# Зсетор оз

## DIRECTIONAL CONTROL VALVES SOLENOID OPERATED

## HD33-ES

60 l/min - 32 MPa (320 bar)

## **1** DESCRIPTION

Valves HD33-ES are directional control valve with subplate mounting interface acc. to ISO 4401, DIN 24340 (CETOP 03).

The design of the body is a quality five chamber casting.

The valve is available with interchangeable metallic DC solenoids, also for AC power supply using a built-in rectifier bridge inside the coil.

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)
HD33	-	ES	-		-		-			/	10

- (1) HD33: 4-way directional control valve CETOP 03
- (2) ES: 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:
  - S-\*\*: calibrated orifice on P port, see 11
  - K : water proof caps on emergency pin, see 10
- (5) Electric voltage and solenoid coils: see 8
  - 0000: no coils 012C: coils for V12DC 024C: coils for V24DC 024A: coils for V24/50AC 115A: coils for V110/50- V 115/60AC
  - 230A: coils for V220/50- V 230/60AC
- (6) Coil connection (see 16): no designation: DIN 43650-A ISO 4400
  - AMP: Amp Junior Timer- vertical configuration AMPX: Amp Junior Timer- axial configuration D: Deutsch
- (7) Design number (progressive) of the valves









The spool 5 shifts into the valve body 1 subject to the action of springs 4 and solenoids 2. Spool 5, 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.

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#### **3** TECHNICAL DATA

Nominal flow	50 l/min		
Maximum rec. flow rate	60 l/min		
Maximum nominal pressure (P, A, B)	32 MPa (320 bar)		
Maximum pressure at T port	21 MPa (210 bar)		
Pressure drops	<b>See</b> 5		
Protection to DIN 40050	IP 65		
Duty cycle	100%		
Installation and dimensions	see 9		
Mass	1,6/1,2 kg		

#### 4 ELECTRIC CHARACTERISTICS

Valve type HD33-ES-\* 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 coils that incorporate a full wave bridge rectifier, from A.C. voltage supply : V 110/50 - V 115/60 = 115A
V 220/50 - V 230/60 = 230A

Other available voltages are : 014C; 048C; 060C; 102C; 205C; and V24/50 = 024A 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 115/50 = 0,26 A V 24 DC = 1,2 A V 230/50 = 0,14 A

Coils with 2 electric pins, conforming with AMP connectors, are only available for DC supply (example of code : B02-012C AMP). Permissible supply voltage variation : ± 10 %

### 5 TYPICAL DIAGRAMS

## 6 HYDRAULIC LIMIT OF USE

Typical  $\Delta$ p-Q curves for valves HD33-ES-\* in standard configuration, with mineral oil at v=32 mm2/s and at T=40°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
OML	2		3		1
3ML	2		3		

 $\Delta p\text{-}Q$  characteristics limits for safe use of HD33-ES-\* solenoid operated valves. Measured at vr = 32mm²/s and T = 40°C



4MLb

0MLb

3MLb

4

3

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1LL

3ML

4ML

2

1



1C			
4C			XHH
0C		$1 \mathbf{MLb} \qquad \overset{\mathbb{A}}{\underset{T}{\overset{\mathbb{A}}}{\overset{\mathbb{A}}{\overset{\mathbb{A}}{\overset{\mathbb{A}}{\overset{\mathbb{A}}{\overset{\mathbb{A}}{\overset{\mathbb{A}}}{\overset{\mathbb{A}}{\overset{\mathbb{A}}{\overset{\mathbb{A}}}}{\overset{\mathbb{A}}{\overset{\mathbb{A}}}}}}}}}}$	
3C			
1LL		4MLb	
3ML	XXII		
4ML		3MLb	

#### **7** SPOOL IDENTIFICATION AND INTERMEDIATE POSITION TRANSITORIES

#### 8 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.



#### **10** INSTALLATION DIMENSIONS





All valves HD33-\* conform with ISO and CETOP specifications for mounting surface dimensions (see 9) and for valves height. When assembled to its mounting plate valve HD33-\* must be fastened with 4 bolts M5x30 (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 HYDRAULIC FLUID

Seals and materials used on standard valves HD33-\* 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.

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#### **11** VERSION "K": OVERRIDE 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.









## **12** VERSION "S\*" ; CALIBRATED ORIFICE ON P PORT

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

- 3S-00 -> D = 0 mm
- 3S-10 -> D = 1,0 mm
- 3S-15 -> D = 1,5 mm
- 3S-20 -> D = 2,0 mm
- 3S-25 -> D = 2,5 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)



## **13** SPECIAL COIL CONNECTIONS



AMP =Amp Junior Timer vertical configuration



AMPX = Amp Junior Timer axial configuration





# **14 QUENCHING DIODE**

On request, coils can be supplied with an integrated bidirectional quenching diode (transil type BZW06-19B) able to provide high overvoltage protection. Their instantaneous response to transient overvoltages makes them particularly suited to protect voltage sensitive devices.



