

# D9

## SECTIONAL VALVE



TECHNICAL CATALOGUE

A member of



 **walvoil**  
FLUID POWER E| MOTION

**1<sup>st</sup> edition D9.05**

---

*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

Ideal for mini-excavators between 1 t and 2.5 t. Especially limited size and weight. It can be equipped with:

- 2 or 3 pumps circuit
- flow addition on PTO function
- second travel speed
- regenerating system on the arm
- flow addition on the boom
- flow addition on the bucket
- flow addition on the arm
- straight travel
- built in boom anti-drift
- various kinds of hydraulic and manual controls
- any number of customisations and set-ups

Suitable for applications including Mini-backhoe loaders, Skid-steer loaders, Mini skid loaders, Mini dumpers and Forestry machines.

Different kind of manual and hydraulic remote controls. Countless configurations and custom made solutions.

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





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						•		•	•	•	•



## GENERAL INDEX

<b>4</b>	<b>General specifications</b> Standard working conditions Fluid options
<b>5</b>	<b>Order example</b> Standard thread Tie-rod kit classification Painting
<b>7</b>	<b>Dimensions</b>
<b>8</b>	<b>Typical curves</b> Pressure drop (P - T) Pressure drop (P - A/B) Pressure drop (A/B - T) Direct relief valve curve Antishock valve curve Combined valve curve Anticavitation check valve curve
<b>10</b>	<b>Inlet Section</b> Order example Inlet side classification Valve identification Valve arrangement Inlet position and available thread type
<b>13</b>	<b>Working section</b> Order example Spool identification Spool actuation classification for manual control Spool actuation classification for hydraulic control Spool return action classification - Spring load values Work section identification Compatibility table Auxiliary valves identification
<b>20</b>	<b>Intermediate inlet section</b> Order example Intermediate inlet section classification Valve identification on intermediate inlet section Valve arrangement on intermediate inlet section Inlet position and available thread type
<b>23</b>	<b>Intermediate outlet section</b> Order example Intermediate outlet section classification Inlet position and available thread type (for BF intermediate) Inlet position and available thread type (for BG intermediate)
<b>25</b>	<b>Outlet section (version 1 outlet)</b> Order example
<b>25</b>	<b>Outlet section (HPCO version outlet)</b> Order example - HPCO version outlet Outlet with single tank classification Outlet with two tanks classification Carry-over connection (HPCO)
<b>29</b>	<b>D9 Spare parts list</b> Gasket kits
<b>33</b>	<b>Installation</b>
<b>35</b>	<b>General conditions and patents</b>



## 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**

D9/1: IR 001 150 A G03 W001A H004 F001A RP G03 01 PA 100 01 PB 100 TJ A G04

**TYPE:**

D9: product type  
/1: working section number

**1) INLET ARRANGEMENT: (page 10)**

**IR 001** inlet side and valve type  
**150** setting (bar)  
**A G03** inlet position and available thread type

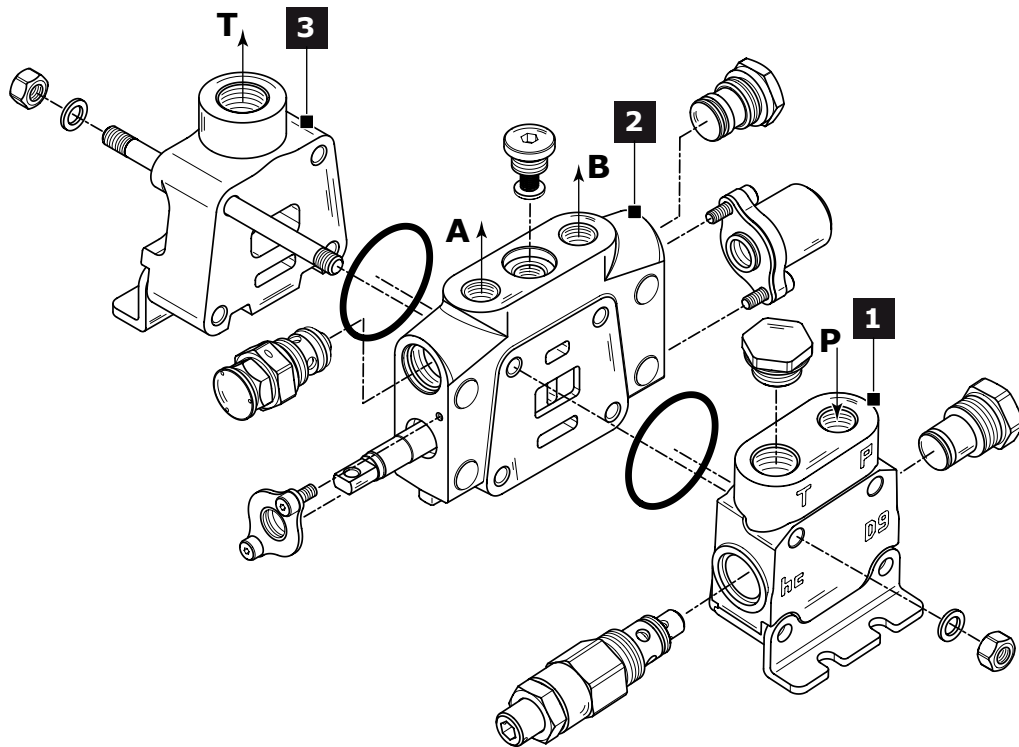
**2) WORK SECTION ARRANGEMENT: (page 13)**

**W001A** spool type  
**H004** spool actuation type  
**F001A** spool return action type  
**RP G03** type and thread section  
**01 PA 100** auxiliary valve (port A)  
**01 PB 100** auxiliary valve (port B)

**3) OUTLET ARRANGEMENT: (page 25)**

**TJ** outlet type  
**A G04** outlet position and available thread type

Ordering row 2 must be repeated for every work section



**Standard thread**

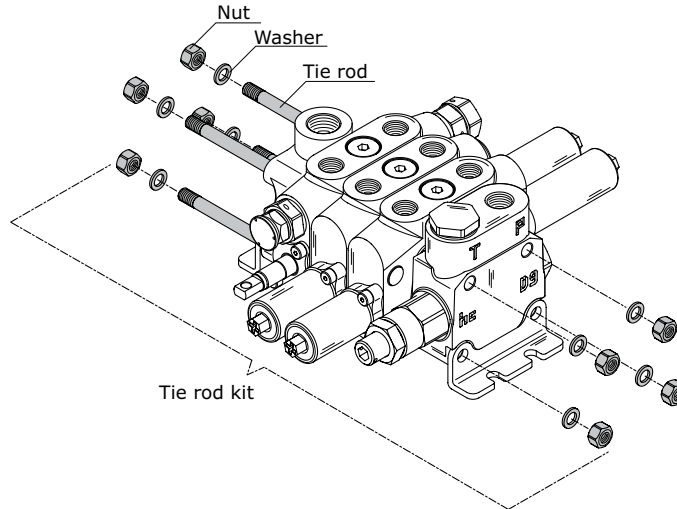
The connection ports size is indicated by an ordering code common for all Hydrocontrol products. Following table shows all available connections; for ordering code refer to table on page 34.

Ports	BSP (ISO - 228)	Code	UN-UNF (ISO - 725)	Code
<b>Inlet Port (P)</b>	G 3/8	<b>G03</b>	3/4" - 16 UNF	<b>U03</b>
<b>Ports (A - B)</b>	G 3/8	<b>G03</b>	3/4" - 16 UNF	<b>U03</b>
<b>Outlet (T) - Carry over (HPCO)</b>	G 1/2	<b>G04</b>	7/8" - 14 UNF	<b>U04</b>
<b>Hydraulic Pilot</b>	G 1/4	<b>G02</b>	9/16" - 18 UNF	<b>U02</b>
<b>Pneumatic Pilot</b>	G 1/8	-	NPTF 1/8-27	-



### Tie-rod kit classification

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. D9 requires 4 tie-rod kits.



Tie rod kit	Order Code	Lenght (mm)	Clamping Torque (Nm)	Quantity
D9/1	300146001	126		
D9/2	300146002	157		
D9/3	300146003	188		
D9/4	300146004	219		
D9/5	300146005	259		
D9/6	300146006	281		
D9/7	300146007	312	25	4
D9/8	300146008	343		
D9/9	300146009	374		
D9/10	300146010	405		
D9/11	300146011	436		
D9/12	300146012	467		

### Painting

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

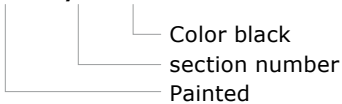
#### Order example of D9/1 painted:

D9/1  
IR 001 150 A G03  
W001A H004 F001A RP G03 01 PA 100 01 PB 120  
TJ A G04

#### P006/1 N10

The painting is indicated with the following value:

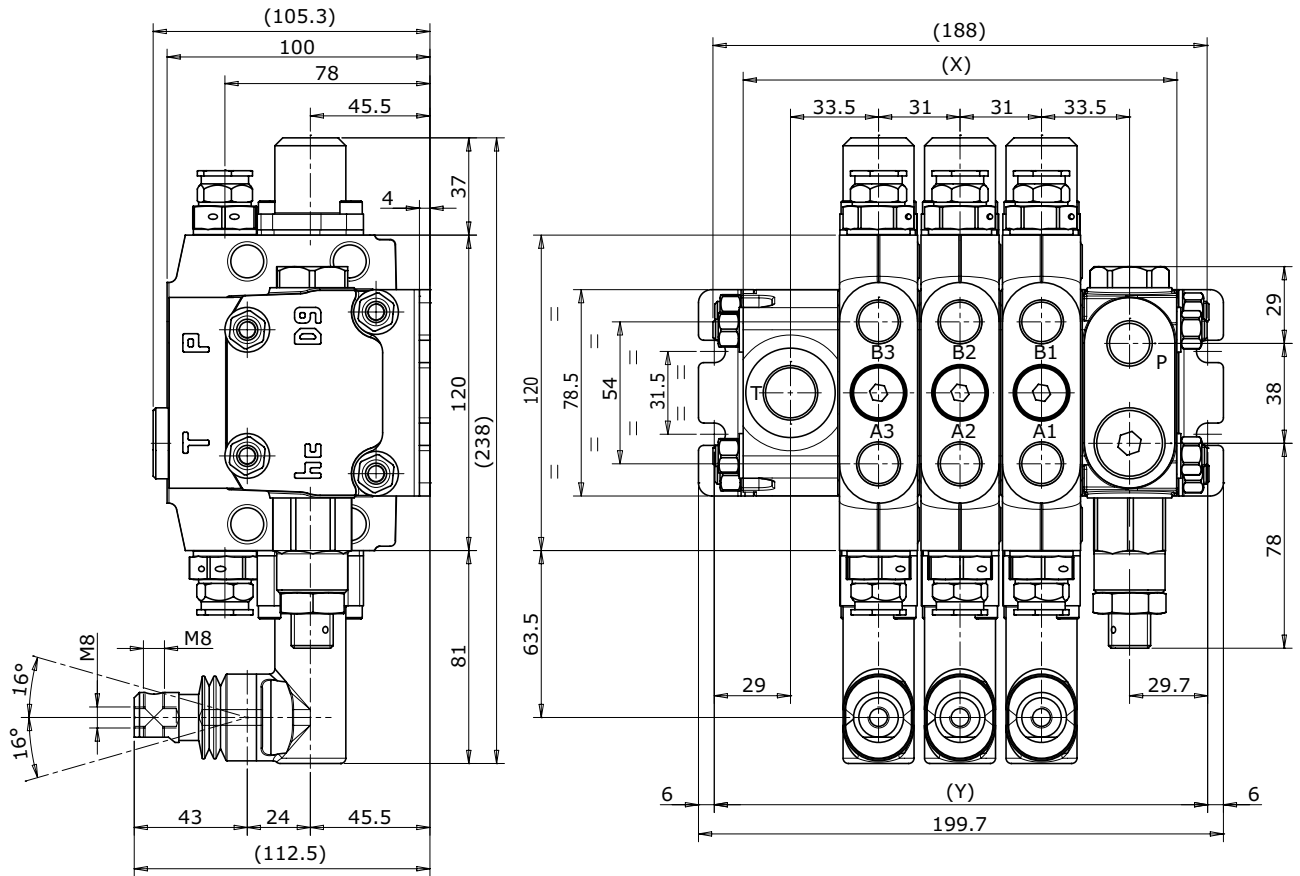
#### P006 - /1 - N10







**DIMENSIONS**



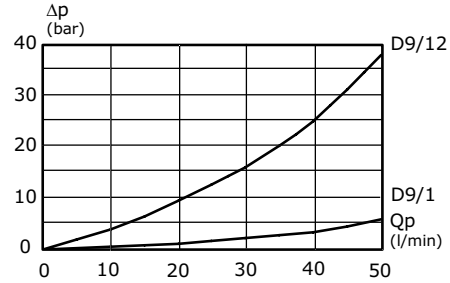
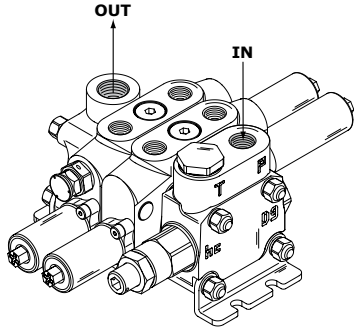
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
<b>X (mm)</b>	125	156	187	218	249	280	311	342	373	404	435	466
<b>Y (mm)</b>	137	168	199	230	261	292	323	354	385	416	447	478
<b>Weights (kg)</b>	4,5	6,2	7,9	9,6	11,3	13	14,7	16,4	18,1	19,8	21,5	23,2



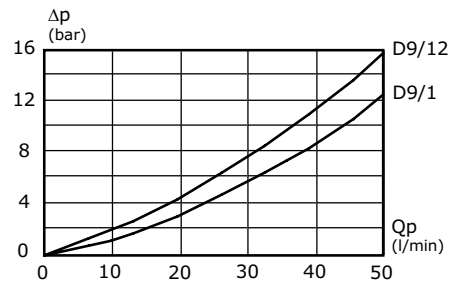
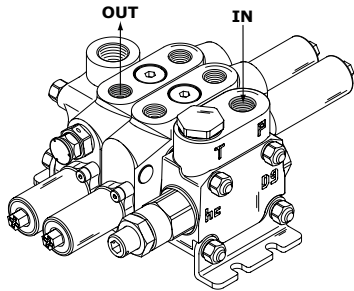
TYPICAL CURVES

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

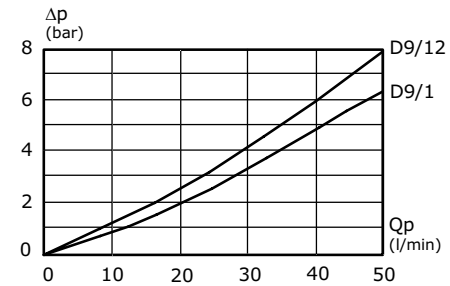
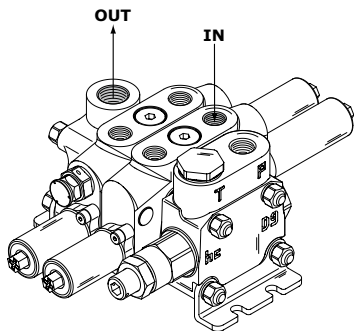
Pressure drop (P - T)



Pressure drop (P - A/B)

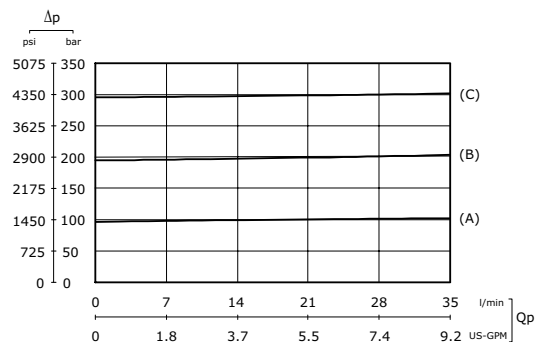


Pressure drop (A/B - T)



Direct relief valve curve

Setting ranges	
type	pressure (bar)
A	30 - 110
B	111 - 220
C	221 - 350



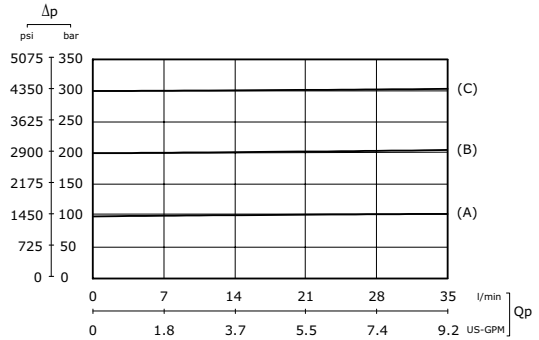


**TYPICAL CURVES**

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

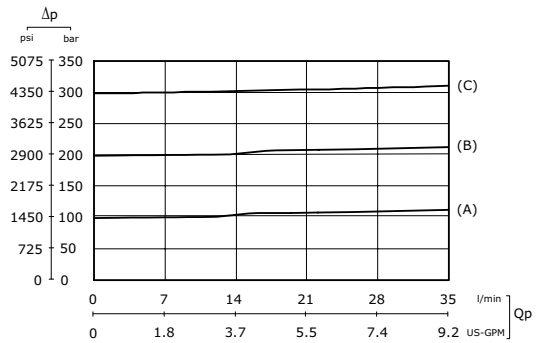
**Antishock valve curve**

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

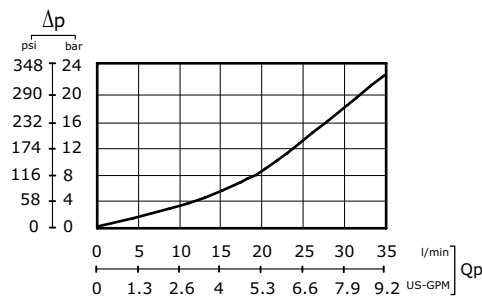


**Combined valve curve**

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



**Anticavitation check valve curve**



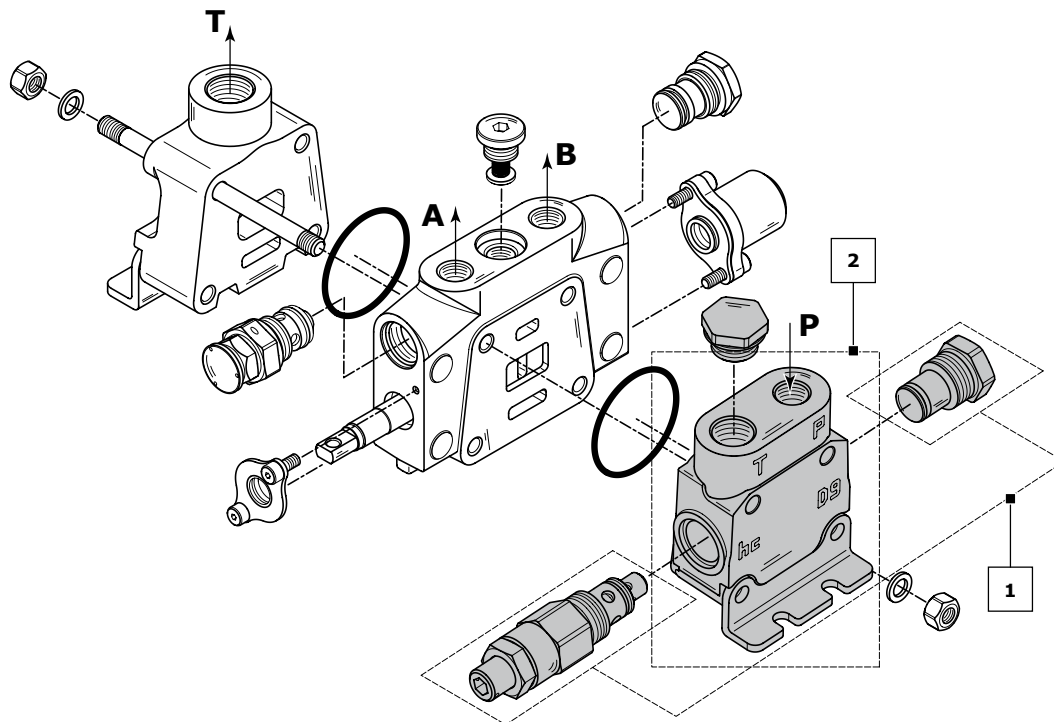


INLET SECTION

Order example

IR	001	150	A G03
----	-----	-----	-------

- 1. **IR** inlet side
- 001** valve arrangement
- 150** setting (bar)
- 2. **A G03** 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>11</b>
<b>1</b>	<b>001</b>	Direct acting pressure relief valve	<b>12</b>
	<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>019</b>	without valves	
<b>2</b>	<b>A G03</b>	Upper inlet (thread G 3/8)	
	<b>A U03</b>	Upper inlet (thread 3/4" - 16 UNF)	
	<b>E G03</b>	Upper inlet-Outlet (thread G 3/8)	
	<b>E U03</b>	Upper inlet-Outlet (tthread 3/4" - 16 UNF)	

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



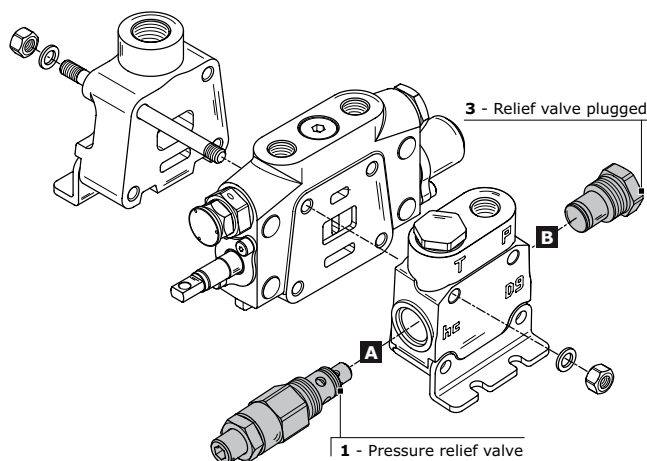
**Inlet side classifications**

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

**Valve identification**

type	schema	layout	description	type	schema	layout	description
<b>1</b>			Direct acting 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>6</b>			Externally piloted 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.

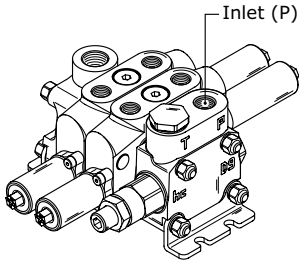
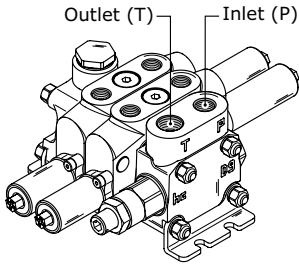
- (A) = spool action side
- (B) = spool return action side

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



VALVE COMBINATION INLET SECTION		Valve type on port B					
		 1	 3	 6	 7	 8	 11
Valve type on port A	 1		001	003	004	005	008
	 3	017	019	022	023	024	027
	 6	046	048				052
	 7	053	055				059
	 8	060	062				066
	 11	084	086	089	090	091	

**Inlet position and available thread type**

Inlet position and thread available	
A G03	 <p>Inlet (P)</p>
A U03	
E G03	 <p>Outlet (T) Inlet (P)</p>
E U03	

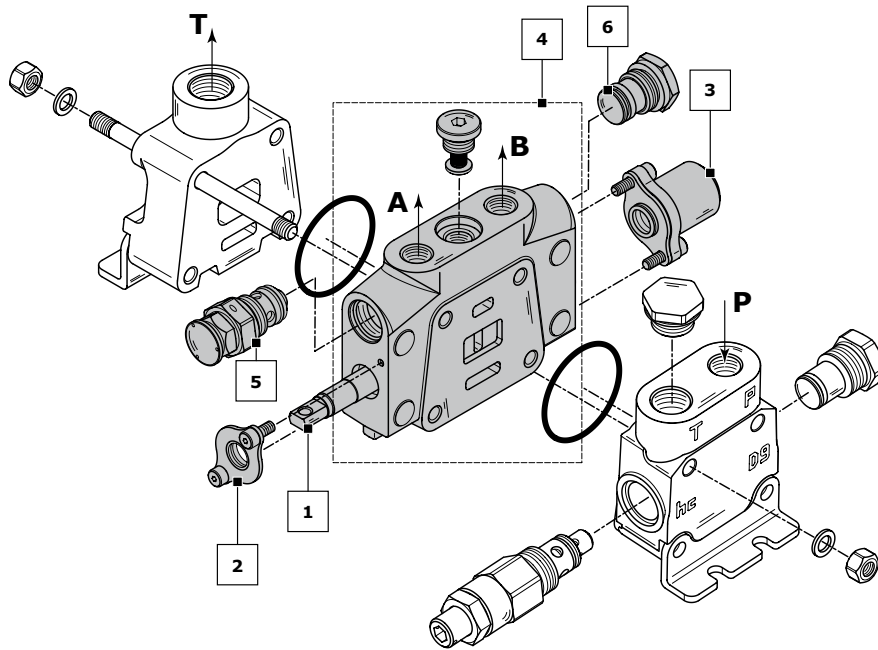
**NOTE:** code "E" on inlet section obliges to choice "E" or "W" on outlet section.



**WORKING SECTION**

Order example:

	W001A	H004	F001A	RP G03	01 PA 100	01 PB 100
1. <b>W001A</b>	spool type					
2. <b>H004</b>	spool actuation type					
3. <b>F001A</b>	spool return action type					
4. <b>RP G03</b>	section type					
5. <b>01 PA 100</b>	auxiliary valve (port A - handle side)					
6. <b>01 PB 100</b>	auxiliary valve (port B - cap side)					



Rif.	Code	Description	Page
1	<b>W001A</b>	3 positions double-acting	14
	<b>W002A</b>	3 positions double-acting A-B to tank	
2	<b>H001</b>	Protected lever	16
	<b>H004</b>	Control without lever	
	<b>H006</b>	hydraulic actuation	
3	<b>F001A</b>	3 positions spring-centred spool (spring A)	17
	<b>F002A</b>	3 positions spring-centred spool detent in A and B (spring A)	
4	<b>RP G03</b>	Parallel circuit (G 3/8)	18
	<b>RP U03</b>	Parallel circuit (3/4"-16 UNF)	
	<b>RT G03</b>	Parallel-Tandem circuit (G 3/8)	
	<b>RT U03</b>	Parallel-Tandem circuit (3/4"-16 UNF)	
5	<b>01 PA 100</b>	Antishock valve (port A)	19
	<b>05 PA</b>	Prearrangement for auxiliary valve (port A)	
6	<b>01 PB 100</b>	Antishock valve (port B)	19
	<b>05 PB</b>	Prearrangement for auxiliary valve (port B)	

**NOTE:** (\*) Leave out the spool return action code when choosing H006.  
 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 (100)**



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>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
<b>J10</b>	A-B IN T	0,10	1,88	
<b>K10</b>	A IN T	0,10	1,88	
<b>Y10</b>	B IN T	0,10	1,88	





CODE	spool type available	
	STANDARD A	METERED B
W001	W001A	W001B
W002	W002A	W002B
W003	W003A	W003B
W004	W004A	W004B
W005	W005A	W005B
W006	W006A	W006B
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.
- Different spools are available on request.

Plaesee contact our Sales department for more information.



Spool actuation classification for manual control

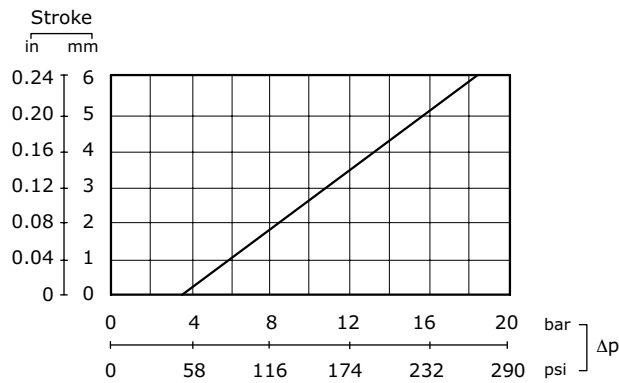
code	description	dimensions	configuration
H001	Protected lever		
H002	Protected lever rotated 180°		
H004	Control without lever		

Spool actuation classification for Hydraulic control

code	description	dimensions	configuration
H006	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.

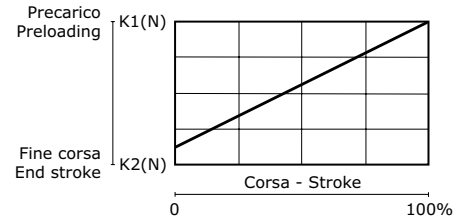




**Spool return action classification - Springs load values**

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

Spring type			
Type - Code	A (standard spring)	B (soft spring)	C (heavy spring)
<b>Preloading</b>	100 N	80 N	120 N
<b>End of stroke</b>	150 N	130 N	180 N
Spool return action identification example			
Type - Code	<b>F001A</b>	<b>F001B</b>	<b>F001C</b>



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)			
<b>F013A</b> <b>F013B</b> <b>F013C</b>	3 positions spring-centred spool prearrangement dual command			



Work section identification

working section type	
RP G03	
RP U03	

Parallel circuit section

**Parallel circuit**

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.

RT G03	
RT U03	

Tandem (conventional) circuit section

**Parallel-Tandem circuit**

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.

RS G03	
RS U03	

Series circuit section

**Series circuit**

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.

Compatibility table

SPOOL ACTION TYPE	SPOOL TYPE																
	W001A	W001B	W002A	W002B	W003A	W003B	W004A	W004B	W005A	W005B	W006A	W006B	W012A	W013A	W015A	W016A	
H001	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H002	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H004	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H006	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
SPOOL RETURN ACTION TYPE	SPOOL TYPE																
	W001A	W001B	W002A	W002B	W003A	W003B	W004A	W004B	W005A	W005B	W006A	W006B	W012A	W013A	W015A	W016A	
F001	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
F002	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
F003	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
F004	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•
F005													•				
F013	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•	•



### 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**

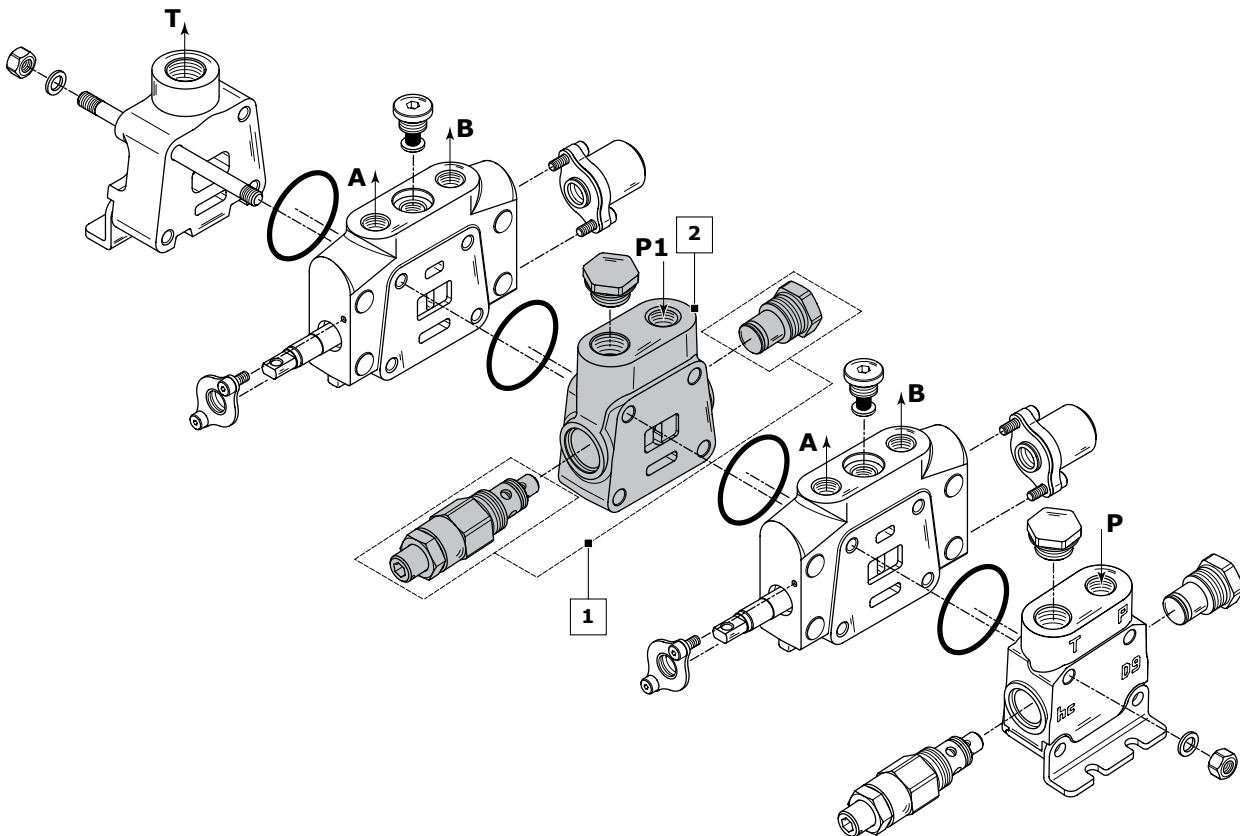


INTERMEDIATE INLET SECTION

Order example

BE	001	150	A G04
----	-----	-----	-------

1. **BE** inlet side \_\_\_\_\_
- 009** valve arrangement \_\_\_\_\_
- 150** setting (bar); when ordering a main relief valve it is necessary to specify setting \_\_\_\_\_
2. **A G03** inlet position and available thread type \_\_\_\_\_



Rif.	Code	Description	Page
-	<b>BE</b> <b>BV*</b>	Intermediate inlet section Intermediate inlet section with pressure relief valve	<b>21</b>
<b>1</b>	<b>001</b> <b>019</b>	Direct acting pressure relief valve without valves	
<b>2</b>	<b>A G03</b> <b>A U03</b>	Upper inlet (thread G 3/8) Upper inlet (thread 3/4"-16 UNF)	<b>22</b>

**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.

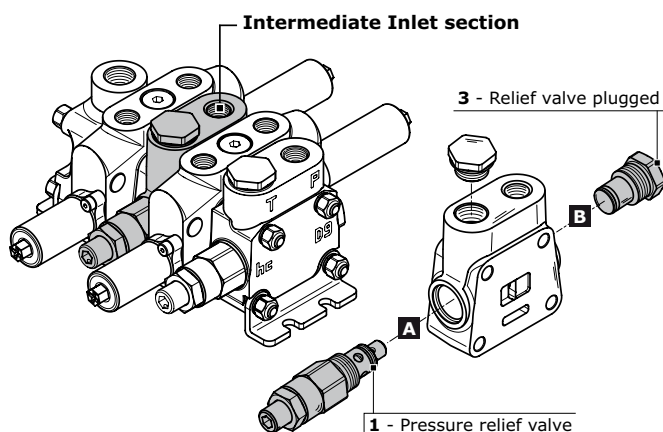
<b>BV</b>			Intermediate inlet section with pressure relief valve
-----------	--	--	---

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>11</b>			Plug with pressure-gauge connection
<b>3</b>			Relief valve plugged				

Valve arrangement on intermediate inlet section



**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.

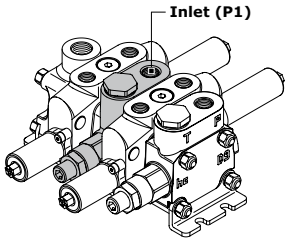
- (A) = spool action side
- (B) = spool return action side

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



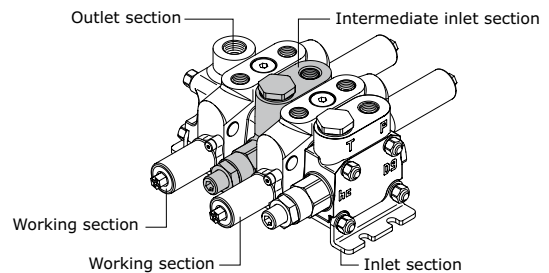
AVAILABLE COMBINATIONS ON INLET SECTION		Valve type on port B		
		 1	 3	 11
Valve type on port A	 1		001	008
	 3	017	019	027
	 11	084	086	

**Inlet position and available thread type**

Inlet position and thread available	
A G03	 <p style="text-align: right;">Upper inlet (P1)</p>
A U03	

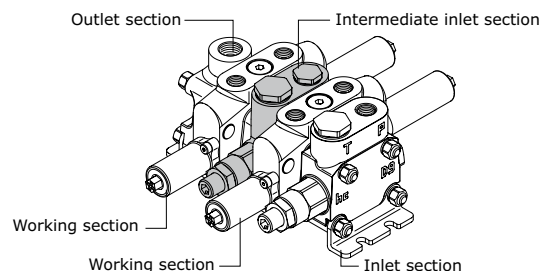
**Complete configuration samples for D9/2 with intermediate inlet section (BE)**

- IR 001 150 A G03..... Right inlet section
- W001A H006 RP G03 ..... Working section
- BE 001 120 A G03.....Intermediate inlet section**
- W001A H006 RP G03 ..... Working section
- TJ A G04 ..... Outlet section



**Complete configuration samples for D9/2 with intermediate inlet section (BV)**

- IR 001 150 A G03..... Right inlet section
- W001A H006 RP G03 ..... Working section
- BV 009 120 .....Intermediate inlet section**
- W001A H006 RP G03 ..... Working section
- TJ A G04 ..... Outlet section





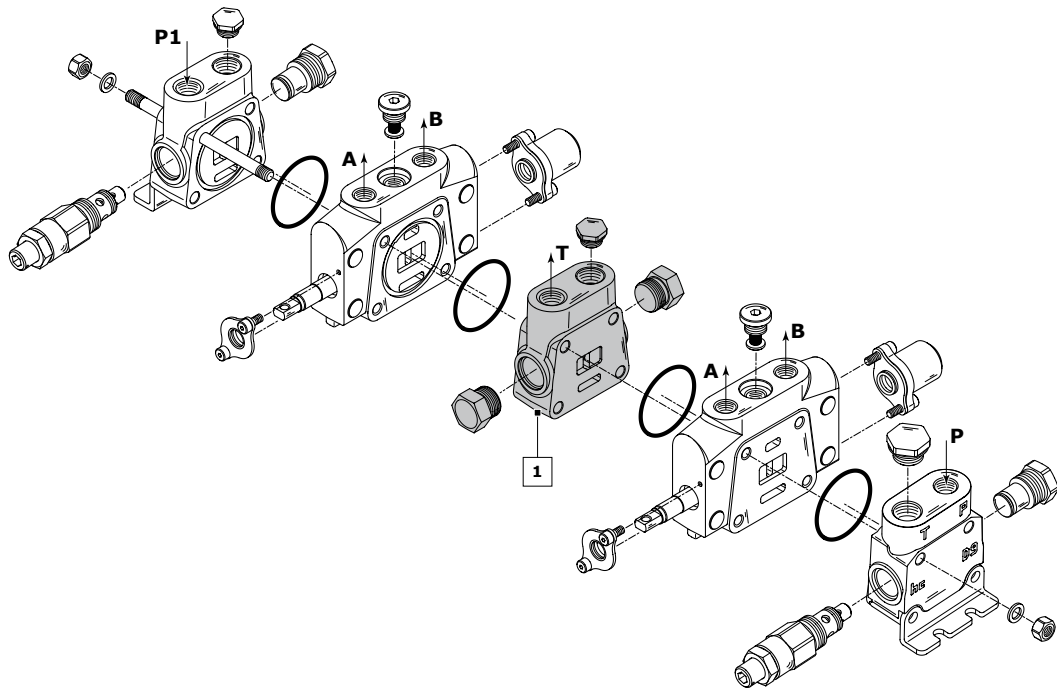


**INTERMEDIATE OUTLET SECTION**

**Order example**

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

- BF** intermediate outlet type \_\_\_\_\_  
**1. A G04** outlet position and available thread type \_\_\_\_\_



Rif.	Code	Type	Description	Page
-	<b>BF</b>		Intermediate outlet section with single tank return	<b>23</b>
-	<b>BG</b>		Intermediate outlet section with two tank returns	
<b>1</b>	<b>A G04</b>	for BF	Upper outlet (thread G 1/2)	<b>24</b>
	<b>J G04</b>	for BG	Upper outlet HPCO - front side A and rear side B to T (thread G 1/2)	

**Intermediate outlet section classifications**

**intermediate outlet type**

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

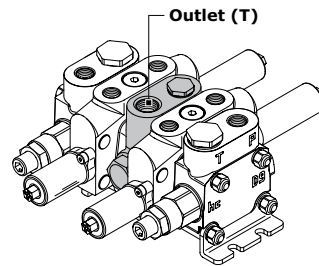
The section in question allows the flow of oil of the two pumps to be piped in two outlets: HPCO for powering another directional control valve, T for discharge of the work ports. In order to obtain this, the two T need to be linked.



Outlet position and available thread type (for BF intermediate)

Outlet combination and thread available

A G04

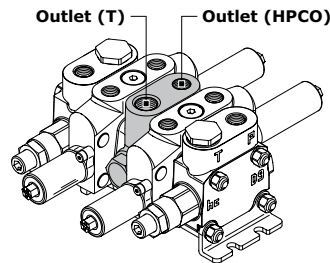


Upper outlet (T)

Outlet position and available thread type (for BG intermediate)

Inlet combination and thread available

W G04



HPCO upper intermediate outlet section  
T (TANK) upper intermediate outlet section

Complete configuration samples for D9/2 with intermediate outlet section (BF)

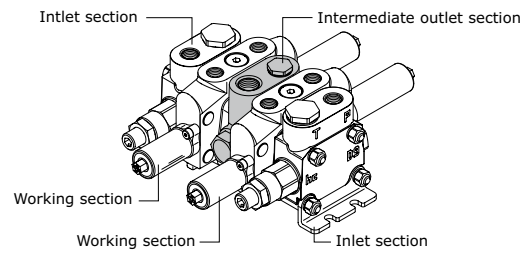
IR 001 150 A G03..... Right inlet section

W001A H006 RP G03 ..... Working section

**BF A G04 .....Intermediate outlet section**

W001A H006 RP G03 ..... Working section

IL 001 150 A G03 ..... Left inlet section



Complete configuration samples for D9/2 with intermediate outlet section (BG)

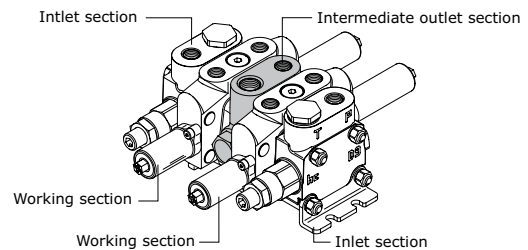
IR 001 150 A G03..... Right inlet section

W001A H006 RP G03 ..... Working section

**BG W G04 .....Intermediate outlet section**

W001A H006 RP G03 ..... Working section

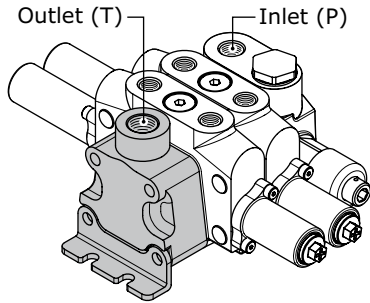
IL 001 150 A G03 ..... Left inlet section





**OUTLET SECTION (VERSION 1 OUTLET)**

**Order example**



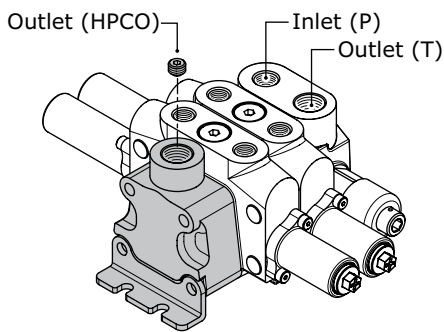
**TJ** | **A G04**

- 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)	26
	<b>TK</b>	Outlet section with single return (T) left-side inlet (P)	
2	<b>A G04</b>	Upper outlet (thread G 1/2)	
	<b>A U04</b>	Upper outlet (thread 7/8" - 14 UNF)	
	<b>E G04</b>	Upper outlet (inlet-outlet) (thread G 1/2)	
	<b>E U04</b>	Upper outlet (inlet-outlet) (thread 7/8" - 14 UNF)	

**OUTLET SECTION (HPCO VERSION OUTLET)**

**Order example - HPCO version Outlet**



**TM** | **W 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)	27
	<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)	

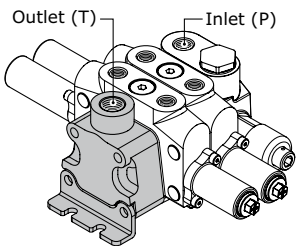
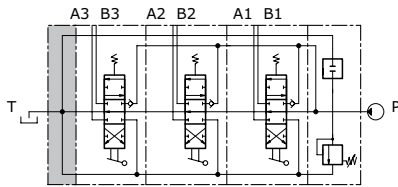


Outlet with single tank classification

outlet identification

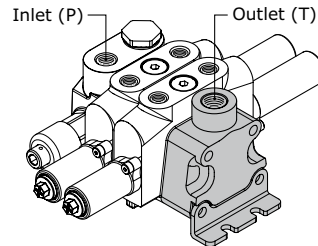
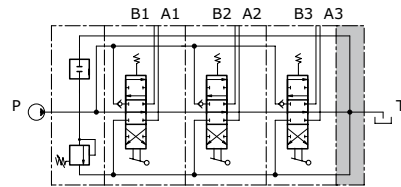
TJ

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



TK

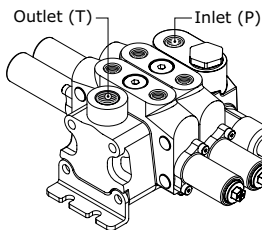
Outlet section with single return (T)  
left-side inlet (P)



Outlet position

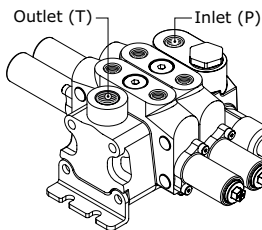
outlet combination and thread available

A G04



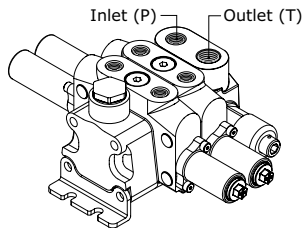
Upper outlet  
(thread G 1/2)

A U04



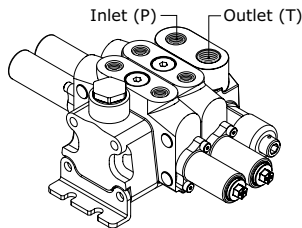
Upper outlet  
(thread 7/8" - 14 UNF)

E G04



Upper outlet  
(inlet - outlet)  
(thread G 1/2)

E U04



Upper outlet  
(inlet - outlet)  
(thread 7/8" - 14 UNF)

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



Outlet with two tanks classification

outlet identification	
<b>TM</b>	<p>Outlet section with two return (T-HPCO) right-side inlet (P)</p>
<b>TN</b>	<p>Outlet section with two return (T-HPCO) left-side inlet (P)</p>

Outlet position

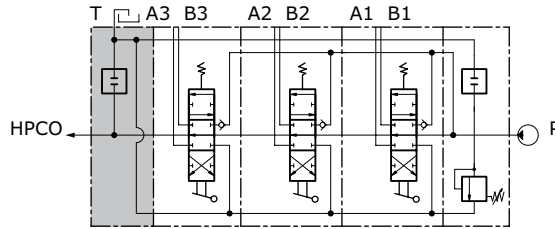
outlet combination and thread available	
<b>W G04</b>	<p>HPCO upper inlet outlet T (TANK) upper outlet section (thread G 1/2)</p>
<b>W U04</b>	<p>HPCO upper inlet outlet T (TANK) upper outlet section (thread 7/8" - 14 UNF)</p>

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

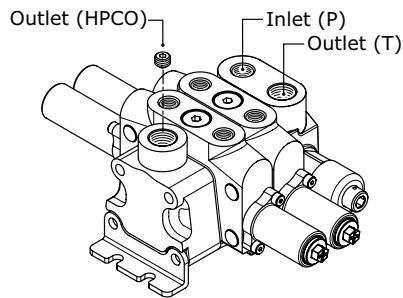


### Carry-over connection (HPCO)

This option, available on all D9, 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.



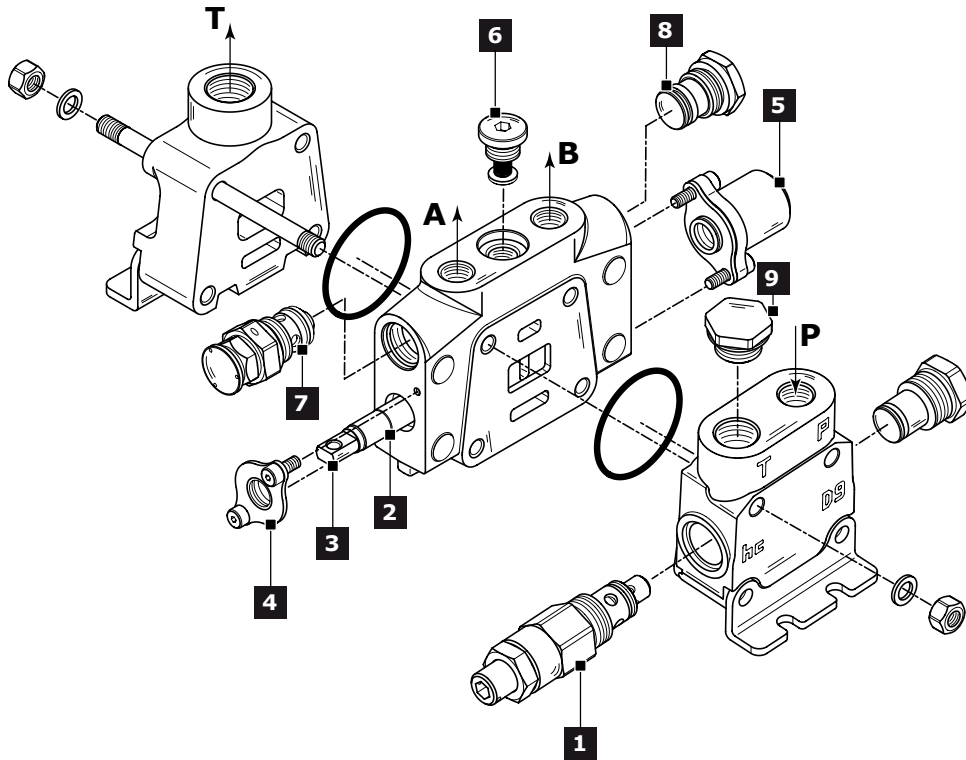
It is possible to transform sectional valve from standard to HPCO version just by ordering the appropriate conic plug:



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



D9 SPARE PARTS LIST



Ref.	Description	Order code	Q.ty	Code	Note
1	Direct acting pressure relief valve (*)	84642	1		Setting: 100 bar
		29005			Setting: 200 bar
		38339			Setting: 300 bar
	Relief valve plugged	430146001	1	-	
	External piloted valve	915044604	1		
	Solenoid dump valve (12 vdc (**))	915044601	1		
Solenoid dump valve (24 vdc (**))	915044602	1			
Plug with pressure-gauge connection	430146002	1			
2	3 positions double-acting spool	421246059	1	W001A	
		421246055		W001B	
	3 positions double-acting A and B to tank spool	421246060		W002A	
	3 positions single-acting on A	421246005		W005A	
	3 positions single-acting on B	421246064		W006A	
4 positions double-acting with float in the 4 <sup>th</sup> pos.	421246065	W012A			
3	Spool end kit	422501119	1		only for protected lever
		422501132			only for control without lever
4	Protected lever	320346001	1	H001 = H002	
		320346002			only for W012 spool
	Control without lever	320346003	1	H004	
		320346004			only for W012 spool
		320546001		2	H006
Hydraulic actuation with side ports	320546035	2		UNF ports	
	320546004	2		BSP ports for W012 spool	
5	3 position spring centres spool	320746002	1	F001A	
	Detent in A and B	320846001		F002A	
	Detent in A	320846002		F003A	
	Detent in B	320846003		F004A	
	Detent in 4 <sup>th</sup> position	320846004		F005A	only for W012 spool
	Prearrangement dual command	320746005		F013A	



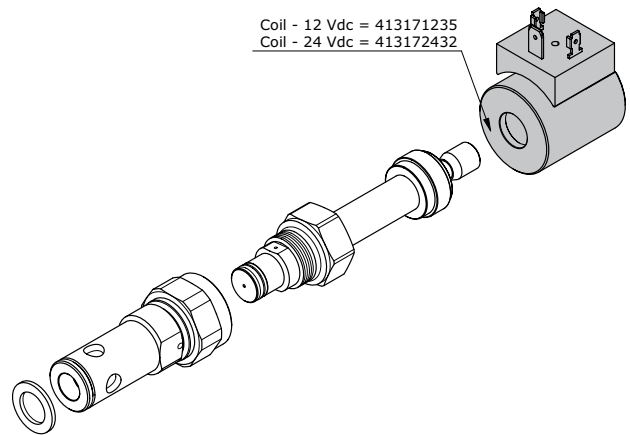
Ref.	Description	Order code	Q.ty	Code	Note
<b>6</b>	Check valve on the work section	<b>320246001</b>	1	-	only for RP and RT section
		<b>4044</b>			Setting: 100 bar
	Antishock valve on port A	<b>6891</b>		<b>01 PA</b>	Setting: 200 bar
<b>7</b>		<b>9778</b>			Setting: 300 bar
	Anticavitation valve on 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>430404001</b>	<b>05 PA</b>			
<b>8</b>		<b>7478</b>			Setting: 100 bar
	Antishock valve on port B	<b>2695</b>		<b>01 PB</b>	Setting: 200 bar
		<b>2827</b>			Setting: 300 bar
	Anticavitation valve on port B	<b>915080401</b>	1	<b>02 PB</b>	
		<b>23504</b>			Setting: 100 bar
Combined valve on port B	<b>14779</b>	<b>03 PB</b>		Setting: 200 bar	
	<b>38346</b>			Setting: 300 bar	
Prearrangement for auxiliary valve on port B	<b>430404001</b>	<b>05 PB</b>			
<b>9</b>	Plug kit (G 3/8)	<b>430000018</b>	1	<b>G03</b>	
	Plug kit (G 1/2)	<b>430000019</b>		<b>G04</b>	
	Plug kit (3/4"-16 UNF)	<b>300001006</b>		<b>U03</b>	
	Plug kit (7/8"-14 UNF)	<b>300004003</b>		<b>U04</b>	





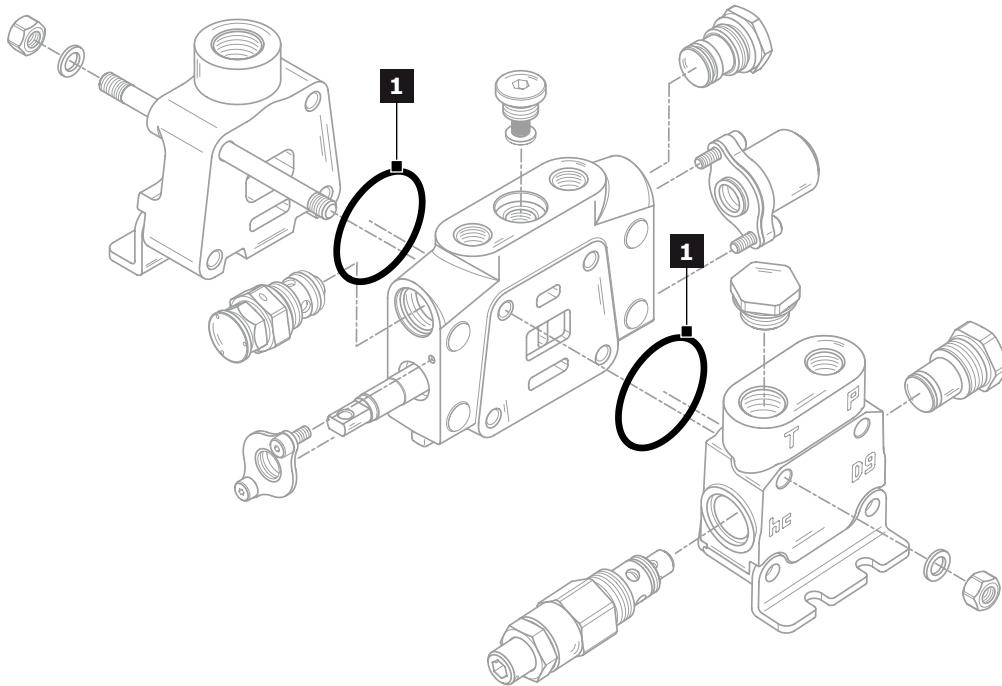
Note

- (\*) = 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**





Gasket kit



**INLET AND WORK SECTION**

Rif.	ORDER CODE	DESCRIPTION	Q.ty
1	412010634	O.R. 70SH 50,47 x 2,62 (2-136)	1

**Complete Gasket kit: order code - 350946001**



**INSTALLATION**

**Guidelines**

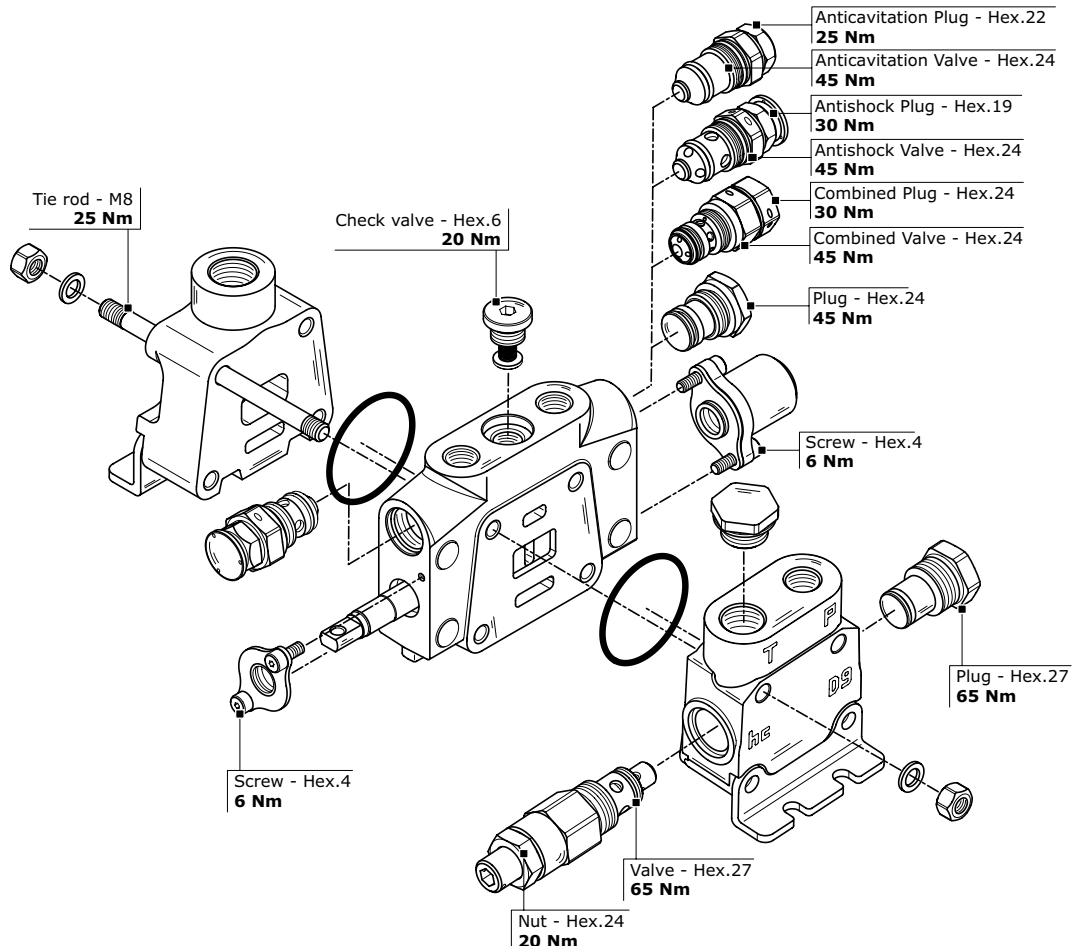
- Mount the control valve securely to a flat surface (recommended 3 point fixing); at the time do not use a hammer to positioning by hitting.
- When handling the control valve, be careful not hold the pilot cover or return spring cap of the spool or accessory valves such as main relief valves and anti-shock 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 3/8</b>	<b>G 3/8</b>	<b>G 3/8</b>
with rubber sealing (DIN 3869)	40	40	40
with copper or steel and rubber washer	40	40	40
<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>UN-UNF (ISO - 725)</b>	<b>7/8" - 14 UNF</b>	<b>7/8" - 14 UNF</b>	<b>7/8" - 14 UNF</b>
with O.R.	90	90	90

**General clamping torque**

The following table provides the main tightening torques of the distributor D9:





**Dimensions - Thread codes**

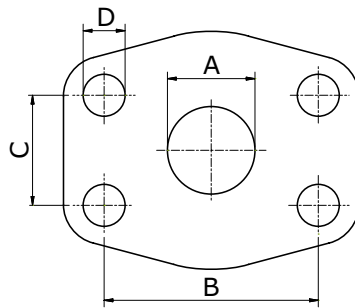
The connection ports size is indicated by an ordering code common for all Hydrocontrol products. Following table shows all available connections.

<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

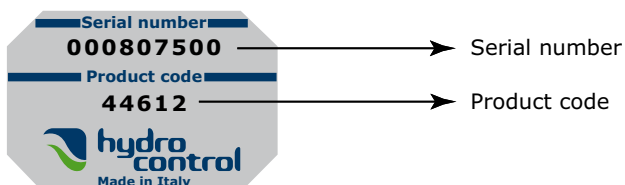
<b>SAE / 6000 FLANGE (ISO 6162-2)</b>								
Type	3/4" (MA)	3/4" (UNC)	1" (MA)	1" (UNC)	1"1/4 (MA)	1"1/4 (UNC)	1"1/2 (MA)	1"1/2 (UNC)
Code	<b>S33</b>	<b>S34</b>	<b>S35</b>	<b>S36</b>	<b>S37</b>	<b>S38</b>	<b>S39</b>	<b>S40</b>
A	19	19	25	25	32	32	38	38
B	50,8	50,8	57,2	57,2	66,6	66,6	79,3	79,3
C	23,8	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.

**Walvoil nel mondo - Walvoil worldwide**  
**Sede principale, Filiali e Uffici di rappresentanza**  
**Headquarters, Subsidiaries and Representative Offices**

**Walvoil S.p.A. - Headquarters**

Via Adige, 13/D . 42124 Reggio Emilia . Italy  
Phone +39 0522 932411 . info@walvoil.com - www.walvoil.com

**Business Unit Hydrocontrol**

Via San Giovanni, 481 . 40060 Osteria Grande  
Castel S. Pietro Terme . Bologna . Italy  
Phone +39 051 6959411

**Galtech Site**

Via Portella della Ginestra, 10 . 42025 Cavriago  
Zona Industriale Corte Tegge . Reggio Emilia . Italy  
Phone +39 0522 932411

**AUSTRALASIA**

**Walvoil Fluid Power Australasia Pty Ltd**

13 Vanessa Way . Delahey VIC 3037 . Melbourne . Australia  
TEL. 0061 458 918 750 . australasia@walvoil.com

**BRASILE . BRAZIL**

**Interpump Hydraulics Brasil Ltda - Walvoil Division**

Gilberto de Zorzi, 525 . Forqueta Caxias do Sul (RS)  
TEL. 0055 54 3223 2373 . infobrasil@walvoil.com

**CANADA**

**Galtech Canada Inc.**

3100, Jacob Jordan . Terrebonne . Qc J6X 4J6 . Canada  
Phone +1 450 477 1076 Ext:225 . info@galtechcanada.com

**CINA . CHINA**

**Walvoil Fluid Power (Shanghai) Company Limited**

24, Lane 129, Dieqiao Road . Pu Dong . Kanqiao Industrial Zone Shanghai (201319)  
TEL. 0086 21 60979800 . info@walvoil.com.cn

**Guangzhou Bushi Hydraulic Technology Ltd**

Shangwei Shaheshe, Yuehu Village . Xiancun, Xintang Town . Zengcheng City  
511335 Guangzhou . Guangdong Province China  
Phone +86 021 52380695 . fareast@hydrocontrol-inc.com

**COREA DEL SUD . SOUTH KOREA**

**Walvoil Fluid Power Korea Ltd.**

80-15, Oseongsandan 1Ro, Oseong-Myun, Pyungtaek, Kyungki . Korea 451-872  
TEL. +82 31 682 6030 . info@walvoil.co.kr

**FRANCIA . FRANCE**

**Walvoil Fluid Power France**

362 rue de Bretagne . 44540 Vritz  
TEL. 0033 2 41 94 41 06 . france@walvoil.com

**INDIA**

**HC Hydraulic Technology(P) LTD**

A5(B) Ngef Ancillary Indl. Estate . Whitefield Road  
Mahadevpura (Po) . Bangalore 560048 . India  
Phone +91 080 40454707 . info@hydrocontrol-india.com

**Walvoil Fluid Power (India) PVT. LTD.**

No 23, Doddanakundi Industrial Area Mahadevapura Post Behind Graphite India  
Bangalore 560 048  
TEL. 0091 80 41842900 . info@walvoil.co.in

**U.S.A.**

**Hydrocontrol Inc.**

1109, Technology Drive . Red Wing . MN 55066 . U.S.A.  
Phone +1 651 212 6400 . usa@hydrocontrol-inc.com

**Walvoil Fluid Power Corporation**

4111 North Garnett Tulsa, OK 74116, USA  
TEL. 001 918 858 7100 . info@walvoilfluidpower.com

1<sup>st</sup> edition D9.05

[www.hydrocontrol-inc.com](http://www.hydrocontrol-inc.com)



D1WHEB01E

