HYDAC INTERNATIONAL

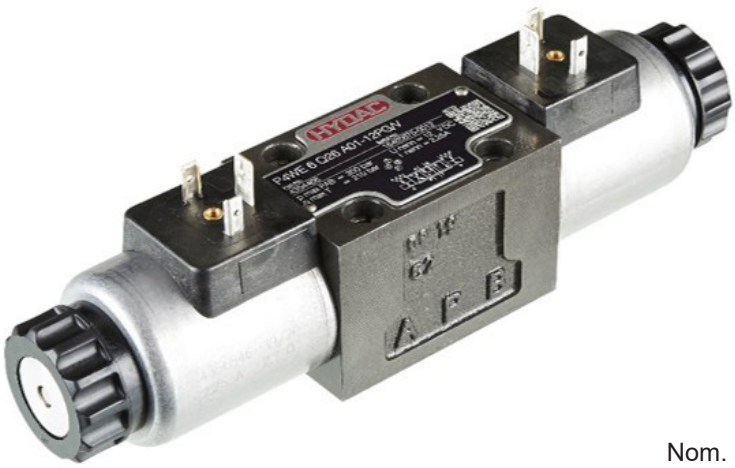
4/2 and 4/3 Proportional Directional Valve Spool Design, Direct-Acting
P4WE 6 A01

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.

TECHNICAL 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)



Nom. size 6
up to 40 l/min
up to 350 bar

CONTENTS

EN 5.228.1.1/09.23

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 Δp = 10 bar, P → 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

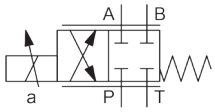
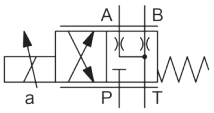
Rated voltage
24 = 24 V DC
12 = 12 V DC

Type of electrical connection (for details see page 7)
PG = plug connector in acc. with DIN EN175301-803
PN = Deutsch plug connector

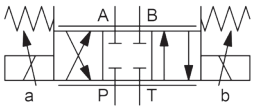
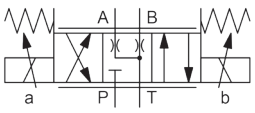
Sealing material
V = FKM (standard)
N = NBR

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.

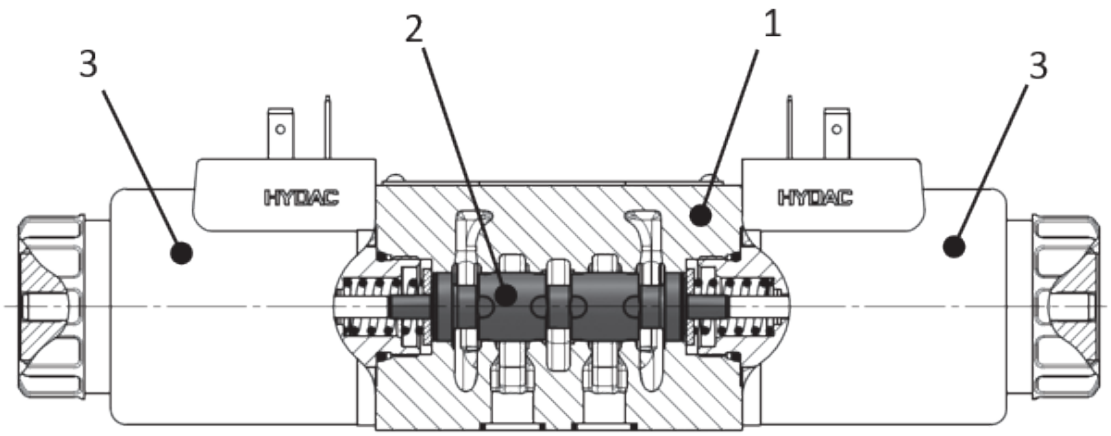
The valve is made up of a valve casing (1), a control spool (2) and the two proportional solenoids (3).
In accordance with the input signal, the solenoid generates a force and moves the spool against the spring. At the same time, the opening areas are released, determining the size of the flow rate, 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).

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

Notice:
The valves are available in 12 V und 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 DATA [1)]

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 to +60 °C	
Installation	No orientation restrictions	
Weight	1.5 kg with one solenoid 2.0 kg with two solenoids	
Material	Valve casing:	Cast iron
	Pole tube	Steel
	Coil housing:	Steel
	Type label:	Aluminium
Surface coating	Valve casing: 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	
Pressure fluid	Hydraulic oil to DIN 51524 Part 1, 2 and 3	
Temperature range of operating fluid	-20 °C to +80 °C	
Viscosity range	15 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 technical specifications		
Reaction times The reaction time specifications are largely dependent on the valve's pressure, flow rate and application.	Switch-on time: 50 to 100 ms Switch-off time: 10 to 60 ms	
Type of voltage	Direct current	
Rated 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" IP65 [2)]	
Typical PWM and dither settings (optimal settings are dependent on application)	PWM frequency: 3000 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

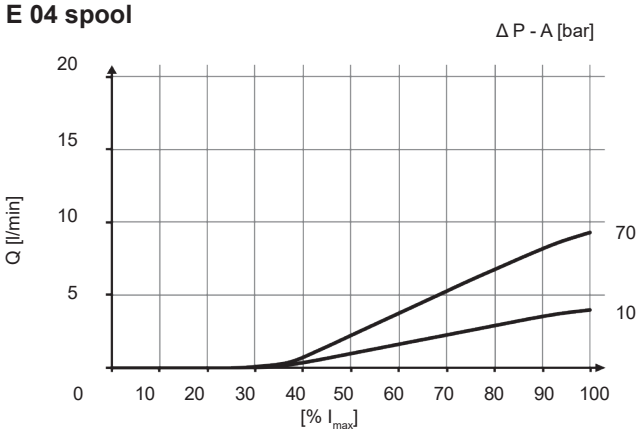
Measured at T_{oil} = 42 °C and ν = 36 mm²/s and spool flow from both sides (e.g. P→A→B→T)

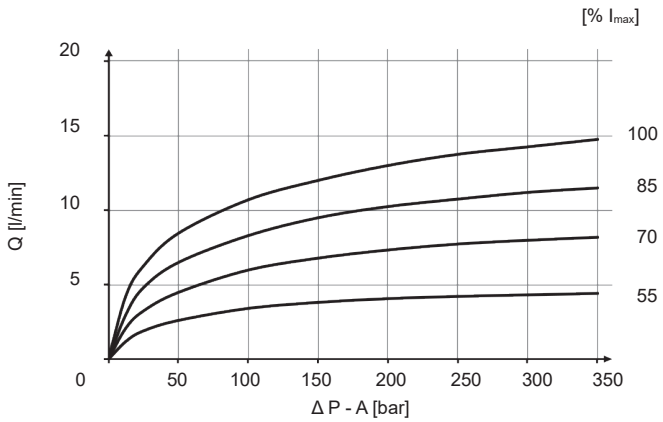
The performance curves constitute typical flow rate curves for the various valve spools. The first curve in each case represents the flow rate value at constant Δp, dependent on the current feed of the solenoid. The second curve represents the relationship between flow rate and Δp with constant solenoid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

Note:

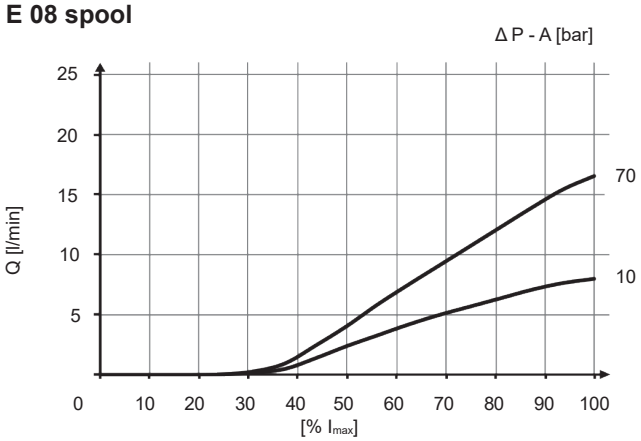
Because of production tolerances, the QI curves shown may differ by ±6 % of I_{max}.

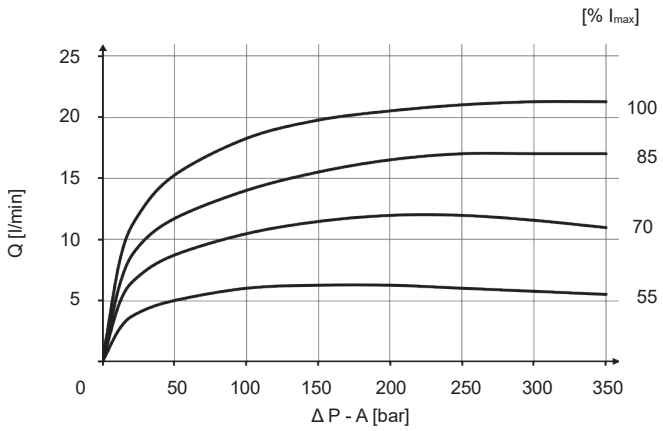
E 04 spool



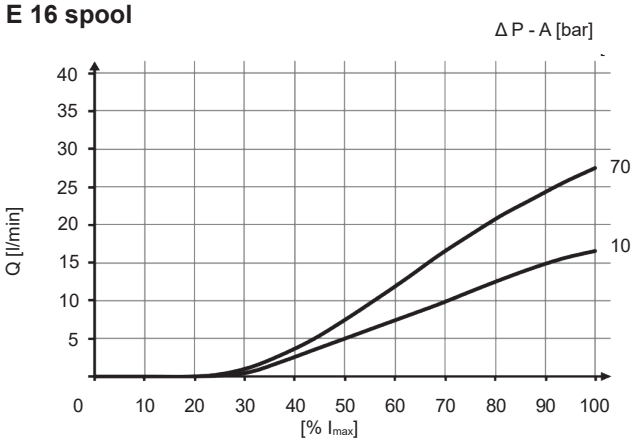


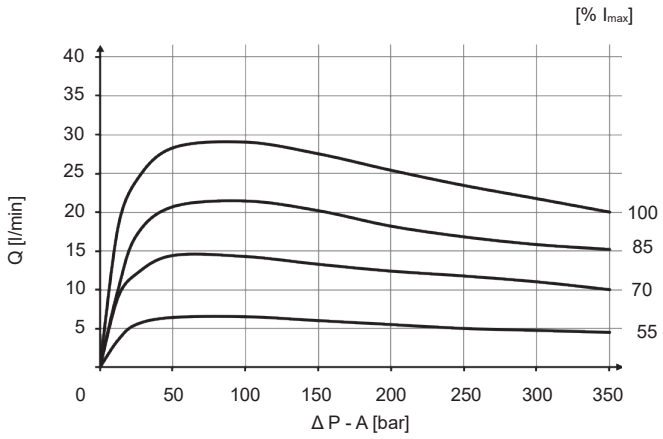
E 08 spool



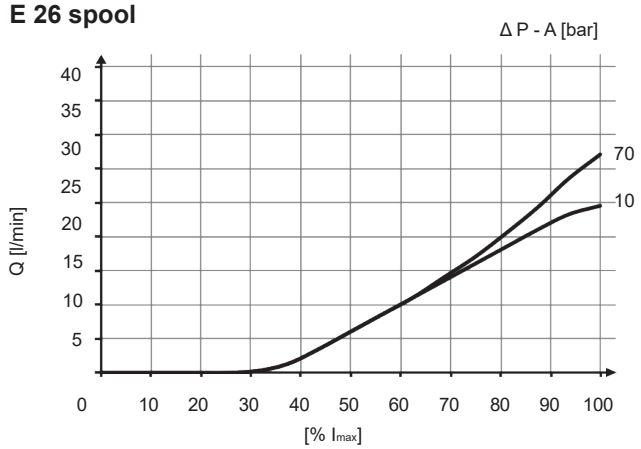


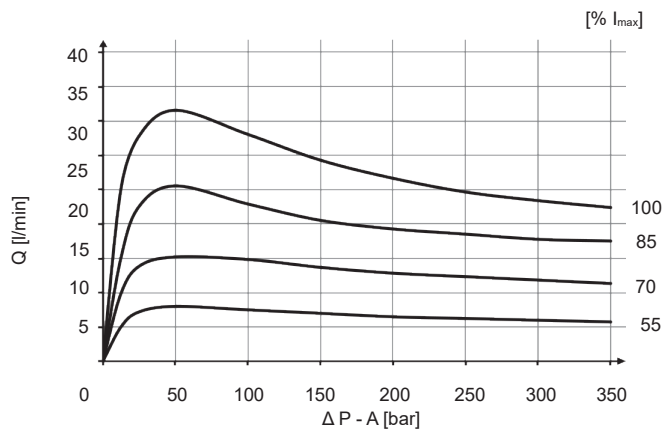
E 16 spool





E 26 spool





TYPICAL PERFORMANCE

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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 feed of the solenoid. The second curve represents the relationship between flow rate and Δp with constant solenoid current feed. The total valve pressure loss (Δp) was measured between the valve's P and T lines.

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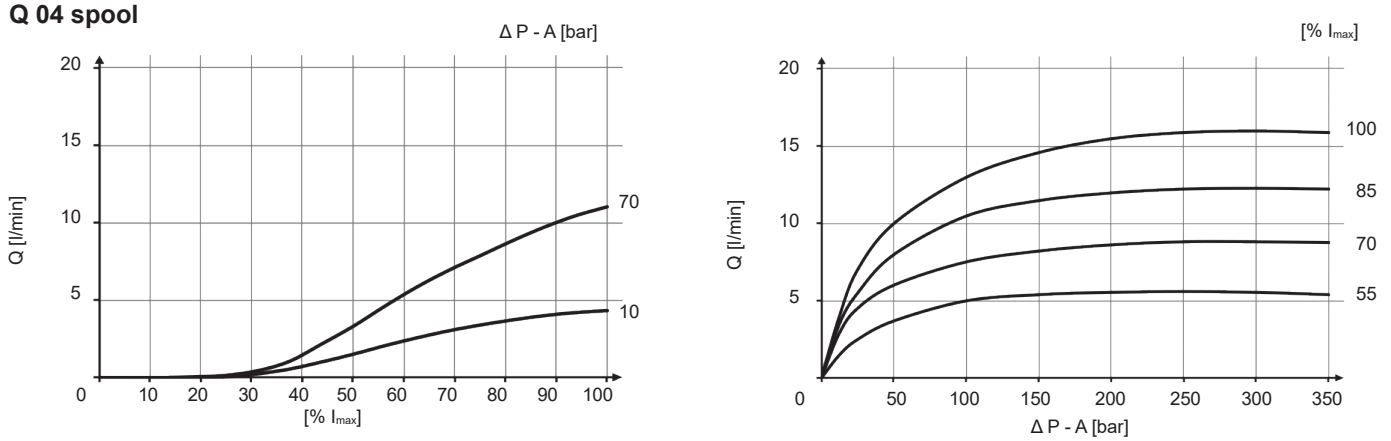
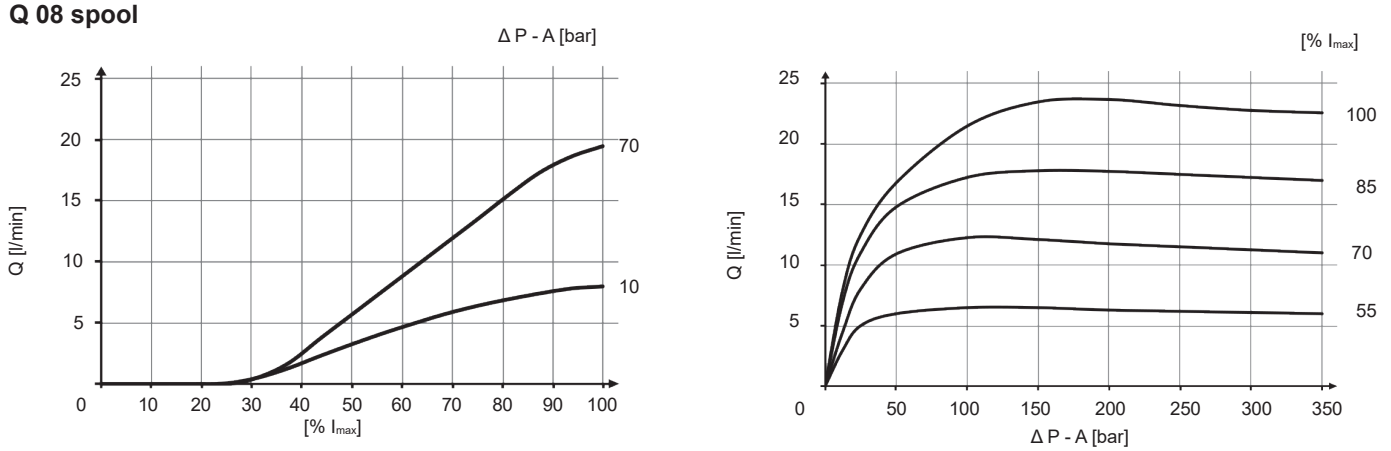
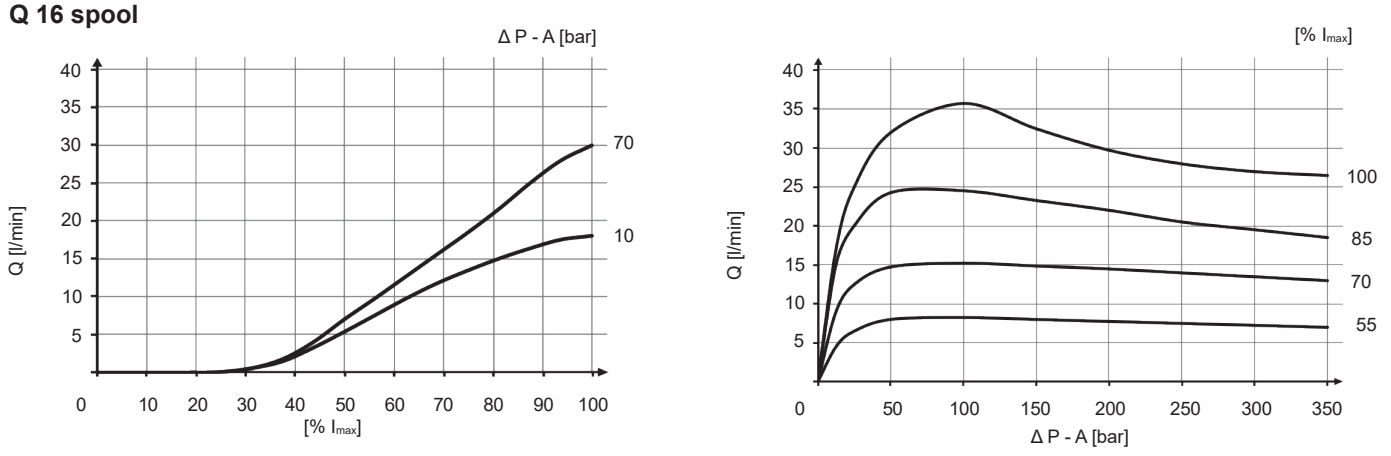
Q 04 spool



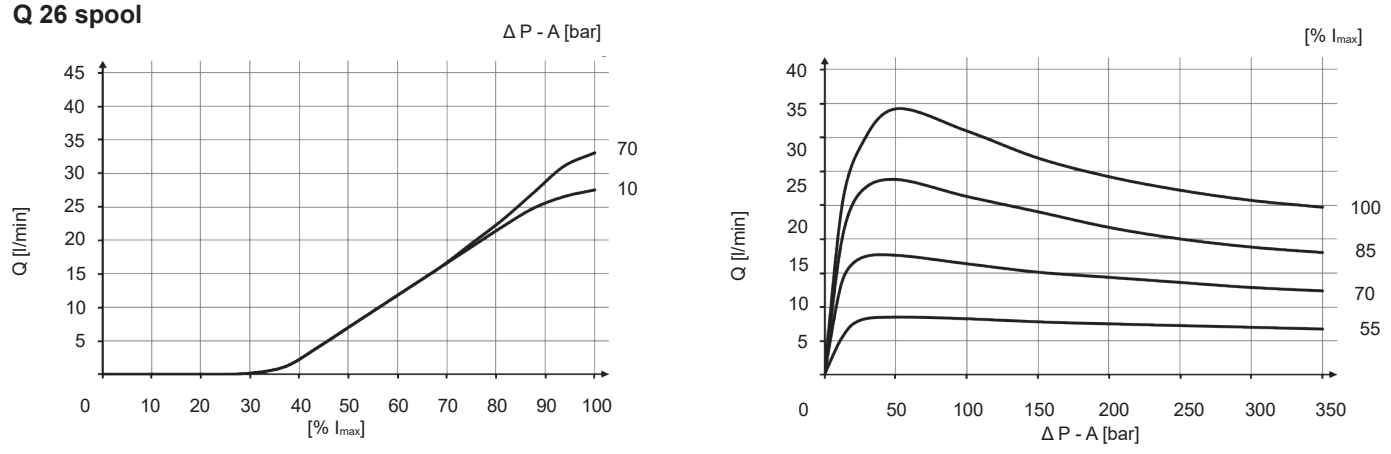
Q 08 spool



Q 16 spool

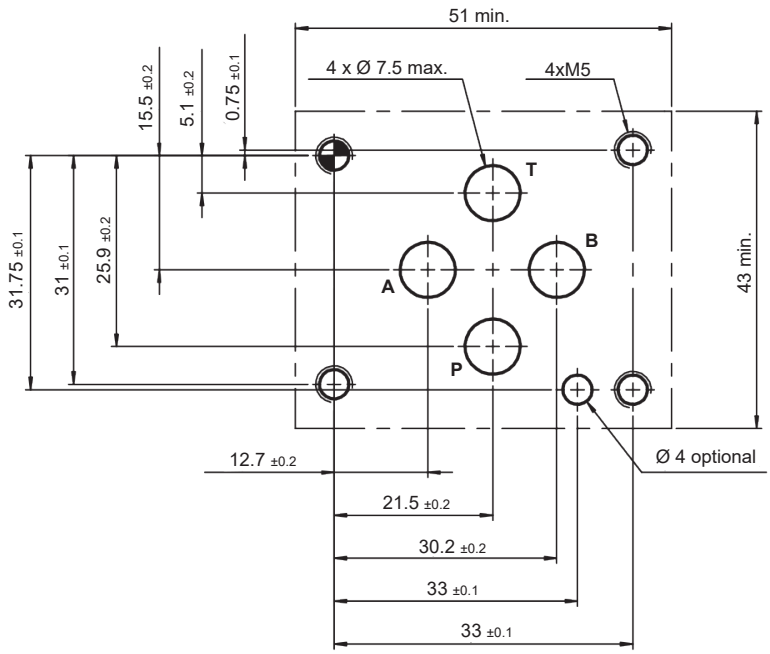


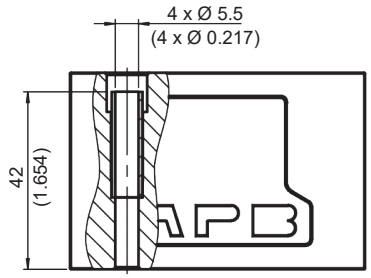
Q 26 spool



DIMENSION

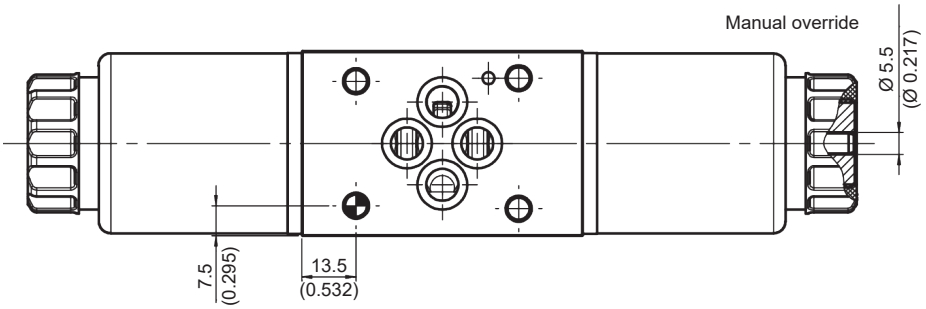
Interface ISO 4401-03-02-0-05 (Cetop 3)

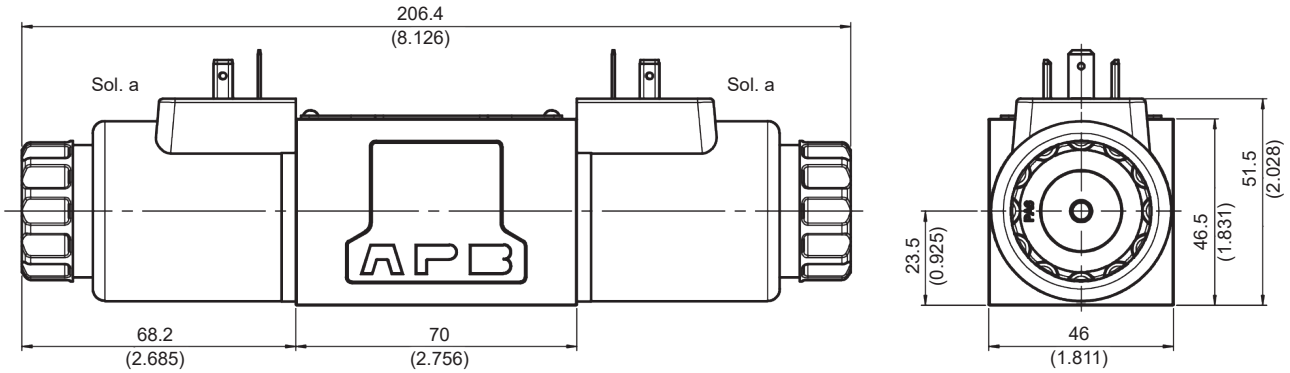




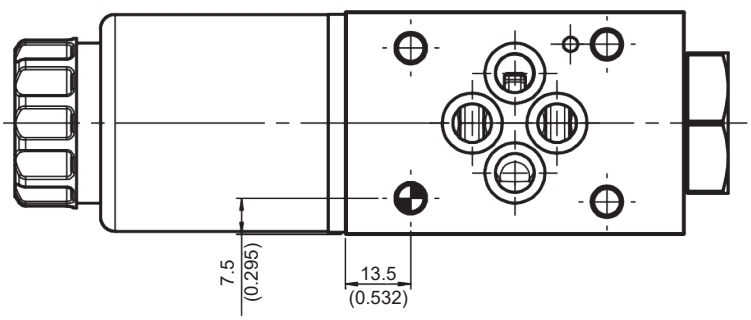
Fastening screws:
(not included in scope of delivery)
DIN EN ISO 4762 - M5 x 50 - 10.9
Tightening torque: 7 Nm

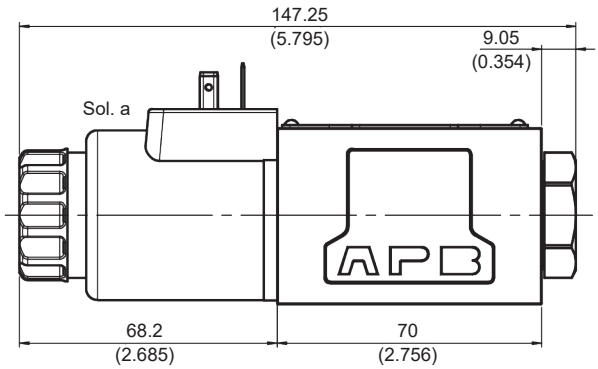
With two solenoids





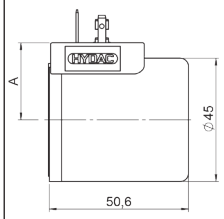
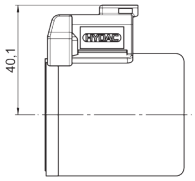
With one solenoid





DEPICTION OF COILS

Electrical connections

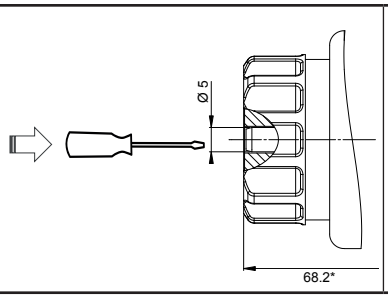
G Connector plug DIN EN 175301-803 A		● IP65 ● A = 28 mm for direct current (DC)	**N** Connector plug Deutsch (DT04-2P)		● IP65 / IP67 ● Original with suppressor diode

*Other versions on request

MANUAL OVERRIDE

The valve can also be operated manually. There are different forms of manual override available for this purpose.

The tank pressure should not exceed 50 bar. If the tank pressure is higher, the force required to operate the manual override increases accordingly. For valves with two solenoids, simultaneous operation of both manual overrides is prohibited.

Standard with concealed manual override		Operation with tool

* Dimensions up to valve casing

ACCESSORIES

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 (4 pcs)	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 for solenoid coil	Nut open, O-ring	4317299
Male connector	Z4 standard 2-pole without PE	394287
	ZW4 incl. 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 not described, please contact the relevant technical department.

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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