

# D3M

SECTIONAL VALVE



 **hydro  
control**  
TECHNICAL CATALOGUE

**1<sup>st</sup> edition D3M.05**

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*This catalogue shows the product in the most standard configurations.  
Please contact our Sales Dpt. for more detailed information or special requests.*

**WARNING!**

*All specifications of this catalogue refer to the standard product at this date.  
Walvoil, oriented to a continuous improvement, reserves the right to  
discontinue, modify or revise the specifications, without notice.*

**WALVOIL IS NOT RESPONSIBLE FOR ANY DAMAGE CAUSED BY AN  
INCORRECT USE OF THE PRODUCT.**



### Applications

Numerous integrated valve features in addition to countless configuration options make D3M highly flexible and easily adaptable to the widest applications range.

The valve is available with manual, direct electric, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls.

Numerous configurations and solutions are possible.

Working sections have auxiliary valves and a broad range of interchangeable spools.

D3M has available:

Direct electric control push push type and push pull type.

Special inlet section for parallel valves connection (suitable for forest applications).

Potentiometer and microswitch kits and Overcenter spool (Fork lift trucks).





QUICK REFERENCE GUIDE

GENERAL SPECIFICATION	D9	D3M	DVS10	D4	D6	D16	D12	DVS20	D20	D25	D40
Working sections number	1-12	1-12	1-12	1-12	1-12	1-12	1-12	1-12	1-12	1-12	1-10
<b>CIRCUIT</b>											
Parallel	•	•	•	•	•	•	•	•	•	•	•
Series	•	•	•	•	•	•	•		•	•	
Tandem	•	•	•	•	•	•		•	•		
Parallel circuit stroke (mm)	6	5	6	6	7	7	9,5	9,5	9,5	12	15
Series circuit stroke (mm)	6	5	6	6	5	7	6,5		6,5	8,5	
Float spool extra stroke (mm)	5	5	5	5,5	6	7	7	7	7	9,5	10
Spools pitch (mm)	31	38	35	40	46	46	56	56	64	75	91
<b>RATED FLOW</b>											
Max recommended flow rate (l/min)	35	55	45	80	100	150	180	250	250	380	700
Max recommended flow rate (GPM)	10	15	12	22	27	40	48	67	67	100	185
<b>RATED PRESSURE</b>											
Max working pressure (bar)	350	350	350	350	350	350	350	250	350	350	350
Max working pressure (PSI)	5000	5000	5000	5000	5000	5000	5000	4000	5000	5000	5000

OPTION CHART	D9	D3M	DVS10	D4	D6	D16	D12	DVS20	D20	D25	D40
Direct acting pressure relief valve	•	•	•	•							
Pilot operated pressure relief valve		•		•	•	•	•	•	•	•	•
2 stage pilot operated relief valve		•		•	•	•	•		•	•	•
Externally piloted valve	•	•	•	•	•	•	•		•	•	•
Solenoid dump valve (12 Vdc)	•	•	•	•	•	•	•				
Solenoid dump valve (24 Vdc)	•	•	•	•	•	•	•				
Main anticavitation check valve		•		•	•	•	•	•	•	•	•
Clamping valve		•	•	•							
<b>SPOOL ACTUATION</b>											
Manual control	•	•	•	•	•	•	•	•	•	•	•
Without lever	•	•	•	•	•	•	•	•	•	•	•
90° joystick control		•	•	•	•	•					
Hydraulic control	•	•	•	•	•	•	•	•	•	•	•
Direct electric control (12-24 Vdc)		•		•							
<b>SPOOL RETURN ACTION</b>											
Spring return	•	•	•	•	•	•	•	•	•	•	•
Detent in A - in B - in A/B	•	•	•	•	•	•	•	•	•	•	•
Detent in 4 <sup>th</sup> position	•	•	•	•	•	•	•	•	•	•	•
Arrangement for dual control	•	•		•	•	•	•		•		
Hydraulic load limit	•	•		•	•	•					
Pneumatic control ON - OFF		•	•	•	•	•	•	•	•		
Proportional pneumatic control		•	•	•	•	•	•	•	•		
Electrical load limit	•	•		•	•	•					
Electrohydraulic control ON-OFF (12-24 Vdc)		•	•	•	•	•	•	•	•		
Electrohydraulic control PROP. (12-24 Vdc)		•	•	•	•	•	•	•	•		
Electropneumatic control (12-24 Vdc)		•	•	•	•	•	•		•		
<b>AUXILIARY VALVES</b>											
Antishock valve	•	•	•	•	•	•	•	•	•	•	•
Anticavitation valve	•	•	•	•	•	•	•	•	•	•	•
Combined valve	•	•	•		•	•	•		•	•	•
Pilot combined valve						•		•	•	•	•





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## GENERAL SPECIFICATIONS

## Standard working conditions

Description	Value
Ambient operating temperature range	-40°C / +60°C
Kinematic viscosity range	10 ÷ 300 cSt
Max contamination level	9 (NAS 1638) - 20/18/15 (ISO 4406:1999)
Recommended filtration level	$\beta_{10} > 75$ (ISO 16889:2008)
Internal filter (on electroproportional valves pilot line)	30 $\mu\text{m}$

All information and diagrams in this catalogue refer to a mineral base oil VG46 at 50°C temperature (32 cSt kinematic viscosity)

## Fluid options

Types of fluid (according to ISO 6743/4) Oil and Solutions	Temperature (°C)		Compatible gasket
	min	max	
Mineral Oil HL, HM (or HLP acc. to DIN 51524)	-25	+80	NBR
Oil in water emulsions HFA	+5	+55	NBR
Water in oil emulsions HFB	+5	+55	NBR
Polyglycol-based aqueous solution HFC	-10	+60	NBR

For special applications and different fluids, please call our Technical Department.



**ORDER EXAMPLE**

D3M/1: IR 001 150 A G04 W001A H001 F001A RP G04 01 PA 100 05 PB TJ A G04

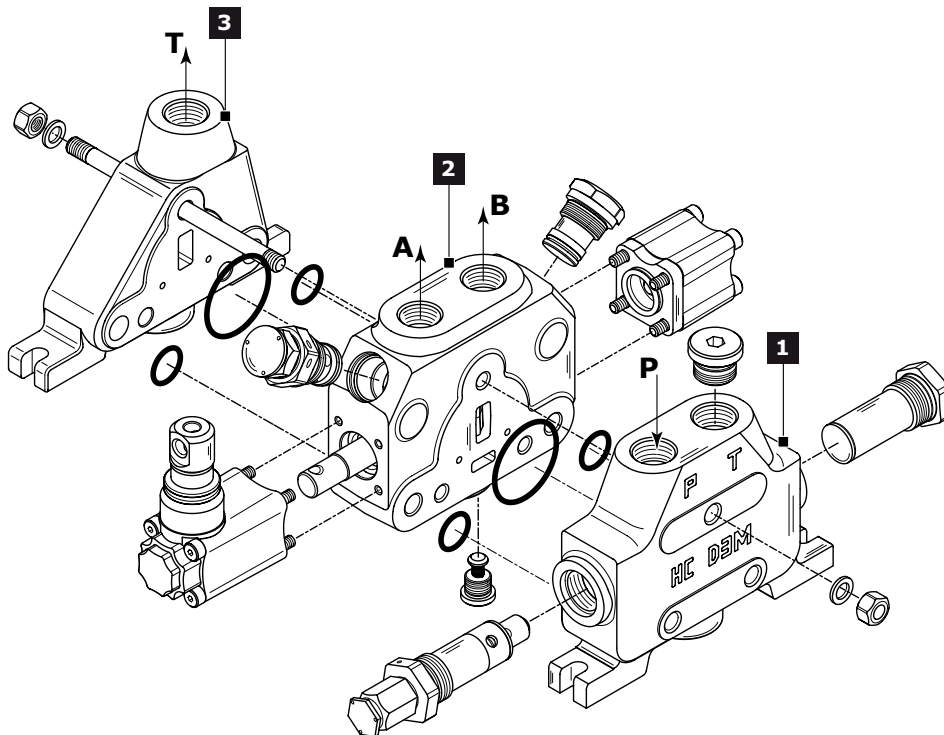
**TYPE:**  
**D3M:** product type  
**/1:** working section number

- 1) INLET ARRANGEMENT: (page 10)**  
**IR 001** inlet side and valve type  
**150** setting (bar)  
**A G04** inlet position and available thread type

- 2) WORK SECTION ARRANGEMENT: (page 14)**  
**W001A** spool type  
**H001** spool actuation type  
**F001A** spool return action type  
**RP G04** type and thread section  
**01 PA 100** auxiliary valve (port A)  
**05 PB** auxiliary valve (port B)

- 3) OUTLET ARRANGEMENT: (page 36)**  
**TJ** outlet type  
**A G04** outlet position and available thread type

Ordering row 2 must be repeated for every work section



**Standard thread**

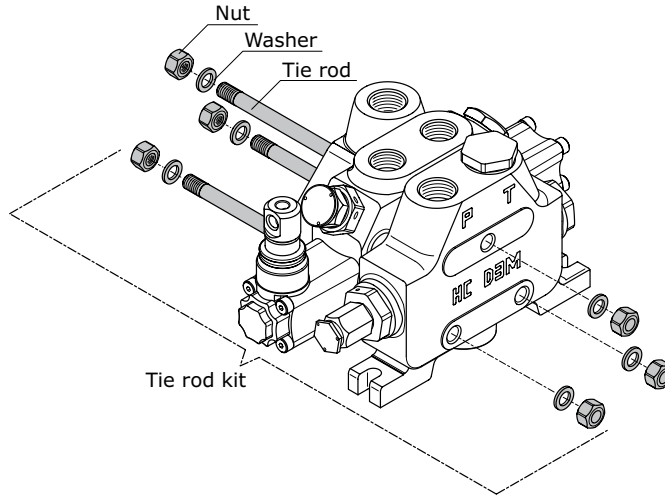
The connection ports size is indicated by an ordering code common for all Hydrocontrol products. Following table shows all available connections; for ordering code refer to table on page 44.

Ports	BSP (ISO - 228)	Code	UN-UNF (ISO - 725)	Code	METRIC (ISO-262)	Code
<b>Inlet Port (P)</b>	G 1/2	<b>G04</b>	3/4" - 16 UNF	<b>U03</b>	M18 x 1.5	<b>M01</b>
<b>Ports (A - B)</b>	G 1/2	<b>G04</b>	3/4" - 16 UNF	<b>U03</b>	M18 x 1.5	<b>M01</b>
<b>Outlet (T) - Carry over (HPCO)</b>	G 1/2	<b>G04</b>	3/4" - 16 UNF	<b>U03</b>	M55 x 1.5	<b>M02</b>
<b>Hydraulic Pilot</b>	G 1/4	<b>G02</b>	9/16" - 18 UNF			
<b>Pneumatic Pilot</b>	G 1/8	-	NPTF 1/8-27			



**Tie-rod kit classification (appendix "A")**

Tie rod kit allows the correct assembly of sectional valves. Tie rod's length depends on the number of sections; each valve is assembled with tie rod kits including a tie rod, two nuts and two washers. D3M requires 3 tie-rod kits.



Tie rod kit	Order Code	Lenght (mm)	Clamping Torque (Nm)	Quantity
D3M/1	300130001	132		
D3M/2	300130002	170		
D3M/3	300130003	208		
D3M/4	300130004	246		
D3M/5	300130005	284		
D3M/6	300130006	322	35	3
D3M/7	300130007	360		
D3M/8	300130008	398		
D3M/9	300130009	436		
D3M/10	300130010	474		
D3M/11	300130011	512		
D3M/12	300130012	550		

**Painting**

On request, all Hydrocontrol valves can be delivered painted (RAL 9005 black primer).

**Order example of D3M/1 painted:**

D3M/1  
 IR 009 150 A G04  
 W001A H001 F001A RP G04 01 PA 100 01 PB 120  
 TJ A G04  
**P006/1 N10**

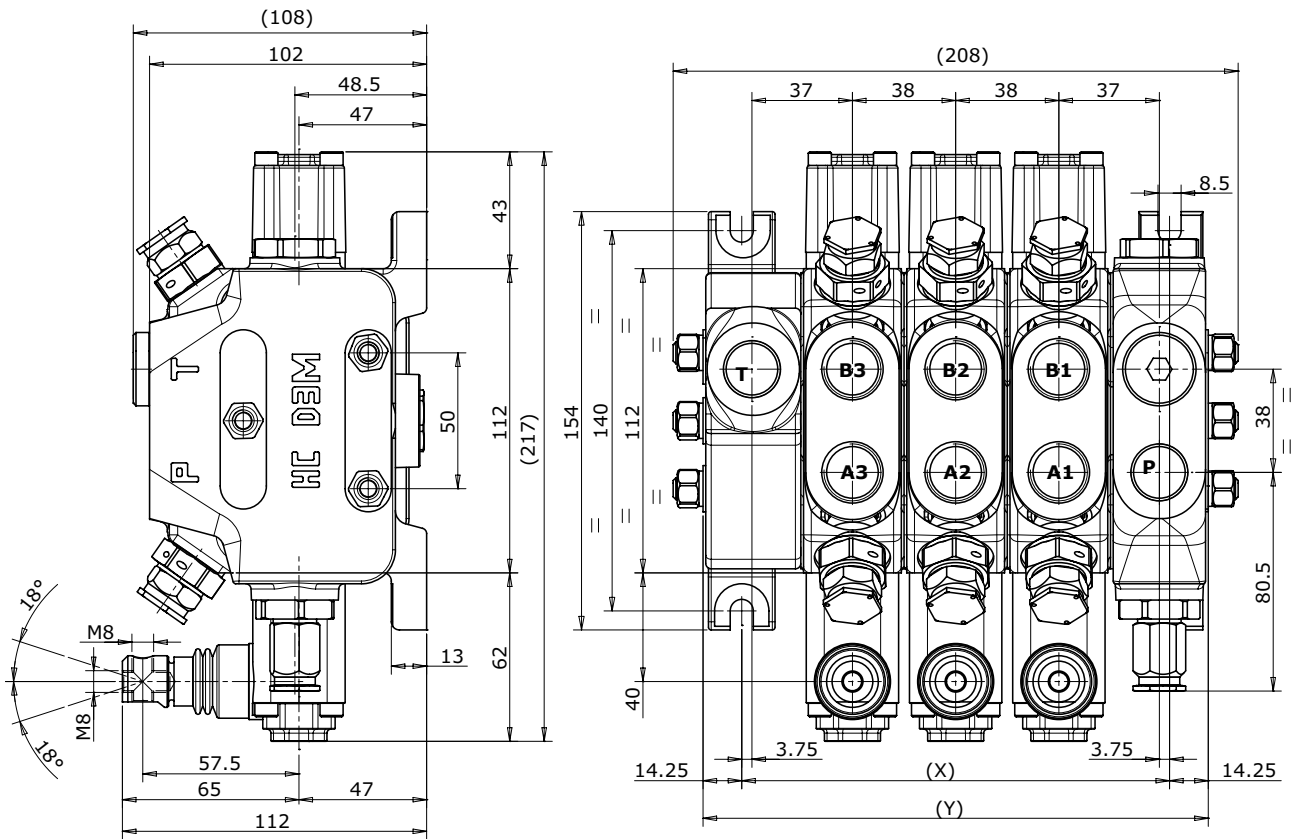
The painting is indicated with the following value:

**P006 - /1 - N10**





**DIMENSIONS**



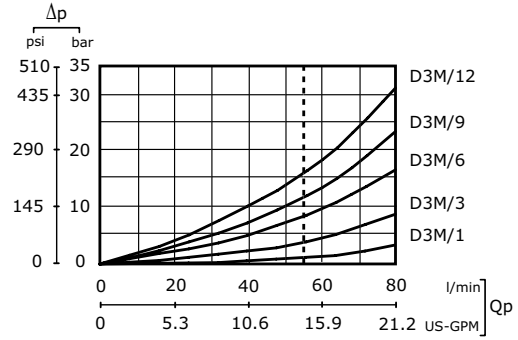
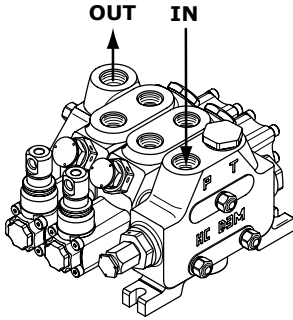
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
<b>X (mm)</b>	81.5	119.5	157.5	195.5	233.5	271.5	309.5	347.5	385.5	423.5	461.5	499.5
<b>Y (mm)</b>	110	148	186	224	262	300	338	376	414	452	490	528
<b>Weights (kg)</b>	6.3	8,8	11.2	13.7	16.2	18.6	21	23.5	26	28.5	31	33.3



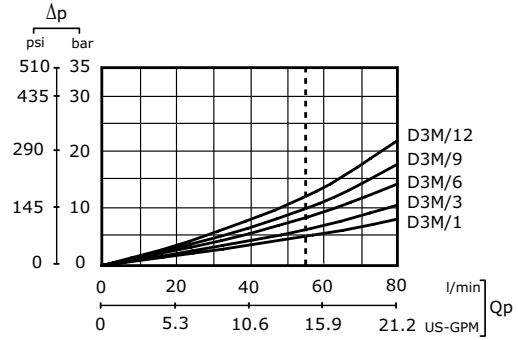
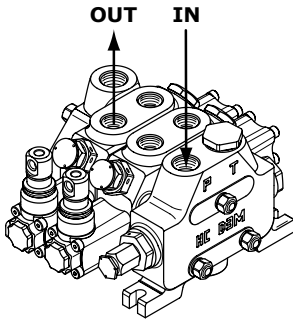
TYPICAL CURVES

Indicated values have been tested with standard sectional valve and W001A spool.

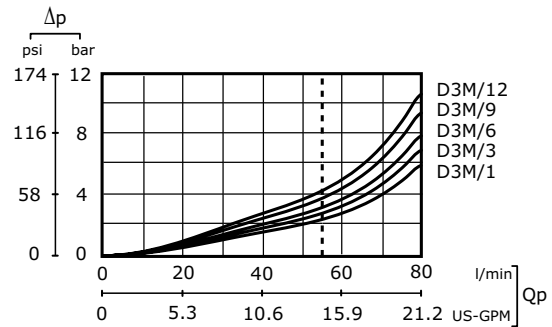
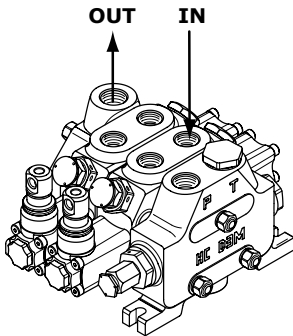
Pressure drop (P - T)



Pressure drop (P - A/B)

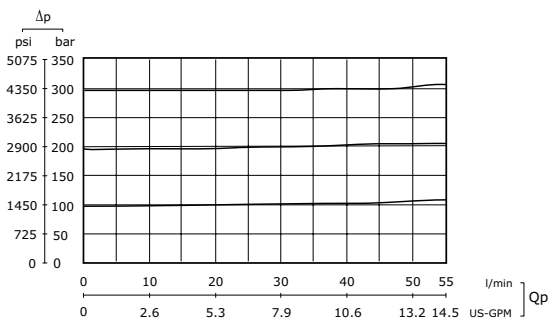


Pressure drop (A/B - T)



Direct relief valve curve

Setting ranges	
type	pressure (bar)
A	30 - 110
B	111 - 150
C	151 - 200
D	201 - 250
E	251 - 350



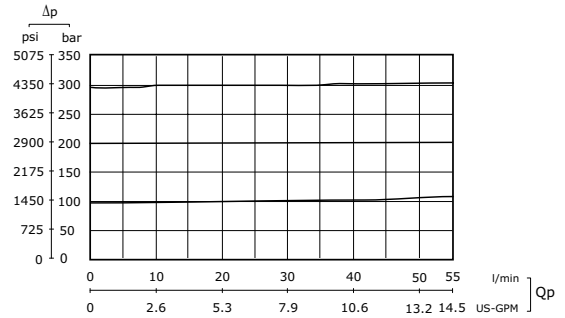


**TYPICAL CURVES**

Indicated values have been tested with standard sectional valve and W001A spool.

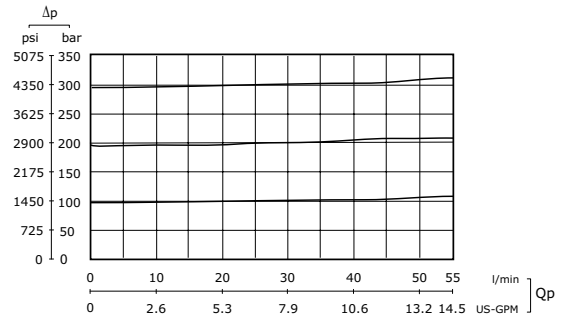
**Pilot operated relief valve curve**

Setting ranges	
type	pressure (bar)
A	30 - 350



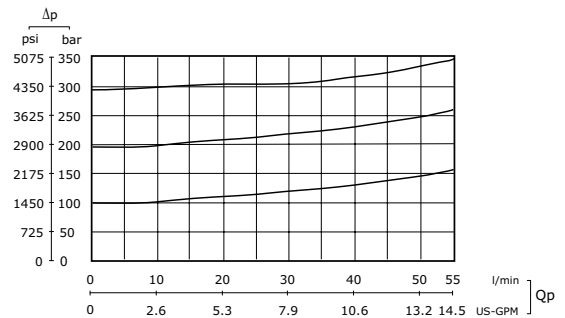
**Antishock valve curve**

Setting ranges		
type	pressure (bar)	
	at full flow	at min. flow
A	20 - 100	10-A / 80-A
B	101 - 220	81-A / 180-A
C	221 - 350	181-A / 350-A

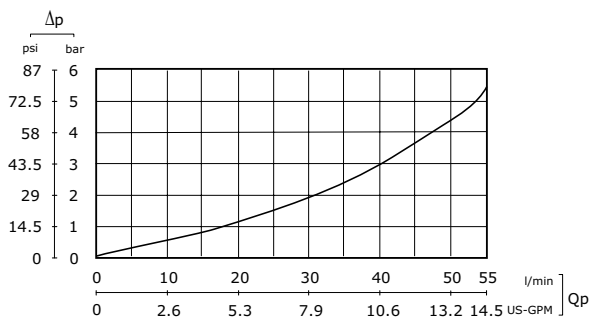


**Combined valve curve**

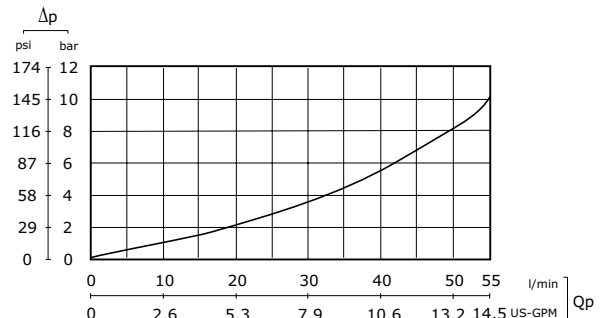
Setting ranges		
type	pressure (bar)	
	at full flow	at min. flow
A	20 - 60	10-A / 40-A
B	61 - 100	41-A / 80-A
C	101 - 220	81-A / 180-A
D	221 - 350	181-A / 350-A



**Main Anticavitation check valve curve**



**Anticavitation check valve curve**



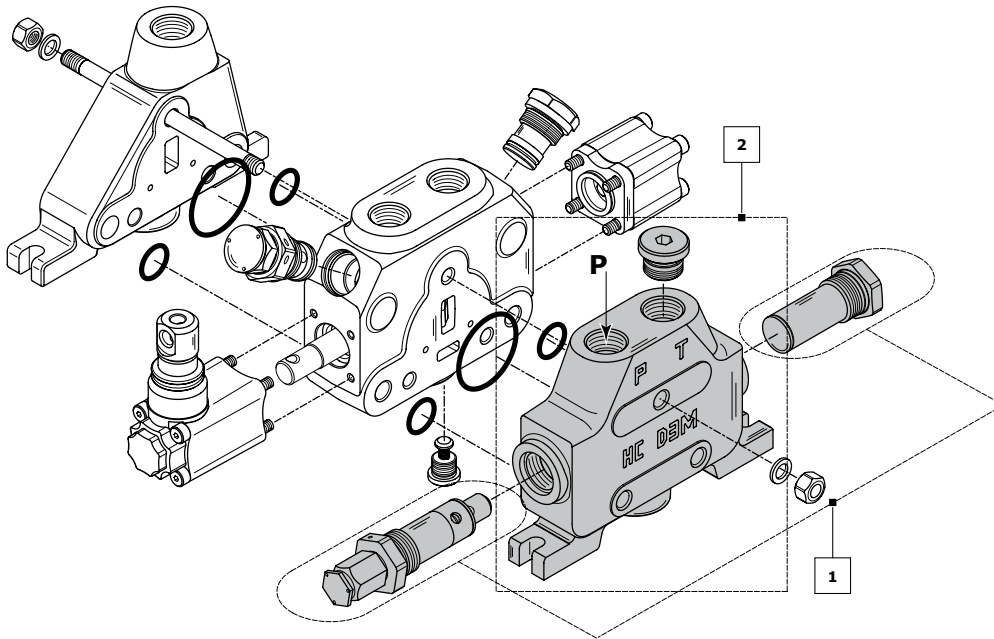


INLET SECTION

Order example

IR	001	150	A G04
----	-----	-----	-------

- IR** inlet side classification \_\_\_\_\_
- 1. 001** valve arrangement \_\_\_\_\_
- 150** setting (bar) \_\_\_\_\_
- 2. A G04** inlet position and available thread type \_\_\_\_\_



Rif.	Code	Description	Page
-	<b>IR</b>	Sectional valve with right inlet section	<b>11</b>
	<b>IL</b>	Sectional valve with left inlet section	
<b>1</b>	<b>001</b>	Direct acting pressure relief valve	<b>12</b>
	<b>002</b>	Direct acting pressure relief valve and Main anticavitation check valve	
	<b>004</b>	Direct acting pressure relief valve and Solenoid dump valve 12 Vdc	
	<b>005</b>	Direct acting pressure relief valve and Solenoid dump valve 24 Vdc	
	<b>009</b>	Pilot operated pressure relief valve	
	<b>010</b>	Pilot operated pressure relief valve and Main anticavitation check valve	
	<b>012</b>	Pilot operated pressure relief valve and Solenoid dump valve 12 Vdc	
	<b>013</b>	Pilot operated pressure relief valve and Solenoid dump valve 24 Vdc	
	<b>019</b>	without valves	
	<b>020</b>	Main anticavitation check valve	
<b>2</b>	<b>A G04</b>	Upper inlet (thread G 1/2)	<b>13</b>
	<b>E G04</b>	Upper inlet (inlet-outlet) (thread G 1/2)	
	<b>A U03</b>	Upper inlet (thread 3/4" - 16 UNF)	
	<b>E U03</b>	Upper inlet (inlet-outlet) (thread 3/4" - 16 UNF)	

**NOTE:** when ordering a relief valve it is necessary to specify factory setting (example 150).





**Inlet side classifications**

	Sectional valve with <b>right inlet</b> section	Sectional valve with <b>right inlet</b> section
<b>IR</b>		

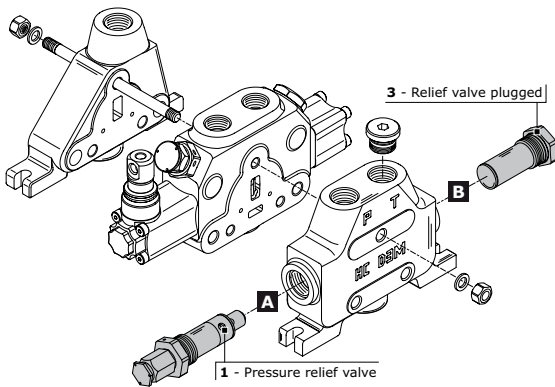
**Valve identification**

**NOTA:** hydraulic lock or brake valve (valve type 10) needs special inlet section.

type	schema	layout	description	type	schema	layout	description
<b>1</b>			Direct acting pressure relief valve	<b>6</b>			Externally piloted dump valve
<b>2</b>			Pilot operated pressure relief valve	<b>7</b>			Solenoid dump valve 12 Vdc
<b>3</b>			Relief valve plugged	<b>8</b>			Solenoid dump valve 24 Vdc
<b>4</b>			Main anticavitation check valve	<b>10</b>			Hydraulic lock or brake valve
<b>5</b>			2 stage pilot operated relief valve	<b>11</b>			Plug with pressure-gauge connection



Valve arrangement



Combination valve example: 001 = 1A - 3B

- 001 Combination valve
- 1A Pressure relief valve in port A
- 3B Relief valve plugged in port B

**The code identifies:**  
with a number, the type of valve; with a letter its position on the inlet section.

- (A) = spool action side
- (B) = spool return action side

**NOTE:** when ordering a main relief valve it is necessary to specify setting

VALVE COMBINATION INLET SECTION		Valve type on port B										
		1	2	3	4	5	6	7	8	10	11	
Valve type on port A		1		001	002		003	004	005	007	008	
		2		009	010		011	012	013	015	016	
		3	017	018	019	020	021	022	023	024	026	027
		4	028	029	030			032			036	
		5			038							
		6	046	047	048	049						
		7	053	054	055							
		8	060	061	062							
		10	074	075	076	077						
		11	084	085	086							

NOTE: Valve combinations 021, and 038 requires double setting (see example).

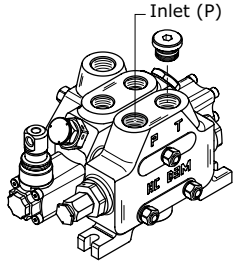
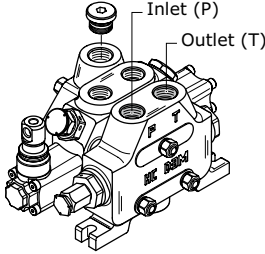
Order example for inlet section: IR 038 200\*280 A G04

038  
200\*380

valve combination \_\_\_\_\_  
double range setting (bar) \_\_\_\_\_



**Inlet position and available thread type**

Inlet combination and thread available	
<b>A G04</b>	
<b>A U03</b>	
<b>E G04</b>	
<b>E U03</b>	

**NOTE:** code E on inlet section obliges to choice E or W on outlet section.

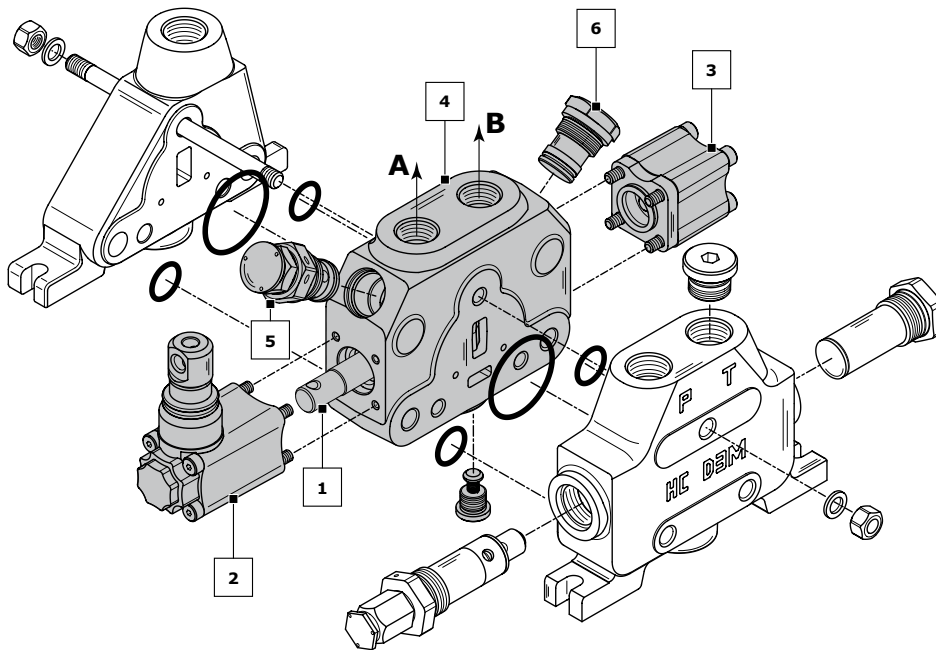


**WORKING SECTION**

Order example:

<b>W001A</b>	<b>H001</b>	<b>F001A</b>	<b>RP G04</b>	<b>01 PA 100</b>	<b>05 PB</b>
--------------	-------------	--------------	---------------	------------------	--------------

- |  |  |
|--|--|
| <ol style="list-style-type: none"> <li>1. <b>W001A</b></li> <li>2. <b>H001</b></li> <li>3. <b>F001A</b></li> <li>4. <b>RP G04</b></li> <li>5. <b>01 PA 100</b></li> <li>6. <b>05 PB</b></li> </ol> | spool type _____<br>spool actuation type _____<br>spool return action type _____<br>section and thread type _____<br>auxiliary valve (port A - handle side) _____<br>auxiliary valve (port B - cap side) _____ |
|--|--|



Rif.	Code	Description	Page
1	<b>W001</b>	3 positions double-acting	<b>15</b>
	<b>W002</b>	3 positions double-acting A-B to tank	
2	<b>H001</b>	Protected lever	<b>17</b>
	<b>H005</b>	hydraulic actuation	
3	<b>F001A</b>	3 positions spring-centred spool (spring A)	<b>20</b>
	<b>F002A</b>	3 positions spring-centred spool detent in A and B (spring A)	
4	<b>RP G04</b>	Parallel circuit (G 1/2)	<b>28</b>
	<b>RP U03</b>	Parallel circuit (3/4"-16 UNF)	
	<b>RT G04</b>	Parallel-Tandem circuit (G 1/2)	
	<b>RT U03</b>	Parallel-Tandem circuit (3/4"-16 UNF)	
5	<b>01 PA 100</b>	Antishock valve (port A)	<b>29</b>
	<b>05 PA</b>	Prearrangement for auxiliary valve (port A)	
6	<b>01 PB 100</b>	Antishock valve (port B)	<b>29</b>
	<b>05 PB</b>	Prearrangement for auxiliary valve (port B)	

**NOTE:** (\*) Leave out the spool return action code when choosing H005.

Sections designed to house auxiliary valve option require double choice on work ports A and B.

Always indicate setting value when using antishock and combined valve: **01 PA (100) - 03 PA (120)**



**Spool identification**

order example of spool: **W001 A J10**

**W001** spool schema 3 positions double-acting  
**A** spool type standard spool  
**J10** restricted service ports restriction on diameter (0,10 mm in A and B)

<b>W001</b>	3 positions double-acting	
<b>W002</b>	3 positions double-acting A and B to tank	
<b>W003</b>	3 positions double-acting A to tank B blocked	
<b>W004</b>	3 positions double-acting A blocked B to tank	
<b>W005</b>	3 positions single - acting on A	
<b>W006</b>	3 positions single - acting on B	
<b>W009</b>	3 positions double-acting with anticavitation valves	
<b>W010</b>	3 positions double-acting switch port closed (A - B blocked)	
<b>W011</b>	3 positions double-acting switch port closed (A - B to tank)	
<b>W012</b>	4 positions double-acting with float in the 4th position	
<b>W013</b>	3 positions double-acting regenerative	
<b>W015</b>	3 positions double-acting series	
<b>W016</b>	3 positions double-acting series A and B to tank	



spools with restricted service ports				
code	circuit	restriction on diameter (mm)	section (mm <sup>2</sup> )	hydraulic schema
J10	A-B IN T	0,10	2,66	
K10	A IN T	0,10	2,66	
Y10	B IN T	0,10	2,66	

CODE	spool type available		
	STANDARD	METERED	SOLENOID OPERATED
	A	B	E
W001	W001A	W001B	W001E
W002	W002A	W002B	W002E
W003	W003A	W003B	
W004	W004A	W004B	
W005	W005A	W005B	
W006	W006A	W006B	
W009	W009A	W009B	
W010	W010A		
W011	W011A		
W012	W012A		
W013	W013A		
W015	W015A		
W016	W016A		

NOTE:

- W012, W013, spools need a special machining on the valve body.
- W015, W016, spools need RS type body. Float spool (W012) need special detent kit (F005).
- Regenerative spool (W013) need special return spring kits.
- W001E and W002E spools are available only with Direct electric control (code H036 or H037).
- Different spools are available on request.

Please contact our Sales department for more information.



**Spool actuation classification for manual control**

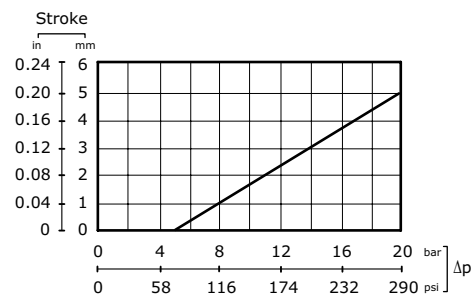
code	description	dimensions	configuration
H001	Protected lever		
H002	Protected lever rotated 180°		
H004	Control without lever		
H019	Protected lever with stroke limiter		
H020	Protected lever with stroke limiter rotated 180°		

**Spool actuation classification for Hydraulic control**

code	description	dimensions	configuration
H005 <small>leave out the spool return action code</small>	Hydraulic actuation with side ports  BSP ports = G 1/4 UNF ports = 9/16-18 UNF		

**Hydraulic pilot control curve**

The diagram shows the spool stroke as a function of the pressure operating.



**Direct electrical control classification**

code	description	dimensions	configuration
H021 <small>only for spool return action code: F0150-F0160</small>	Direct electric control		
H022 <small>only for spool return action code: F0150-F0160</small>	Direct electric control rotated 180°		

**NOTE:**

the direct electric control use a type "E" special spool and a type "RPE" special body. Is available the Direct electric control without lever (code H024).

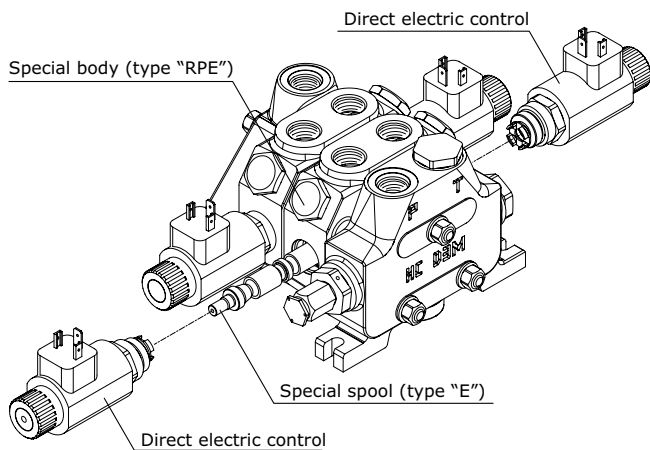


**Direct electrical control classification**

The ON-OFF electric control D3M control valve is suitable for all mobile applications and in particular for agricultural harvesting machines, gardening machines and small-sized dumpers. This actuation system is also recommended for earth moving and lifting machinery applications; in particular, it enables to remote-control truck mounted crane and aerial platform stabilizers.

code	description	dimensions
<b>H036</b> leave out the spool return action code	Direct electric control 12 Vdc (45W - 3 A)	
<b>H037</b> leave out the spool return action code	Direct electric control 24 Vdc (45W - 1,5 A)	

**Direct electric control specifications**

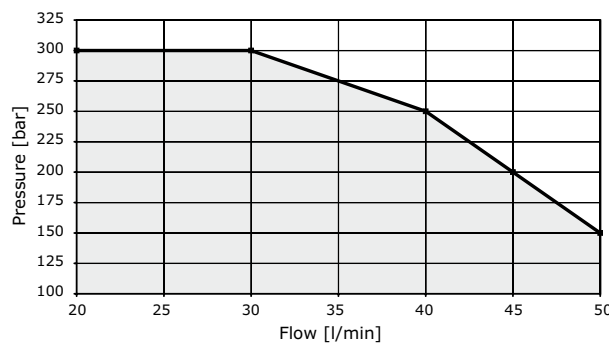


Type	HC-D3M	
Rated voltage	12 VDC	24 VDC
Rated current	3 A	1,5 A
Rated power	36 W	
Permitted working voltage	±10% Nominal	
Max ambient temperature	+40°C	
Max oil temperature	+80°C	
Operation time	S1 (100%)	
Protection degree	IP65	
Insulation degree	H	
Standard connector	DIN 43650	
Spool stroke	2,8 + 2,8 mm	

The H036 and H037 direct electric controls come as two kits each including a: coil, spring, solenoid and adapter. The H036 and H037 electric controls use a type E special spool and a type special body. The ON-OFF Electric Control kit includes a manually operated emergency push-button.

**Operating limit curve**

Data detected after voltage decrease equal to 28% of the rated value (conditions occurring with coil under stabilization temperature conditions with rated voltage reduced by 10%).







**Joystick control classification**

The configuration of joystick control interests always two working sections with relative four ports: **A1 – B1 – A2 – B2.**

For convention:

- section 1 is the first invested from the flow of the oil: it depends from the right or left inlet of the control valve
- Port A = spool action side
- Port B = spool return action side

The position of the fulcrum is identified by a code and stands in four configurations as shown in the following table:

Fulcrum Inlet side	FULCRUM 1 <sup>st</sup> section	FULCRUM 2 <sup>nd</sup> section
RIGHT INLET	<p><b>H009</b></p> <p>Right side inlet fulcrum on 1<sup>st</sup> section (compulsory code for second section: H120)</p>	<p><b>H010</b></p> <p>Right side inlet fulcrum on 2<sup>nd</sup> section (compulsory code for first section: H120)</p>
	<p><b>H011</b></p> <p>Left side inlet fulcrum on 1<sup>st</sup> section (compulsory code for second section: H120)</p>	<p><b>H012</b></p> <p>Left side inlet fulcrum on 2<sup>nd</sup> section (compulsory code for first section: H120)</p>

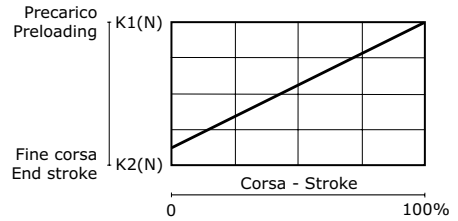
The second section concerned the configuration of the joystick control is always identified with code H120. Lever has to be ordered separately.



**Spool return action classification - Springs load values**

Spool return kits have three different spring types; following the codes depending on spring loads.

Spring type			
Code	A (standard spring)	B (soft spring)	C (heavy spring)
<b>Preloading</b>	121.6 N	88.3 N	149.1 N
<b>End of stroke</b>	203 N	147.1 N	206 N
Spool return action identification example			
<b>Code</b>	<b>F001A</b>	<b>F001B</b>	<b>F001C</b>



**Spool return action classification**

code	description	schema	dimensions	configuration
<b>F001A</b> <b>F001B</b> <b>F001C</b>	3 positions spring-centred spool			
<b>F002A</b>	3 positions spring-centred spool detent in A and B			
<b>F003A</b>	3 positions spring-centred spool detent in A			
<b>F004A</b>	3 positions spring-centred spool detent in B			
<b>F005A</b>	4 positions spring-centred spool detent in 4 <sup>th</sup> position (only for W012 spool)			



**Spool return action classification**

code	description	schema	dimensions	configuration
<b>F009A</b> <b>F009B</b> <b>F009C</b>	2 positions in A spring-centred spool			
<b>F010A</b> <b>F010B</b> <b>F010C</b>	2 positions in B spring-centred spool			
<b>F011A</b> <b>F011B</b> <b>F011C</b>	2 positions detent in A spring-centred spool			
<b>F012A</b> <b>F012B</b> <b>F012C</b>	2 positions detent in B spring-centred spool			
<b>F013A</b> <b>F013B</b> <b>F013C</b>	3 positions spring-centred spool prearrangement dual command			

**Direct electrical control identification**

It allows for the remote activation on the valve through the use of electrical on/off switches.

Available voltages: 12V and 24V. Need a special machining on the valve body. Available just with spool W001E.

code	description	dimensions	configuration
<b>F0150</b> <small>only for spool actuation code: H021 H022-H024</small>	Direct electrical control (PUSH-PULL) 12 vdc (60 W - 5 A)		
<b>F0160</b> <small>only for spool actuation code: H021 H022-H024</small>	Direct electrical control (PUSH-PULL) 24 vdc (60 W - 2,5 A)		

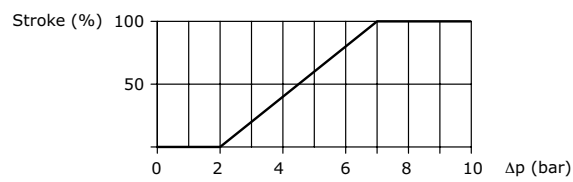


Pneumatic control classification

code	description	schema	dimensions	configuration
<b>F020A</b>	Pneumatic control ON - OFF		<p>Proportional control with port BSP: G 1/8</p>	
<b>F021A</b>	Pneumatic control ON - OFF rotated 180°			
<b>F022A</b>	Proportional Pneumatic control		<p>Proportional control with port NPTF: 1/8-27</p>	
<b>F023A</b>	Proportional Pneumatic control rotated 180°			
<b>F135A</b>	Pneumatic control ON - OFF		<p>Proportional control with port NPTF: 1/8-27</p>	
<b>F136A</b>	Pneumatic control ON - OFF rotated 180°			
<b>F126A</b>	Proportional Pneumatic control		<p>Proportional control with port NPTF: 1/8-27</p>	
<b>F127A</b>	Proportional Pneumatic control rotated 180°			

Proportional pneumatic control curve

The diagram shows the spool stroke as a function of the pneumatic pressure operating.





**Electropneumatic control classification**

code	description	dimensions	configuration
<b>F0620</b>	3 positions electropneumatic control ON-OFF (12 vdc) 7 W - 0,58 A		
<b>F0630</b>	3 positions electropneumatic control ON-OFF (24 vdc) 7 W - 0,29 A		

Minimum  
working  
pressure  
5 bar

**Control tie rod assembly**

The length of the control tie rod, will change depending on the section numbers; in this way it will be easy to install in the right way the sections and avoid any misassembly. Each kit is composed by 1 tie rod and 2 plugs.

**NOTE:** the control tie rod kit has always to be ordered separately.

**Order code for control tie rod (BSP):**

- 320103013** = control tie rod /1
- 320103014** = control tie rod /2
- 320103015** = control tie rod /3
- 320103016** = control tie rod /4
- 320103017** = control tie rod /5
- 320103018** = control tie rod /6
- 320103019** = control tie rod /7
- 320103020** = control tie rod /8

**Order code for control tie rod (UNF):**

- 320103038** = control tie rod /1
- 320103039** = control tie rod /2
- 320103040** = control tie rod /3
- 320103041** = control tie rod /4
- 320103042** = control tie rod /5
- 320103043** = control tie rod /6
- 320103044** = control tie rod /7
- 320103045** = control tie rod /8

**Load limit classification**

code	description	schema	dimensions	configuration
<b>F024A</b> <b>F024C</b>	Load limit in A and B			
<b>F025A</b> <b>F025C</b>	Load limit in A and B rotated 180°			
<b>F026A</b> <b>F026C</b>	Load limit in A			
<b>F027A</b> <b>F027C</b>	Load limit in A rotated 180°			
<b>F028A</b> <b>F028C</b>	Load limit in B			
<b>F029A</b> <b>F029C</b>	Load limit in B rotated 180°			

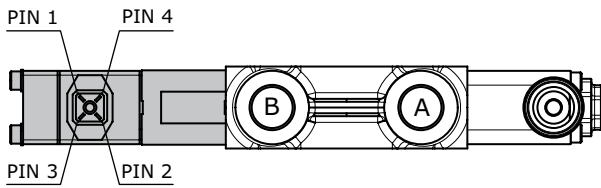
**NOTE:** on request is available the load limit with dual control; for more informations please contact our Commercial Dept.



Electrical load limit kit identification

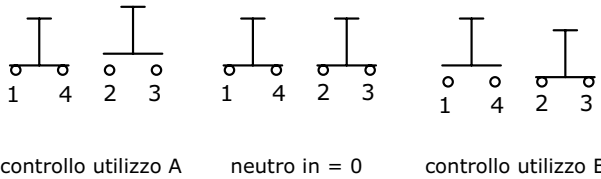
Spool position sensor			
Power supply	Contacts capacity	Protection degree	temperature range
12 vdc	3 A	IP 65	da -25°C a +90°C
24 vdc	1,5 A		

Operational diagram



**CONTROL in A e B** = connect PIN 1 - 4 and 2 - 3  
**CONTROL in A** = connect PIN 2 - 3  
**CONTROL in B** = connect PIN 1 - 4

Wiring diagram



In case of inductive loads it is advisable to connect the terminals of the workport (solenoid) to a 200 VDC - 3A diode.

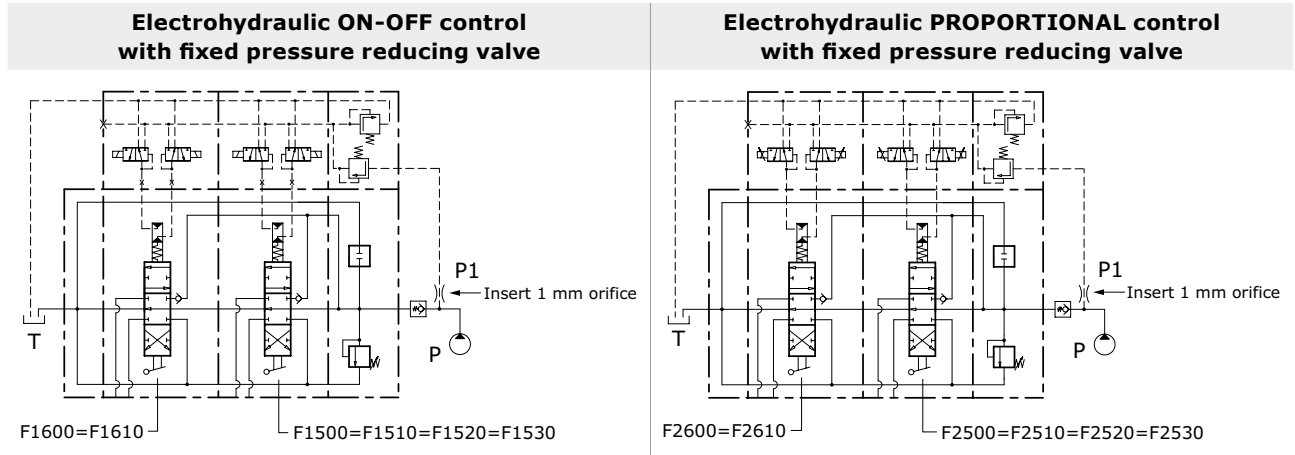
code	description	dimensions	configuration
<b>F0360</b>	Electrical load limit (normally closed contacts)		
<b>F0370</b>	Electrical load limit rotated 180° (normally closed contacts)		
<b>F0450</b>	Electrical load limit (normally open contacts)		
<b>F0460</b>	Electrical load limit rotated 180° (normally open contacts)		

**NOTE:** a HIRSCHMANN female connector, type G4 W1F, is available on request (code 413000045, to be ordered separately).



**Electrohydraulic control specifications**

Operating temperature range	-20°C / +80°C
Max inlet pressure	350 bar
Reduced pressure	16 bar
Back pressure on (T)	3 bar
Filtering degree	25 μ assoluti
Raccommended pilot pipe size	Ø 6 mm - G 1/4



Proportional control kit, mechanically retrooperated, allows the maximum precision of positioning, limiting the hysteresis. The control is operated with PWM control of the current. PWM frequency suggest: 60-80 Hz

Nominal voltage (V)	regulation currents		
	Resistance R <sub>20</sub> (Ohm)	Current min (A)	Current max (A)
12 vdc	3,7	0,9	1,7
24 vdc	15,5	0,45	0,85

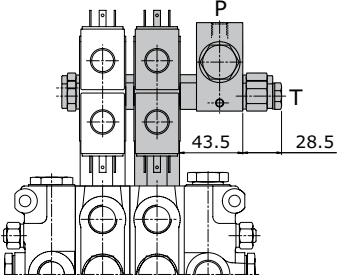
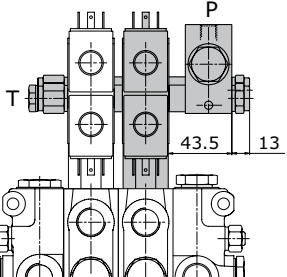
**Electrohydraulic control classification**

code	description	dimensions	configuration
<b>F1600</b>	3 positions electrohydraulic control ON - OFF 12 Vdc		
<b>F1610</b>	3 positions electrohydraulic control ON - OFF 24 Vdc		
<b>F2600</b>	3 positions electrohydraulic control PROPORTIONAL 12 Vdc		
<b>F2610</b>	3 positions electrohydraulic control PROPORTIONAL 24 Vdc		

Electrohydraulic ON-OFF control is stackable with electrohydraulic PROPORTIONAL control (F2600 = F2610). Control kit already includes orifice to make spool displacement more gradual.



**Electrohydraulic control with fixed pressure reducing valve classification**

code	description	configuration
<b>F1500</b>	Electrohydraulic control ON - OFF (fixed pressure reducing valve) P - T inlet side (12 vdc)	 <p>Port BSP (P - T) = G 1/4 Port UNF (P - T) = 9/16"18 UNF</p>
<b>F1510</b>	Electrohydraulic control ON - OFF (fixed pressure reducing valve) P - T inlet side (24 vdc)	
<b>F2500</b>	Electrohydraulic control PROPORTIONAL (fixed pressure reducing valve) P - T inlet side (12 vdc)	
<b>F2510</b>	Electrohydraulic control PROPORTIONAL (fixed pressure reducing valve) P - T inlet side (24 vdc)	
<b>F1520</b>	Electrohydraulic control ON - OFF (fixed pressure reducing valve) P inlet - T outlet (12 vdc)	 <p>Port BSP (P - T) = G 1/4 Port UNF (P - T) = 9/16"18 UNF</p>
<b>F1530</b>	Electrohydraulic control ON - OFF (fixed pressure reducing valve) P inlet - T outlet (24 vdc)	
<b>F2520</b>	Electrohydraulic control PROPORTIONAL (fixed pressure reducing valve) P inlet - T outlet (12 vdc)	
<b>F2530</b>	Electrohydraulic control PROPORTIONAL (fixed pressure reducing valve) P inlet - T outlet (24 vdc)	

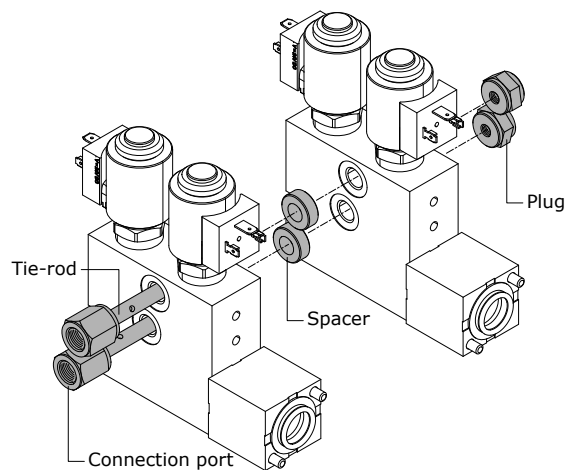
**Control tie rod assembly**

The length of the control tie rod, will change depending on the section numbers; in this way it will be easy to install in the right way the sections and avoid any misassembly. Each kit is composed by 2 tie rods, 2 plugs, 2 connection ports and spacers according to the section number.

**NOTE:** the control tie rod kit has always to be ordered separately.  
Reducing valve, combined with electrohydraulic control kit has to be calculated as a normal working section.

**ORDER EXAMPLE:**

Complete valves with 3 sections F1600 requires a complete tie-rod kit /3.  
Complete valves with 2 sections F1600 and 1 section with F1500 (reducing valve) requires a complete tie-rod kit /4.



**Order code fixed pressure reducing valve:**

- 915000303** = reducing valve for BSP ports
- 915000312** = reducing valve for UNF ports

**Order code for control tie rod (BSP):**

- 320103001** = control tie rod /1
- 320103002** = control tie rod /2
- 320103003** = control tie rod /3
- 320103004** = control tie rod /4
- 320103005** = control tie rod /5
- 320103006** = control tie rod /6
- 320103007** = control tie rod /7
- 320103008** = control tie rod /8
- 320103009** = control tie rod /9

**Order code for control tie rod (UNF):**

- 320103026** = control tie rod /1
- 320103027** = control tie rod /2
- 320103028** = control tie rod /3
- 320103029** = control tie rod /4
- 320103030** = control tie rod /5
- 320103031** = control tie rod /6
- 320103032** = control tie rod /7
- 320103033** = control tie rod /8
- 320103034** = control tie rod /9



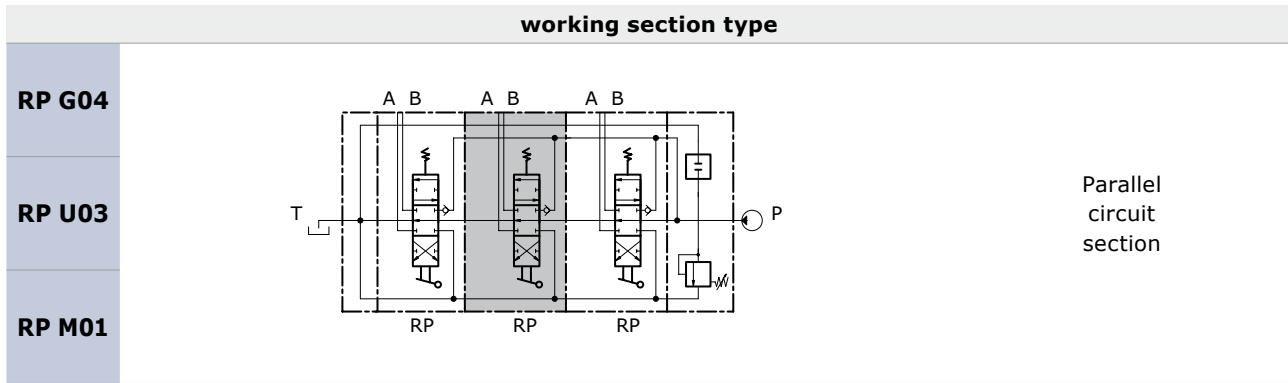


Compatibility table

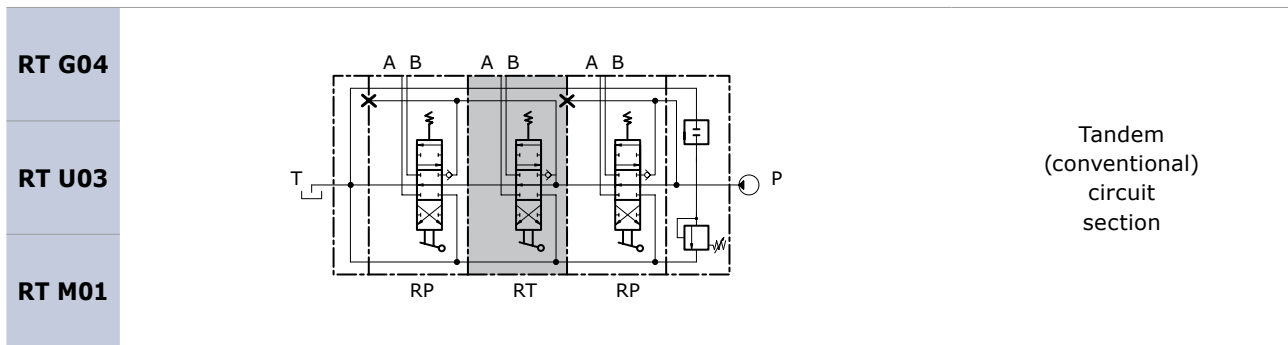
SPOOL ACTION TYPE	SPOOL TYPE																						
	W001A	W001B	W001E	W002A	W002B	W002E	W003A	W003B	W004A	W004B	W005A	W005B	W006A	W006B	W009A	W009B	W010A	W011A	W012A	W013A	W015A	W016A	
H001	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H002	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H004	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H005	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H009	•	•		•	•		•	•	•	•					•	•				•	•	•	•
H010	•	•		•	•		•	•	•	•					•	•				•	•	•	•
H011	•	•		•	•		•	•	•	•					•	•				•	•	•	•
H012	•	•		•	•		•	•	•	•					•	•				•	•	•	•
H120	•	•		•	•		•	•	•	•					•	•				•	•	•	•
H019	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H020	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H021			•			•																	
H022			•			•																	
H036			•			•																	
H037			•			•																	
SPOOL RETURN ACTION TYPE	SPOOL TYPE																						
	W001A	W001B	W001E	W002A	W002B	W002E	W003A	W003B	W004A	W004B	W005A	W005B	W006A	W006B	W009A	W009B	W010A	W011A	W012A	W013A	W015A	W016A	
F001	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
F002	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•	•
F003	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•	•
F004	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•	•
F005																			•				
F009	•	•	•	•	•	•	•	•	•						•	•	•	•				•	•
F010	•	•	•	•	•	•	•	•	•						•	•	•	•				•	•
F011	•	•	•	•	•	•	•	•	•						•	•	•	•				•	•
F012	•	•	•	•	•	•	•	•	•						•	•	•	•				•	•
F013	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
F020=F021	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
F022=F023	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
F135=F136	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
F126=F127	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
F024=F025	•	•	•	•	•	•	•	•	•	•					•	•	•	•				•	•
F026=F027	•	•	•	•	•	•	•	•	•	•					•	•	•	•				•	•
F028=F029	•	•	•	•	•	•	•	•	•	•					•	•	•	•				•	•
F0150			•			•																	
F0160			•			•																	
F0360=F0370	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•	•
F0450=F0460	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•				•	•
F0620=F0630	•	•	•	•	•	•	•	•	•	•					•	•	•	•			•	•	•
F1500=F1510	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
F1520=F1530	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
F2500=F2510	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
F2520=F2530	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
F1600=F1610	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•
F2600=F2610	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•	•



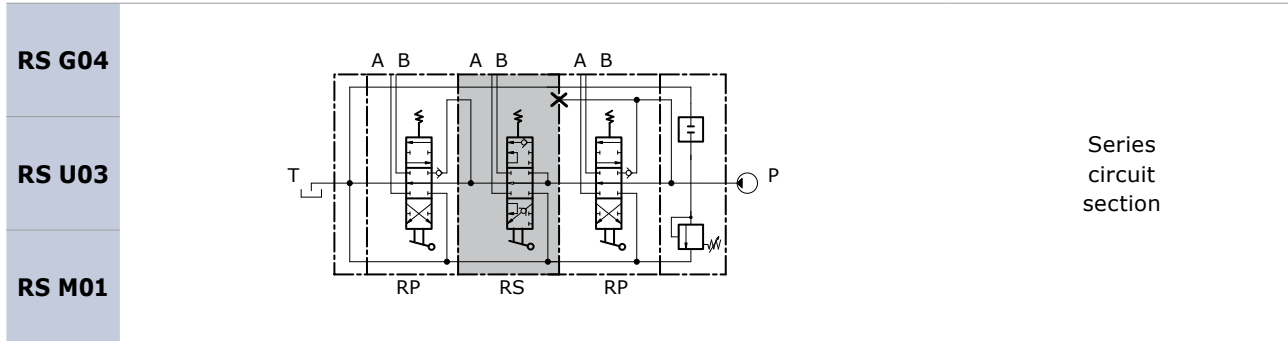
Work section identification



When the spool is operated it intercepts the by-pass gallery by diverting the flow of oil to service port A or B. If two or more spools are actuated at the same time, the oil will power the service port that has the lower load; by throttling the spools, the flow of oil can be divided between two or more service ports.



When the spool is operated it intercepts the switch gallery by diverting the flow of oil to service port A or B. The Tandem circuit is powered by the switch gallery thus permitting the use of just one work section at a time. The section downstream from the tandem section that has been actuated does not operate, the upstream section has priority.



When the spool is operated it intercepts the switch gallery by diverting the flow of oil to service port A or B. The oil that flows back from the actuator is carried to the switch gallery thus making it available to the service ports downstream from the series section. The pressure drop downstream is added to the pressure drop of the section itself.



**Auxiliary valve identification**

code	description	schema	configuration	setting range (bar)			
				type	at full flow	type	at min. flow
01PA	Antishock valve (port A)			A	20 / 100	A	10-A / 80-A
				B	101 / 220	B	81-A / 180-A
				C	221 / 350	C	181-A / 350-A
02PA	Anticavitation valve (port A)						
03PA	Combined valve (port A)			A	20 / 60	A	10-A / 40-A
				B	61 / 100	B	41-A / 80-A
				C	101 / 220	C	81-A / 180-A
				D	221 / 350	D	181-A / 350-A
05PA	Prearrangement for auxiliary valve (port A)						

code	description	schema	configuration	setting range (bar)			
				type	at full flow	type	at min. flow
01PB	Antishock valve (port A)			A	20 / 100	A	10-A / 80-A
				B	101 / 220	B	81-A / 180-A
				C	221 / 350	C	181-A / 350-A
02PB	Anticavitation valve (port A)						
03PB	Combined valve (port A)			A	20 / 60	A	10-A / 40-A
				B	61 / 100	B	41-A / 80-A
				C	101 / 220	C	81-A / 180-A
				D	221 / 350	D	181-A / 350-A
05PB	Prearrangement for auxiliary valve (port A)						

**Auxiliary valve - Setting range**

Sections designed to house auxiliary valve option require double choice on work ports A and B.

Always indicate setting value when using antishock valve and combined valve:

**01PA (120) = setting at full flow**

**01PA (120-A) = setting at min. flow**

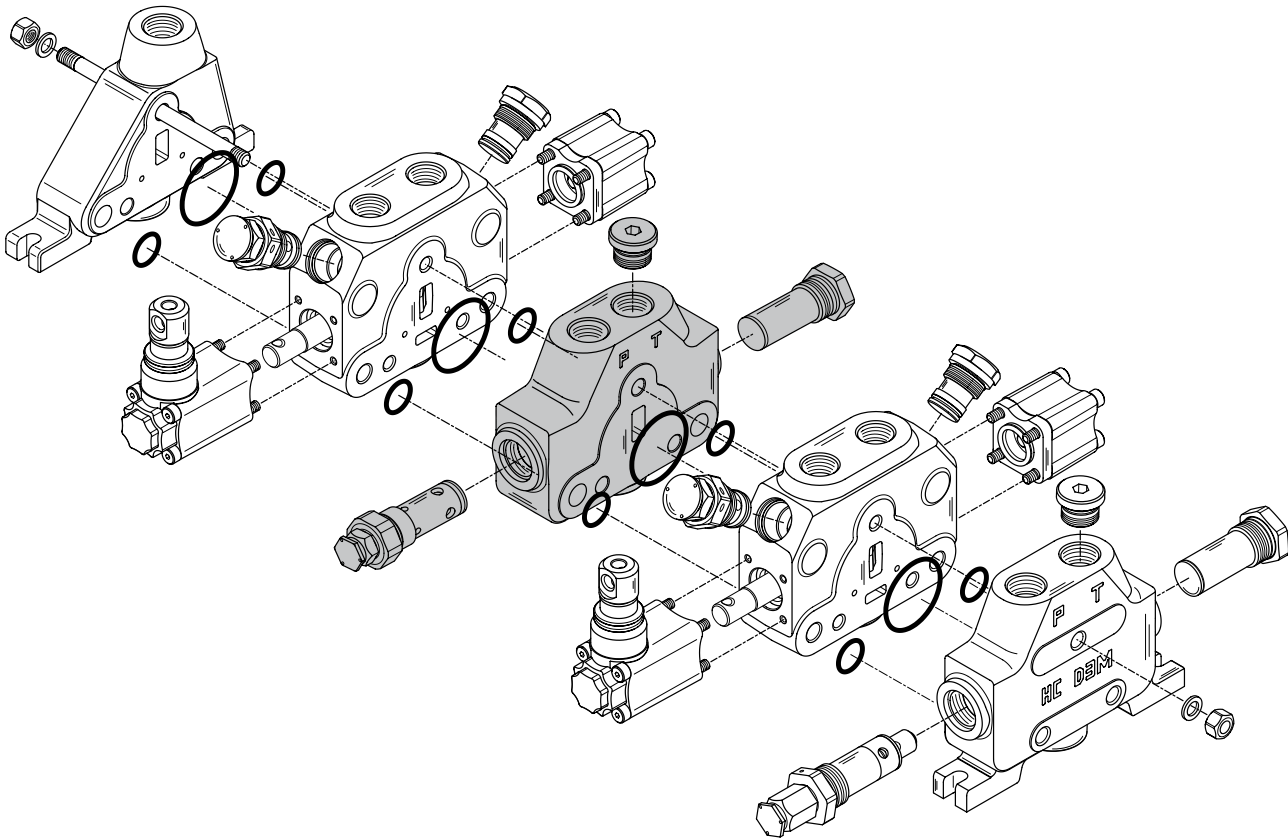


INTERMEDIATE INLET SECTION

Order example

BE	009	150	A G04
----	-----	-----	-------

1. **BE** inlet side \_\_\_\_\_
2. **009** valve arrangement \_\_\_\_\_
3. **150** setting (bar); when ordering a main relief valve it is necessary to specify setting \_\_\_\_\_
3. **A G04** inlet position and available thread type \_\_\_\_\_



Rif.	Code	Description	Page
-	<b>BE</b>	Intermediate inlet section	<b>31</b>
-	<b>BV*</b>	Intermediate inlet section with pressure relief valve	
<b>1</b>	<b>001</b>	Direct acting pressure relief valve	<b>32</b>
	<b>002</b>	Direct acting pressure relief valve and Main anticavitation check valve	
	<b>009</b>	Pilot operated pressure relief valve	
	<b>020</b>	Main anticavitation check valve	
<b>2</b>	<b>A G04</b>	Upper inlet (thread G 1/2)	
	<b>A U03</b>	Upper inlet (thread 3/4"-16 UNF)	
	<b>A U04</b>	Upper inlet (thread 7/8" - 14 UNF)	
	<b>A M01</b>	Upper inlet (thread M18 x 1.5)	

**NOTE:** when ordering a relief valve it is necessary to specify factory setting (example 150).

\* = omit the code for inlet positioning and thread



Intermediate inlet section classifications

**intermediate inlet type**

<b>BE</b>			Intermediate inlet section
-----------	--	--	----------------------------

The intermediate inlet section is driven by two pumps (P + P1). The downstream elements can be set to a lower pressure than the upstream ones by adjusting the pressure relief valve of the intermediate section in question.

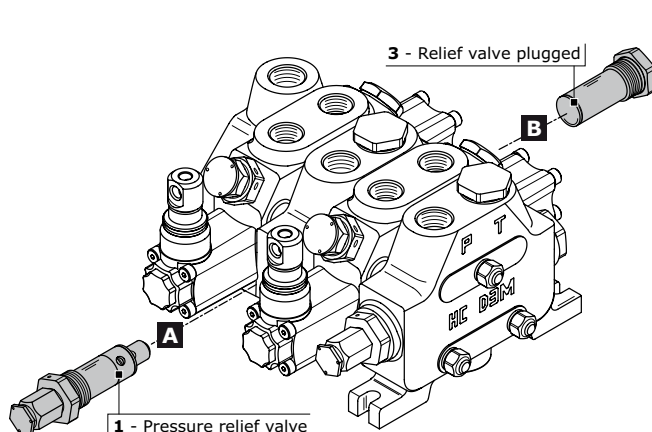
<b>BV</b>			Intermediate inlet section with pressure relief valve
-----------	--	--	---

The intermediate inlet section and the elements are driven by a single pump (P). The downstream elements can be set to a lower pressure than the upstream ones by adjusting the pressure relief valve of the intermediate section in question.

Valve identification on intermediate inlet section

type	schema	layout	description	type	schema	configurazione	descrizione
<b>1</b>			Direct acting pressure relief valve	<b>4</b>			Externally piloted valve
<b>2</b>			Pilot operated pressure relief valve	<b>11</b>			Plug with pressure-gauge connection
<b>3</b>			Relief valve plugged				

Valve arrangement on intermediate inlet section



**Combination valve example: 009 = 2A - 3B**











- 009** Combination valve
- 2A** Pressure relief valve in port A
- 3B** Relief valve plugged in port B

**The code identifies:**  
with a number, the type of valve; with a letter its position on the inlet section.

- (A) = spool action side
- (B) = spool return action side

**NOTE:** when ordering a main relief valve it is necessary to specify setting



VALVE COMBINATION INLET SECTION		Valve type on port B					
							
		1	2	3	4	11	
Valve type on port A		1			001	002	008
		2			009	010	016
		3	017	018	019	020	027
		4	028	029	030		
		11	084	085	086		

**Inlet position and available thread type**

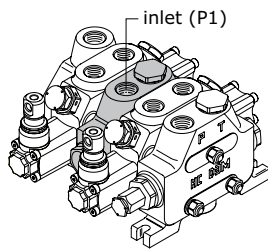
**Inlet combination and thread available**

A G04

A U03

A U04

A M01



Upper inlet (P1)

**Complete configuration samples for D3M/2 with intermediate inlet section (BE)**

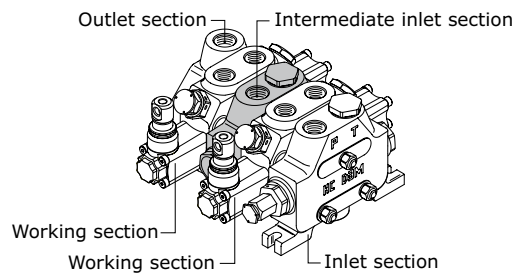
IR 001 150 A G04..... Right inlet section

W001A H001 F001A RP G04 ..... Working section

**BE 009 150 A G04 .....Intermediate inlet section**

W001A H001 F001A RP G04 ..... Working section

TJ A G04 ..... Outlet section



**Complete configuration samples for D3M/2 with intermediate inlet section (BV)**

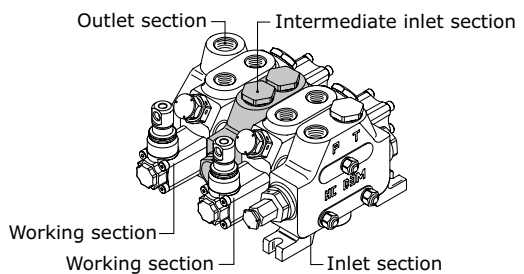
IR 001 150 A G04..... Right inlet section

W001A H001 F001A RP G04 ..... Working section

**BV 009 150 .....Intermediate inlet section**

W001A H001 F001A RP G04 ..... Working section

TJ A G04 ..... Outlet section



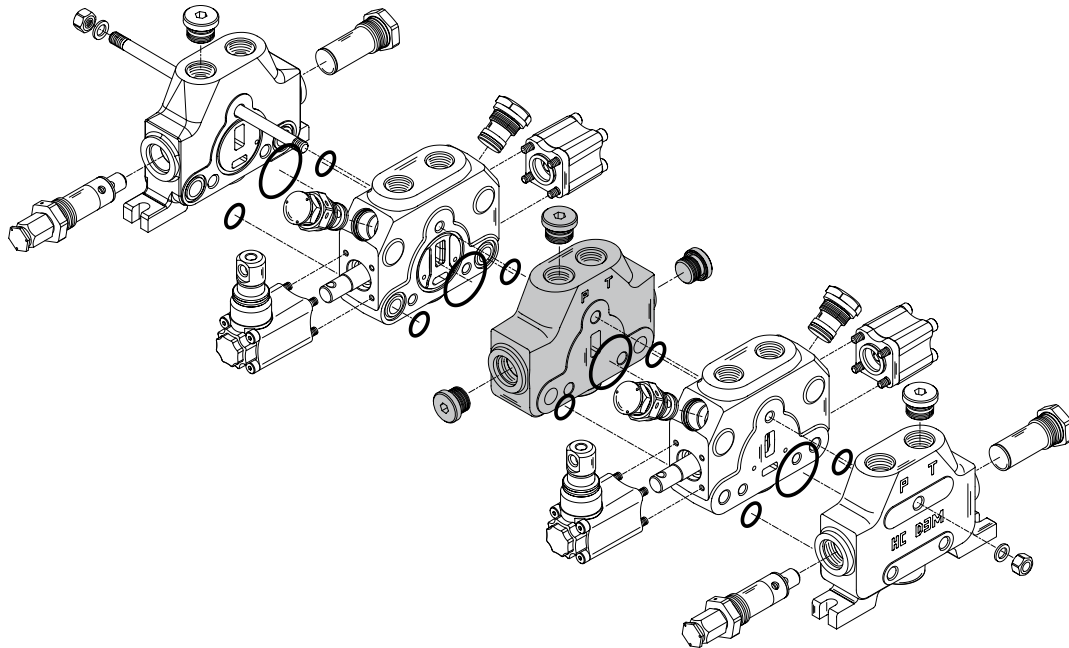


**INTERMEDIATE OUTLET SECTION**

**Order example**

**BF** | **A G04**

1. **BF** inlet side \_\_\_\_\_  
**A G04** inlet position and available thread type \_\_\_\_\_



Rif.	Code	Type	Description	Page
-	<b>BF</b>		Intermediate outlet section with single tank return	
-	<b>BG</b>		Intermediate outlet section with two tank returns	
1	<b>A G04</b>		Upper outlet (thread G 1/2)	34
	<b>A U03</b>		Upper outlet (thread 3/4"-16 UNF)	
	<b>G G04</b>	for	Front outlet side A (thread G 1/2)	
	<b>G U03</b>	BF	Front outlet side A (thread 3/4"-16 UNF)	
	<b>H G04</b>		Rear outlet side B (thread G 1/2)	
	<b>H U03</b>		Rear outlet side B (thread 3/4"-16 UNF)	
	<b>J G04</b>	for	Upper outlet HPCO - front side A and rear side B to T (thread G 1/2)	
	<b>J U03</b>	BG	Upper outlet HPCO - front side A and rear side B to T (thread 7/8"-16 UNF)	



**intermediate outlet classification**

<b>BF</b>			<p>Intermediate outlet section <b>with single tank return</b></p>
-----------	--	--	---

The above outlet section allows the flow of oil of the two pumps and the tank ports to be piped to a single outlet T.

<b>BG</b>			<p>Intermediate outlet section <b>with two tank returns</b></p>
-----------	--	--	---

The section in question allows the flow of oil of the two pumps to be piped in two outlets: HPCO for powering another directional control valve, T for discharge of the work ports. In order to obtain this, the two T need to be linked.

**Outlet combination and thread available**

<b>A G04</b>		<p>available only for <b>BF</b></p>	<p>Upper outlet (T)</p>
<b>A G05</b>			
<b>A U03</b>			
<b>A U04</b>			
<b>A M02</b>			
<b>G G04</b>		<p>available only for <b>BF</b></p>	<p>Front outlet side A (T)</p>
<b>G U03</b>			
<b>G U04</b>			
<b>G M02</b>			
<b>H G04</b>		<p>available only for <b>BF</b></p>	<p>Rear outlet side B (T)</p>
<b>H U03</b>			
<b>H U04</b>			
<b>H M02</b>			
<b>J G04</b>		<p>available only for <b>BG</b></p>	<p>Upper outlet HPCO front side A and rear side B to T</p>
<b>J U03</b>			
<b>J U04</b>			
<b>J M02</b>			





**Complete configuration samples for D3M/2 with intermediate outlet section (BF)**

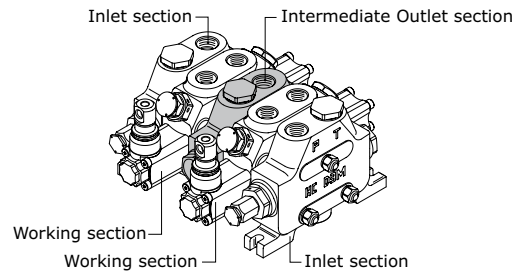
IR 001 150 A G04..... Right inlet section

W001A H001 F001A RP G04 ..... Working section

**BF A G05 .....Intermediate outlet section**

W001A H001 F001A RP G04 ..... Working section

IL 009 150 A G04..... Left inlet section



**Complete configuration samples for D3M/2 with intermediate outlet section (BG)**

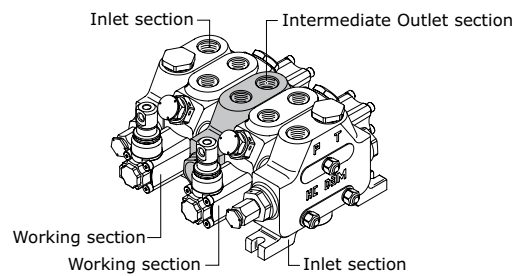
IR 001 150 A G04..... Right inlet section

W001A H001 F001A RP G04 ..... Working section

**BG J G04 .....Intermediate outlet section**

W001A H001 F001A RP G04 ..... Working section

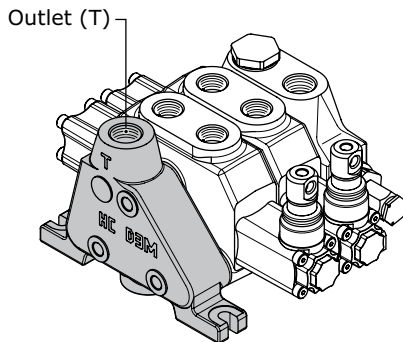
IL 009 150 A G04..... Left inlet section





OUTLET SECTION (VERSION 1 OUTLET)

Order example



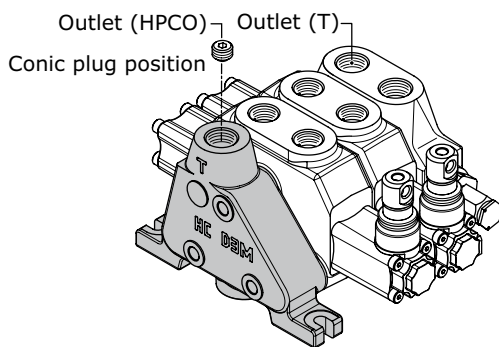
**TJ** | **A G04**

1. **TJ** outlet section type
2. **A G04** outlet position and available thread type

Rif.	Code	Description	Page
1	<b>TJ</b>	Outlet section with single return (T) right-side inlet (P)	
	<b>TK</b>	Outlet section with single return (T) left-side inlet (P)	
2	<b>A G04</b>	Upper outlet (thread G 1/2)	37
	<b>C G04</b>	Central outlet (thread G 1/2)	
	<b>A U04</b>	Upper outlet (thread 7/8" - 14 UNF)	
	<b>C U04</b>	Central outlet (thread 7/8" - 14 UNF)	

OUTLET SECTION (HPCO VERSION OUTLET)

Order example - HPCO version Outlet



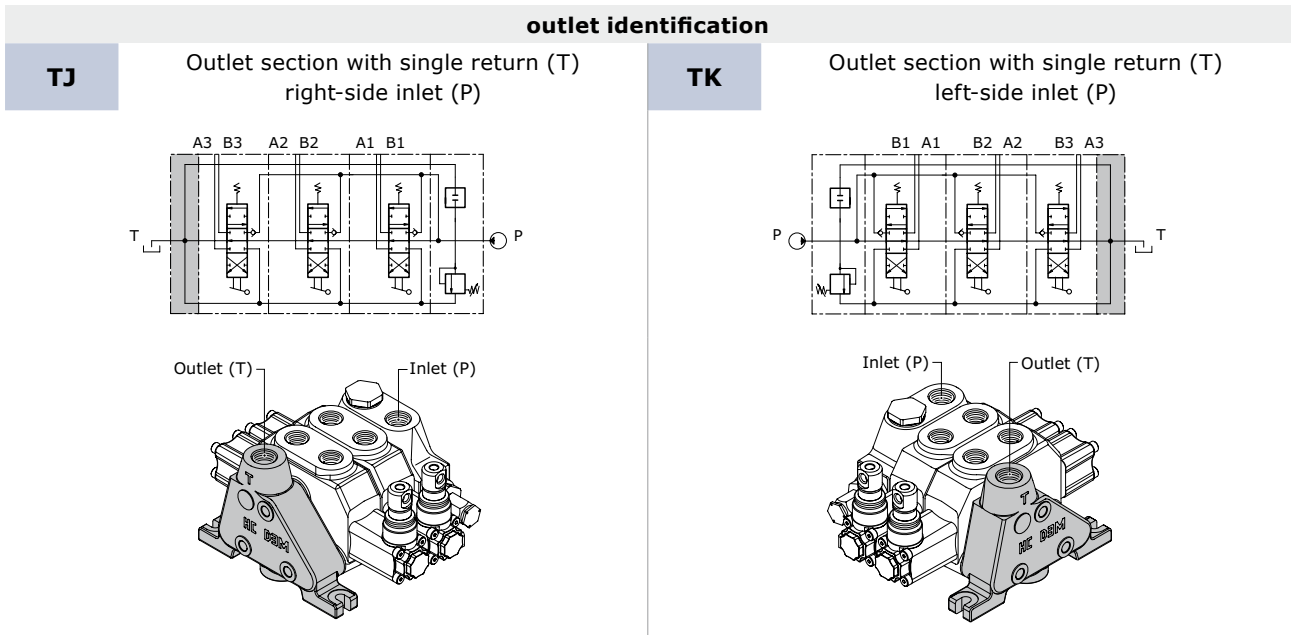
**TM** | **M G04**

1. **TM** outlet section type
2. **W G04** outlet position and available thread type

Rif.	Code	Description	Page
1	<b>TM</b>	Outlet section with two return (T-HPCO) right-side inlet (P)	
	<b>TN</b>	Outlet section with two return (T-HPCO) left-side inlet (P)	
2	<b>W G04</b>	HPCO Upper inlet - outlet T (tank) upper outlet section (thread G 1/2)	38
	<b>W U03</b>	HPCO Upper inlet - outlet T (tank) upper outlet section (thread 3/4" - 16 UNF)	



**Outlet with single tank classification**



**outlet combination and thread available**

<b>A G04</b>		Upper outlet (thread G 1/2)
<b>A U03</b>		Upper outlet (thread 3/4" - 16 UNF)
<b>A M02</b>		Upper outlet (thread M22 x 1,5)
<b>E G04</b>		Upper outlet (inlet - outlet) (thread G 1/2)
<b>E U03</b>		Upper outlet (inlet - outlet) (thread 3/4" - 16 UNF)
<b>E M02</b>		Upper outlet (inlet - outlet) (thread M22 x 1,5)

**NOTE: code "E" on outlet section obliges to choice "E" on inlet section.**

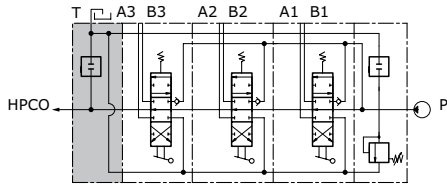


Outlet with two tanks classification

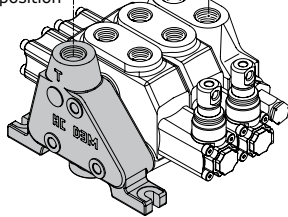
outlet identification

TM

Outlet section with two return (T-HPCO) right-side inlet (P)

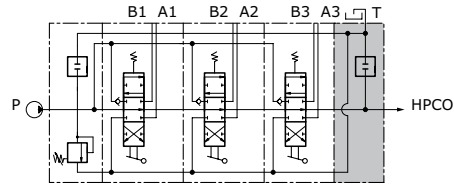


Outlet (HPCO) Outlet (T) Inlet (P)  
Conic plug position

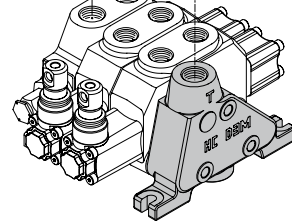


TN

Outlet section with two return (T-HPCO) left-side inlet (P)



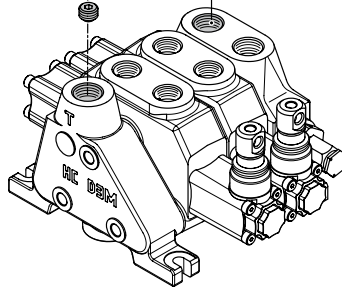
Inlet (P) Outlet (HPCO)  
Outlet (T) Conic plug position



outlet combination and thread available

W G04

Outlet (HPCO) Outlet (T)



HPCO Upper inlet - outlet  
T (tank) upper outlet section  
(thread G 1/2)

W U03

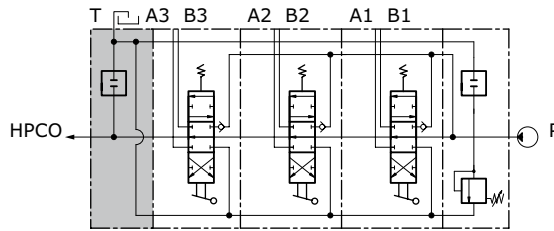
HPCO Upper inlet - outlet  
T (tank) upper outlet section  
(thread 3/4" - 16 UNF)

NOTE: code "W" on outlet section obliges to choice "E" on inlet section.

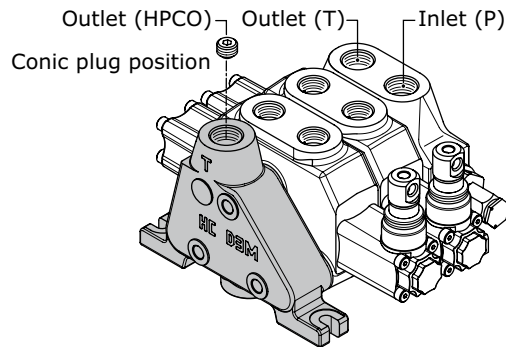


**Carry-over connection (HPCO)**

This option, available on all D3M, allows the sectional valve to feed a second valve, by extending the free flow channel. In this configuration, the valve need a separated port for connection to tank.



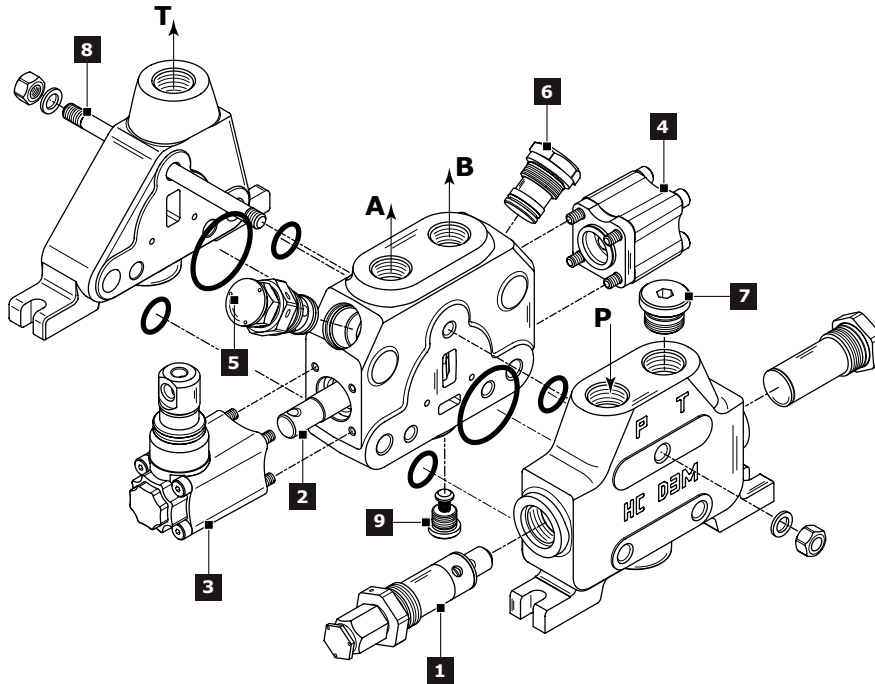
It is possible to transform sectional valve from standard to HPCO version just by ordering the appropriate conic plug:



code (HPCO Plug identification)	description	q.ty
413010203	conic plug G 1/4 x 13	1



D3M SPARE PARTS LIST



Ref.	Description	Order code	Q.ty	Code	Note
1	Direct acting pressure relief valve (*)	81451			Setting: 100 bar
		2723	1	-	Setting: 200 bar
		5371			Setting: 300 bar
		48734			Setting: 100 bar
	Pilot operated pressure relief valve (*)	4480	1	-	Setting: 200 bar
		7383			Setting: 300 bar
		Relief valve plugged	430104001	1	
	Main Anticavitation check valve	915050401	1		
External piloted valve	915040405	1			
Solenoid dump valve (12 vdc) (**)	915040402	1			
Solenoid dump valve (24 vdc) (**)	915040403	1			
Hydraulic lock or brake valve	915000401	1			
Plug with pressure-gauge connection	430104002	1			
2	3 positions double-acting spool	421203169		W001A	for protected lever
		421203021		W001B	for protected lever
		421203122		W001A	for without lever
		421203124	1	W001B	for without lever
		421203001		W001A	for hydraulic actuation
		411203148		W001E	for direct electrical control
	3 positions double-acting A and B to tank spool	411203149			for H036 = H037 control
		421203171		W002A	for protected lever
		421203026		W002B	for protected lever
		421203039	1	W002A	for without lever
		421203060		W002B	for without lever
		421203002		W002A	for hydraulic actuation
	3 positions single-acting on A	421203033	1	W005A	for protected lever
	3 positions single-acting on B	421203034	1	W006A	for protected lever
4 positions double-acting with float in the 4 <sup>th</sup> pos.	421203028	1	W012A	for protected lever	
	421203118			for hydraulic actuation	
3	Protected lever	320359006	1	H001 = H002	
		320359002			only for W012 spool
	Control without lever	320303020	1	H004	
		320303021			only for W012 spool
	Protected vertical safety lever	320303012	1	H015 = H016	
	Protected horizontal safety lever	320303010	1	H017 = H018	
	Hydraulic actuation with side ports	320503001	2	H005	
320503003		1		only for W012 spool	



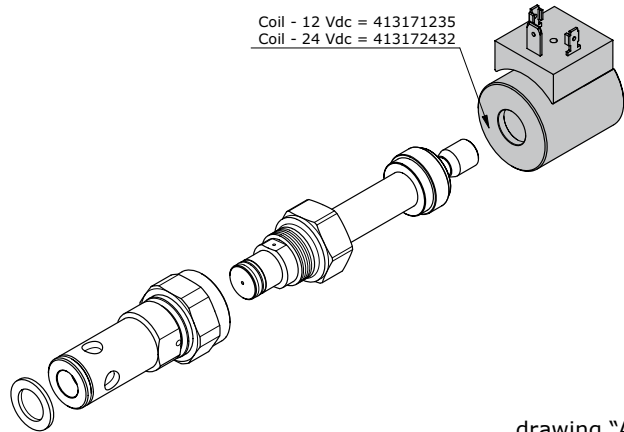
Ref.	Description	Order code	Q.ty	Code	Note
<b>3</b>	Protected lever	<b>320303016</b>	1	<b>H021=H022</b>	
	Control without lever	<b>320303024</b>	1	<b>H024</b>	
	Direct electric control (12 vdc)	<b>320003004</b>	2	<b>H036</b>	only for type "E" spool
	Direct electric control (24 vdc)	<b>320003005</b>	2	<b>H037</b>	
	Joystick control	<b>320630015</b>	1	<b>H009=H012</b>	
		<b>320630014</b>	1	<b>H010=H011</b>	
<b>4</b>	3 position spring centred spool	<b>320703001</b>	1	<b>F001A</b>	
	Detent in A and B	<b>320803001</b>	1	<b>F002A</b>	
	Detent in A	<b>320803002</b>	1	<b>F003A</b>	
	Detent in B	<b>320803003</b>	1	<b>F004A</b>	
	Detent in 4 <sup>th</sup> position	<b>320803004</b>	1	<b>F005A</b>	only for W012 spool
	Prearrangement dual command	<b>320703002</b>	1	<b>F013A</b>	
	Pneumatic control ON-OFF	<b>321103002</b>	1	<b>F020A=F021A</b>	BSP ports
		-		<b>F135A=F136A</b>	NPT ports
	Proportional Pneumatic control	<b>321203002</b>	1	<b>F022A=F023A</b>	BSP ports
		-		<b>F126A=F127A</b>	NPT ports
	Electropneumatic control ON-OFF (12 vdc)	<b>321603001</b>	1	<b>F0620</b>	
	Electropneumatic control ON-OFF (24 vdc)	<b>321603002</b>	1	<b>F0630</b>	
	Load limit in A and B	<b>320003020</b>	1	<b>F024A=F025A</b>	
	Load limit in A	<b>320003018</b>	1	<b>F026A=F027A</b>	
	Load limit in B	<b>320003019</b>	1	<b>F028A=F029A</b>	for protected lever
	Electrical load limit (normally closed contacts)	<b>320003010</b>	1	<b>F0360=F0370</b>	for protected lever
	Electrical load limit (normally open contacts)	<b>320003022</b>	1	<b>F0450=F0460</b>	for without lever
	Electrohydraulic ON-OFF (12 vdc)	<b>321403021</b>	1	<b>F1600</b>	for without lever
	Electrohydraulic ON-OFF (24 vdc)	<b>321403022</b>	1	<b>F1610</b>	for hydraulic actuation
	Electrohydraulic Proportional (12 vdc)	<b>322003001</b>	1	<b>F2600</b>	for direct electrical control
	Electrohydraulic Proportional (24 vdc)	<b>322003002</b>	1	<b>F2610</b>	for protected lever
	Electrohydraulic ON-OFF (12 vdc) with reducing valve	<b>321403023</b>	1	<b>F1500=F1520</b>	BSP ports
	Electrohydraulic ON-OFF (24 vdc) with reducing valve	<b>321403024</b>	1	<b>F1510=F1530</b>	BSP ports
	Electrohydraulic Proportional (12 vdc) with reducing valve	<b>322003003</b>	1	<b>F2500=F2520</b>	BSP ports
	Electrohydraulic Proportional (24 vdc) with reducing valve	<b>322003004</b>	1	<b>F2510=F2530</b>	BSP ports
	Electrohydraulic ON-OFF (12 vdc) with reducing valve	<b>321403028</b>	1	<b>F1500=F1520</b>	UNF ports
	Electrohydraulic ON-OFF (24 vdc) with reducing valve	<b>321403029</b>	1	<b>F1510=F1530</b>	UNF ports
Electrohydraulic Proportional (12 vdc) with reducing valve	<b>322003012</b>	1	<b>F2500=F2520</b>	UNF ports	
Electrohydraulic Proportional (24 vdc) with reducing valve	<b>322003013</b>	1	<b>F2510=F2530</b>	UNF ports	
<b>5</b> Check valve on the work section	<b>320230006</b>	1	-	only for RP and RT section	
<b>6</b>	Antishock valve on port A	<b>4044</b>			Setting: 100 bar
		<b>6891</b>		<b>01 PA</b>	Setting: 200 bar
		<b>9778</b>			Setting: 300 bar
	Anticavitation valve on port A	<b>915083001</b>	1	<b>02 PA</b>	
		<b>23504</b>			Setting: 100 bar
	Combined valve on port A	<b>14779</b>		<b>03 PA</b>	Setting: 200 bar
		<b>38346</b>			Setting: 300 bar
Prearrangement for auxiliary valve on port A	<b>430430001</b>		<b>05 PP</b>		
<b>7</b>	Antishock valve on port B	<b>4044</b>			Setting: 100 bar
		<b>6891</b>		<b>01 PB</b>	Setting: 200 bar
		<b>9778</b>			Setting: 300 bar
	Anticavitation valve on port B	<b>915083001</b>	1	<b>02 PB</b>	
		<b>23504</b>			Setting: 100 bar
	Combined valve on port A	<b>14779</b>		<b>03 PB</b>	Setting: 200 bar
		<b>38346</b>			Setting: 300 bar
Prearrangement for auxiliary valve on port B	<b>430430001</b>		<b>05 PB</b>		
<b>8</b>	Plug kit (G 1/2)	<b>430000019</b>		<b>G04</b>	
	Plug kit (3/4" - 16 UNF)	<b>300001006</b>	1	<b>U03</b>	
	Plug kit (M18 x 1.5)	<b>300004002</b>		<b>M01</b>	
	Plug kit (M22 x 1.5)	<b>300004005</b>		<b>M02</b>	
<b>9</b> Check valve	<b>320230006</b>	1			



Note

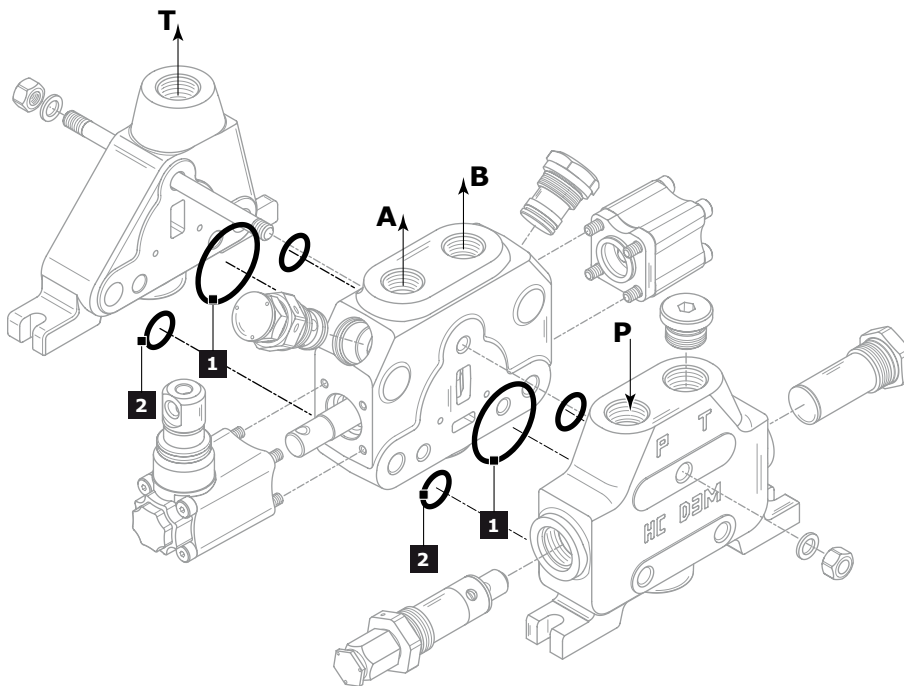
- (\*) = for different settings please contact our Sales Dpt.
- (\*\*) = electric dump valve coil can be ordered separately as spare part: (see drawing "A")  
 Ordering code Coil 12 vdc: **413171235**  
 Ordering code Coil 24 vdc: **413172432**

Coil - 12 Vdc = 413171235  
 Coil - 24 Vdc = 413172432



drawing "A"

Gasket kit



Outlet and work section

Rif.	Order code	Description	Q.ty
1	412010127	O.R. 70SH 41,00 x 1,78 (2-30)	1
2	412010106	O.R. 70SH 17,17 x 1,78 (2-17)	2

Complete Gasket kit: order code - 350930001





## INSTALLATION

### Guidelines

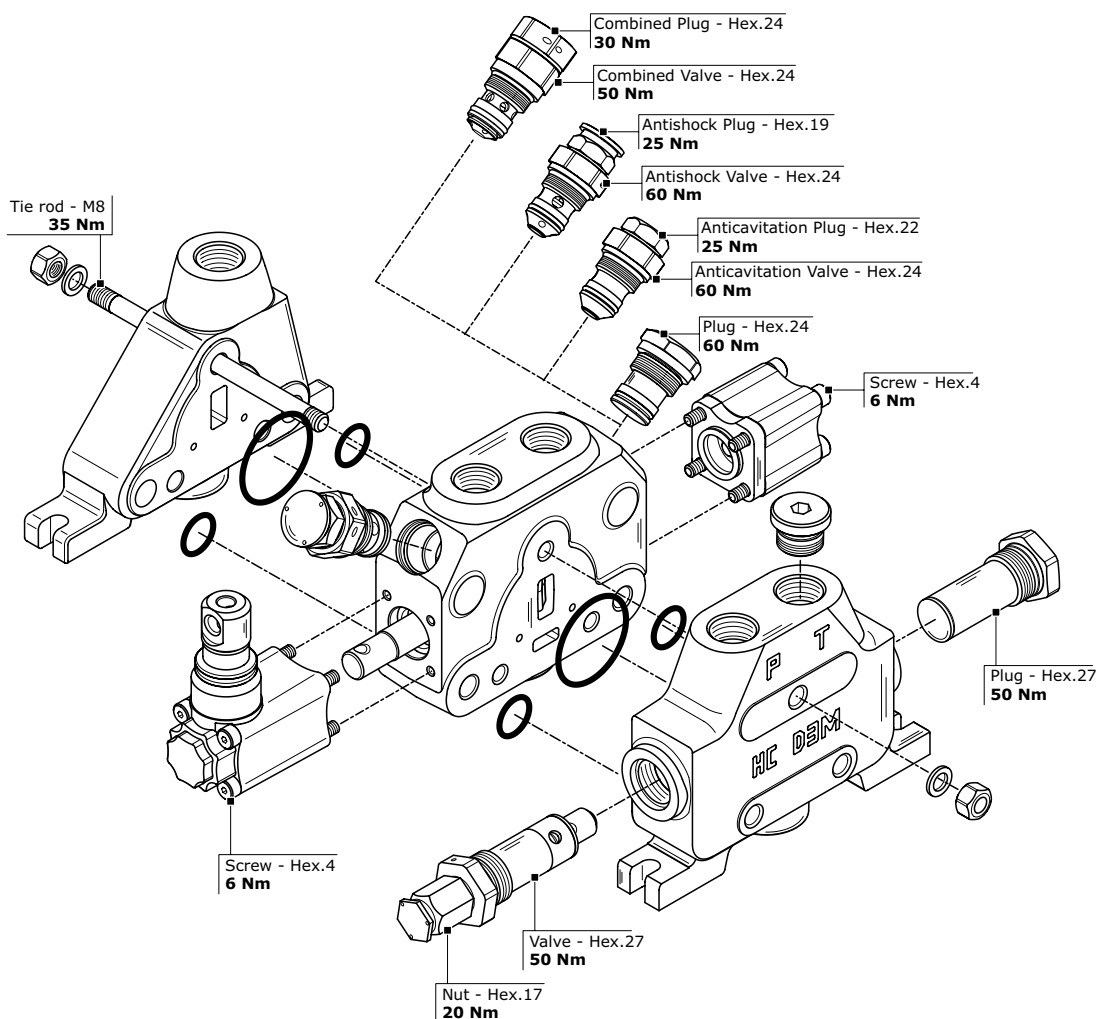
- Mount the control valve securely to a flat surface (recommended 3 point fixing); at the time do not use a hammer to positioning by hitting.
- When handling the control valve, be careful not hold the pilot cover or return spring cap of the spool or accessory valves such as main relief valves and anti-shock relief valves.
- Clean piping materials sufficiently before use.
- Make sure to prevent the port openings from being entered with dust or foreign matters.
- Tighten the port connectors surely with the recommended fastening torques.
- Do not direct the jet of a pressure washing unit directly to the valve.

### Fittings tightening torque (Nm)

thread type	port P	Port A - B	Port T
<b>BSP (ISO - 228)</b>	<b>G 1/2</b>	<b>G 1/2</b>	<b>G 1/2</b>
with rubber sealing (DIN 3869)	70	70	70
with copper or steel and rubber washer	70	70	70
<b>UN-UNF (ISO - 725)</b>	<b>3/4" - 16 UNF</b>	<b>3/4" - 16 UNF</b>	<b>3/4" - 16 UNF</b>
with O.R.	40	40	40
<b>METRIC (ISO - 262)</b>	<b>M18 x 1,5</b>	<b>M18 x 1,5</b>	<b>M22 x 1,5</b>
with O.R.	80	80	80

### General clamping torque

The following table provides the main tightening torques of the distributor HC-D3M:





**Dimensions - Thread codes**

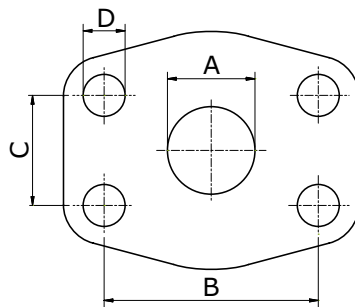
The connection ports size is indicated by an ordering code common for all Hydrocontrol products. Following table shows all available connections.

<b>METRIC THREAD (ISO 9974-1)</b>			
Type	M18x1,5	M22x1,5	M27x2
Code	<b>M01</b>	<b>M02</b>	<b>M03</b>

<b>BSP THREAD (ISO 1179-1)</b>								
Type	1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Code	<b>G02</b>	<b>G03</b>	<b>G04</b>	<b>G05</b>	<b>G06</b>	<b>G07</b>	<b>G08</b>	<b>G09</b>

<b>UN / UNF THREAD (ISO 11926-1)</b>						
Type	9/16" 18 UNF SAE6	3/4" 16 UNF SAE8	7/8" 14 UNF SAE10	1 1/16" 12 UNF SAE12	1 5/16" 12 UNF SAE16	1 5/8" 12 UNF SAE20
Code	<b>U02</b>	<b>U03</b>	<b>U04</b>	<b>U05</b>	<b>U06</b>	<b>U07</b>

**Dimensions - SAE Flange codes**



<b>SAE / 3000 FLANGE (ISO 6162-1)</b>												
Type	3/4" (MA)	3/4" (UNC)	1" (MA)	1" (UNC)	1 1/4" (MA)	1 1/4" (UNC)	1 1/2" (MA)	1 1/2" (UNC)	2" (MA)	2" (UNC)	3" (MA)	3" (UNC)
Code	<b>S03</b>	<b>S04</b>	<b>S05</b>	<b>S06</b>	<b>S07</b>	<b>S08</b>	<b>S09</b>	<b>S10</b>	<b>S11</b>	<b>S12</b>	<b>S15</b>	<b>S16</b>
A	19	19	25	25	32	32	38	38	51	51	76	76
B	47,6	47,6	52,4	52,4	58,7	58,7	69,9	69,9	77,8	77,8	106,4	106,4
C	22,3	22,3	26,2	26,2	30,2	30,2	35,7	35,7	42,9	42,9	61,9	61,9
D	M10	3/8-16	M10	3/8-16	M10	7/16-14	M12	1/2-13	M12	1/2-13	M16	5/8-11

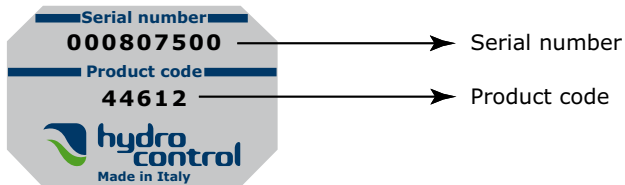
<b>SAE / 6000 FLANGE (ISO 6162-2)</b>								
Type	3/4" (MA)	3/4" (UNC)	1" (MA)	1" (UNC)	1 1/4" (MA)	1 1/4" (UNC)	1 1/2" (MA)	1 1/2" (UNC)
Code	<b>S33</b>	<b>S34</b>	<b>S35</b>	<b>S36</b>	<b>S37</b>	<b>S38</b>	<b>S39</b>	<b>S40</b>
A	19	19	25	25	32	32	38	38
B	50,8	50,8	57,2	57,2	66,6	66,6	79,3	79,3
C	23,8	23,8	27,8	27,8	31,8	31,8	36,5	36,5
D	M10	3/8-16	M12	7/16-14	M14	1/2-13	M16	5/8-11



## GENERAL CONDITIONS AND PATENTS

### Product identification

All Hydrocontrol products have an identifying plate placed in specific position.



#### Serial number:

It univocally identifies the physical valve: this provides an easy way to find all sales and production details.

#### Product code:

It is a number univocally identifying the configuration and pressure settings of a valve.

### Introduction

These general conditions apply to all general supplies from Hydrocontrol s.p.a., after receiving orders from the Customer. Should commercial terms such as EXW, DDP, etc be mentioned, of course the Incoterms of the International Chamber of Commerce must be referred to, according to the test existing when the general supply conditions are agreed on.

### Management of orders

No Customer's order is binding to Hydrocontrol s.p.a. if Hydrocontrol s.p.a. has not confirmed the order in writing. Hydrocontrol s.p.a. commits to supplying the orders in compliance with the order confirmation that has been issued. Any disagreement with the content of the order confirmation must be communicated in writing to Hydrocontrol s.p.a. within and no later than 5 days from the delivery of the order confirmation. The Customer commits to paying for the goods supplied by Hydrocontrol s.p.a., according to the prices indicated on the order confirmation.

### Payment conditions

The Parties agree on the payment terms at the beginning of the supply. The terms will be indicated on the order confirmation. Should the Customer be late with the payments, Hydrocontrol S.p.a. will be entitled to require the payment of interests on arrears based on the exiting Prime Rate increased by 2%. Should there be any payment delay, Hydrocontrol s.p.a. will be entitled not to process the Customer's purchase order, even if it has already been confirmed.

### Delivery and shipment

The goods are always supplied Ex Works, even when Hydrocontrol s.p.a. agrees with the Customer that the shipment, or a part of it, will be arranged by Hydrocontrol s.p.a. It is agreed that the Customer will bear the risk of goods deterioration or damaging from the moment the goods are handed by Hydrocontrol s.p.a. to the first carrier.

### Product characteristics

Hydrocontrol s.p.a. commits to supplying good quality products, compliant with the technical specifications declared on the technical tables and on the catalogue. Hydrocontrol s.p.a, even without notice, at its own discretion, reserves the right to modify the products as necessary, without these changes altering the main characteristics of the products.

### Claims

Any claims about defects on delivered products (just as an example: claims about the packaging, the number, the quantity or the external product characteristics) will have to be notified to Hydrocontrol s.p.a. in writing, within and no later than 7 days from reception of the goods, otherwise the claims will be considered as null and void. Occult defects (the defects of the goods that cannot be spotted with a careful control of the goods received by the Customer), will have to be notified in writing to Hydrocontrol s.p.a. within 7 days from the discovery of the defect, and anyhow no later than 12 months from the delivery of the goods, otherwise the claim will be considered as null and void. Even in case of claim or objection, the Customer will never be entitled to suspend or delay the payments to Hydrocontrol s.p.a. for the products subject to claim or objection nor for any other supply.



## GENERAL CONDITIONS AND PATENTS

### Warranty

Should the products supplied by Hydrocontrol not be compliant or have the required quality and should this defect be due to Hydrocontrol, Hydrocontrol s.p.a. commits, at its choice, to replace or repair the faulty products, as long as the defect or lack of compliance is notified to Hydrocontrol s.p.a. in writing, as specified at point 6, within and no later than 18 months from product delivery. On the products that have been fixed or replaced in accordance with what specified above, the above-mentioned warranty applies. The 12 month duration starts from the date of repair or replacement. In case of defects, lack of quality or in case of lack of compliance for the supplied products, with the exception of fraud or serious offence, Hydrocontrol s.p.a. only commits to repairing or replacing the faulty products, according to what specified above. This warranty replaces any other Supplier's warranty or liability established by the law. This warranty excludes any other liability contractual or extra-contractual by Hydrocontrol s.p.a. on the products supplied by Hydrocontrol (as a mere example: damage refund, loss of profit, product recall campaign, etc). Hydrocontrol s.p.a. has signed a product civil liability police, with a suitable maximum coverage.

### Ownership retention

The products supplied by Hydrocontrol s.p.a. will be owned by the latter until Hydrocontrol receives the complete payment for the supplied goods.

### Obligation confidentiality

Hydrocontrol s.p.a. commits to not disclosing the technical and commercial information it receives from the Customer, unless this information has already been publicly disclosed.

### Patents

The Customer is not allowed to use the provided Products, or a part of them, their descriptions or drawings protected or not protected by Patent or registered trademark in order to design or make similar products, unless Hydrocontrol s.p.a. previously issues its written authorization. Should Hydrocontrol s.p.a. give its written authorization, all patents, trademarks, registered designs, copyrights and intellectual property rights related or connected to the Products provided by Hydrocontrol s.p.a. will stay Hydrocontrol's property. The Customer commits to respecting the highest confidentiality.

### Applicable law and court of jurisdiction

Hydrocontrol s.p.a.'s supplies are regulated by these General Supply Conditions and, for anything not defined here, by the Italian law. Any controversy related, generated or connected to the supply of Products by Hydrocontrol s.p.a., where Hydrocontrol s.p.a. is involved, will be exclusively dealt with by the Court of Bologna.

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