

4/3 proportional directional spool valve Control valve with On-Board Electronic and transducer solenoid-operated, direct-acting **C4WERE 6**

DESCRIPTION

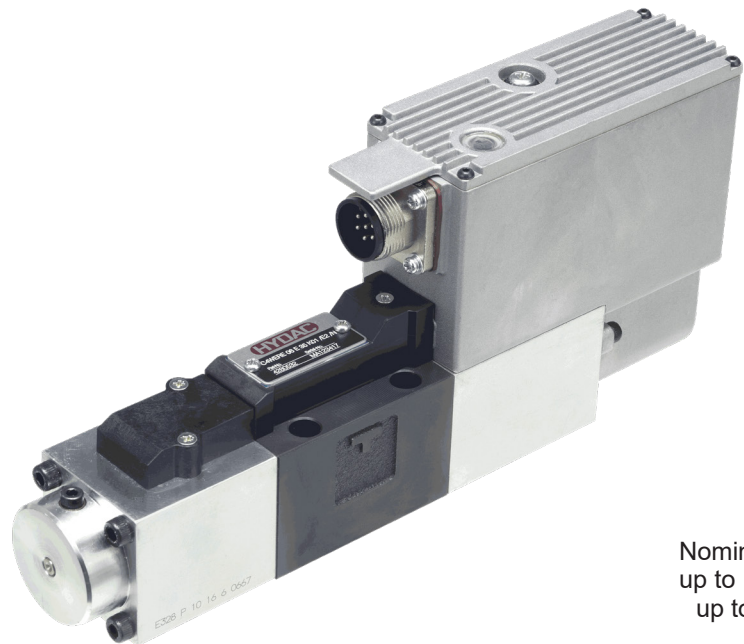
HYDAC 4/3 control valves of the C4WERE 6 series are direct-acting, electrically operated spool valves.

The valve operates by oil-immersed control solenoid. During this process, the solenoid quickly and precisely pushes the valve's control piston into the respective position to obtain the desired flow path. The position of the piston is proportional to the input signal and is controlled by integrated electronics and direction control (LVDT).

For further information see instruction manual 5.907.6.BA "Instruction Manual C4WERE6 Proportional Spool Valve".

FEATURES

- Application for position, pressure and speed control
- Resistant to contamination due to powerful solenoids
- Easy to use due to plug-and-play design
- High dynamic and very good response
- Interface according to ISO 4401-03; DIN 24340 Form A6



Nominal size 6
up to 100 l/min
up to 350 bar

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MODEL CODE

C4WERE 6 Z - FA 35 K01 / E0B / V

Type

Solenoid-operated control valve with integrated electronic and positional transducer, direct acting

Nominal size

6

Spool symbol

See page 3

Fail-safe function

Not specified = no fail-safe function (standard)

FA = ports P and B to ports A and T

FB = ports P and A to ports B and T

Flow rate (at 10 bar Δp port P to T)

10 = 10 l/min

20 = 20 l/min

35 = 35 l/min

Series

K01 = standard

Input signal

E0B = voltage ± 10 V

E1B = current 4 – 20 mA

Sealing material

N = NBR

V = FKM (standard)

SPOOL TYPES / SYMBOLS

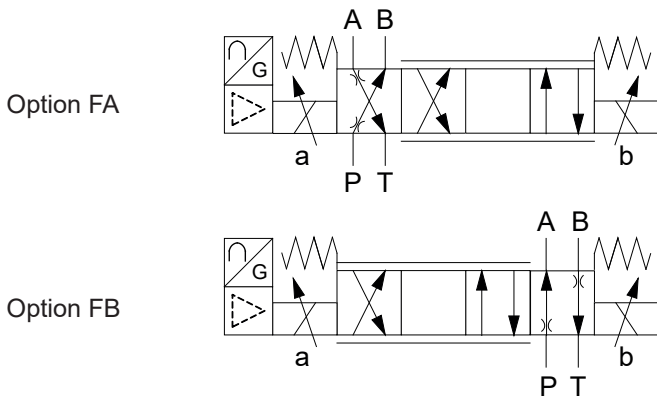
4/3-DIRECTIONAL SPOOL VALVES

Type	Symbol	Description
Q		
E		10% overlap with total stroke*
Z		2% overlap with total stroke*

*Full piston stroke = 2.5 mm

FAIL-SAFE FUNCTION (OPTION)

Position of the piston in the absence of power supply:



Designation	Spool position	Symbol
C4WERE 6 E .. K01/.../.	Centre position: All ports blocked	Spool E
C4WERE 6 Q .. K01/.../.	Centre position: From port A and B low leakage to T	Spool Q
C4WERE 6 -FA .. K01/.../.	20% of total stroke Equivalent to approx. 20% from Q_{NOM}	Spool E, Z and Q
C4WERE 6 -FB .. K01/.../.	20% of total stroke Equivalent to approx. 20% from Q_{NOM}	Spool E, Z and Q

FUNCTION

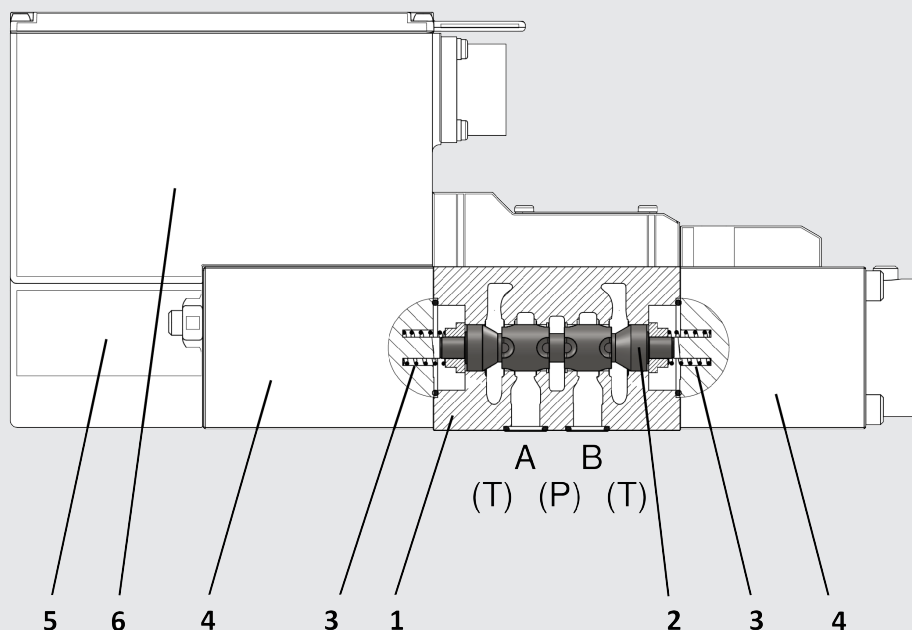
The solenoid-operated proportional directional spool valves of the C4WERE 6 series are used to control a flow precisely and dynamically.

The valve consists of a valve casing (1) with corresponding valve piston (2). It has two return springs (3) and is equipped with two powerful control solenoids (4), as well as a transducer (5) and On-Board Electronic (6).

The On-Board Electronic convert an analogue nominal value signal into a proportional spool design in relation to the return spring. Thus releases or closes flow directions between the respective ports. The force needed to perform the spool design is generated by the solenoid. The transducer constantly records the current position - the On-Board Electronic sets the necessary control current for stabilization of nominal position of the valve piston by comparing the nominal and current position. This results a constantly increasing flow even if the pressure difference through the valve is increasing.

In the absence of power supply on the valve, the return springs shift the valve piston back in a safe position (fail-safe function).

SECTION VIEW



TECHNICAL DATA ¹⁾

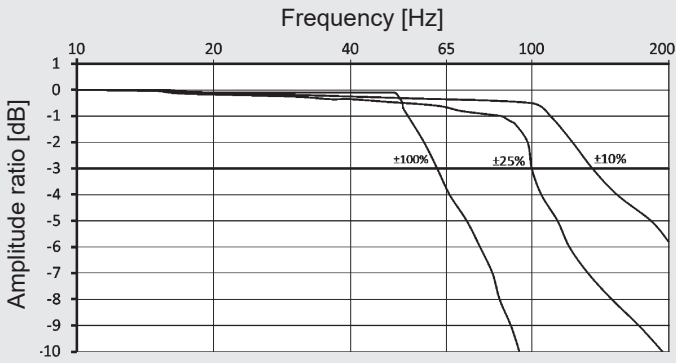
General specifications		
Ambient temperature:	[°C]	0 to 50
Installation position:		Horizontal +/- 15°
Weight:	[kg]	3.3
Material:	Valve casing:	Cast iron
	Electronic casing:	Metal die-cast
	Coil casing:	Steel
	Name plate:	Aluminium
Surface coating:	Valve casing:	Phosphate plated
Hydraulic specifications		
Operating pressure:	[bar]	350
Tank pressure:	[bar]	210
Flow rate: Q_{NOM} (at 10 bar Δp p→T)	[l/min]	10 = 10 l/min 20 = 20 l/min 35 = 35 l/min
Operating fluid:		Hydraulic oil to DIN 51524 Part 1, 2 and 3
Temperature range of operating fluid:	[°C]	-15 to +60
Viscosity range:	[mm ² /s]	15 to 400
Permitted contamination level of operating fluid:		Class 18/16/13 according to ISO 4406
Sealing material:		FKM (standard), NBR
Electrical specifications		
Hysteresis:	[%]	0.1
Repeatability:	[%]	0.1
Protection class according to DIN EN 60529:		IP65

¹⁾ see "Conditions and Instructions for Valves" in brochure 53.000

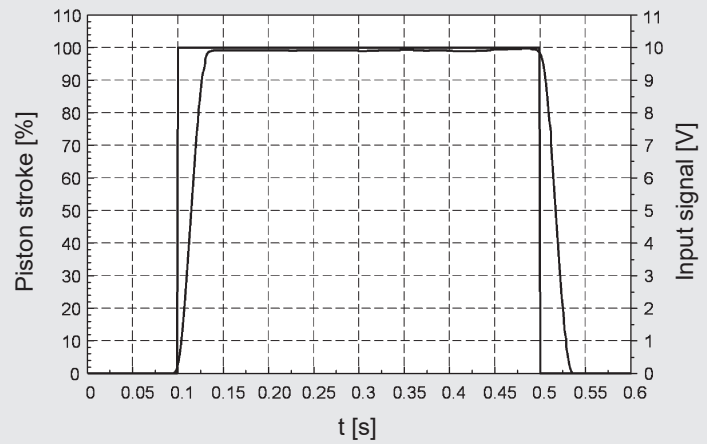
PERFORMANCE

Example Z spool

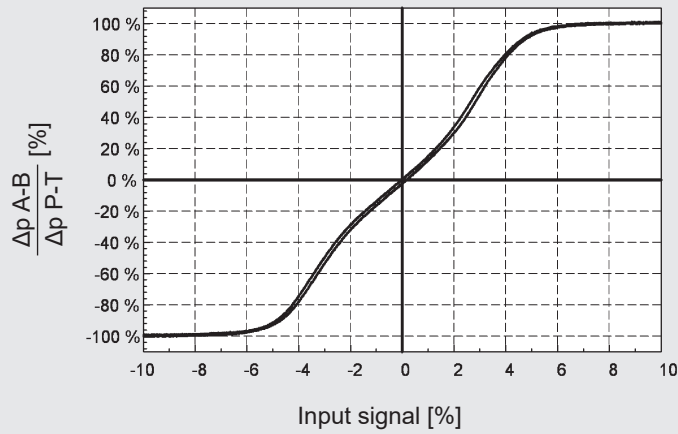
Frequency range



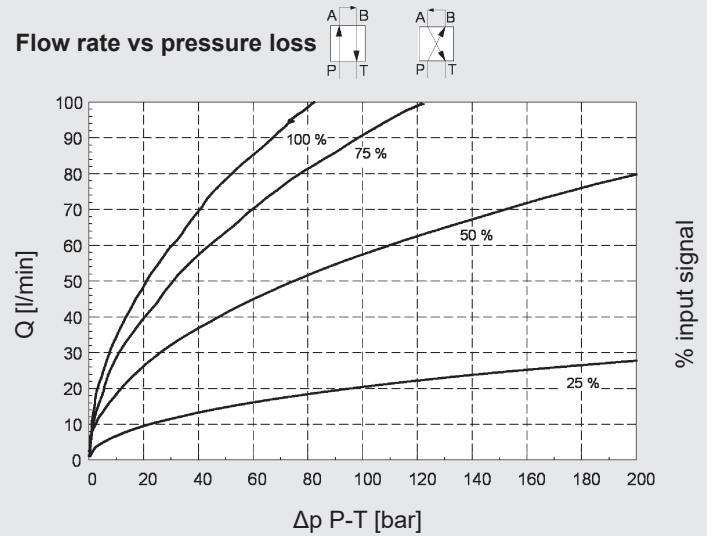
Switching times



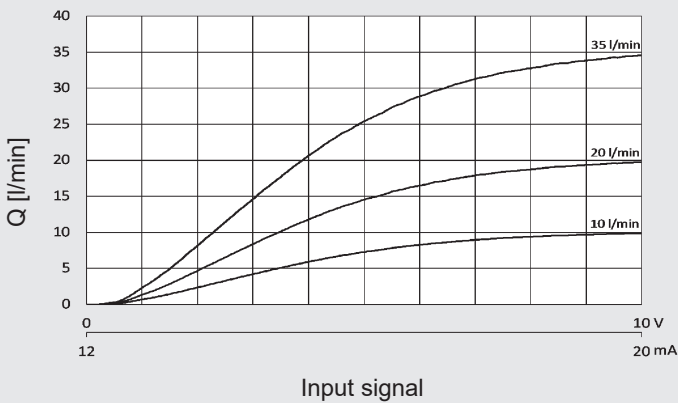
Pressure increase



Flow rate vs pressure loss



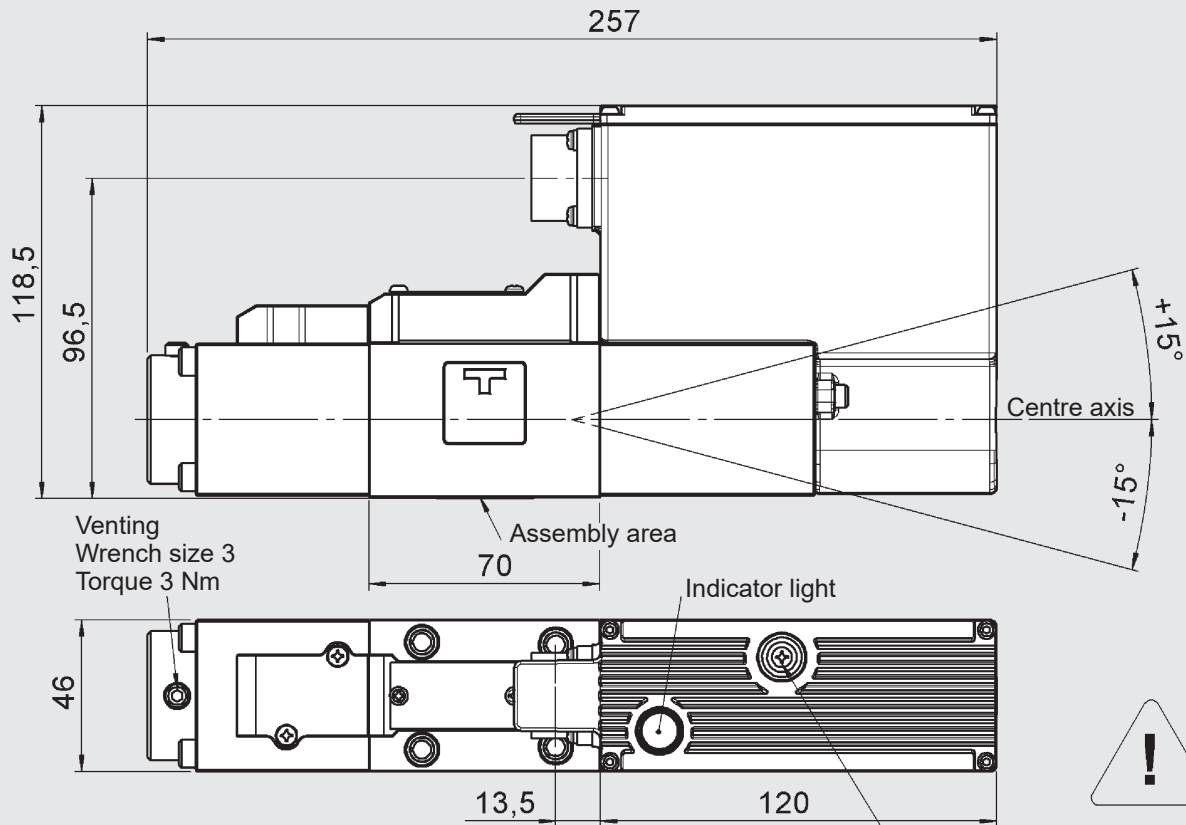
Flow increase (Δp_{P-T} : 10 bar)



Calculation of the flow rate (at pressure difference > 10 bar)

$$Q_x = Q_{NOM} \times \sqrt{\frac{\Delta p_x}{10}}$$

DIMENSIONS



Protective screw
 NULL adjustment hole:
 Null position is adjusted at
 factory.
 For Null adjustment remove
 the screw and turn the
 trimmer behind it.
 After adjustment attach the
 screw again.

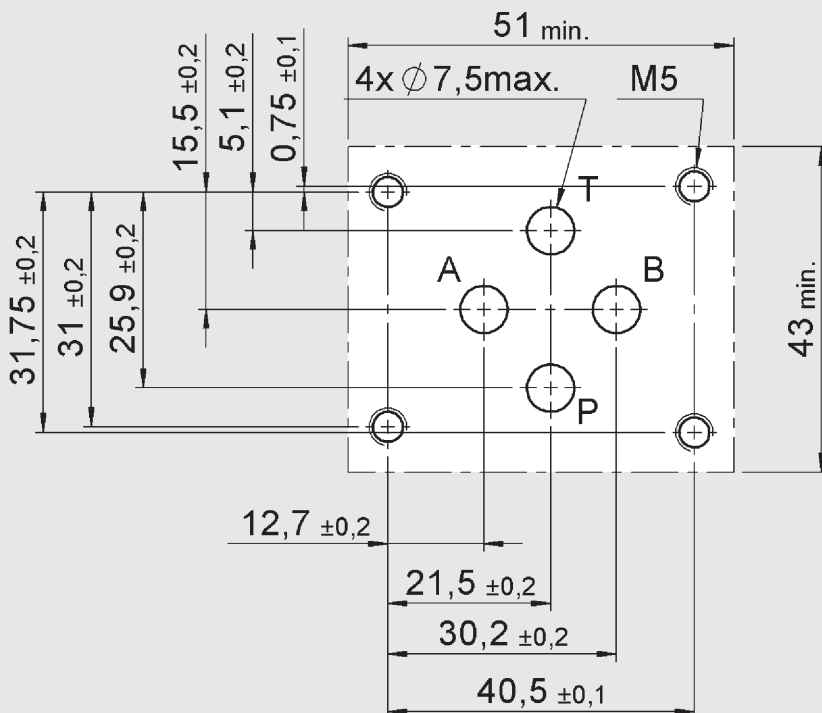
Interface to ISO 4401-03-02-0-05 (CETOP 4.2-4-03-350)

Mounting screws (included in delivery):

4 screws ISO 4762 M5x45

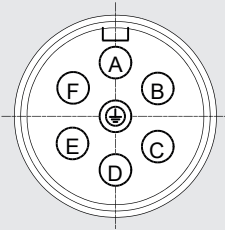
Tightening torque: 7 Nm (screws A 10.9)

Clamping length: 38 mm

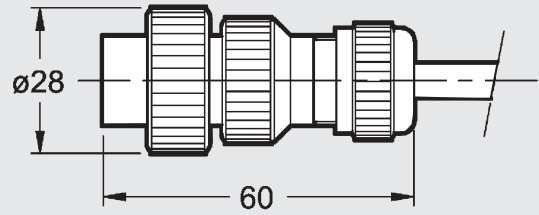


ELECTRONICS

Pin assignment



Metal connector



The outside diameter of the cable sheath for the connector (cable and connector are not included in delivery) must be min. 8 mm and can be max. 10 mm.

OPERATING MODALITIES

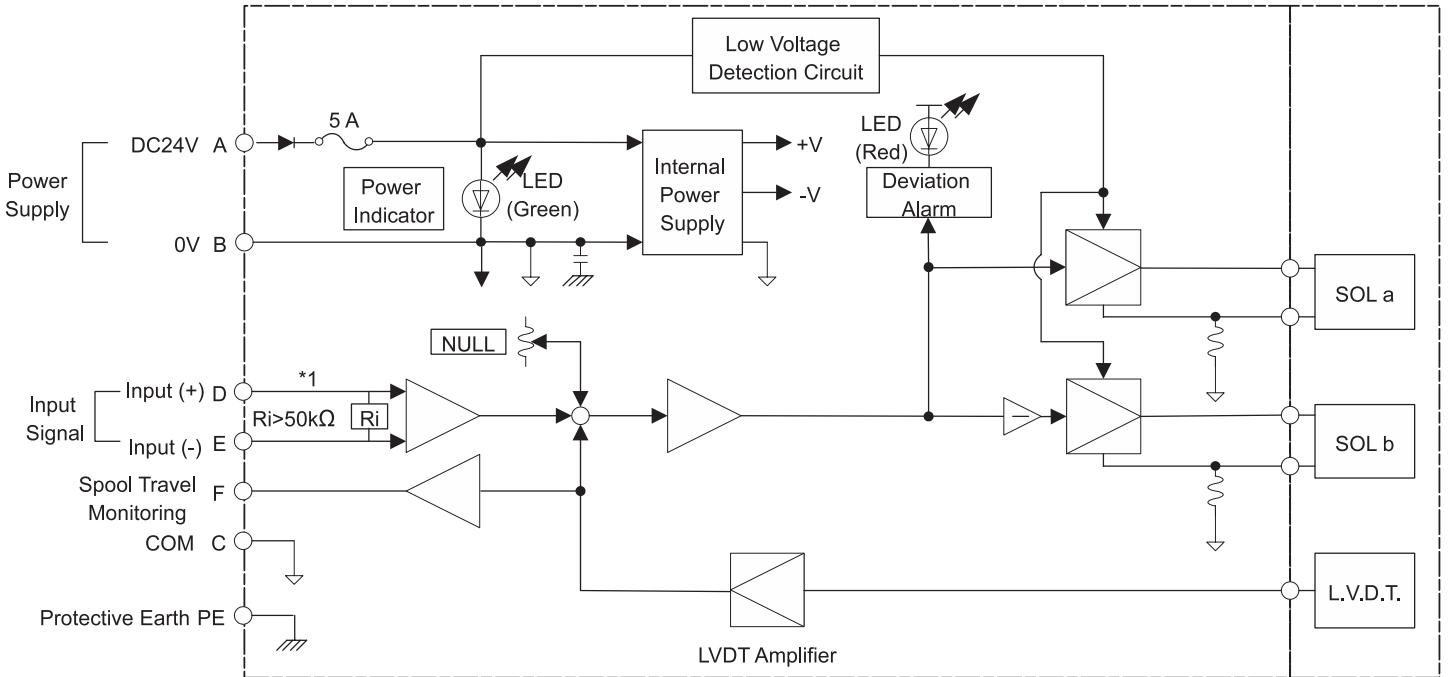
Pin	Code	C4WERE.../E1B	C4WERE.../E0B
PIN A	Power supply	24 V DC (21.6 - 26.4 V DC) * ³	
PIN B		0 V	
PIN C	Signal common	COM (0 V)	
PIN D	Input (+) (differential) * ¹	4-20 mA Ri = 200 Ω	± 10 V
PIN E	Input (-) (differential) * ¹		Ri ≥ 50 kΩ
PIN F	Spool travel monitoring	4-20 mA Ri = 100 - 500 Ω* ²	± 10 V Ri ≥ 10 kΩ
PIN	Protective earth	-	

*¹ The different input signal is only used for the type C4WERE.../E0

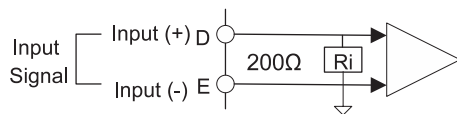
*² Recommended load resistance Ri = 200 Ω

*³ Power consumption max. 75 VA and without nominal value setting min. 16 VA

BLOCK DIAGRAM



*¹ The input stage for input signal 4–20 mA is as follows:



ACCESSORIES

Designation	Part no.
Connector for valves with On-Board Electronic	6080324

NOTE

The information in this brochure relates to the operating conditions and applications described. For applications or operating conditions not described, please contact the relevant technical department.

Technical modifications are reserved.