

DIRECTIONAL CONTROL VALVES– CETOP 03 proof II 2 GD, Ex d IIC T5

HD3-EX-*

40 l/min 25 MPa (250 bar)

1 DESCRIPTION

Valves HD3-EX are ATEX directional control valve solenoid operated with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03).

The design of the body is an high quality five chamber casting. The valve is available with ATEX metallic DC and AC solenoids. In the standard version, the valve housing is phosphated for 240 h salt spray protection acc. to ISO 9227 . Enhanced surface protection for specific applications is available (ISO 9227, 520 h salt spray).



2 ORDERING CODE

(1)	(2)	(3)	(4)	(5)	(6)
HD3	-	EX	-	-	/ 25

(1) HD3 : 4-way directional valve Cetop 03 – Pressure 25 Mpa (250 bar)

(2) EX : electrically controlled, Ex-proof solenoid

(3) Spool type (see 4):

-number is the main spool type

-letter is the solenoid or spring arrangement:

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

N : 2 solenoids spool is detented (2 position) see 9

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)

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

(4) Code reserved for option and variants

b: only for LL, ML, LM sol. b installed (instead of sol. a)

S-**: calibrated orifice on P port, see 10

ZN: nichel trivalent plated valve, see 11

(5) Electric voltage and solenoid coils

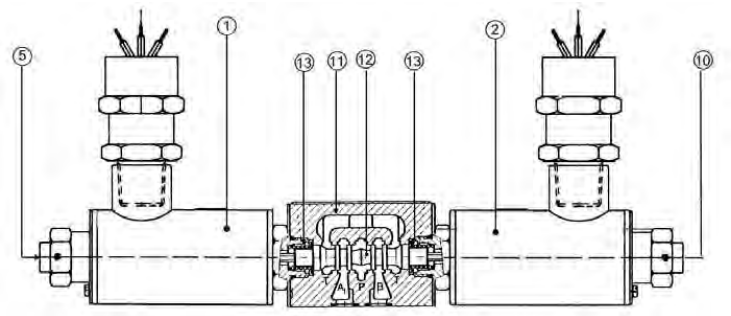
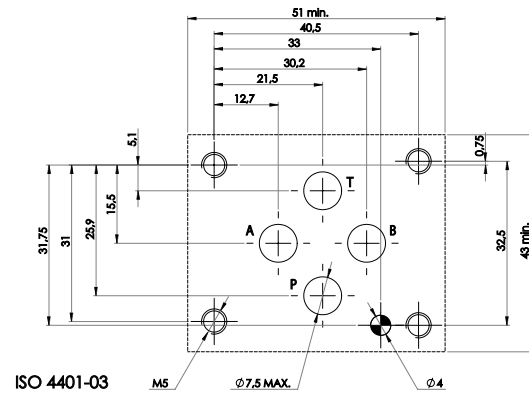
012C: coil(s) for V12DC

024C: coil(s) for V24DC

110A: coil(s) for V110/50 – V115/60 AC

230A: coil(s) for V220/50 – V230/60 AC

(6) Design number of the valves Atex solenoid for G and D

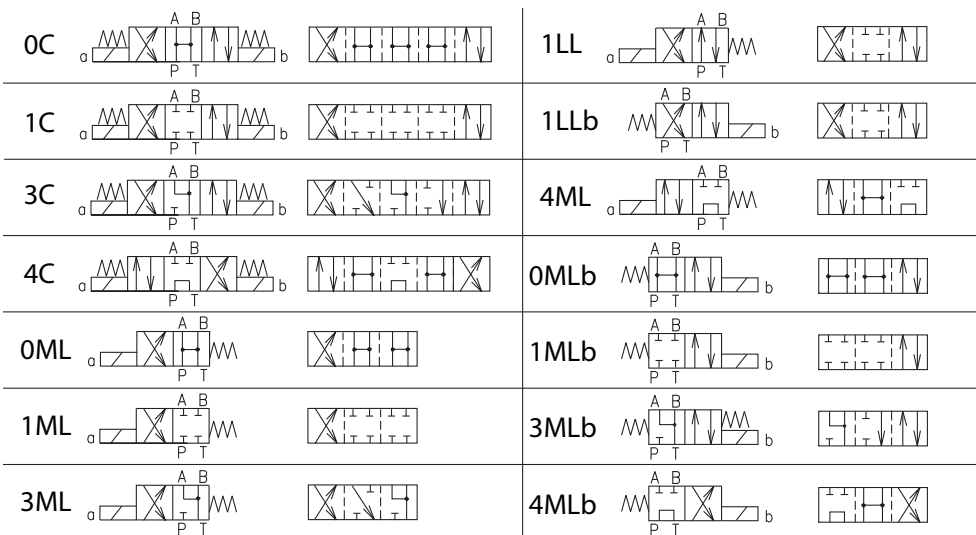


The spool 12 shifts into the valve body 11 subject to the action of springs 13 and solenoids 2. Spool 12, depending from its shape and its position in the valve body, opens and/ or closes passages between P, A, B and T ports, thus controlling the direction of the hydraulic flow.

3 TECHNICAL DATA

Nominal flow	32 l/min	Electric Characteristics: Valves type HD3-EX-* are operated by solenoid that are energized: • directly from a D.C. voltage supply: V 12 DC = 012 C V 24 DC = 024 C • by the use of coils that incorporate a full wave bridge rectifier, from A.C. voltage supply: V 110/50-V 115/60 = 110 A V 220/50-V 230/60 = 230 A Other voltages are available. Permissible supply voltage variation: + 5%. Ex-proof solenoid according to ATEX 94/9/EC, II 2GD, class Exd IIC T5 – see 7 Power consumption: max 11 w. Currents are, at nominal voltage and at 25°C: V12DC = 0,92A V115AC = approx 0,1A V24DC = 0,46A V230AC = approx 0,05A
Maximum rec. flow rate	40 l/min	
Maximum nominal pressure (P,A,B)	25 MPa (250 bar)	
Maximum pressure at T port	25 MPa (250 bar)	
Pressure drops	See 5	
Protection to DIN 40050	IP 67	
Duty cycle	100%	
Service life	≥ 10 ⁷ cycles	
Dimensions and Installation	see 6	
Mass	Approx 2,6 / 3,7 kg	

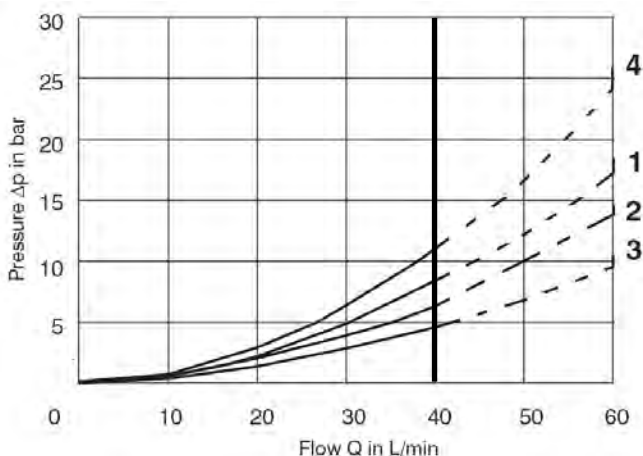
4 SPOOL IDENTIFICATION AND INTERMEDIATE POSITION TRANSITORIES



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 exceptions 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:

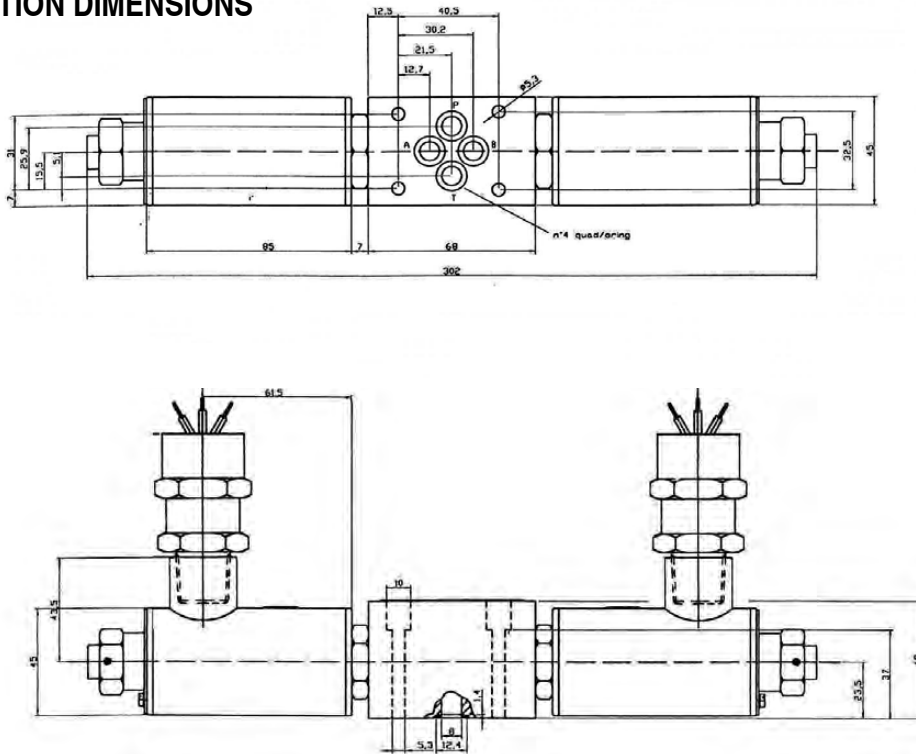
- 0 = P, A, B, T connected
- 1 = P, A, B, T closed
- 3 = P closed, A, B, T, connected.

5 TYPICAL DIAGRAMS



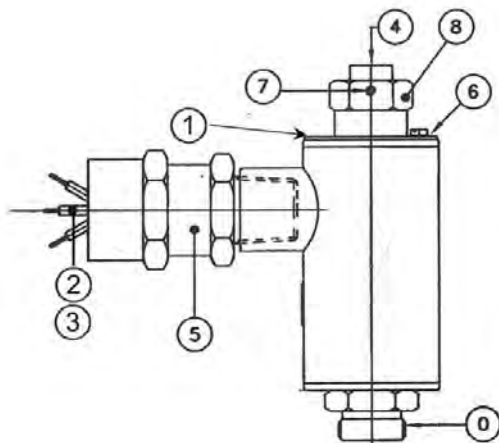
	P-A	P-B	A-T	B-T	P-T
1C	2	2	2	2	-
4C	4	4	4	4	2
0C	2	2	3	3	2
3C	2	2	3	3	-
1LL	3	3	4	4	-
1LLb	3	3	4	4	-
1ML	-	2	2	-	-
4ML	4	-	-	4	2
0ML	2	-	-	3	2
3ML	2	-	-	2	-

6 INSTALLATION DIMENSIONS



All valves HD3-* 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 HD3-* must be fastened with 4 bolts M5 X 45 mm (or M5 x ** 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 9,25x1,68x1,68.

7 EXPLOSION PROOF SOLENOID GMA-6/HD SERIES 271 GD



0: Ex proof solenoid according to ATEX 94/9/EC.
II 2GD Exd IIC T5.

- Solenoid outside surfaces are zinc-nickel plated, with 7 minimum thickness
- 1: Solenoid label indicates supply voltage, protection class Exd, certification number by INERIS and maximum absorbed power.
 - 2: 3-wires cable, according to CEI 20-22, of standard length of 1,5 m, is fastened to the coil and locked by cable gland.
 - 3: Wires have 1,5 mm² section; earth connection wire is green-yellow. Electric connection must be in accordance with Ex-proof norm ATEX.
 - 4: Manual override operation is by pushing the extended pin.
 - 5: Normalised cable gland –torque 8 Nm + 1 – device has threaded attachment ½" conical – ISO 7/1
 - 6: Earth connection screw
 - 7: Threaded plug (socket hexagon 1,5 mm) to lock the retaining coil nut
 - 8: Nut for retaining the coil –torque 6 Nm + 1 – hexagon 24 mm.

Conformity of unit to the norms is not granted if coil is used separately from its electromagnetic tube.

Atex Certificates :
INERIS 05ATEX0028X/02 for Gas and Dust

8 HYDRAULIC FLUIDS

Seals and materials used on standard valves HD3-* 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.

9 VERSION "N": MECHANICAL DETENT ON SPOOL

Solenoid valves with detent typically are 2 position, 2 solenoid, nospring valve where the spool is kept at the extreme ends of its stroke by a mechanical device. This permits that solenoids are energized by short time current pulses and that the spool remains at its position regardless of forces due to hydrodynamics or gravitational/inertial effects (vibrations).

10 VERSION "S*": CALIBRATED ORIFICE ON P PORT

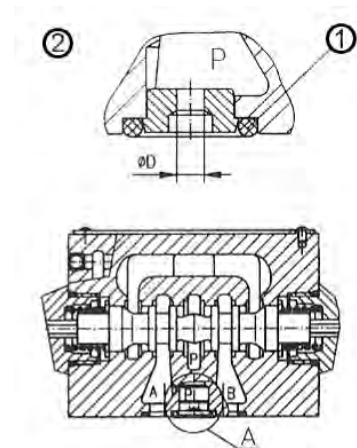
Option "S*" is represented by elements , suitably shaped to be inserted on P port of the solenoid valve, having a calibrated orifice (of various sizes) able to restrict, at the requested P value, the flow rate entering the solenoid valve. Those elements have the following orifice diameter:

3S - 10 $\varnothing D = 1 \text{ mm}$

3S - 20 $\varnothing D = 2 \text{ mm}$

3S - 25 $\varnothing D = 2,5 \text{ mm}$

and are kept sealed on the P port of the valve by an OR of 9,25x1,78 mm sizes (example OR 110 - 2037).



11 VERSION "ZN": ZINC NICHEL PLATED

Solenoid valves according to "ZN" version have central body nichel trivalent 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 .