

## DIRECTIONAL CONTROL VALVES SOLENOID OPERATED

### HD2-EI-\*

25 l/min - 32 MPa (320 bar)

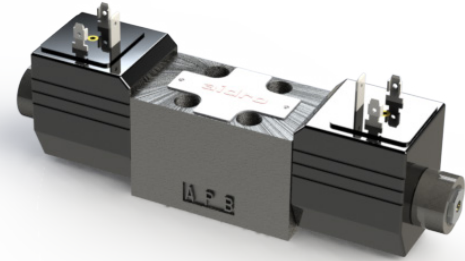
#### 1 DESCRIPTION

Valves HD2-EI are directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 02).

The design of the body is a three chamber casting for production cost saving and low pressure drops.

The valve is available with interchangeable plastic DC solenoids, also for AC power supply using connectors with a built-in rectifier bridge.

In the standard version, the valve housing is phosphated for 240 h salt spray protection acc. to ISO 9227. Enhanced surface protection for mobile sector available (ISO 9227, 520 h salt spray).



#### 2 ORDERING CODE

(1)	(2)	(3)	(4)	(5)	(6)	(7)
HD2	-	EI	-	-	-	/ 10

(1) HD2: 4-way directional control valve CETOP 02

(2) EI: electrically controlled

(3) Spool type (see [4])

-number is the main spool type

-letter is solenoid and spring arrangement:

C: 2 solenoids, spool is spring centered (3 position)

LL: 1 solenoid (a), spool is spring offset (2 position, end to end)

ML: 1 solenoid (a), spool is spring offset (2 position, middle to end)

(4) Side options

b: only for version LL and ML, solenoid b installed (instead of solenoid a)

(5) Code reserved for option and variants:

ZN: Zinc Nickel surface treatment

(6) Electric voltage and solenoid coils:

0000: no coils

012C: coils for V12DC

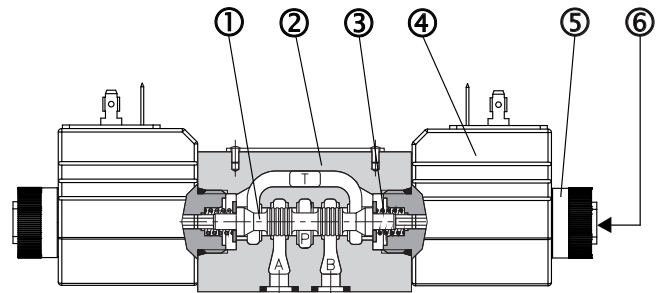
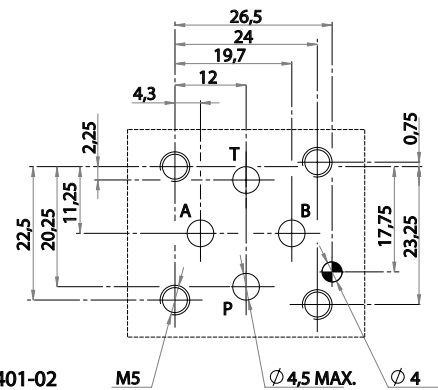
024C: coils for V24DC

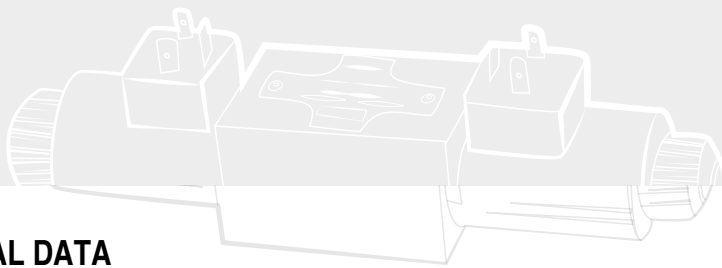
110R: coils for V98DC (V110/50 – V115/60 RAC)

220R: coils for V198DC (V220/50 – V230/60 RAC)

(7) Design number (progressive) of the valves

Spools, springs and solenoids combination permit to obtain almost every type of ports (P, A, B, T) connection and sequence. For almost all types of solenoids/springs combination and for all type of spools (with the exception of spool 4), when solenoid "a" is energized, hydraulic connections are P-->B and A-->T; to obtain P-->A and B-->T solenoid "b" must be energized. The hydraulic connections that are obtained in the "central" (neutral) position when solenoids are not energized is the characteristic mark of the spool shape and from it derives its identification number: 0 = P, A, B, T connected 1 = P, A, B, T closed 3 = P closed, A, B, T, connected for other types see [4]

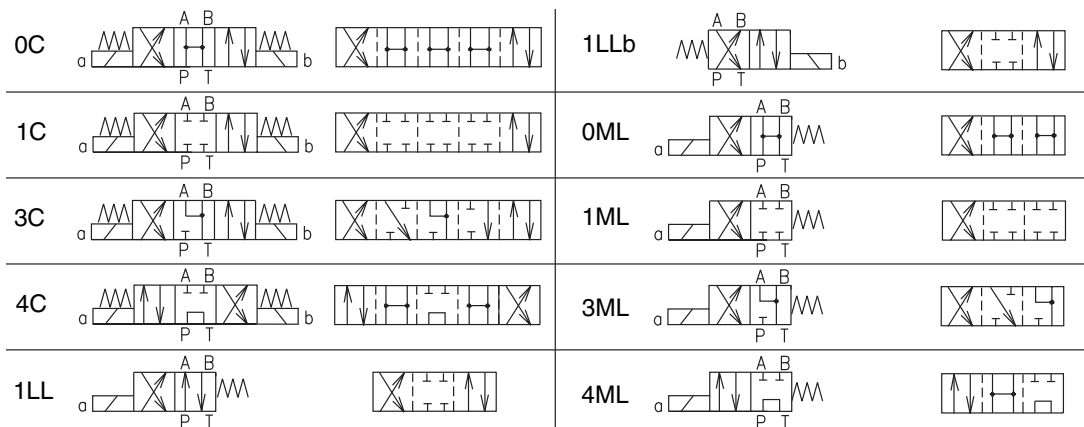




### 3 TECHNICAL DATA

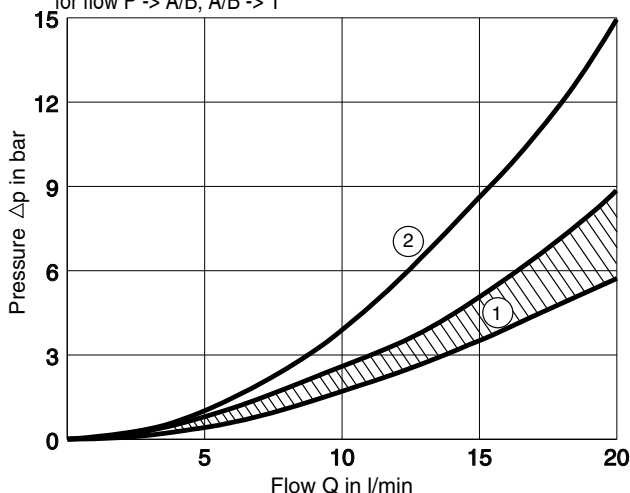
Maximum nominal flow	20 l/min	<b>Electric characteristic:</b> Valves HD2-EI-* are operated by solenoid that are energized: - directly from a D.C. voltage supply: V 12 DC (012C) V 24 DC (024C) - by the use of connectors that incorporate a full wave bridge rectifier, from A.C. voltage supply: V 110/50, V 115/60 or V115/50 (110R) V 220/50, V 230/60 or V 230/50 (220R) All connectors must conform to ISO 4400 (DIN 43650) and electric circuitry must be able to carry the following rated current values: V 12 DC= 2,4 A V 24 DC= 1,2 A V 110 R= 0,30 A V 220 R= 0,15 A Permissible supply voltage variation: +5% -10%
Maximum rec. flow rate	25 l/min	
Maximum nominal pressure (P, A, B)	25 MPa (250 bar)	
Maximum pressure	32 MPa (320 bar)	
Maximum pressure at T port	16 MPa (160 bar)	
Pressure drops	see [5]	
Protection to DIN 40050	IP 65	
Duty cycle	100%	
Service life	≥ 10 <sup>7</sup> cycles	
Installation and dimensions	see [7]	
Mass	approx 0,8/1,1kg	

### 4 SPOOL IDENTIFICATION AND INTERMEDIATE POSITION TRANSITORIES



### 5 TYPICAL DIAGRAMS

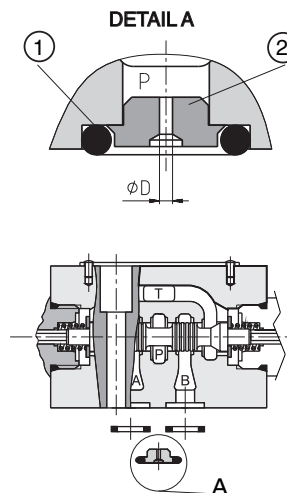
Typical  $\Delta p$ -Q curves for valves HD2 -EI-\* in standard configuration, with mineral oil at 36 cSt and at 50°C for flow P -> A/B, A/B -> T



- ①= all spool: P -> A/B and A/B -> T
- ②= spool 4: P -> A/B and P->T

### 6 OPTIONS

OPTION S CALIBRATED ORIFICE ON P PORT



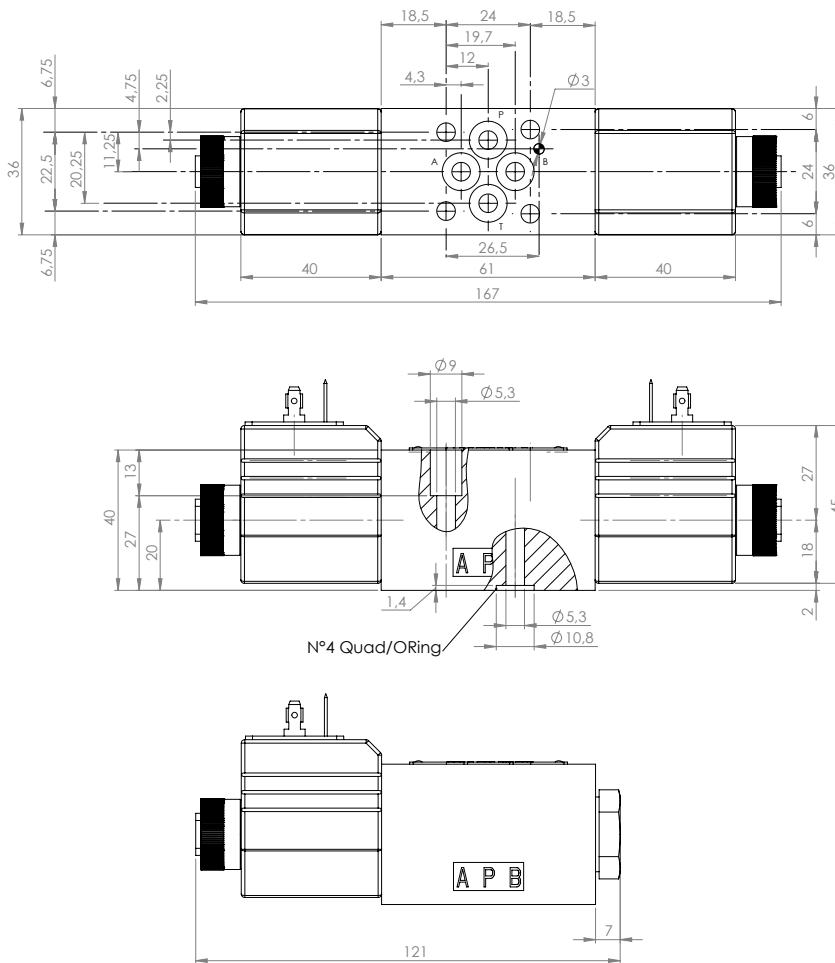
Option "S" is represented by elements ②, suitably shaped to be inserted on P port of the solenoid valve, having a calibrated orifice (of various sizes) able to restrict, at the requested  $\Delta p$  value, the flow rate entering the solenoid valve.

Those elements have the following orifice diameter:

- 2S - 08 -> D=0,8 mm
- 2S - 10 -> D=1 mm
- 2S - 12 -> D=1,2 mm
- 2S - 15 -> D=1.5 mm

and are kept sealed on the P port of the valve by an OR ① of 7,65x1,78 mm sizes (example OR 107-2031).

## 7 INSTALLATION DIMENSIONS (mm)



All valves HD2-\* conform with ISO and CETOP specifications for mounting surface dimensions and for valves height. When assembled to its mounting plate valve HD2 - \* must be fastened with 4 bolts M5x35 (or M5x\*\* according to the number of modules) tightened at 8 Nm torque. Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of QUAD/O Ring type 7,65x1,68x1,68. Connections to the electric supply is made by standard 3-PIN connectors, according to ISO 4400 (DIN 43650). Connectors can be with different cable exit size (PG9, PG11) and beside of the plain connecting function they may incorporate various features like:

- signal led
- bridge rectifier for AC supply
- voltage surge suppressor, etc.

## 8 HYDRAULIC FLUIDS

Seals and materials used on standard valves HD2-\* are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidantizing 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.