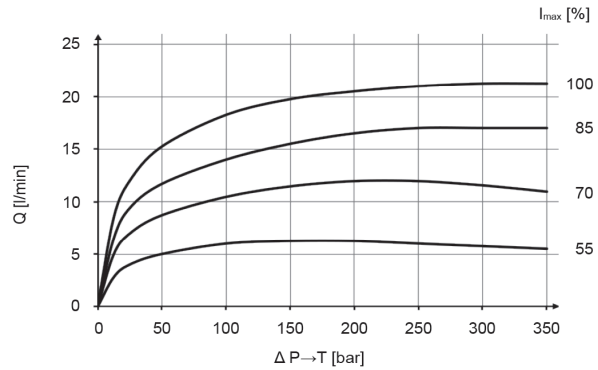
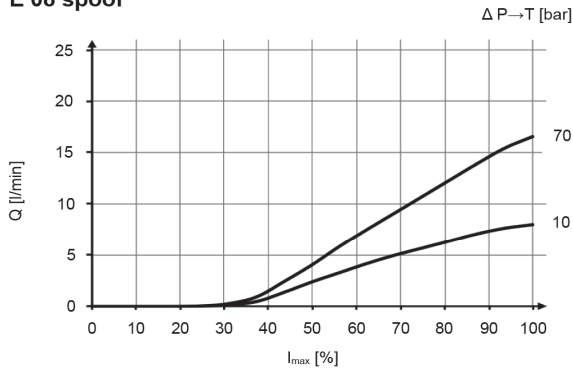
Note:

The QI performance curves shown may deviate by $\pm 6\%$ from I_{max} due to manufacturing tolerances.

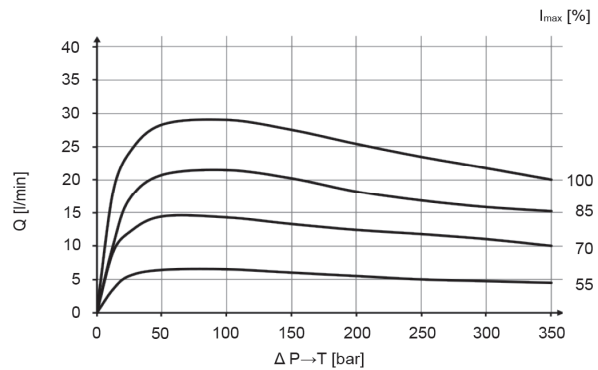
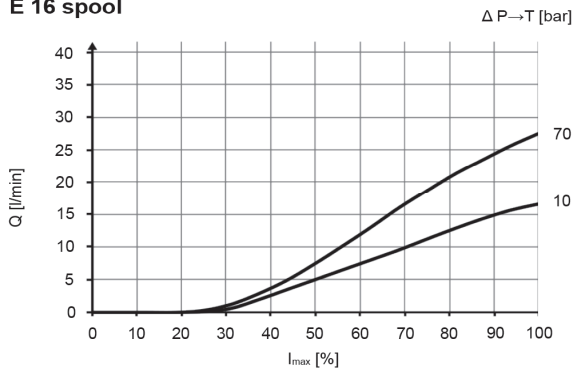
E 04 spool



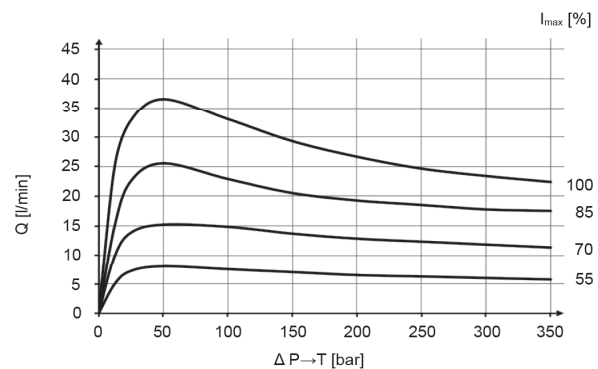
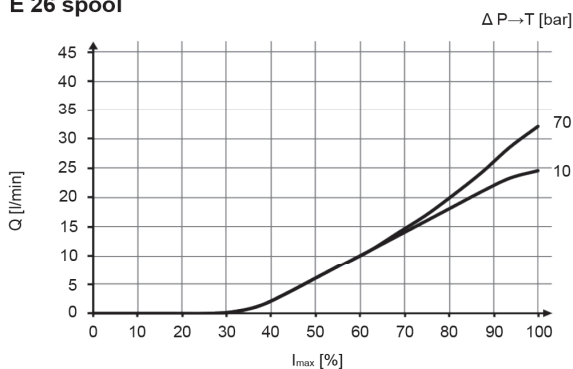
E 08 spool



E 16 spool



E 26 spool



TYPICAL PERFORMANCE

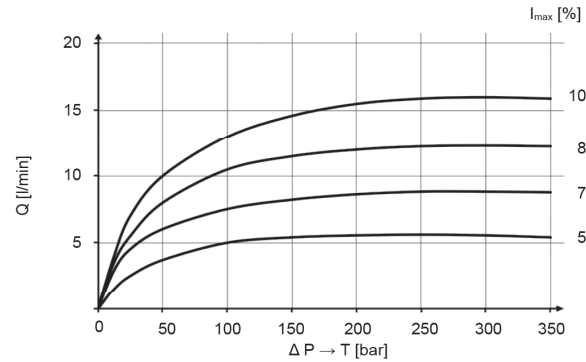
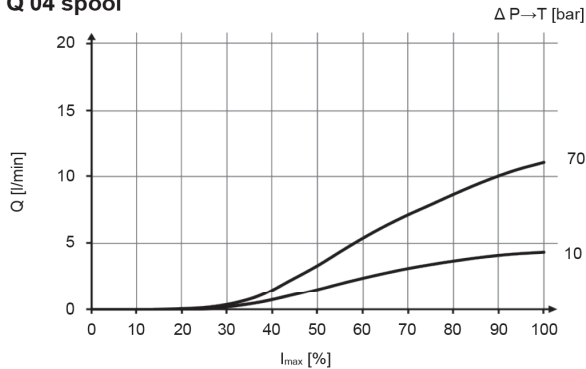
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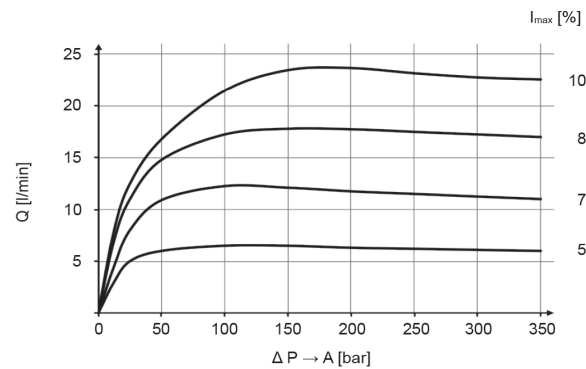
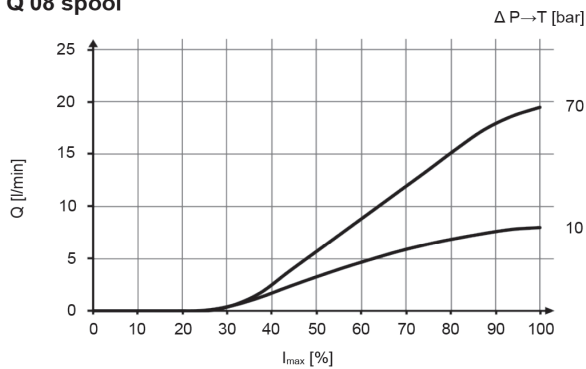
Note:

The QI performance curves shown may deviate by $\pm 6\%$ from I_{max} due to manufacturing tolerances.

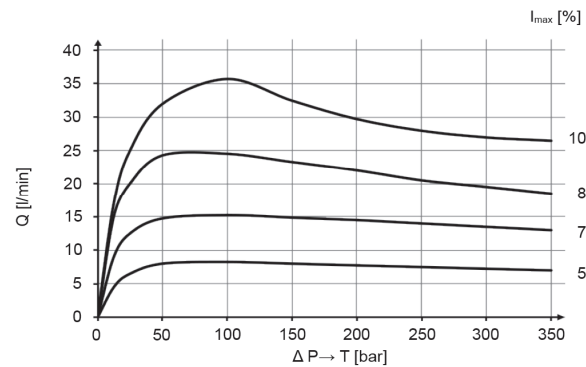
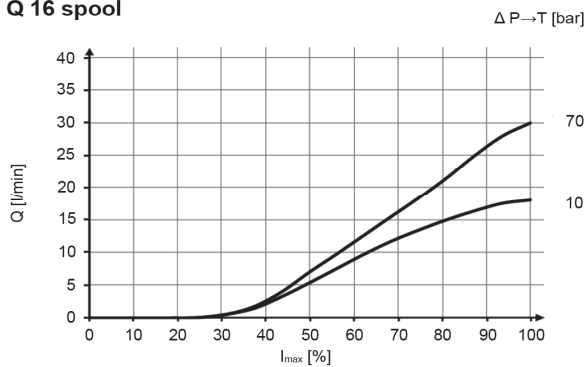
Q 04 spool



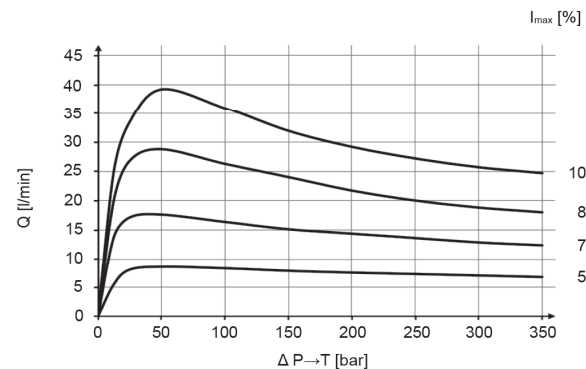
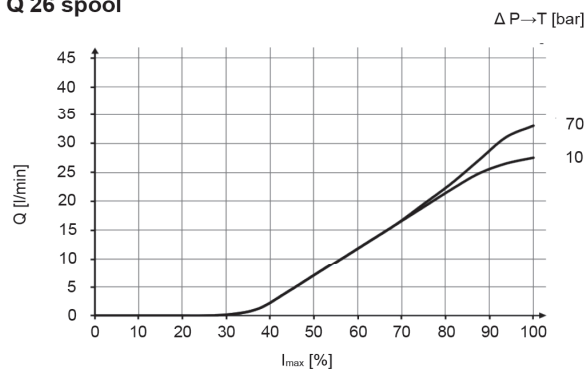
Q 08 spool



Q 16 spool

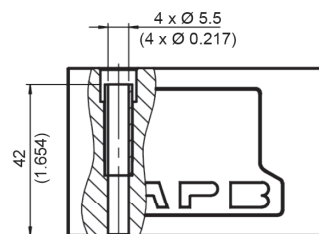
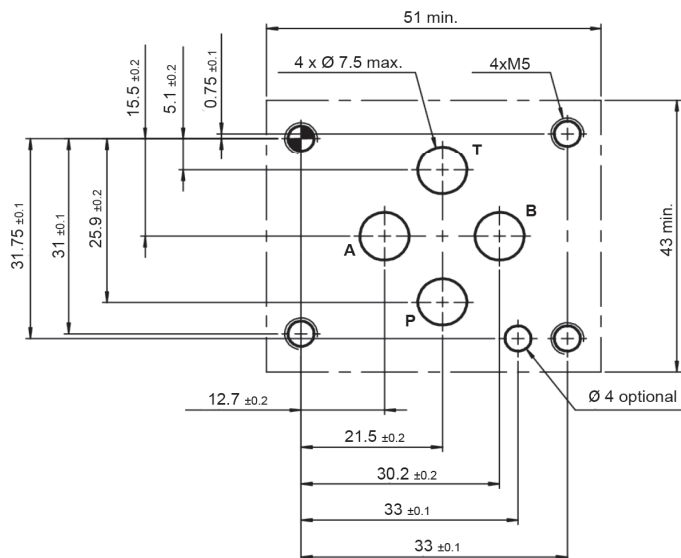


Q 26 spool



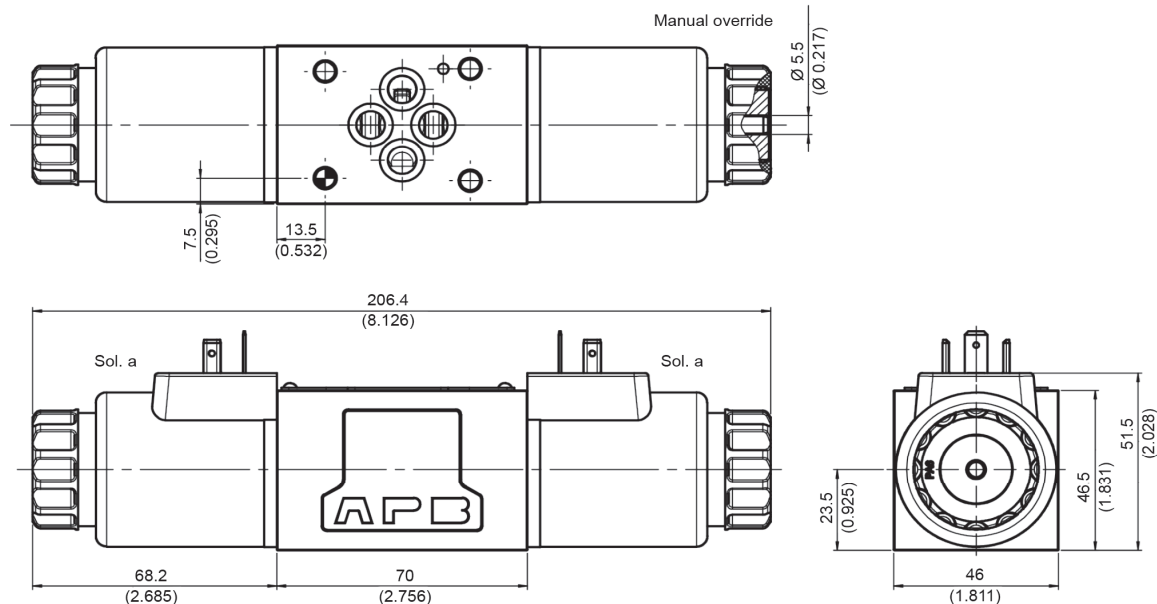
DIMENSION

Interface ISO 4401-03-02-0-05 (Cetop 3)

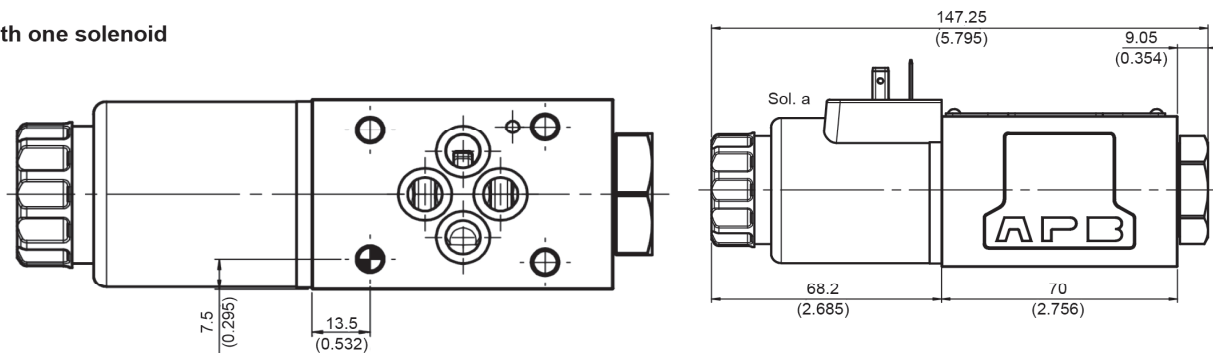


Fastening screws:
 (not included in scope of delivery)
 DIN EN ISO 4762 - M5 x 50 - 10.9
 Tightening torque: 7 Nm

With two solenoids



With one solenoid



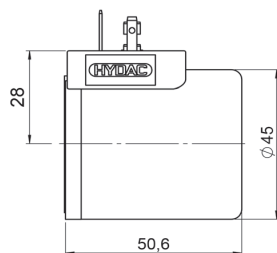
DEPICTION OF COIL

Electrical connections

Plug connector

G

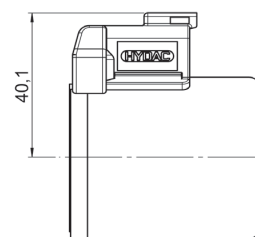
DIN EN 175301-803 A
• IP65



Plug connector

N

DEUTSCH connector
(DT04-2P)
• IP65 / IP67

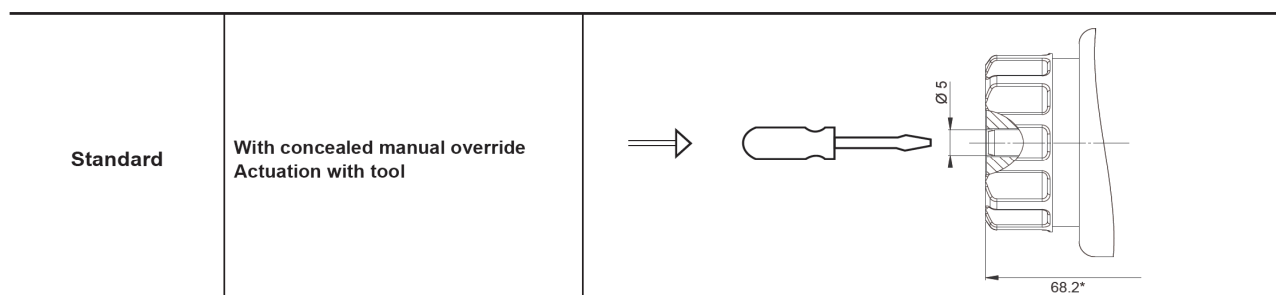


*Further versions on request.

MANUAL OVERRIDE

The valve can also be actuated manually. Various manual override options are available.

The tank pressure should not exceed 50 bar. If the tank pressure is higher, the force required to actuate the manual override is correspondingly higher. For valves with two solenoids, operating both manual overrides at the same time is not permitted.



* Dimensions up to valve casing

ACCESSORY

Designation	Part No.
Seal kits (4-part set)	9.25 x 1.78 90 Sh NBR 3120269
	9.25 x 1.78 90 Sh FKM 3492432
Fastening screws (4x)	DIN EN ISO 4762 - M5 x 50 - 10.9 4312231
Solenoid coils	COIL 12PG- 2.7 -50-2345 -S 4356846
	COIL 24PG- 5 -50-2345 -S 4356848
	COIL 12PN- 2.7 -50-2345 -S 4356849
	COIL 24PN- 5 -50-2345 -S 4356851
Seal kit, solenoid coil	Nut open, O-ring 4317299
Plug connector	Z4 standard 2-pole without PE 394287
	ZW4 incl. bridge rectifier 394293
	Z4L incl. LED 394285
Control module EHCD*	AM005XXX 6158999

NOTE

The information in this brochure relates to the operating conditions and applications described. For applications and operating conditions not described, please contact the relevant technical departments.
Subject to technical modifications.
Documents are only valid if they have been obtained via the website and are up-to-date.

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