

DIRECTIONAL CONTROL VALVES SOLENOID OPERATED - STACKABLE

HDF*-ES-*

25 l/min - 25 MPa (250 bar)

1 DESCRIPTION

Distributors HDF type are the basic elements for building blocks through horizontal assembly without the need of additional manifolds. Channels A, B outputs at the upper surface of the body are provided with threads G1/4. The individual distributor bodies are connected into a compact block using three bolts. Directional valves and the other modules can be combined in order to have different hydraulic circuits. The basic surface treatment of the valve housing phosphate coated and the solenoids are zinc coated.

2 ORDERING CODE

(1)	(2)	(3)	(4)	(5)	(6)	(7)
HDF	-	ES	-	-	/	10

(1) HDF: 4-way directional control valve – Pressure 25 Mpa (250 bar)

(2) Ports variants (see [8]):

- no designation: standard version
- C : P and T not passing (closing element with seals)
- B : P and T not passing (closing element without seals)
- 2 : additional ports A and B on mounting surface

(3) ES: electrically controlled, standard

(4) 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)
- 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)

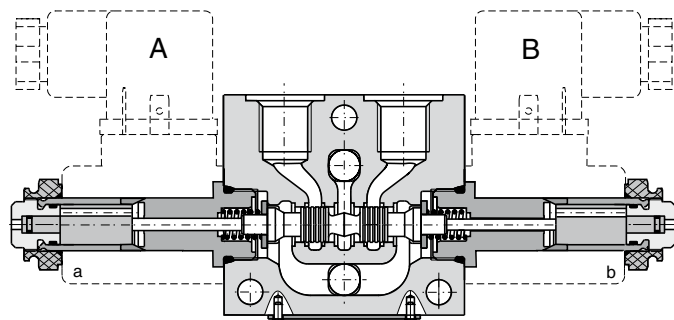
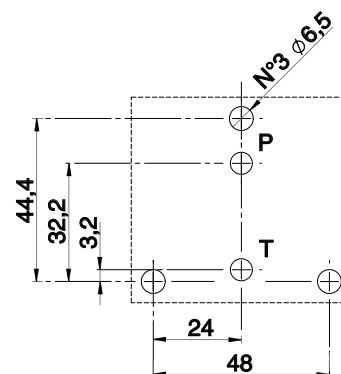
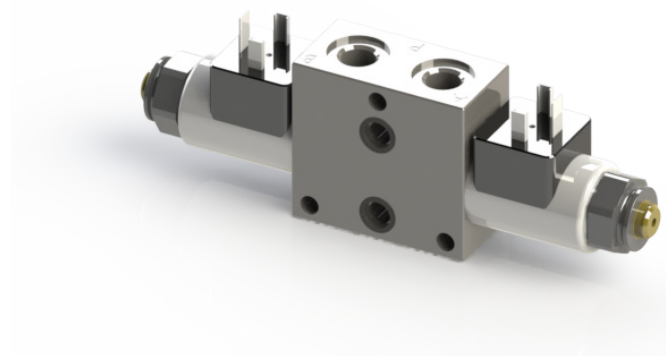
(5) Code reserved for option and variants:

- b : only for version LL, ML, LM solenoid b installed (instead of solenoid a)
- S-**: calibrated orifice on P port (see [9])
- ZT : body, solenoid tubes and coils are zinc trivalent plated

(6) Electric voltage and solenoid coils (see [3]):

- 0000: no coils
- 012C: coils for V12DC
- 024C: coils for V24DC
- 220R: coils for V220/50 – V230/60 AC

(7) Design number (progressive) of the valves

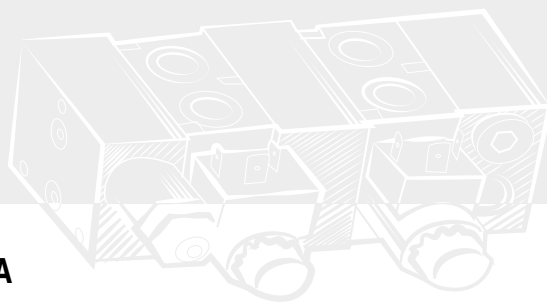


Spools, spring and solenoids combination permit to obtain almost every type of ports (P, A, B, T) connection and sequence.

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.

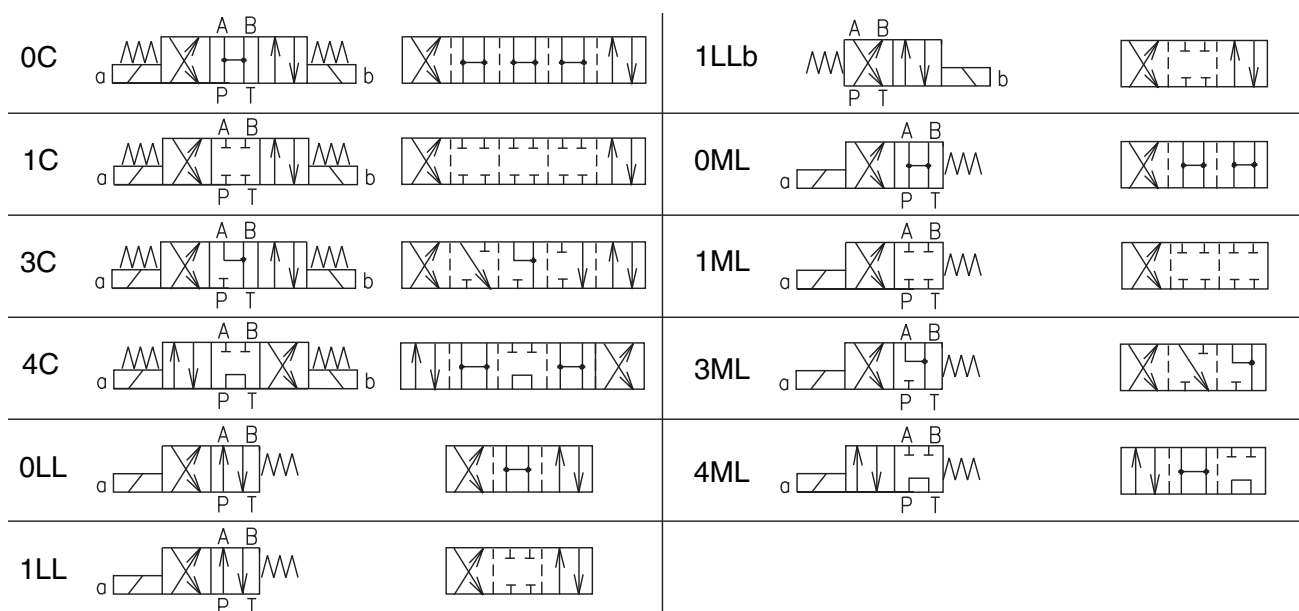
For other types see [4]



3 TECHNICAL DATA

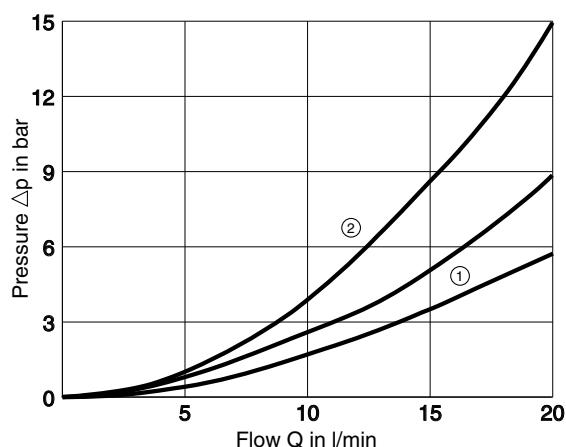
Maximum nominal flow	20 l/min	Electric characteristics: Valves HDF-ES-* are operated by solenoid B01 (see cap 12 pag 0011) that are energized: - directly from a D.C. voltage supply: V 12 DC V 24 DC - by the use of connectors that incorporate a full wave bridge rectifier, from A.C. voltage supply: V 220/50 (V 230/60). 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 = 1,83 A V 24 DC = 0,92 A V 220 R = 0,08 A Permissible supply voltage variation: +5% -10%
Maximum rec. flow rate	25 l/min	
Maximum nominal pressure (P, A, B)	25 MPa (250bar)	
Maximum pressure at T port	200 MPa (200bar)	
Pressure drops	see [5]	
Protection to DIN 40050	IP 65	
Duty cycle	100%	
Service life	$\geq 10^7$ cycles	
Installation and dimensions	see [7]	
Mass	1,04 - 0,9 Kg	

4 SPOOL IDENTIFICATION AND INTERMEDIATE POSITION TRANSITORIES



5 TYPICAL DIAGRAMS

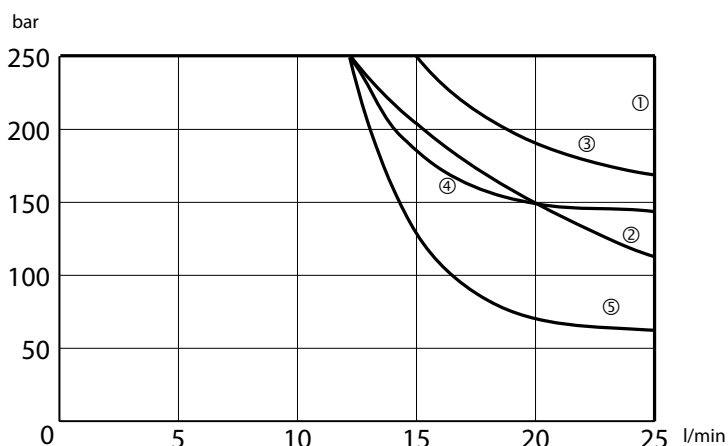
Typical Δp -Q curves for valves HDF-ES-* in standard configuration, with mineral oil at 36 cSt and at 50°C for flow P → A/B, A/B → T



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

6 POWER LIMITS

p-Q characteristic limits for safe use of HDF-ES* solenoid operated valves. Limit curves apply to solenoid valves energized with rated voltage -5% and flushed with hydraulic fluid.



- ① HDF-ES-1C, HDF-ES-0ML, HDF-ES-1LL, HDF-ES-1LLb, HDF-ES-1ML
② HDF-ES-4C, HDF-ES-4ML ③ HDF-ES-0C, HDF-ES-0ML
④ HDF-ES-3C, HDF-ES-3ML ⑤ HDF-ES-0LL

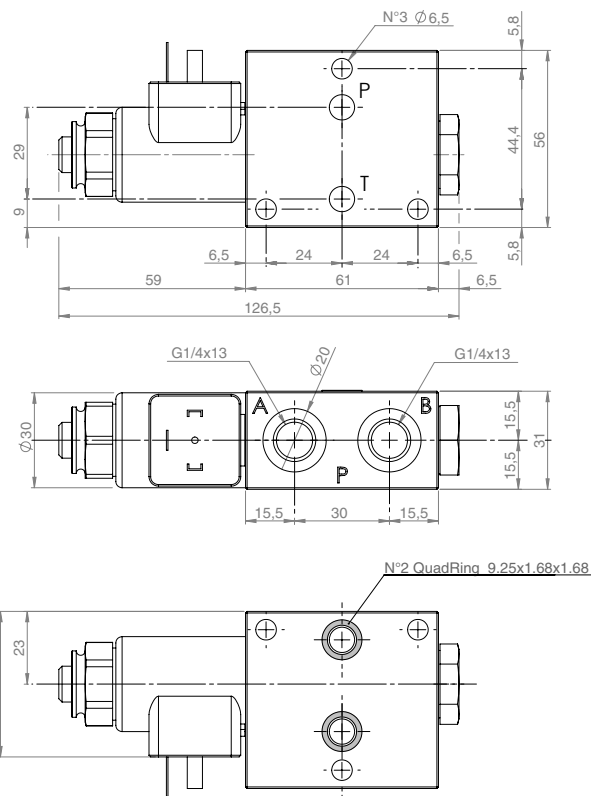
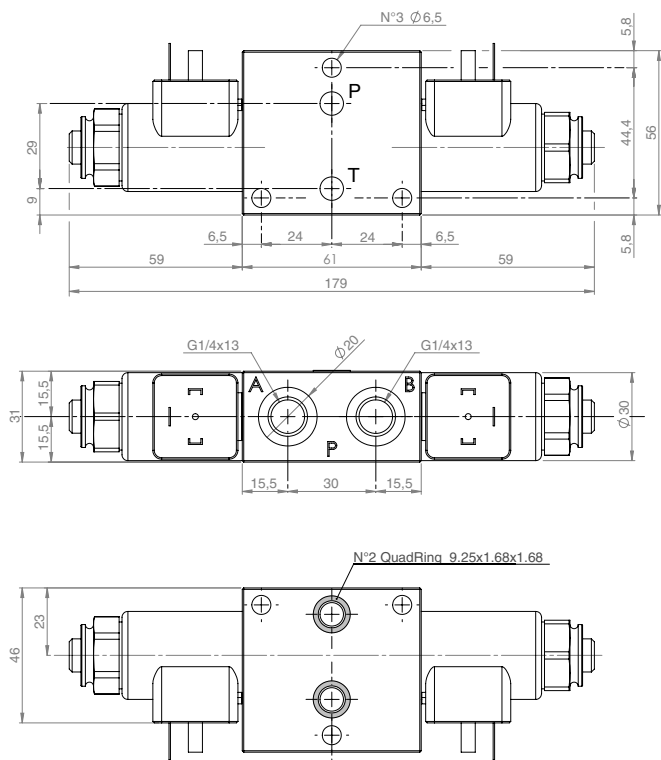
7 INSTALLATION DIMENSIONS (mm)

HDF-ES-*C-*

HDF-ES-*LL-*

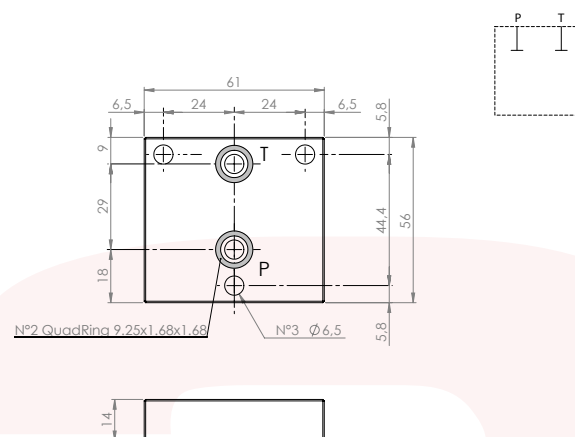
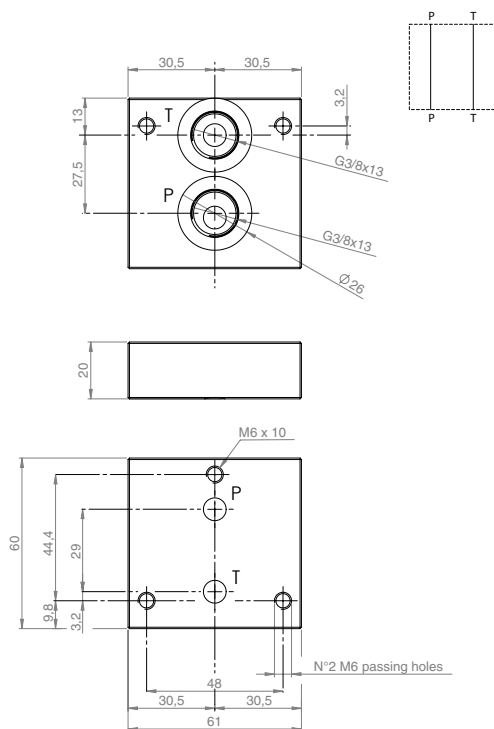
HDF-ES-*ML-*

HDF-ES-*LM-*



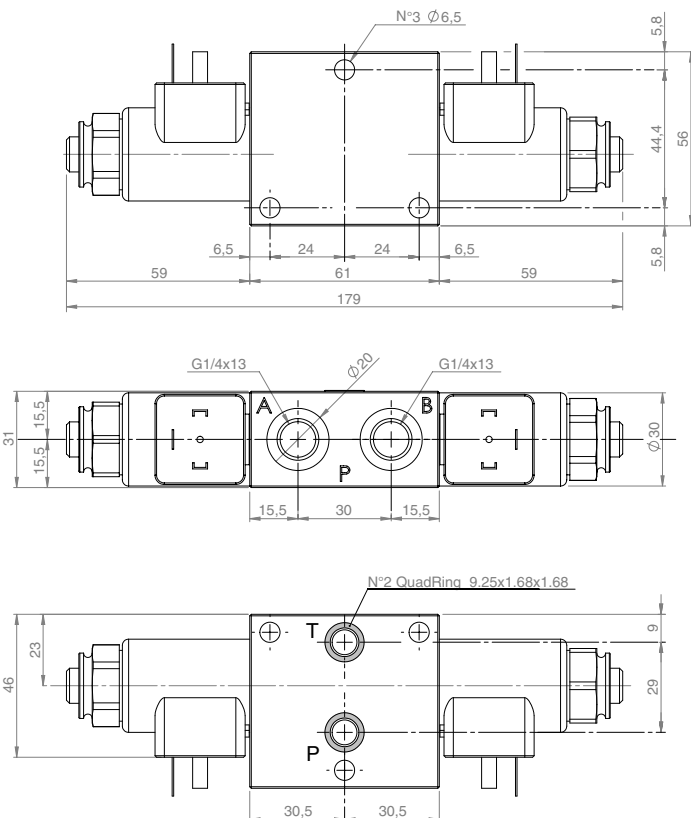
INLET PLATE, STACKABLE WITH HDF-ES VALVES, TYPE PD1-03/32-5

CLOSING PLATES, STACKABLE WITH HDF-ES VALVES TYPE PD1-03/32

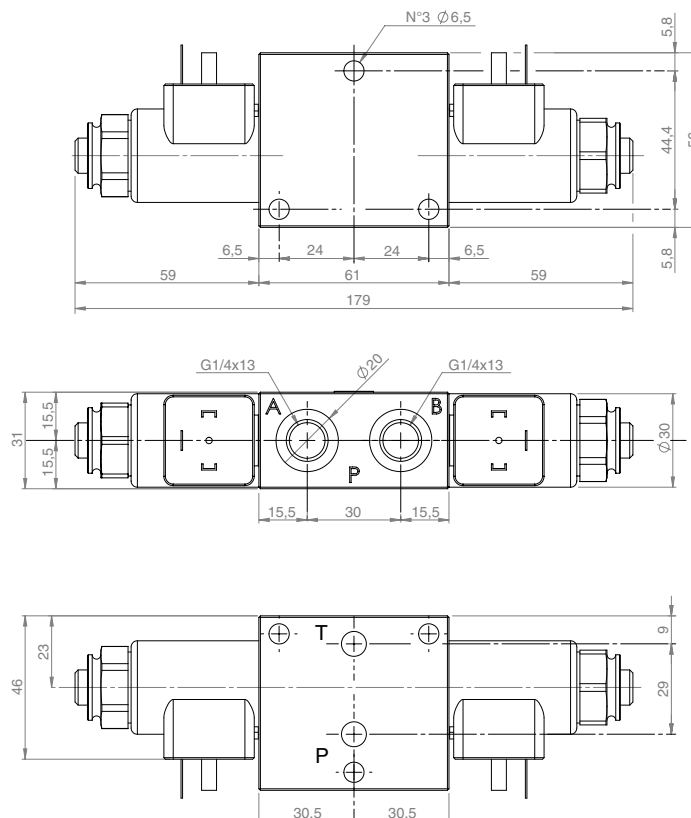


INSTALLATION DIMENSIONS (mm)

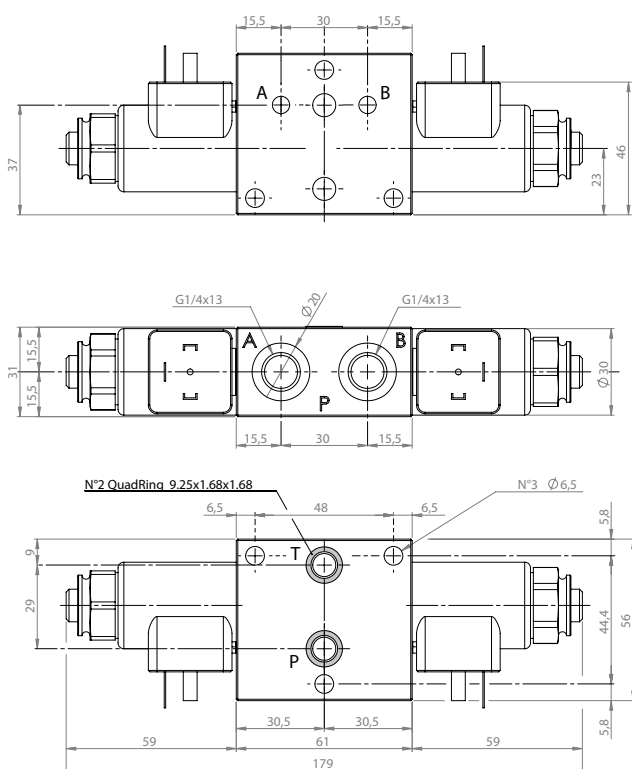
HDFC-ES*



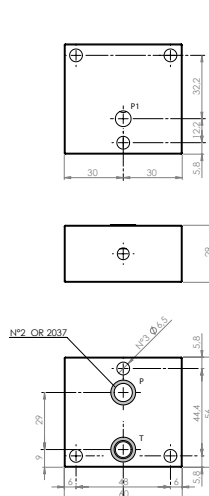
HDFB-ES*



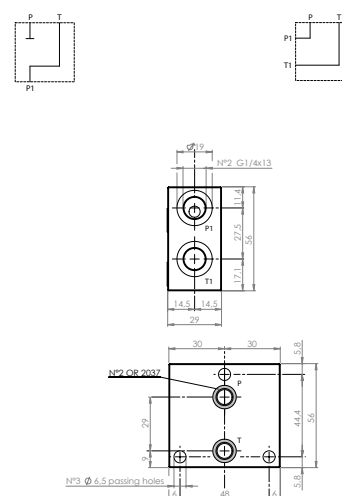
HDF2-ES*



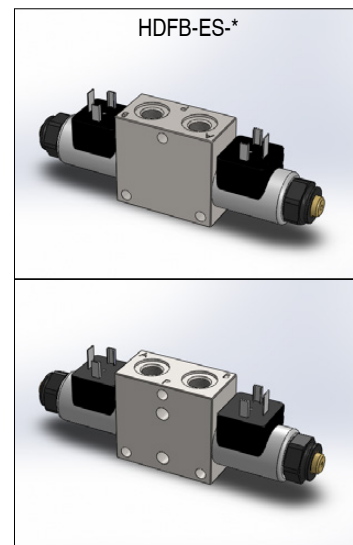
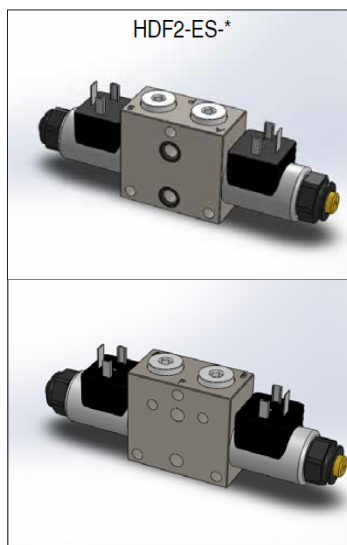
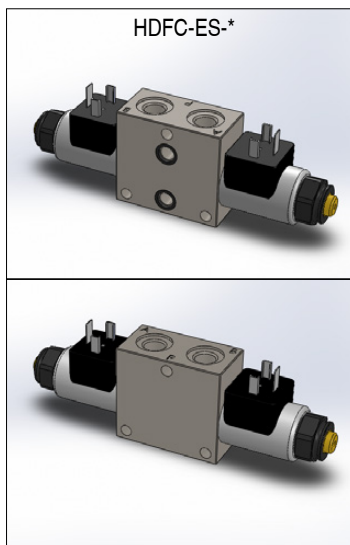
Tandem circuit plate,
stackable with
HDF-ES valves,
AMF-PM-TP



inlet/outlet plate,
stackable with
HDF-ES valves,
PD1-PT



8 PORTS VARIANTS



Suitable to be used as closing element in a stack of HDF-ES-* valves

Especially designed (with A and B additional ports) to be stacked with the double pilot operated check valve type AMF-CP-AB. HDF2ES-* valves are supplied with G1/4 A and B ports plugged

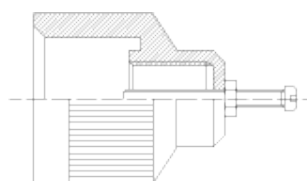
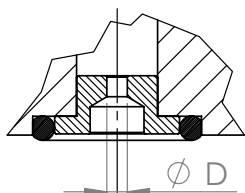
Suitable to be used as closing element in a stack of HDF-ES-* valves

9 OPTIONS

Available for P and T lines "section reducer" or "stop" with O ring

Standard retaining nut can be replaced by a mechanical override nut device, code G01-E:

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



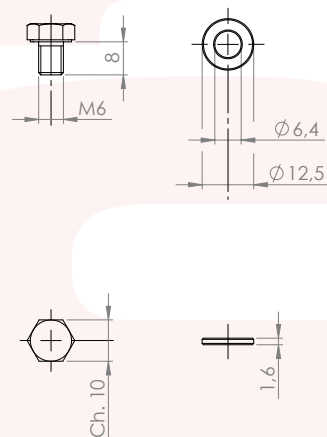
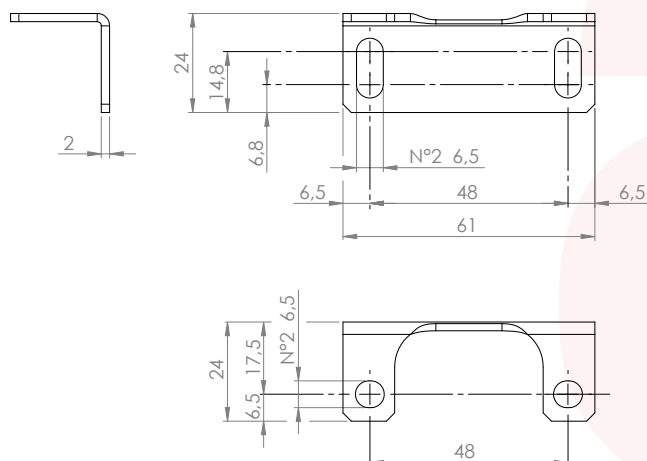
10 MOUNTING ANGLES KIT TYPE MAF-KIT

Fixing elements for HDF-ES-* stack :

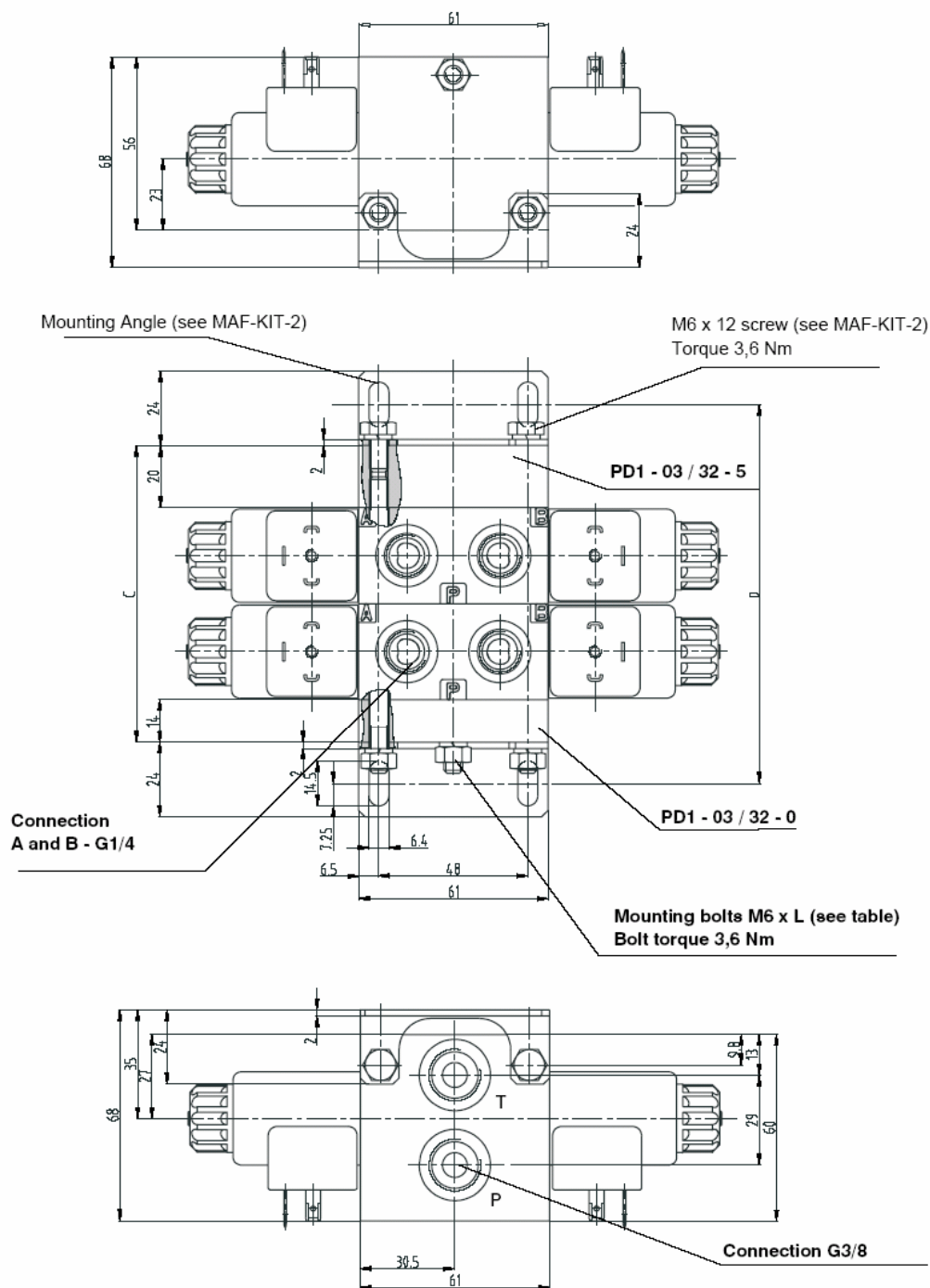
N°2 Mounting angle

N°2 M6 Screw

N°2 Washer



11 BLOCK ASSEMBLY (mm)



Dimensions

Number of section	1	2	3	4	5	6	7	8
Dimension C [mm]	65	96	127	158	189	220	251	282
Dimension D [mm]	91,5	122,5	153,5	184,5	215,5	264,5	277,5	308,5
Dimension L [mm]	55	100	133	163	194	224	256	287