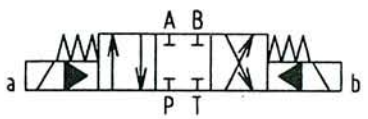
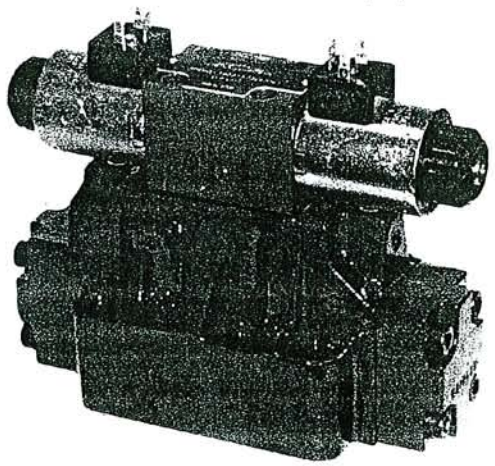
aidro	4/2- AND 4/3- WAY DIRECTIONAL CONTROL VALVES PILOT OPERATED	HD7-ES	Tab. HD7
	Size 16	320 bar	300 L/min

- ❑ **Solenoid pilot operated directional valves**
- ❑ **Hydraulic pilot operated directional valves**
- ❑ **Many standard spool types**
- ❑ **Small energy input**
- ❑ **Wet pin core tubes**
- ❑ **Manual overrides optional**
- ❑ **Installation dimensions to DIN 24 340, ISO 4401 and CETOP - RP 121H**





Functional Description

The HD7-ES solenoid operated -hydropiloted valves are consisting of an HD3-ES type solenoid operated directional control valve (see data sheet HD-310/1) that operates a 4-way hydropiloted control valve with a connection surface in accordance with the CETOP standards.They are available in various configurations and spool types.

The pilot and the drain connections can be made internal or external by inserting or removing the accordant threaded plugs located in the main directional control valve.

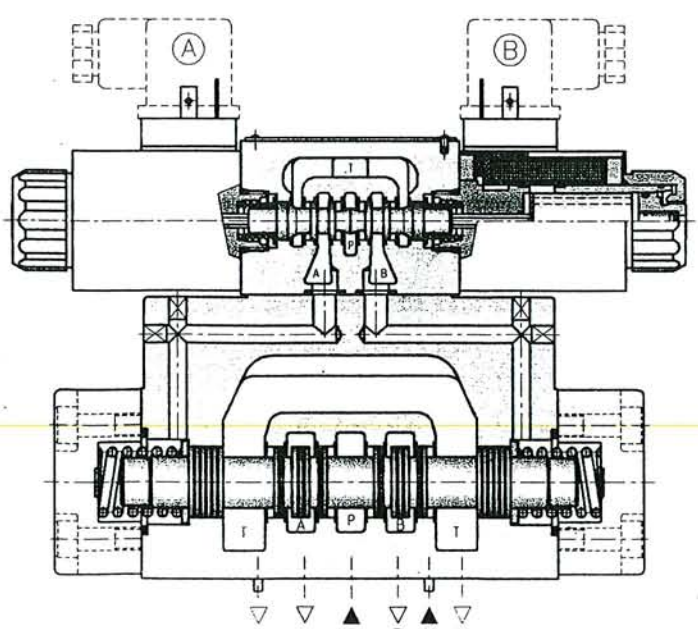
A wide range of configurations and different solenoid operated -hydropiloted directional control valve spool positions are available:

– 4-way,3-position directional control valve,with two solenoids;positioning of the spool in center position is obtained with centering springs.

– 4-way,2-position directional control valve with one solenoid;positioning of the spool in center position is determined hydraulically by the pilot valve and mechanically (even without pressure)by the main stage return spring.

– 4-way,2-position directional valve,with two solenoids; with mechanical detent of the shifted pilot spool positions when solenoids are de-energized.

The basic surface treatment of the valve housing is phosphate coated and the solenoids are zinc coated.



1 How to read the model code for valves HD7-PS-*

HD7 -	(ES)	-	(1)	(C)	(-)	/	(*)	(E)	-	(024C)	/	40
①	②		③	④	⑤		⑥	⑦		⑧		⑨

① HD7 : 4-way directional control valve Cetop 08- Pressure 32 Mpa (320 bar)

② (ES) :
ES : electrically controlled, standard
HH: hydraulically piloted (main body)

③ (1) : spool type (see table)

④ (C) : Solenoid(s) and spring(s) arrangement, see also functional symbols

C	: 2 sol., spool is spring centered	(3 position)
N	: 2 sol., pilot is detented	(2 position)
LL	: 1 sol. (a), spool is spring/hydr. offset	(2 position, end to end)
ML	: 1 sol. (a), spool is spring offset	(2 position, middle to end)
LM	: 1 sol. (a), spool is spring offset	(2 position, end to middle)

⑤ (-) : Centering of the main spool
- : standard, by springs
S : by hydraulic centering device

⑥ (*) : Code reserved for options and variants
b : only for versions LL, MI, LM see also functional symbols
C : adjustable limits for main spool stroke
D : double flow control valve to adjust shifting speed
G : adjustable limits and adjustable shifting speed
P : check valve incorporated in P port of the valve

⑦ (E) : Pilot and drain arrangement
- : internal pilot and external drain (standard)
I : internal pilot and internal drain
E : external pilot and external drain

⑧ (024C) : Electric voltage and solenoid coils
0000 : no coil(s)
012C : coil(s) for V12DC
024C : coil(s) for V24DC
115A : coil(s) for V110/50 - V 115/60 AC
230A : coil(s) for V220/50 - V 230/60 AC
See also electric characteristics

⑨ Design number (progressive) of the valves

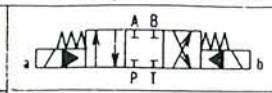
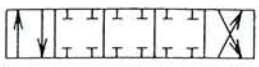
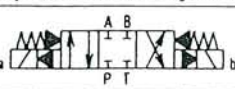
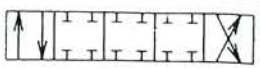
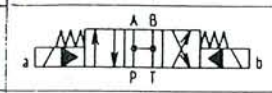
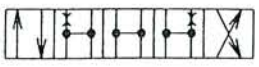
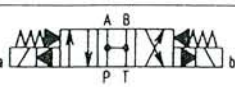
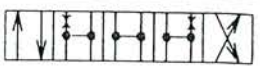
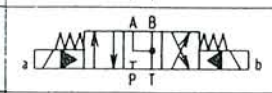
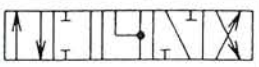
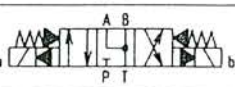
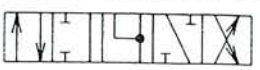
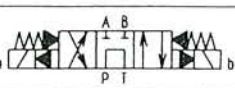
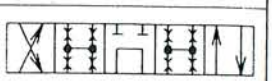
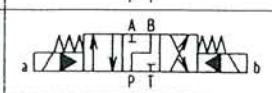
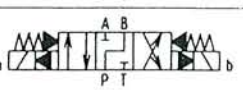
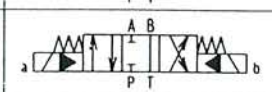
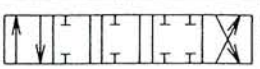
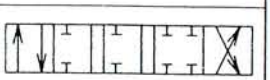
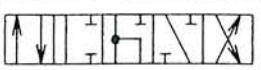
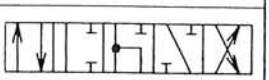
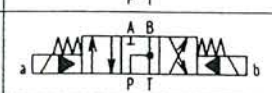
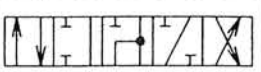
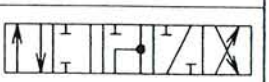
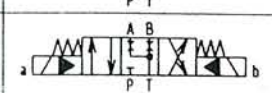
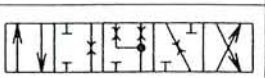
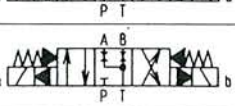
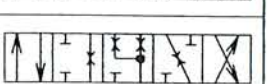
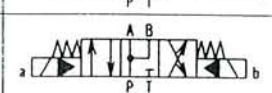
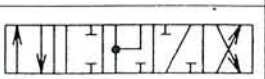
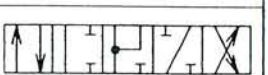
Technical Data

max recommended flow (spring centering)		250 l/min.
max recommended flow (hydraulic centering and hydraulic off set)		350 l/min.
max pressure at P,A,B ports		32 MPa (320 bar)
max pressure at T port (internal drain)		16 MPa (160 bar)
max pressure at T port (external drain)		25 MPa (250 bar)
pilot pressure minimum		0,5 MPa (5 bar)
pilot pressure max recommended		20 MPa (200 bar)
Mass :	HD7-ES	approx 9,00 Kg
	HD7-HH	approx 7,50 Kg

aidro srl - Italia - 21020 Taino, via Prati Bassi 36 - Tel. (++39) 0331 960250 - Fax (++39) 0331 960075 - e-mail: aidro@aidro.it - web: www.aidro.it

Functional Symbols

Symbols are referred to the solenoid valve.For the hydraulic control version please verify the connection scheme.

Three positions with spring centering			Three positions with hydraulic and spring centering		
1C			1CS		
OC			OCS		
3C			3CS		
4C			4CS		
6TC			67CS		
77C			77CS		
55C			55CS		
56C			56CS		
3SC			3SC		
8C			8CS		
76C			76CS		
65C			65CS		

Two positions with return spring			Two positions with return spring		
1LLb			1LL		
OLLb			OLL		
1MLb			1ML		

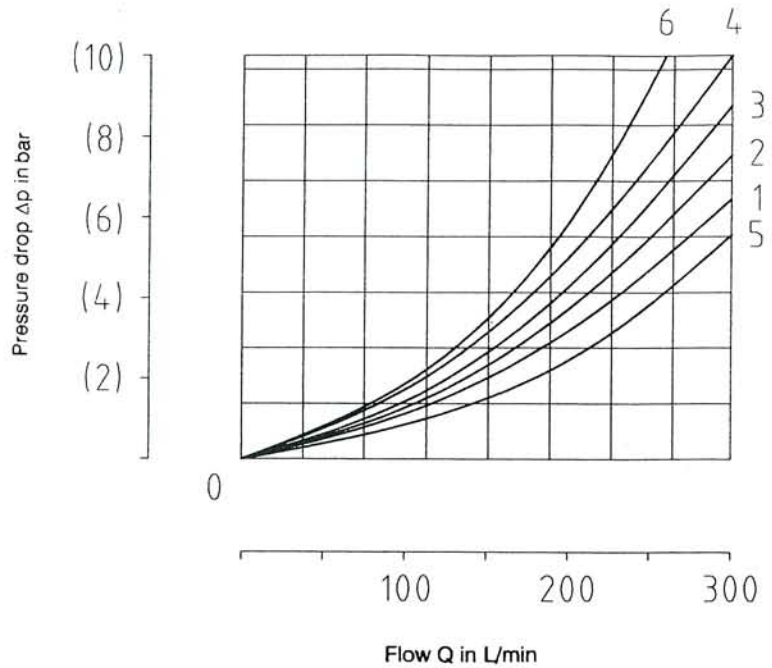
Two positions with mechanical detent on pilot valve		
1N		
ON		

Besides the diagrams shown, which are the most frequently used, other special versions are available: consult our technical department for their identification, feasibility and operating limits.

aidro srl - Italia - 21020 Taino, via Prati Bassi 36 - Tel. (++39) 0331 960250 - Fax (++39) 0331 960075 - e-mail: aidro@aidro.it - web: www.aidro.it

Pressure Drop Δp-Q

Measured at v = 166 SUS (35 mm²/s) and t = 122 °F (50 °C)



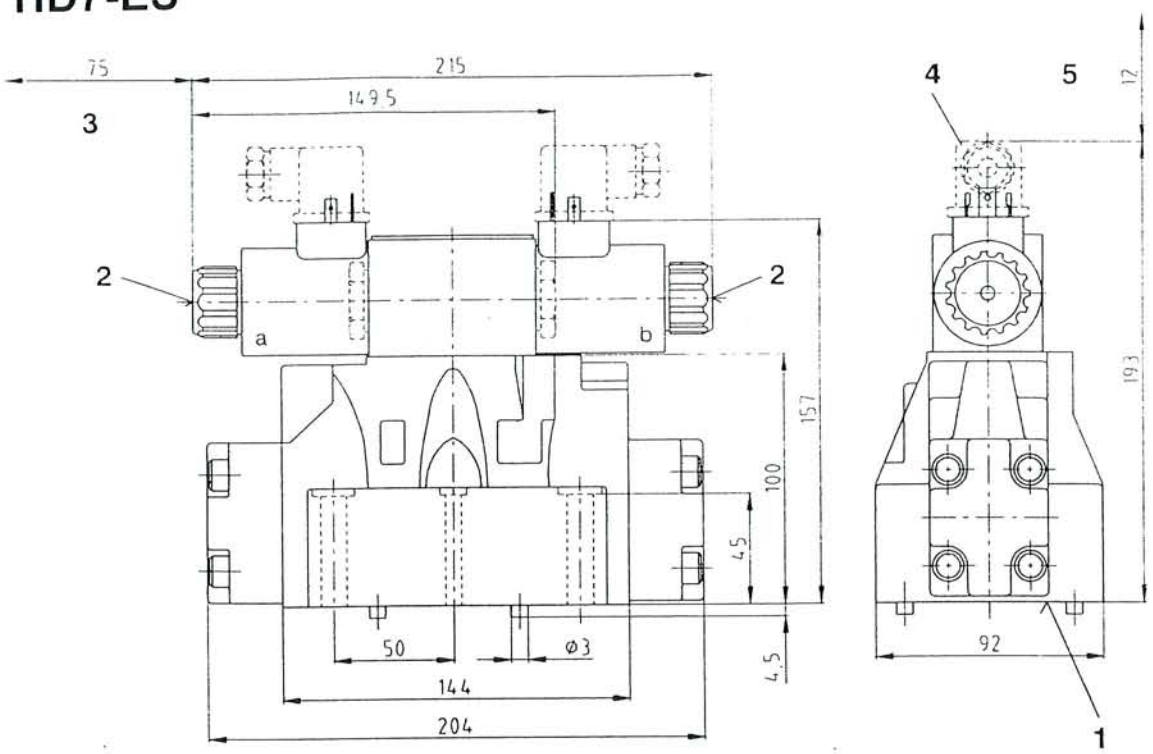
Spool type	Spool position	Connections				
		P - A	P - B	A - T	B - T	P - T
		Curves on graph				
1C	Energized	1	1	2	3	
OC	De-energized Energized	5	5	1	2	6*
3C	De-energized Energized	1	1	4• 1	4° 2	
4C	De-energized Energized	6	6	3	4	6
67C	De-energized Energized	1	4 5	2	3	
77C	De-energized Energized	1	1	2	4 2	
55C	De-energized Energized	6	6	3	4	6°
56C	De-energized Energized	6	6	4	3	6•
3SC	Energized	1	1	2	3	
8C	De-energized Energized	4• 5	4° 5	2	3	
76C	De-energized Energized	1	1	3 1	3	
65C	De-energized Energized	4 5	1	2	3	
1LL, OLL, 1ML	De-energized Energized	1	1	2	3	
1N, ON	Energized	1	1	2	3	

* A-B blocked • B blocked ° A blocked

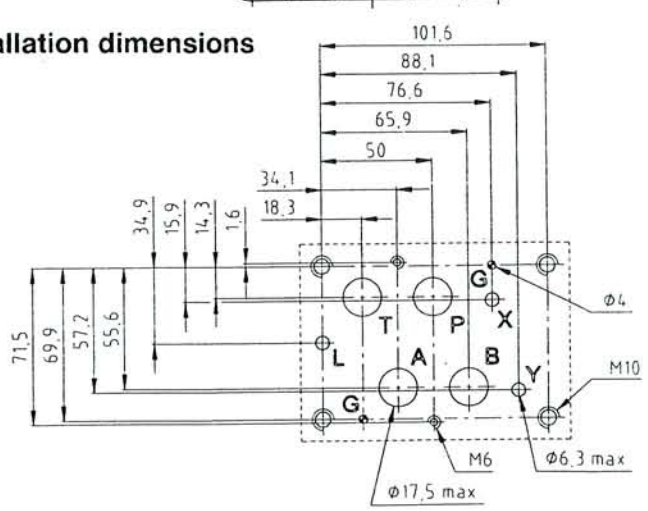
Valve Dimensions

Dimensions in millimetres

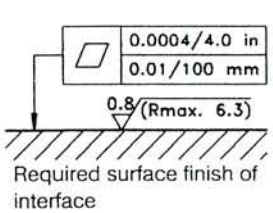
HD7-ES



Installation dimensions



1 Mounting surface with seal rings
2 Manual override
3 Space required to remove coil
4 Electrical connector
(must be ordered separately)
5 Space required to remove connector



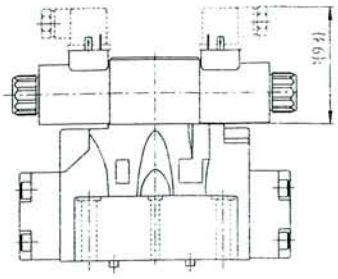
Required surface finish of interface

Single valve fastening:	4 bolts M10 x 60 2 bolts M6 x 60
Bolt torque:	M10 x 60: 40 Nm - bolts A 8.8; 67 Nm - bolts A 12.9 M6 x 60:5. 8 Nm - bolts A 8.8; 14 Nm - bolts A 12.9
Threads of mounting holes:	M6 x 18; M10 x 18
Seal rings:	4 O-rings type 22 22 x 2.62 2 O-rings type 10.82 x 1.78

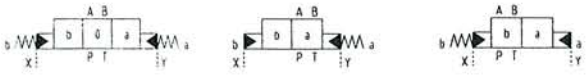
aidro srl - Italia - 21020 Taino, via Prati Bassi 36 - Tel. (++39) 0331 960250 - Fax (++39) 0331 960075 - e-mail: aidro@aidro.it - web: www.aidro.it

Type of Command

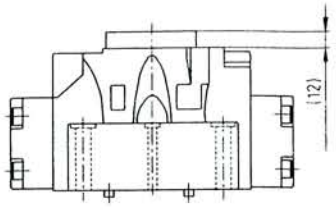
Solenoid control: HD7-ES
The valve is supplied with a pilot solenoid valve type HD3-ES.



Hydraulic control: HD7-HH
The valve is supplied as main body.
X and Y connections are used for the hydraulic control of the valve.

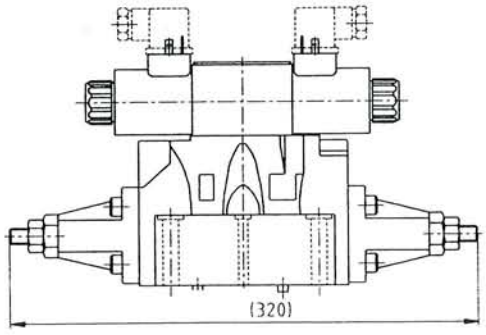


HD7-HH-*C/E HD7-HH-*LL/E HD7-HH-*LLb/

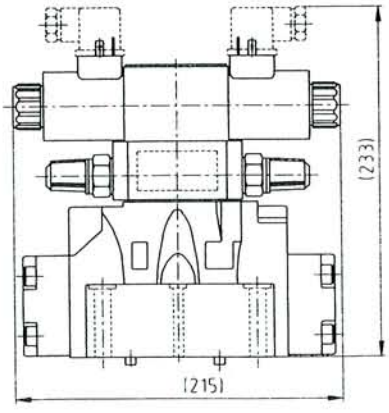


Controls

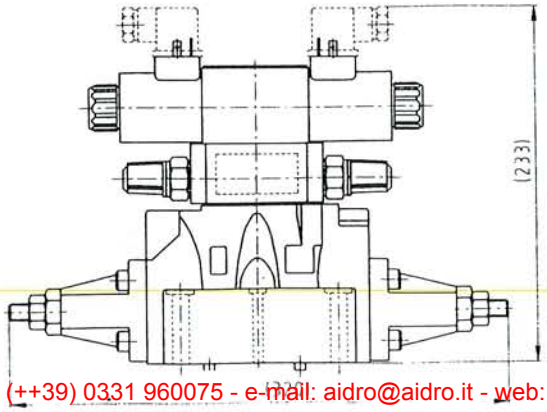
Control of the main spool stroke:C
It is possible to introduce special stroke controls in the heads of the hydropiloted valve so as to vary the maximum spool stroke.
This solution allows control of the flow rate from the pump to the actuator and from the actuator to the outlet,obtaining a double adjustable control on the actuator.Add the letter **C** to the identification code to request this device.



Control of the main spool shifting speed:D
By placing a double flow control valve between the pilot solenoid valve and the hydropiloted valve, the piloted flow rate can be controlled and therefore the shifting speed can be varied.Add the letter **D** to the identification code to request this device.



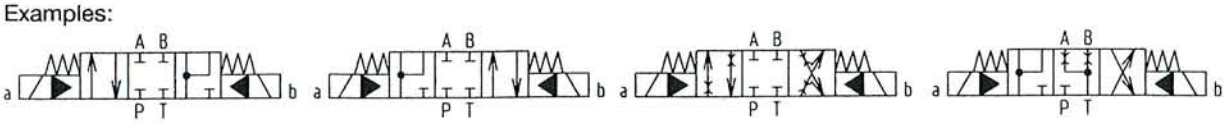
Control of the main spool stroke and shifting speed: G
It is possible to have the valve fitted with both the spool stroke device and the piloting flow rate control device. Add the letter **G** to the identification code to request this solution.



Special Configurations

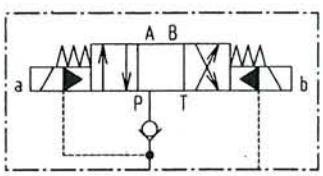
Solenoid valves with special spools
Besides the standard configurations (see pages 3 and 4), we can develop, on request, connection diagrams with special spools for a wide range of applications: consult our technical department for their identification, feasibility and operating limits.

Examples:

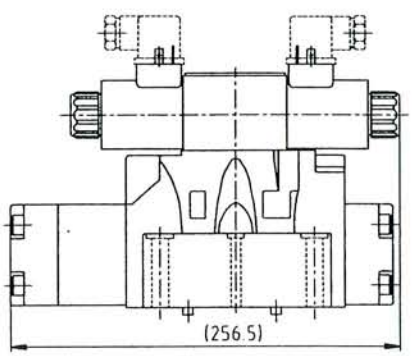


19C 18C 1SC 38C

Check valve incorporated on line P: P
Valve HD7 is available upon request with check valve incorporated on line P.This is particularly useful to obtain the necessary piloting pressure when the main control valve,in the rest position,has line P connected to the T outlet.The cracking pressure is 73 PSI (5 bar).Add **P** to the identification code for this request.



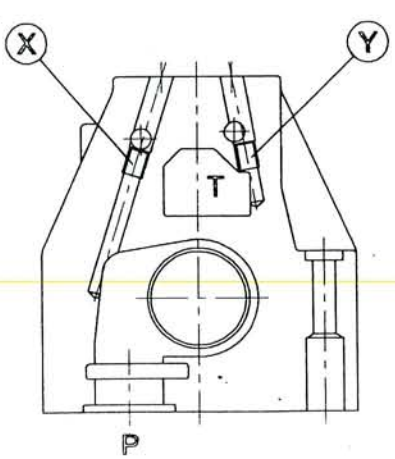
Hydraulic centering: CS
For use beyond the indicated flow rate limits and maintaining correct operating guarantees, the hydraulic centering version is recommended for the 3-position, 2-solenoid types in addition to spring centering. This feature is compatible with all other variants. Please consult our technical department for its use.



Pilot and Drain

The HD7 valves are available with pilot and drain, both internal and external. The version with external drain allows for a higher back pressure on the outlet.

Type of valve		Plug assembly	
		X	Y
HD7-ES-**/*	Internal pilot and external drain	NO	YES
HD7-ES-**/*I	Internal pilot and internal drain	NO	NO
HD7-ES-**/*E	External pilot and external drain	YES	YES
HD7-ES-**/*EI	External pilot and internal drain	YES	NO



X: plug M6 x 8 for external pilot
Y: plug M6 x 8 for external drain

aidro srl - Italia - 21020 Taino, via Prati Bassi 36 - Tel. (++39) 0331 960250 - Fax (++39) 0331 960075 - e-mail: aidro@aidro.it - web: www.aidro.it