## **PROPERTIONAL**



## PROPORTIONAL 4-WAY CONTROL VALVES SOLENOID OPERATED HD5-PS-\*

63 I/min 32 MPa (320 bar)

#### 1 DESCRIPTION

Valves HD5-PS are proportional directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 05). The design of the body is an high quality five chamber casting. The valve is available with different spools able to control different flow ranges. In the standard version, the valve housing is phosphated for 240 h salt spray protection acc. to ISO 9227.

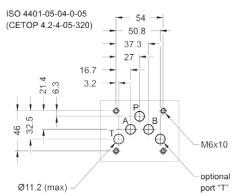


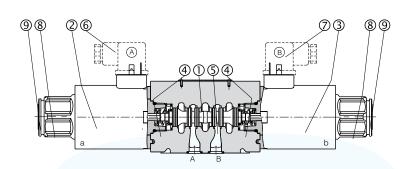
#### 2 ORDERING CODE

(1)		(2)		(3)		(4)	(5)		(6)
HD5	-	PS	-		-			/	10

- (1) HD5: 4-way directional valve CETOP 05 Pressure 32 MPa (320 bar)
- (2) PS: Proportional electric control
- (3) Functional spool type (see 4)
  - -number is the main spool type
    - 1: closed center (P, A, B, T blocked)
    - 3: P blocked, A, B, T connected
  - -spool nominal flow
    - P: 63 l/min with $\Delta P = 1$  MPa (10 bar) (PA+BT or PB+AT)
    - R: 32 I/min with  $\Delta P = 1$  MPa (10 bar) (PA+BT or PB+AT)
    - D: differential Qb = 2Qa: 63/32 l/min with P = 1 MPa (10 bar)
  - -solenoid and springs arrangements
    - C: 2 solenoid, spool is springs centred
    - ML: 1 solenoid ("a") spool is centred + 1 end position
    - MLb: 1 solenoid ("b") spool is centred + 1 end position
- (4) Options and variants:

  - AK : extended manual overrides with air bleeding valves (see <a>[</a> )
  - ZC : zinc plated valves (see 9)
- (5) Type of coils and supply voltages
  - R1 : R= 3,78  $\Omega$
  - R2 : R= 4,7  $\Omega$  standard for V12DC;
  - R4: R=13,9  $\Omega$  standard for V24DC;
- (6) Design number (progressive) of the valve.





The spool 1 shifts in to the valves body 5 subject to the action of springs 4 and proportional solenoid 2 and 3. Spool 1, depending from its shape and its position in the valves body, opens and/or closes passages between P, A, B, T ports, thus controlling the direction and the rate of the hydraulic flow. Solenoid 2 and 3 is energized by electric current flowing-in through cables; in case of electric cut-offs, the spool can be manually shifted by acting on the emergency pins, located at the end of the solenoids and accessible through the retaining nuts.



#### 3 TECHNICAL DATA

Nominal flow rates	32, 63 l/min	Electric Characteristics:				
Maximum nominal pressure (P,A,B)	32 MPa (320 bar)	Valves type HD5-PS-* are operated by proportional solenoids that are rated for an average max power of 13,5 W. The values of nominal max. current are: for coils type R1 (3,78 $\Omega$ ): I max = 2,4 A R2 (4,7 $\Omega$ ): I max = 1,9 A R4 (13,9 $\Omega$ ): I max = 1,1 A				
Maximum pressure at T port	21 MPa (210 bar)					
Maximum rec. Pressure drops	10 MPa (100 bar) (see 📵)					
Protection DIN 40050	IP 67	Currents to hydraulic proportional valves are normally supplied by an electronic driver based				
Duty cycle	100%	on PWM mode of operation, capable of full control of min and max values of current for drivers type UED-*				
Service life	≥ 10 <sup>7</sup> cycles					
Installation and Dimensions	(see 10)					
Mass Approx 4,3 / 5,8 kg						

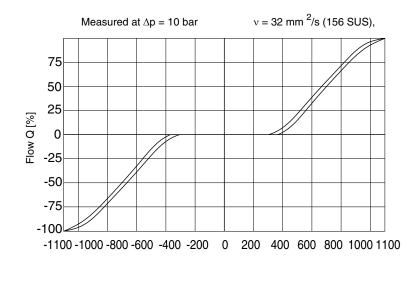
### 4 SPOOL IDENTIFICATION AND NOMINAL FLOW RATE

Nominal Flow rate 32 I/min

# HD5-PS-1RML-R\* HD5-PS-1RML-R\* HD5-PS-3RML-R\* HD5-PS-3RML-R\* HD5-PS-3RML-R\* Nominal Flow rate 63 //min HD5-PS-1PML-R\* A B HD5-PS-3PML-R\*

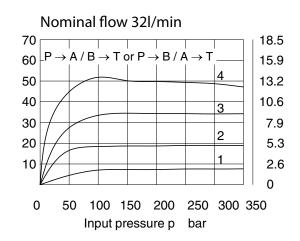
HD5-PS-1PMLb-R\*

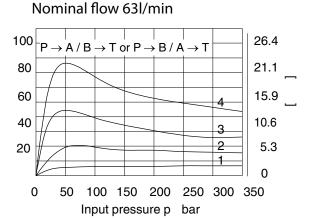
#### **5 TYPICAL DIAGRAMS**



#### 6 FLOW RATES AND PRESSURE DIFFERENTIAL

For a given  $\Delta P$  on a given valve the flow rates are proportional to the driving current; for a given driving current on a given alve, the flow rates increase with the increasing of the  $\Delta P$  up to certain limits. Typical limit curves are:

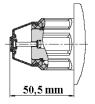








#### 7 VERSION "K": EXTENDED EMERGENCY PIN





Solenoid valves according to "K" version have extended emergency actuator pins protruding from the solenoid shape, that permit a quick and easy "Hand operation" of the valves, without the need of any tool. The actuator pin and the end of the solenoid are protected by a flexible rubber cap that makes easy operation and protects from moisture and water splashes.

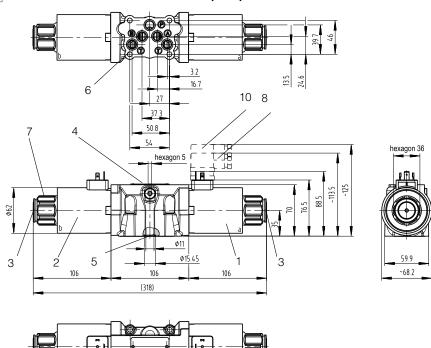
#### 8 VERSION "AK": EXTENDED PIN AND VALVE AIR BLEEDING

Proportional valves according to "AK" version have extended emergency actuator pins that incorporate air bleeding valves, to purge air from the solenoid tube for a simplified start-up of the system. The actuator pin and the end of the solenoid are protected by a flexible rubber cap that makes easy operation and protects from moisture and water splashes.

#### 9 VERSION "ZC": ZINC PLATED VALVES

Solenoid valves according to "ZC" version have central body zinc plated and protected against every type of corrosion due to saline ambiance or other aggressive chemicals. Zinc thickness are on the valve body: 10-15 µm; and 8/12 µm on solenoids.

#### 10 INSTALLATION DIMENSIONS (mm)



All valves HD5-PS-\* conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height. When assembled to its mounting plate, valve HD5-ES-\* must be fastened with 4 fixing bolts (socket head screws to ISO 4762) M6 x 40 mm (or M6 x \* according to the number of modules) of class 12,9 (ISO898) tightened at 12 Nm torque. Leakage between valve and mounting surface is prevented by the positive compression on their seats of 5 seals of Quad-Ring type 12,42 x 1,68 x 1,68 mm.

#### 11 HYDRAULIC FLUIDS

Seals and materials used on standard valves HD5-\* are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and anti-oxidizing agents. The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.



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