

## DIRECTIONAL CONTROL VALVES SOLENOID OPERATED IN STAINLESS STEEL

### HD3-AMES-\*/10

AISI316L for body and AISI430 for solenoid

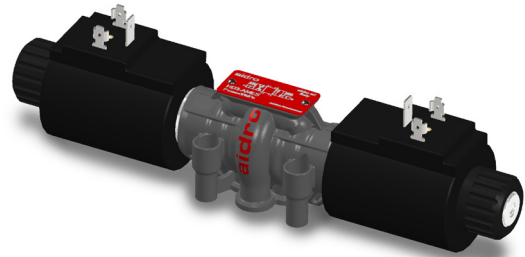
80 l/min - 35 MPa (350 bar)

#### 1 DESCRIPTION

Valves HD3-AMES are directional control valve with subplate mounting interface according to ISO 4401, DIN 24340 (CETOP 03).

The design of the body is a five chamber, manufactured by Additive Manufacturing technology for high performance and low pressure drops.

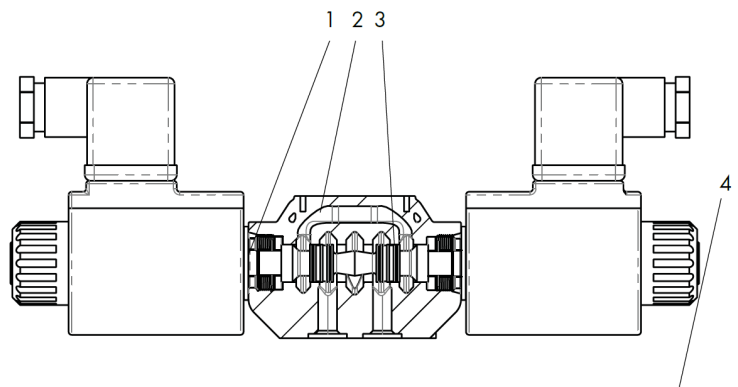
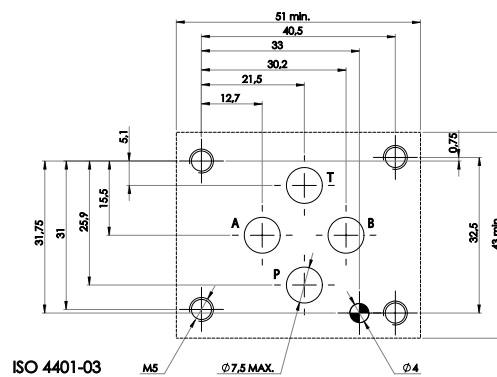
The valve is available with interchangeable DC coils, also for AC power supply using connectors with a built-in rectifier bridge.



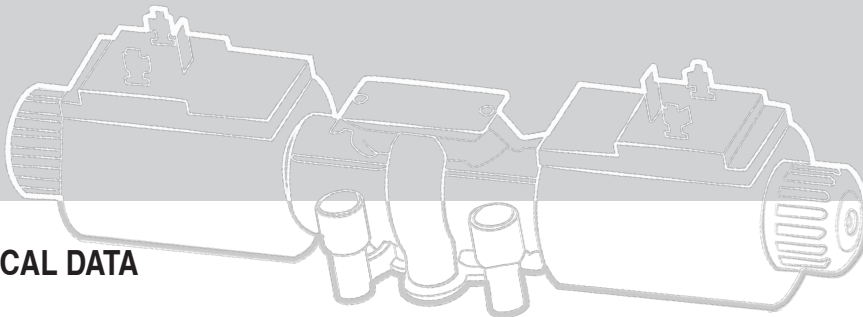
#### 2 ORDERING CODE

(1)	(2)	(3)	(4)	(5)	(6)	(7)
HD3	-	AMES	-	-	-	/ 10

- (1) HD3: 4-way directional control valve CETOP 03
- (2) AMES: Produced by Additive Manufacturing - Electrically controlled
- (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)
    - LL : 1 solenoid, spool is spring offset (2 position)
    - ML : 1 solenoid, spool is spring centered (2 position)
- (4) Code reserved for option and variants
- (5) Electric voltage and solenoid coils: see [10](#)
  - 012C: coils for V12DC
  - 024C: coils for V24DC
  - Other voltages are available
- (6) Coil connection
  - no designation: DIN 43650-A ISO 4400
  - AMP: Amp Junior Timer
  - D: Deutsch
  - ( AMP and Deutsch connect are only available for DC supply voltage up to 48V)
- (7) Design number (progressive) of the valves



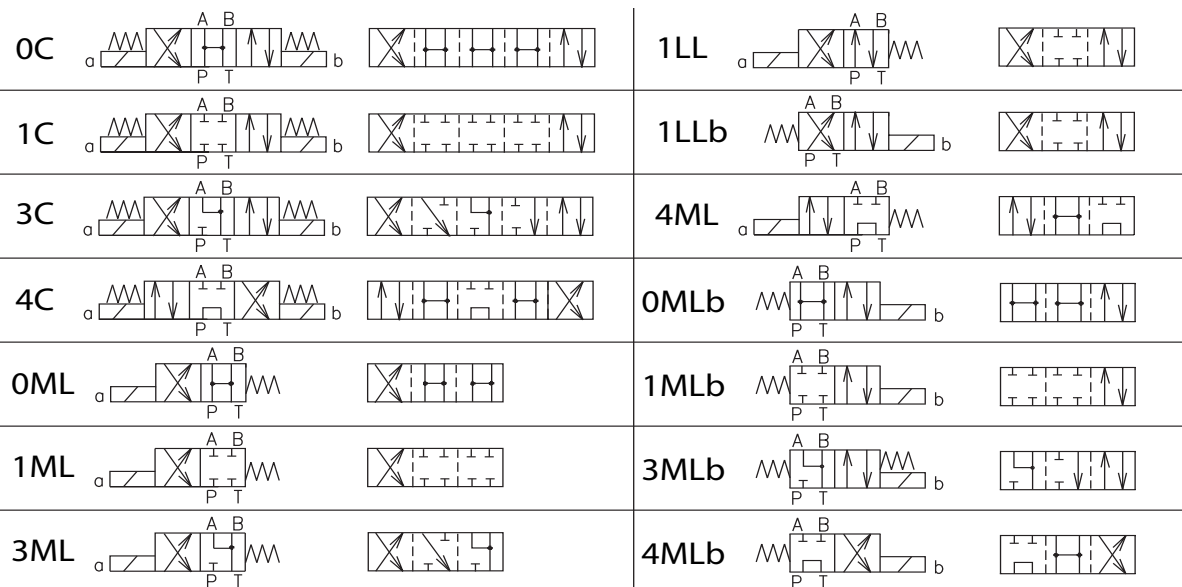
The spool 3 shifts into the valve body 2 subject to operation of solenoid and reaction of spring. Spool 3 depending on its configuration and position in the valve body 2, opens and/ or closes passages between P,A,B and T ports, thus controlling the direction of the hydraulic flow.



### 3 TECHNICAL DATA

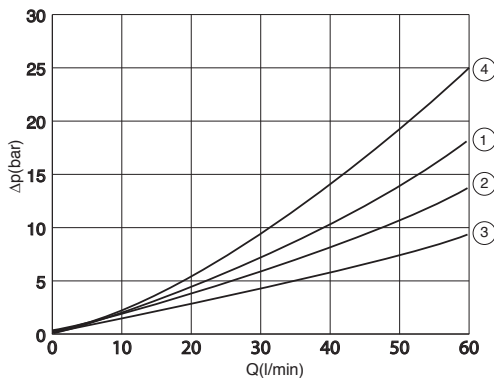
Nominal flow	60 l/min	Electric characteristics:  Valve type HD3-AMES are operated by solenoid that are energized : directly from a D.C. voltage supply V 12 DC = 012C V 24 DC = 024C  Other voltage supply are possible 3 pin connectors must conform to ISO 4400 (DIN 43650)  Permissible supply voltage variation : +5% -10%
Maximum rec. flow rate	80 l/min	
Maximum nominal pressure (P, A, B)	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%	
Installation and dimensions	see 8	
Protection AMP and Deutsch	IP69 - IP69k	
Mass	0,53 / 0,68 kg	

### 4 SPOOL IDENTIFICATION AND INTERMEDIATE POSITION TRANSITORIES

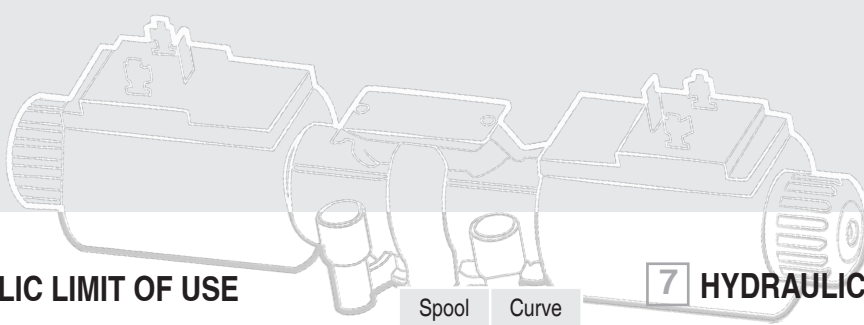


### 5 TYPICAL DIAGRAMS

Typical  $\Delta p$ -Q curves for valves HD3-AMES in standard configuration, with mineral oil at  $v=32 \text{ mm}^2/\text{s}$  and  $T=40^\circ\text{C}$

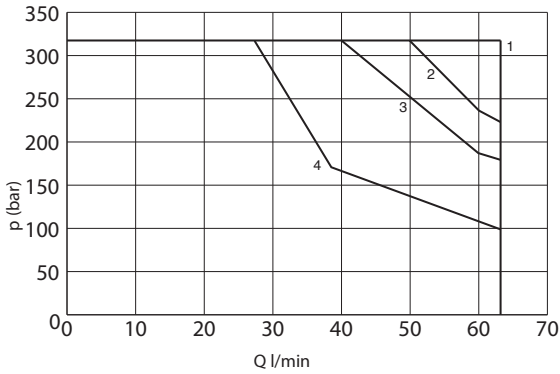


Spool	P-A	P-B	A-T	B-T	P-T
1C	2	2	2	2	
4C	4	4	1	1	1
0C	2	2	3	3	1
3C	2	2	3	3	
1LL	1	1	1	1	
1LLb	1	1	1	1	
1ML		2	2		
4ML	4		1		1
0ML	2		3		1
3ML	2		3		



## 6 HYDRAULIC LIMIT OF USE

$\Delta p$ -Q characteristics limits for safe use of HD3-AMES-\* solenoid operated valves. Measured at  $v = 32\text{mm}^2/\text{s}$  and  $T = 40^\circ\text{C}$

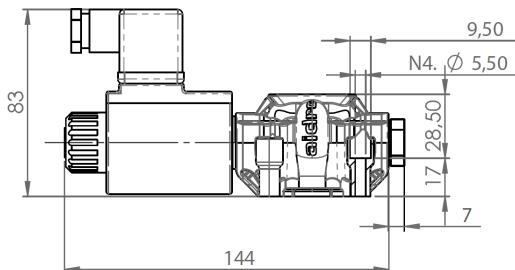
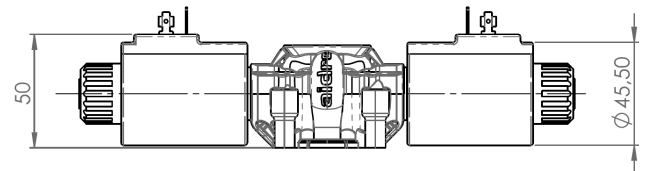
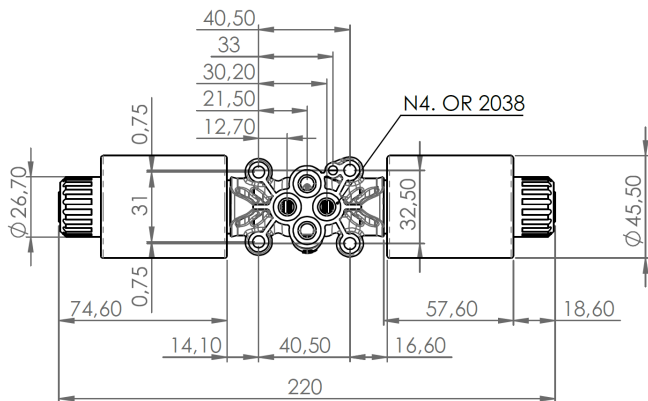


## 7 HYDRAULIC FLUID

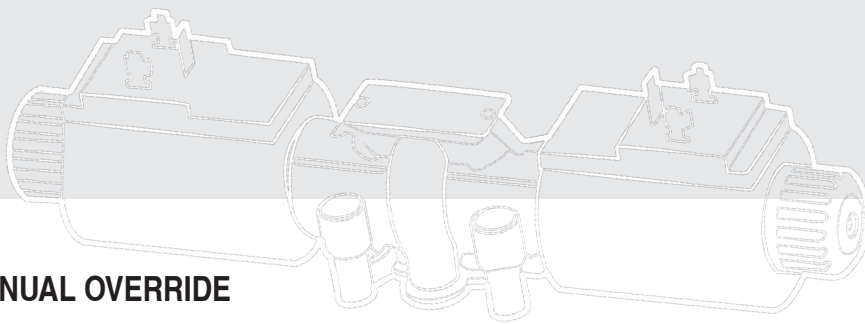
Seals and materials used on standard valves HD3-AMES\* are fully compatible with hydraulics fluids of mineral base, upgraded with antifoaming and anti oxidizing agents. The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Spool	Curve
1C	1
4C	4
0C	4
3C	2
1LL	3
3ML	2
4ML	4
1ML	1
0ML	4
1MLb	1
1LLb	3
4MLb	4
0MLb	4
3MLb	2

## 8 INSTALLATION DIMENSIONS (mm)



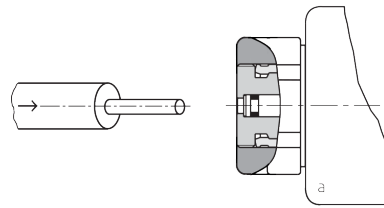
All valves HD3-AMES-\* conform with ISO and CETOP specifications for mounting surface dimensions and for valves height. When assembled to its mounting plate valve HD3-\* must be fastened with 4 bolts M5x25 (or M5x\*\* according to the number of modules) tightened at 8 Nm torque. Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of O Ring type 9,25x1,78



## 9 MANUAL OVERRIDE

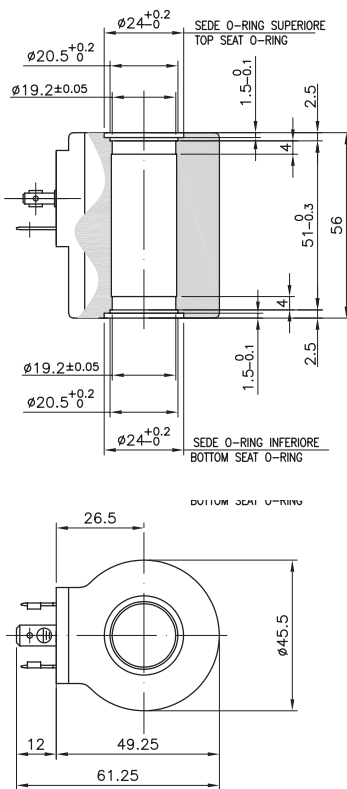
In case of electric cut-offs, the spool can be manually shifted by acting on the emergency pins, located at the end of the solenoids and accessible through the retaining nuts.

Standard model of the manual override

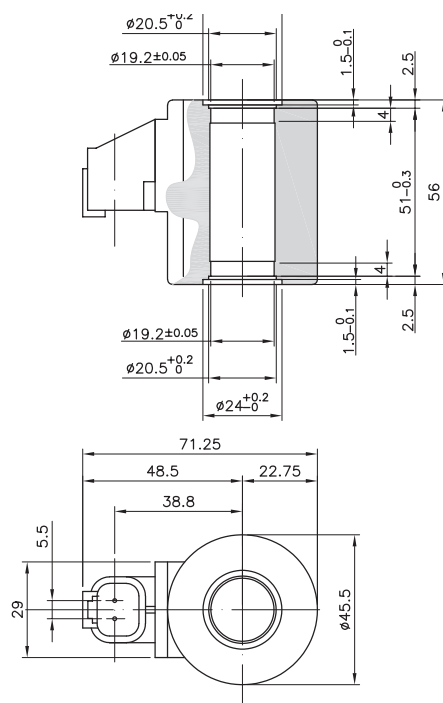


## 10 STANDARD COILS

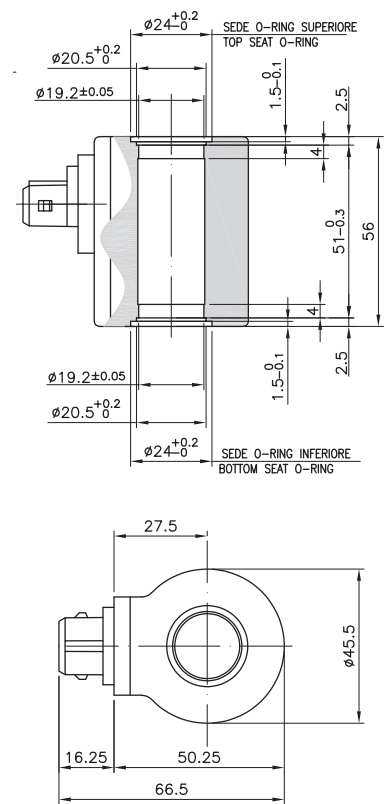
C45 DIN 43650



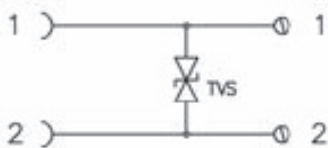
C45 Deutsch



C45 Amp Junior Timer



## 11 QUENCHING DIODE



On request, coils can be supplied with an integrated bidirectional quenching diode (transil type) able to provide high overvoltage protection by clamping action. Their instantaneous response to transient overvoltages makes them particularly suited to protect voltage sensitive devices