

D4

SECTIONAL VALVE



 **walvoil**
MOTION BY PEOPLE

TECHNICAL CATALOGUE



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MOTION BY PEOPLE

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Additional information

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

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 D4 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. Special versions for LS variable pumps can be realised on request. Suitable for applications including cranes and aerial platforms, compactors, hook and skip loaders, drilling machines, forklifts, wheel loaders, backhoe loaders and excavators max 7 t.

Following features are available on D4 family:

Direct electric control push push type.

Special auxiliary valve for Single acting/Double acting choice (tractor application).

Special inlet with Priority Steer function integrated for LS and CA systems (Fork lift trucks, Telehandler, Loaders).

Special circuit to regulate reduced flow on HPCO connection (Truck mounted cranes, stabilizers circuits).

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

Boom Priority function (Wheel loaders)

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
CIRCUIT											
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
RATED FLOW											
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
RATED PRESSURE											
Max working pressure (bar)*	315	350	350	350	315	350	350	250	350	350	350
Max working pressure (PSI)*	4500	5000	5000	5000	4500	5000	5000	4000	5000	5000	5000

NOTE (*): Intermittent pressure at max. 1 million cycles with specific internal testing.

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		•	•	•							
SPOOL ACTUATION											
Manual control	•	•	•	•	•	•	•	•	•	•	•
Without lever	•	•	•	•	•	•	•	•	•	•	•
90° joystick control		•	•	•	•	•					
Hydraulic control	•	•	•	•	•	•	•	•	•	•	•
Direct electric control (12-24 Vdc)		•		•							
SPOOL RETURN ACTION											
Spring return	•	•	•	•	•	•	•	•	•	•	•
Detent in A - in B - in A/B	•	•	•	•	•	•	•	•	•	•	•
Detent in 4 th 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)		•	•	•	•	•	•		•		
AUXILIARY VALVES											
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	b10 > 75 (ISO 16889:2008)
Internal filter (on electroproportional valves pilot line)	30 µm

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

D4/1: IR 009 150 A G04 W001A H001 F001A RP G04 01 PA 100 01 PB 120 TJ A G04

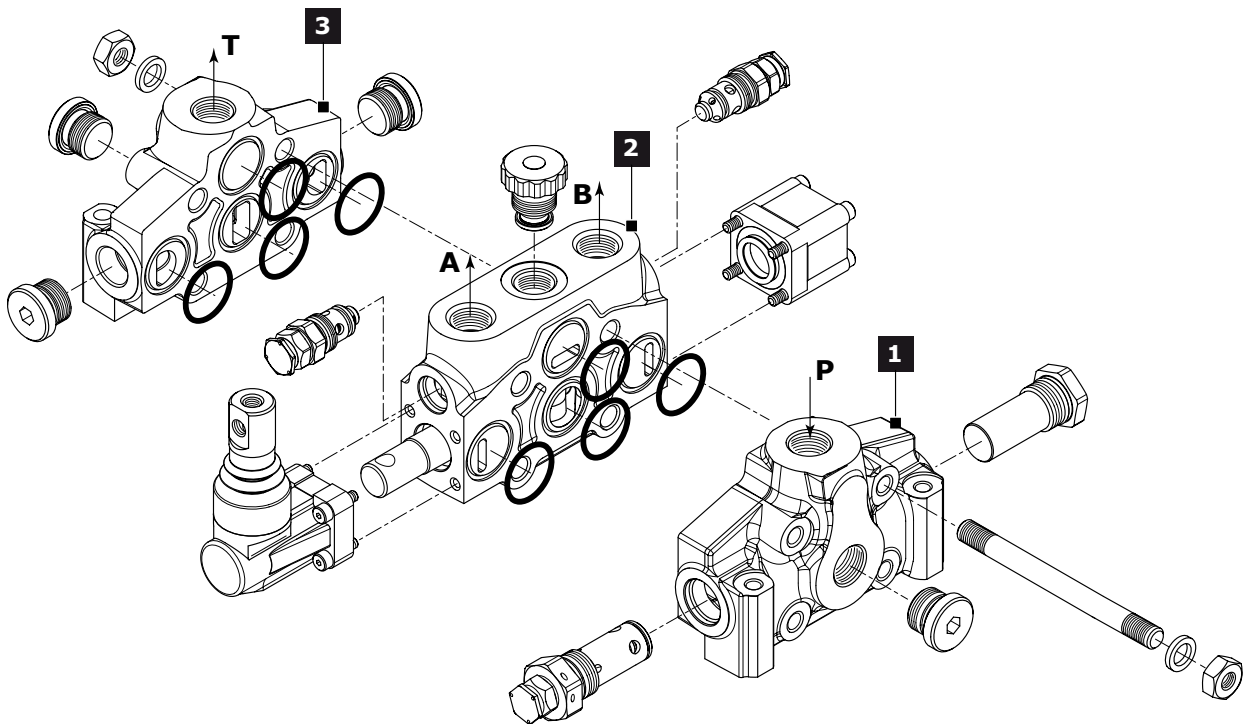
TYPE:
D4 product type
/1 working section number

- 1) INLET ARRANGEMENT: (page 10)**
IR 009 inlet side and valve type
150 setting (bar)
A G04 inlet position and available thread type

- 2) WORK SECTION ARRANGEMENT: (page 13)**
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)
01 PB 120 auxiliary valve (port B)

- 3) OUTLET ARRANGEMENT: (page 35)**
TJ outlet type
A G04 outlet position and available thread type

Ordering row 2 must be repeated for every work section



Standard thread

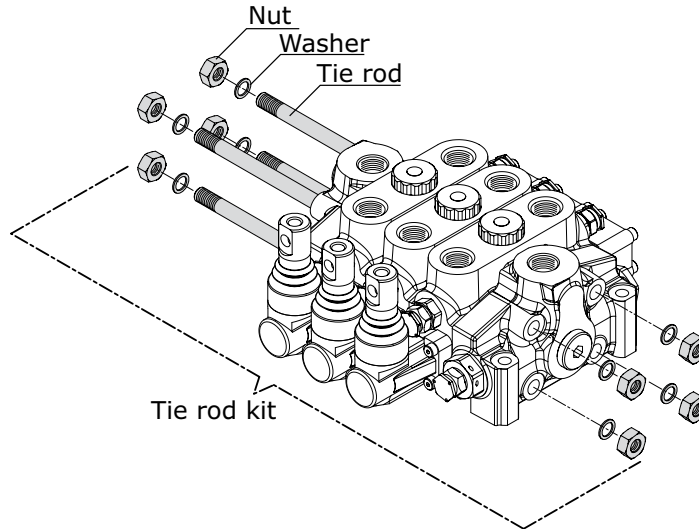
The connection ports size is indicated by an ordering code common for all Walvoil products. Following table shows all available connections; for ordering code refer to table on page 44.

Ports	BSP (ISO - 228)	Code	UN-UNF (ISO - 725)	Code
Inlet Port (P)	G 1/2	G04	7/8" - 14 UNF	U04
Ports (A - B)	G 1/2	G04	7/8" - 14 UNF	U04
Outlet (T) - Carry over (HPCO)	G 1/2 - G 3/4	G04 - G05	7/8" - 14 UNF . 1"1/16 - 12 UNF	U04 - U05
Hydraulic Pilot	G 1/4	G02	9/16" - 18 UNF	U02
Pneumatic Pilot	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. D4 requires 4 tie-rod kits.



Tie rod kit	Order Code	Lenght (mm)	Clamping Torque (Nm)	Quantity
D4/1	300104001	140		
D4/2	300104002	180		
D4/3	300104003	220		
D4/4	300104004	260		
D4/5	300104005	300		
D4/6	300104006	340	35	4
D4/7	300104007	380		
D4/8	300104008	420		
D4/9	300104009	460		
D4/10	300104010	500		
D4/11	300104011	540		
D4/12	300104012	580		

Painting

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

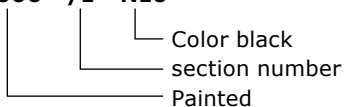
Order example of D4/1 painted:

D4/1
IR 009 150 A G04
W001A H001 F001A RP G04 01 PA 100 01 PB 120
TJ A G04

P006/1 N10

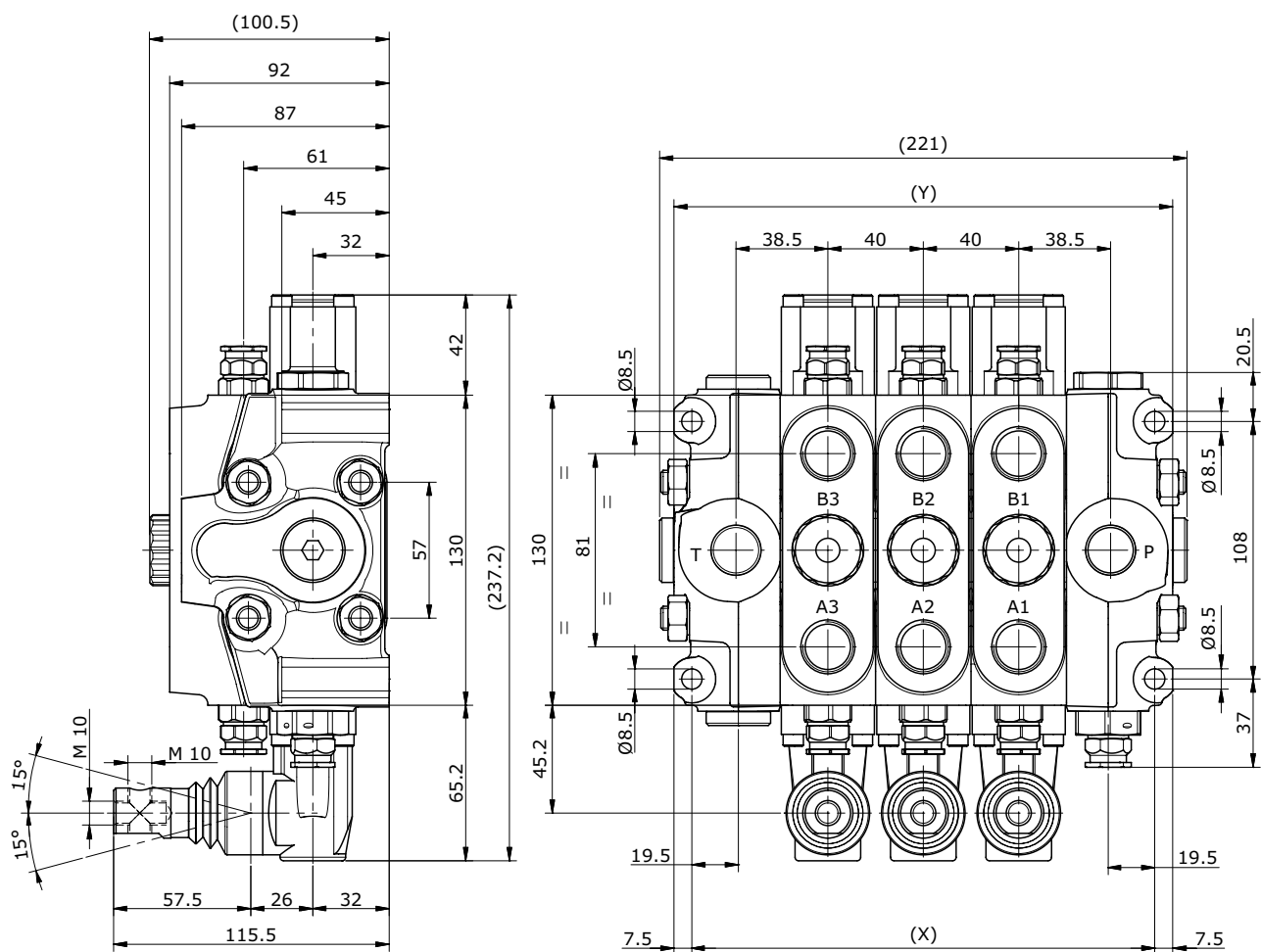
The painting is indicated with the following value:

P006 - /1 - N10





DIMENSIONS



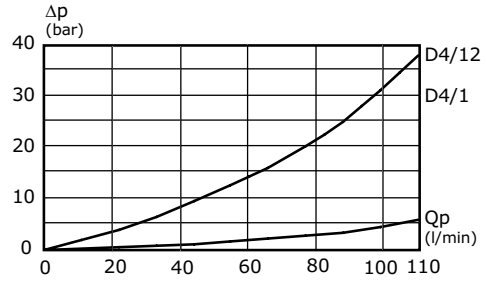
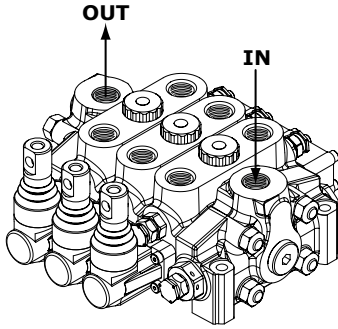
TYPE	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10	/11	/12
X (mm)	114	154	194	234	274	314	354	394	434	474	514	554
Y (mm)	129	169	209	249	289	329	369	409	449	489	529	569
Weights (kg)	8	10,8	13,7	16,5	19,4	22,3	25,2	28	30,8	33,7	36,6	39,5



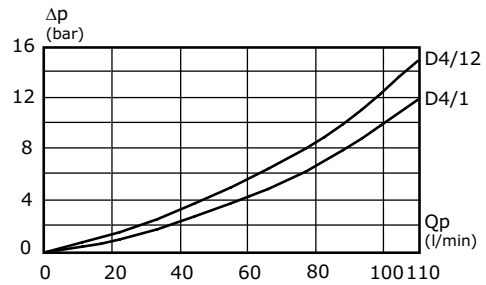
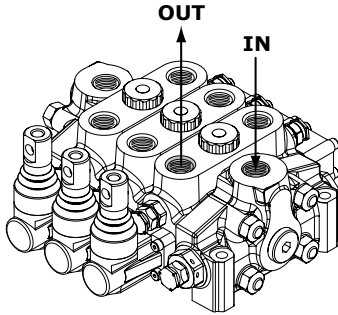
TYPICAL CURVES

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

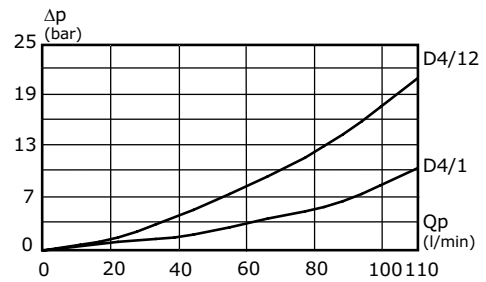
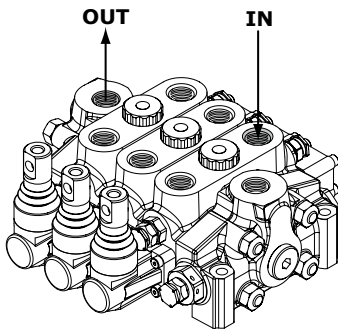
Pressure drop (P - T)



Pressure drop (P - A/B)

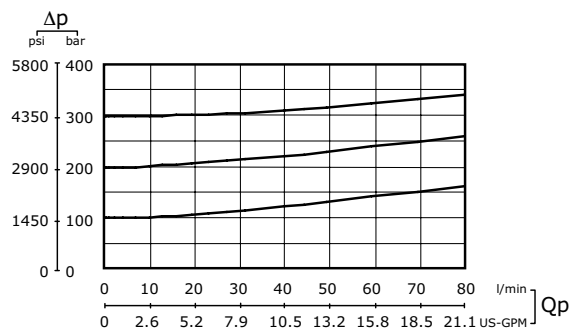


Pressure drop (A/B - T)



Direct relief valve curve

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

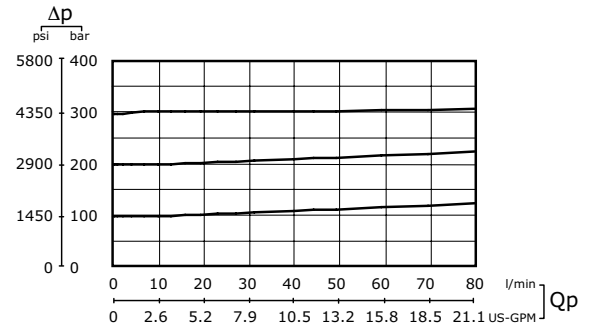




Indicated values have been tested with standard sectional valve and W001A spool.

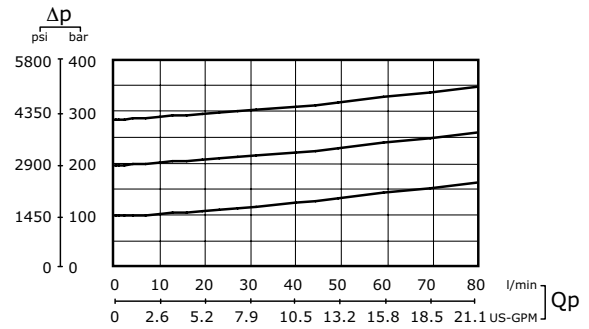
Pilot operated relief valve curve

Setting ranges	
type	pressure (bar)
A	30 - 350

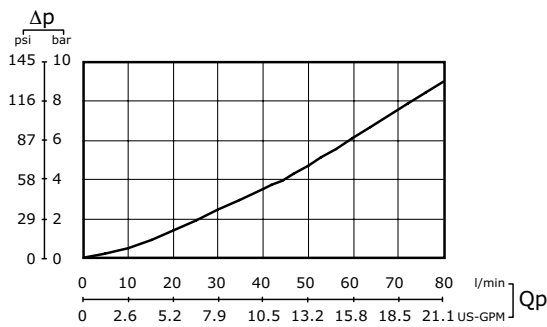


Antishock valve curve

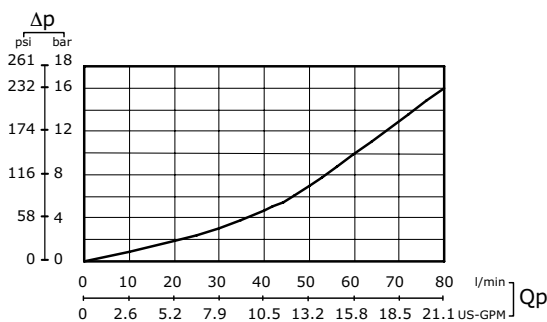
type	Setting ranges	
	at full flow	at min. flow
A	40 - 120	
B	121 - 150	25-A / 95-A
C	151 - 250	96-A / 220-A
D	251 - 350	221-A / 280-A



Main anticavitation check valve curve



Anticavitation check valve curve



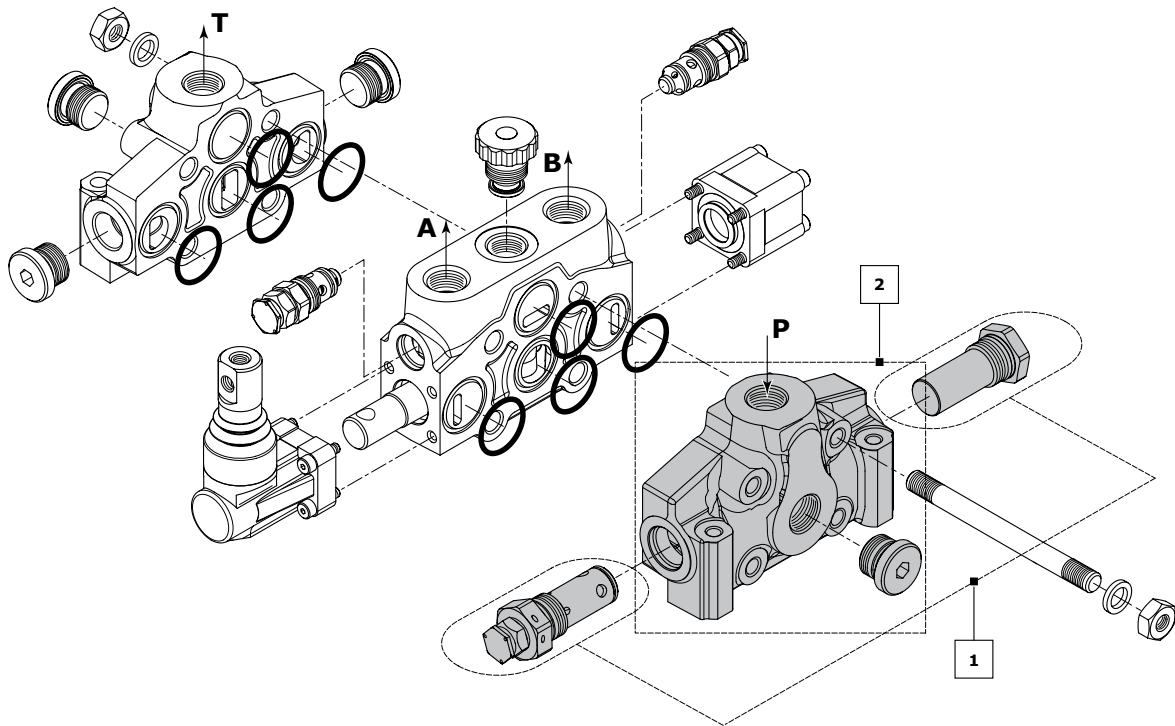


INLET SECTION

Order example

IR	009	150	A G04
----	-----	-----	-------

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

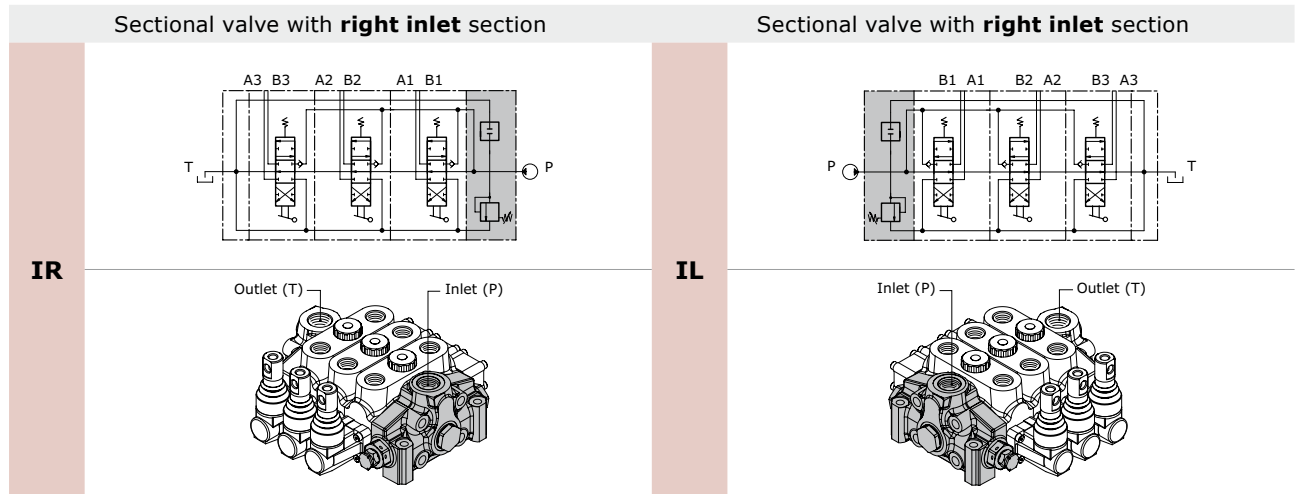


Rif.	Code	Description	Page
-	IR	Sectional valve with right inlet section	11
-	IL	Sectional valve with left inlet section	11
1	001	Direct acting pressure relief valve	11
	002	Direct acting pressure relief valve and Main anticavitation check valve	
	004	Direct acting pressure relief valve and Solenoid dump valve 12 Vdc	
	005	Direct acting pressure relief valve and Solenoid dump valve 24 Vdc	
	009	Pilot operated pressure relief valve	
	010	Pilot operated pressure relief valve and Main anticavitation check valve	
	012	Pilot operated pressure relief valve and Solenoid dump valve 12 Vdc	
	013	Pilot operated pressure relief valve and Solenoid dump valve 24 Vdc	
	019	without valves	
	020	Main anticavitation check valve	
2	A G04	Upper inlet (thread G 1/2)	12
	C G04	Central side inlet (thread G 1/2)	
	A U04	Upper inlet (thread 7/8" - 14 UNF)	
	C U04	Central side inlet (thread 7/8" - 14 UNF)	

NOTE: when ordering a relief valve it is necessary to specify factory setting (example 200).



Inlet side classifications

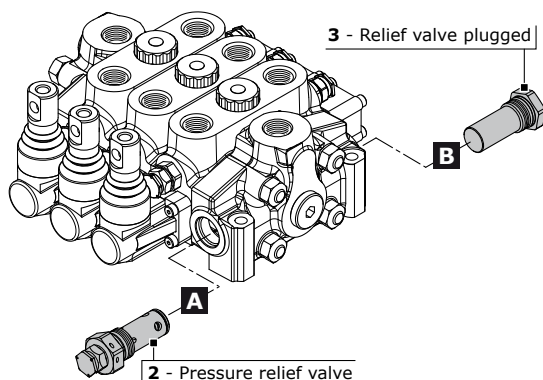


Valve identification

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

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

Valve arrangement



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	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							

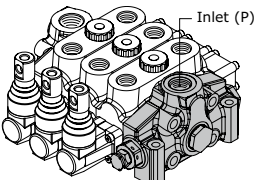
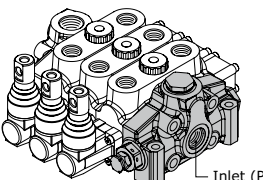
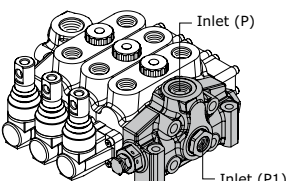
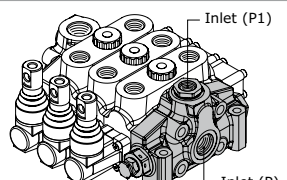
NOTE: Valve combinations 021, and 038 requires double setting (see example).

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 arrangement and thread available	
A G04	 <p>Inlet (P)</p> <p>Upper inlet (P)</p>
A U03	
A U04	
C G04	 <p>Inlet (P)</p> <p>Central side inlet (P)</p>
C U03	
C U04	
B G04	 <p>Inlet (P1)</p> <p>Upper inlet (P) (P1) with pressure-gauge connection G 1/4</p>
B U03	
B U04	
D G04	 <p>Inlet (P1)</p> <p>Central side inlet (P) (P1) with pressure-gauge connection G 1/4</p>
D U03	
D U04	



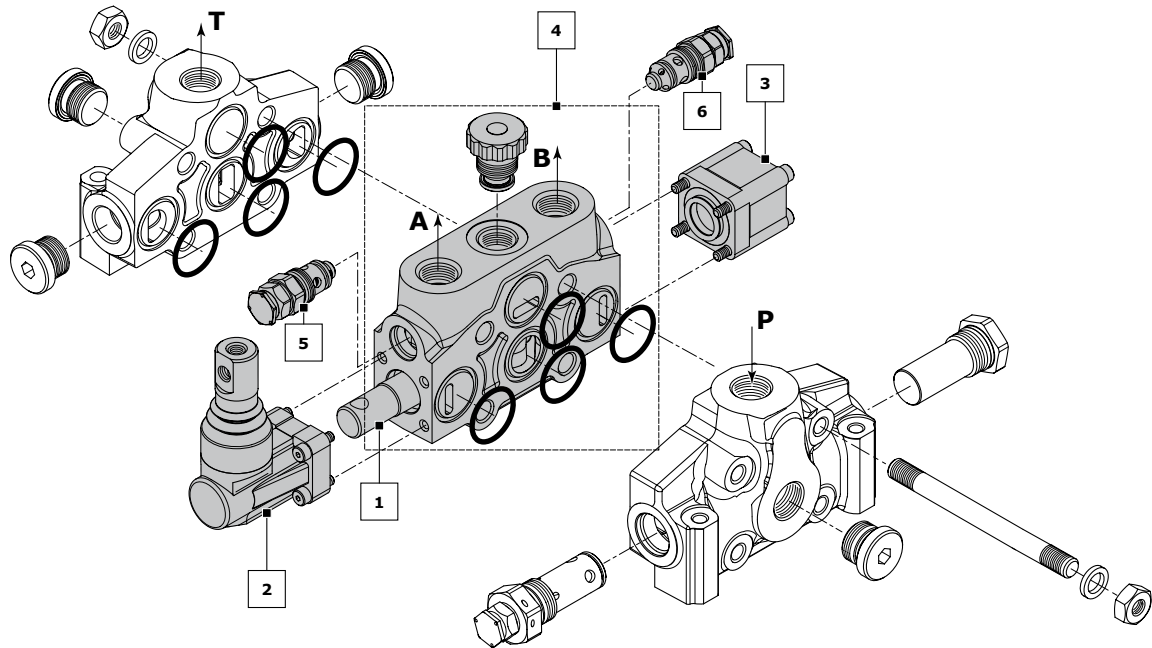
D4 SECTIONAL VALVE



WORKING SECTION

Order example:

	W001C	H001	F001A	RP G04	01 PA 100	01 PB 100
1. W001A	spool type					
2. H001	spool actuation type					
3. F001A	spool return action type					
4. RP G04	section and thread type					
5. 01 PA 100	auxiliary valve (port A - handle side)					
6. 01 PB 100	auxiliary valve (port B - cap side)					



Rif.	Code	Description	Page
1	W001	3 positions double-acting	14
	W002	3 positions double-acting A-B to tank	
2	H001	Protected lever	16
	H005	hydraulic actuation	
3	F001A	3 positions spring-centred spool (spring A)	19
	F002A	3 positions spring-centred spool detent in A and B (spring A)	
4	RP G04	Parallel circuit (G 1/2)	26
	RP U04	Parallel circuit (7/8"-14 UN)	
	RT G04	Parallel-Tandem circuit (G 1/2)	
	RT U04	Parallel-Tandem circuit (7/8"-14 UN)	
5	01 PA 100	Antishock valve (port A)	27
	05 PA	Prearrangement for auxiliary valve (port A)	
6	01 PB 100	Antishock valve (port B)	
	05 PB	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)**



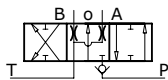
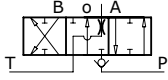

Spool identification

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)	_____

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



spools with restricted service ports				
code	circuit	restriction on diameter (mm)	section (mm ²)	hydraulic schema
J10	A-B IN T	0,10	2,82	
K10	A IN T	0,10	2,82	
Y10	B IN T	0,10	2,82	

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.

Plaese 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		
H015	Protected vertical safety lever		
H016	Protected vertical safety lever rotated 180°		
H017	Protected horizontal safety lever		
H018	Protected horizontal safety lever rotated 180°		

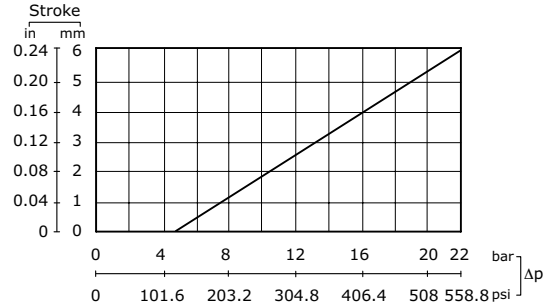
Spool actuation classification for Hydraulic control

code	description	dimensions	configuration
H005	Hydraulic actuation with side ports leave out the spool return action code BSP ports = G 1/4 UNF ports = 9/16-18 UNF		
H025	Hydraulic actuation with upper ports leave out the spool return action code BSP ports = G 1/4 UNF ports = 9/16-18 UNF		

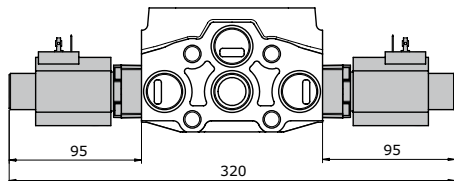
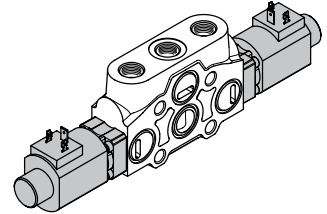
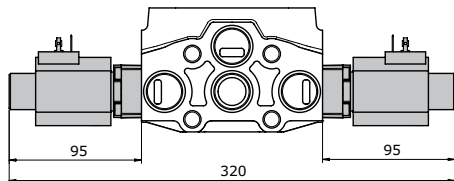
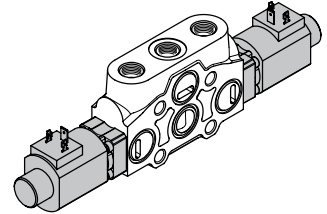


Hydraulic pilot control curve

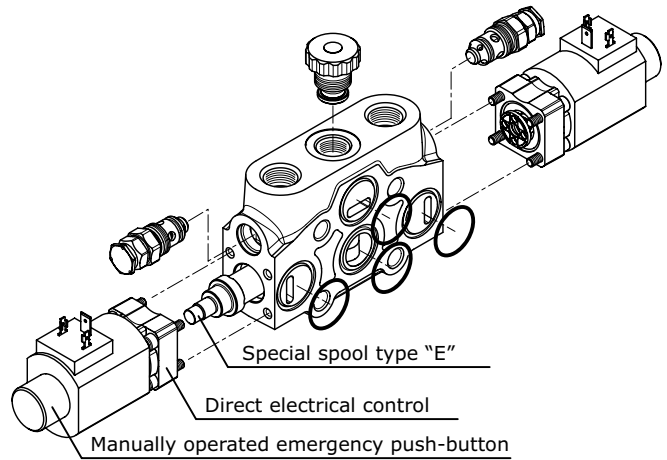
The diagram shows the spool stroke as a function of the pressure operating.



Direct electrical control classification

code	description	dimensions	configuration
H036 <small>leave out the spool return action code</small>	Direct electric control 12 Vdc (45W - 3,75 A)		
H037 <small>leave out the spool return action code</small>	Direct electric control 24 Vdc (45W - 1,88 A)		

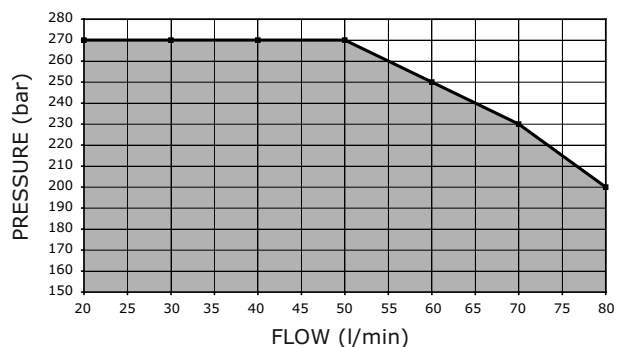
Type	D4	
Rated voltage	12 VDC	24 VDC
Rated current	3,75 A	1,88 A
Rated power	45 W	
Permitted working voltage	±10% Nominal	
Max ambient temperature	+40°C	
Max oil temperature	+80°C	
Operation time	S1 (100%)	
Protection degree	IP65	
Insulation degree	H	
Standard connector	DIN 43650	
Spool stroke	2,8 + 2,8 mm	



The H036 and H037 direct electric controls come as two kits each including a: coil, spring, solenoid and adapter. **The direct electric controls use a type E special spool.** The D4 control valve body is the standard type normally used for manual controls. 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 st section	FULCRUM 2 nd section
RIGHT INLET	<p>H009</p> <p>Right side inlet fulcrum on 1st section (compulsory code for second section: H120)</p>	<p>H010</p> <p>Right side inlet fulcrum on 2nd section (compulsory code for first section: H120)</p>
	<p>H011</p> <p>Left side inlet fulcrum on 1st section (compulsory code for second section: H120)</p>	<p>H012</p> <p>Left side inlet fulcrum on 2nd section (compulsory code for first section: H120)</p>
LEFT INLET	<p>H011</p> <p>Left side inlet fulcrum on 1st section (compulsory code for second section: H120)</p>	<p>H012</p> <p>Left side inlet fulcrum on 2nd section (compulsory code for first section: H120)</p>

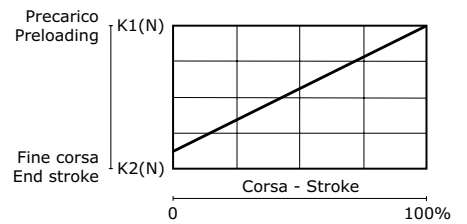
The second section concerned the configuration of the joystick control is always identified with code H120. Lever has to be ordered separately.



Spool return action classification - Springs load values

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

Spring type			
Type - Code	A (standard spring)	B (soft spring)	C (heavy spring)
Preloading	117,7 N	101 N	172,6 N
End of stroke	145,2 N	117,7 N	246,2 N
Spool return action identification example			
Type - Code	F001A	F001B	F001C



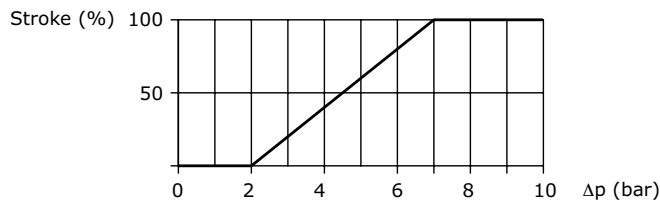
code	description	schema	dimensions	configuration
F001A F001B F001C	3 positions spring-centred spool			
F002A	3 positions spring-centred spool detent in A and B			
F003A	3 positions spring-centred spool detent in A			
F004A	3 positions spring-centred spool detent in B			
F005A	4 positions spring-centred spool detent in 4 th position (only for W012 spool)			
F009A F009B F009C	2 positions in A spring-centred spool			
F010A F010B F010C	2 positions in B spring-centred spool			
F011A F011B F011C	2 positions detent in A spring-centred spool			
F012A F012B F012C	2 positions detent in B spring-centred spool			
F013A F013B F013C	3 positions spring-centred spool prearrangement dual command			



Pneumatic control classification

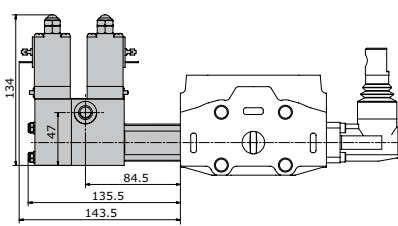
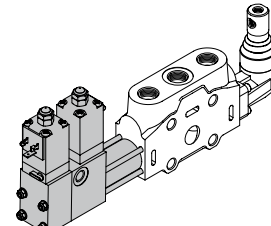
code	description	schema	dimensions	configuration
F020A	Pneumatic control ON - OFF			
F021A	Pneumatic control ON - OFF rotated 180°			
F022A	Proportional Pneumatic control		Proportional control with port BSP: G 1/8	
F023A	Proportional Pneumatic control rotated 180°			
F135A	Pneumatic control ON - OFF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

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





Electropneumatic control classification

code	description	dimensions	configuration
F0620	3 positions electropneumatic control ON-OFF (12 vdc) 7 W - 0,58 A		
F0630	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.

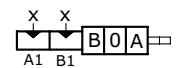
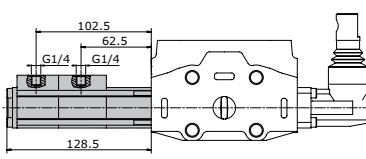
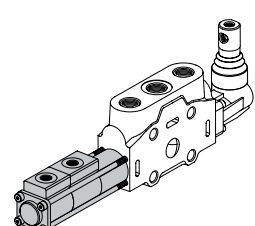
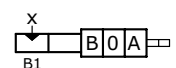
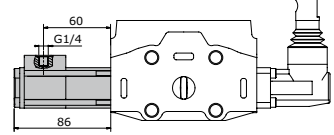
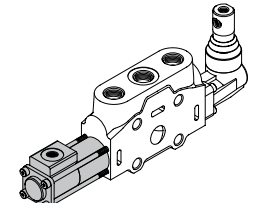
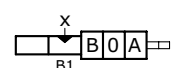
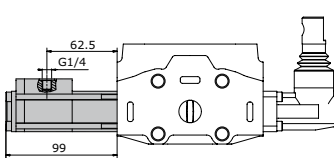
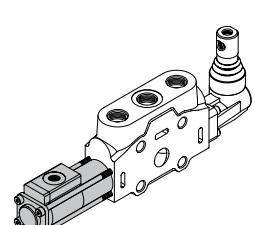
Order code for control tie rod (BSP):

- 320104012** = control tie rod /1
- 320104013** = control tie rod /2
- 320104014** = control tie rod /3
- 320104015** = control tie rod /4
- 320104016** = control tie rod /5
- 320104017** = control tie rod /6
- 320104018** = control tie rod /7
- 320104019** = control tie rod /8

Order code for control tie rod (UNF):

- 320104035** = control tie rod /1
- 320104036** = control tie rod /2
- 320104037** = control tie rod /3
- 320104038** = control tie rod /4
- 320104039** = control tie rod /5
- 320104040** = control tie rod /6
- 320104041** = control tie rod /7
- 320104042** = control tie rod /8

Load limit classification

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

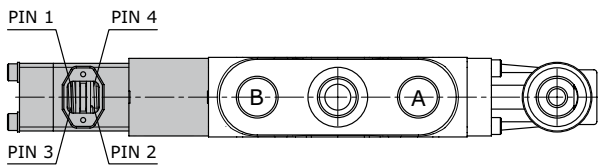
NOTE: on request is available the load limit with dual control; for more informations please contact our Commercial Dept.



Electrical load limit classification

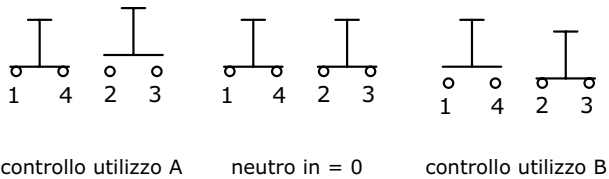
Spool position sensor			
Power supply	Contacts capacity	Protection degree	temperature range
12 vdc	3 A	IP 65	da -25°C a +90°C
24 vdc	1,5 A		

Operational diagram



CONTROL in A e B = connect PIN 1 - 4 and 2 - 3
CONTROL in A = connect PIN2 - 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.

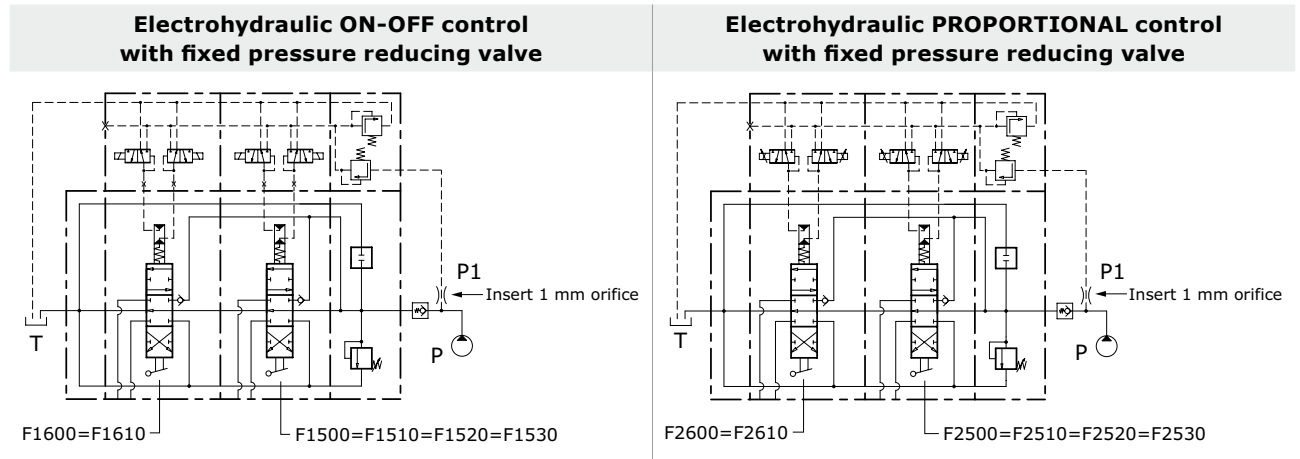
code	description	dimensions	configuration
F0360	Electrical load limit (normally closed contacts)		
F0370	Electrical load limit rotated 180° (normally closed contacts)		
F0450	Electrical load limit (normally open contacts)		
F0460	Electrical load limit rotated 180° (normally open contacts)		

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



Electrohydraulic control specifications

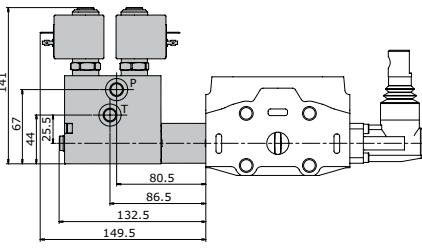
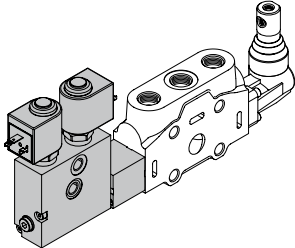
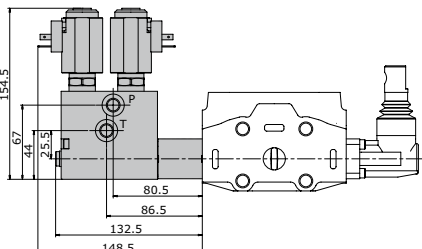
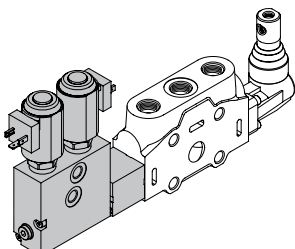
Operating temperature range	-20°C / +80°C
Max inlet pressure	350 bar
Reduced pressure	16 bar
Back pressure on (T)	3 bar
Filtering degree	25 μ assoluti
Racommended pilot pipe size	Ø 6 mm - G 1/4



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

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

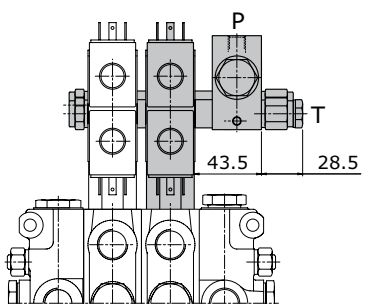
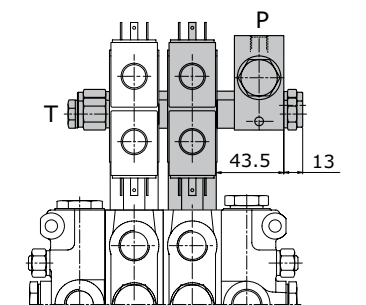
Electrohydraulic control classification

code	description	dimensions	configuration
F1600	3 positions electrohydraulic control ON - OFF 12 Vdc		
F1610	3 positions electrohydraulic control ON - OFF 24 Vdc		
F2600	3 positions electrohydraulic control PROPORTIONAL 12 Vdc		
F2610	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	
F1500	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>	
F1510	Electrohydraulic control ON - OFF (fixed pressure reducing valve) P - T inlet side (24 vdc)		
F2500	Electrohydraulic control PROPORTIONAL (fixed pressure reducing valve) P - T inlet side (12 vdc)		
F2510	Electrohydraulic control PROPORTIONAL (fixed pressure reducing valve) P - T inlet side (24 vdc)		
F1520	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>
F1530	Electrohydraulic control ON - OFF (fixed pressure reducing valve) P inlet - T outlet (24 vdc)		
F2520	Electrohydraulic control PROPORTIONAL (fixed pressure reducing valve) P inlet - T outlet (12 vdc)		
F2530	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.

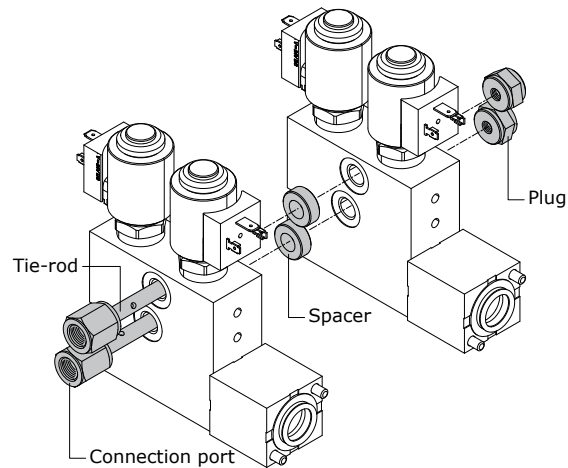
NOTE: the control tie rod kit has always to be ordered separately.

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
- 320104001** = control tie rod /2
- 320104002** = control tie rod /3
- 320104003** = control tie rod /4
- 320104004** = control tie rod /5
- 320104005** = control tie rod /6
- 320104006** = control tie rod /7
- 320104007** = control tie rod /8
- 320104008** = control tie rod /9

Order code for control tie rod (UNF):

- 320103026** = control tie rod /1
- 320104024** = control tie rod /2
- 320104025** = control tie rod /3
- 320104026** = control tie rod /4
- 320104027** = control tie rod /5
- 320104028** = control tie rod /6
- 320104029** = control tie rod /7
- 320104030** = control tie rod /8
- 320104031** = control tie rod /9

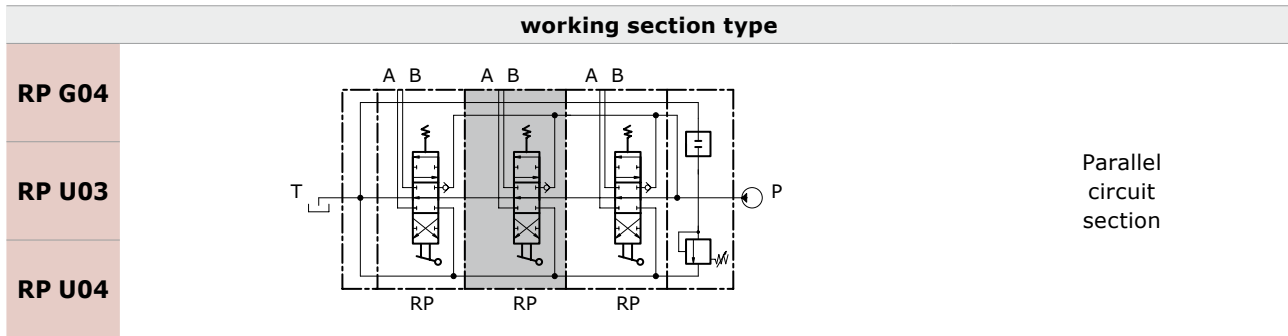


Compatibility table

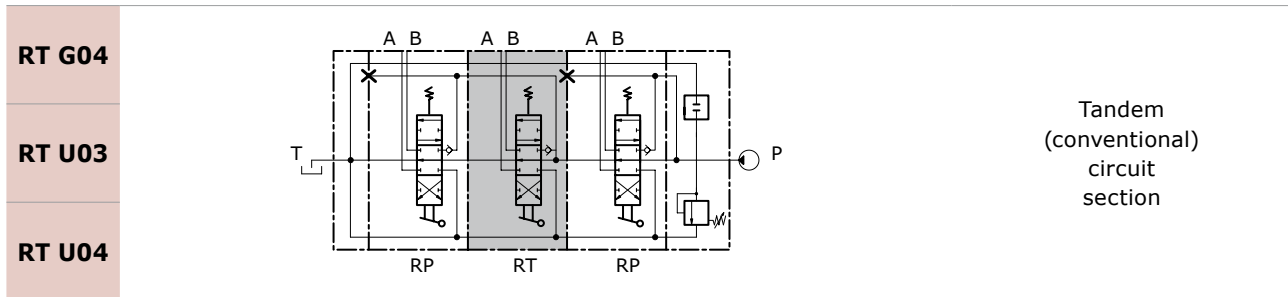
SPOOL ACTION TYPE	SPOOL TYPE																						
	W001A	W001B	W001E	W002A	W002B	W002E	W003A	W003B	W004A	W004B	W005A	W005B	W006A	W006B	W009A	W009B	W010A	W011A	W012A	W013A	W015A	W016A	
H001	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H002	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H004	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H005	•	•		•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
H025	•	•		•	•		•	•	•	•					•	•			•		•	•	•
H009	•	•		•	•		•	•	•	•					•	•			•		•	•	•
H010	•	•		•	•		•	•	•	•					•	•			•		•	•	•
H011	•	•		•	•		•	•	•	•					•	•			•		•	•	•
H012	•	•		•	•		•	•	•	•					•	•			•		•	•	•
H120	•	•		•	•		•	•	•	•					•	•			•		•	•	•
H015	•	•		•	•		•	•	•	•					•	•	•	•	•	•	•	•	•
H016	•	•		•	•		•	•	•	•					•	•	•	•	•	•	•	•	•
H017	•	•		•	•		•	•	•	•					•	•	•	•	•	•	•	•	•
H018	•	•		•	•		•	•	•	•					•	•	•	•	•	•	•	•	•
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	•	•	•	•	•	•	•	•	•	•					•	•	•	•			•	•	•
F0170	•																						
F0360=F0370	•	•	•	•	•	•	•	•	•	•					•	•	•	•				•	•
F0450=F0460	•	•	•	•	•	•	•	•	•	•					•	•	•	•				•	•
F0620=F0630	•	•	•	•	•	•	•	•	•	•					•	•	•	•			•	•	•
F1500=F1510	•	•	•	•	•	•	•	•	•	•					•	•	•	•			•	•	•
F1520=F1530	•	•	•	•	•	•	•	•	•	•					•	•	•	•			•	•	•
F2500=F2510	•	•	•	•	•	•	•	•	•	•					•	•	•	•			•	•	•
F2520=F2530	•	•	•	•	•	•	•	•	•	•					•	•	•	•			•	•	•
F1600=F1610	•	•	•	•	•	•	•	•	•	•					•	•	•	•			•	•	•
F2600=F2610	•	•	•	•	•	•	•	•	•	•					•	•	•	•			•	•	•



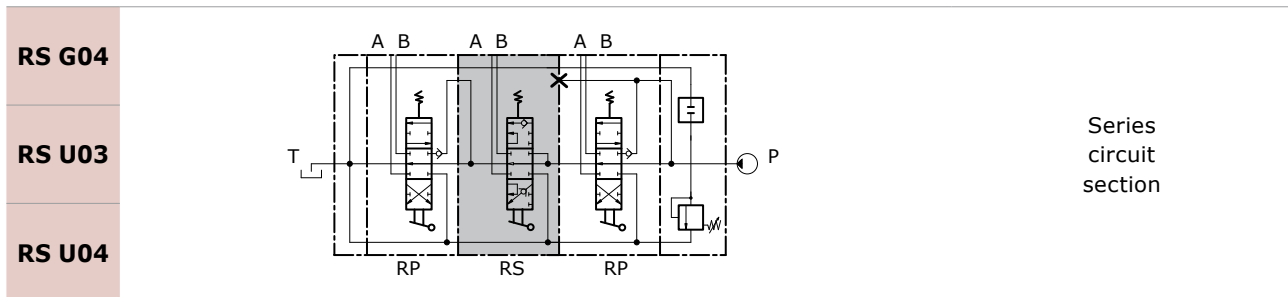
Work section identification



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.




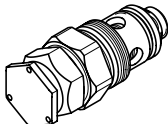

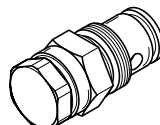

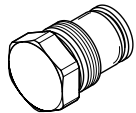
When the spool is operated it intercepts the switch gallery by diverting the flow of oil to service port A or B. The Tandem circuit is powered by the switch gallery thus permitting the use of just one work section at a time. The section downstream from the tandem section that has been actuated does not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


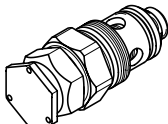

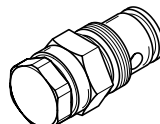

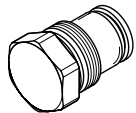


When the spool is operated it intercepts the switch gallery by diverting the flow of oil to service port A or B. The oil that flows back from the actuator is carried to the switch gallery thus making it available to the service ports downstream from the series section. The pressure drop downstream is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



Auxiliary valve identification

code	description	schema	sonfiguration	setting range (bar)			
				type	at full flow	type	at min. flow
01 PA	Antishock valve (port A)			A	20 / 70	A	-
				B	71 / 120	B	-
				C	121 / 150	C	25-A / 95-A
				D	151 / 250	D	96-A / 220-A
				E	251 / 350	D	221-A / 280-A
02 PA	Anticavitation valve (port A)						
05 PA	Prearrangement for auxiliary valve (port A)						

code	description	schema	sonfiguration	setting range (bar)			
				type	at full flow	type	at min. flow
01 PB	Antishock valve (port B)			A	20 / 70	A	-
				B	75 / 120	B	-
				C	125 / 150	C	25-A / 95-A
				D	155 / 250	D	96-A / 220-A
				E	255 / 350	D	221-A / 280-A
02 PB	Anticavitation valve (port B)						
05 PB	Prearrangement for auxiliary valve (port B)						

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:

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

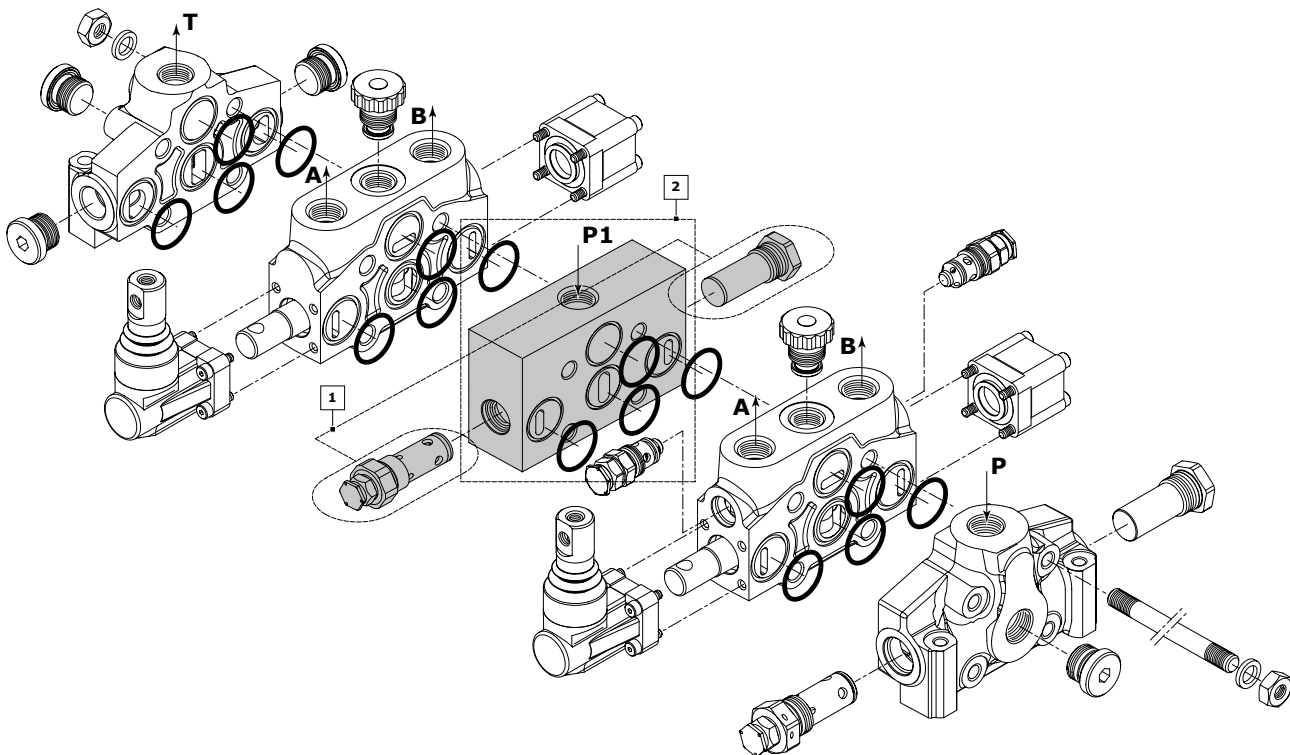


INTERMEDIATE INLET SECTION

Order example

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

1. **BE** inlet side
2. **009** valve arrangement
- 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
-	BE	Intermediate inlet section	29
-	BV	Intermediate inlet section with pressure relief valve	
1	001	Direct acting pressure relief valve	29
	002	Direct acting pressure relief valve and Main anticavitation check valve	
	009	Pilot operated pressure relief valve	
	010	Pilot operated pressure relief valve and Main anticavitation check valve	
	019	without valves	
	020	Main anticavitation check valve	
2	A G04	Upper inlet (thread G 1/2)	30
	A U03	Upper inlet (thread 3/4"-16 UNF)	
	A U04	Upper inlet (thread 7/8" - 14 UNF)	

NOTE: when ordering a relief valve it is necessary to specify factory setting (example 200).
* = omit the code for inlet positioning and thread)



Intermediate inlet section classifications

intermediate inlet type

BE			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.

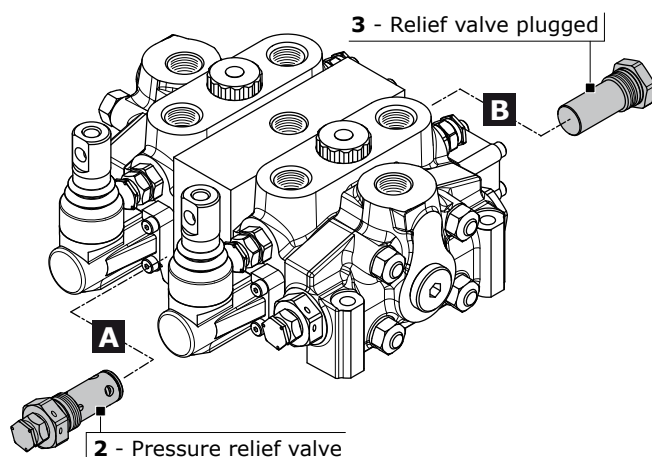
BV			Intermediate inlet section with pressure relief valve
-----------	--	--	---

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
1			Direct acting pressure relief valve	4			Externally piloted valve
2			Pilot operated pressure relief valve	11			Plug with pressure-gauge connection
3			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.

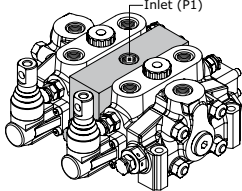
- (A) = spool action side
- (B) = spool return action side

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		

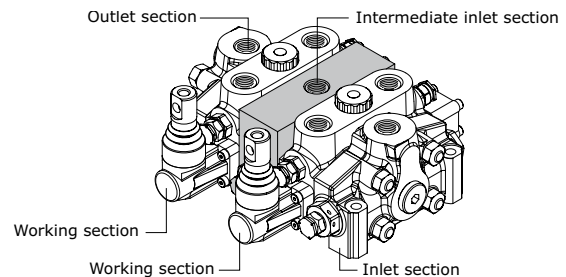
Inlet position and available thread type

Inlet combination and thread available	
A G04	
A U03	
A U04	

Upper inlet (P1)

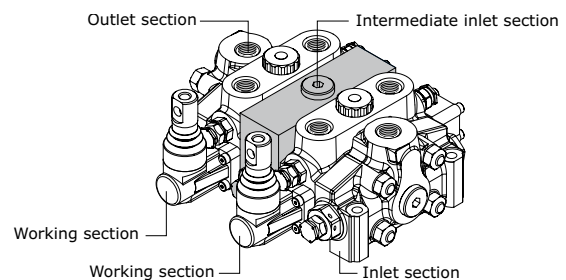
Complete configuration samples for HC-D4/2 with intermediate inlet section (BE)

- IR 009 150 A G04 Right inlet section
- W001A H001 F001A RP G04 Working section
- BE 009 120 A G04Intermediate inlet section**
- W001A H001 F001A RP G04 Working section
- TJ A G04 Outlet section



Complete configuration samples for HC-D4/2 with intermediate inlet section (BV)

- IR 009 150 A G04 Right inlet section
- W001A H001 F001A RP G04 Working section
- BV 009 120Intermediate inlet section**
- W001A H001 F001A RP G04 Working section
- TJ A G04 Outlet section





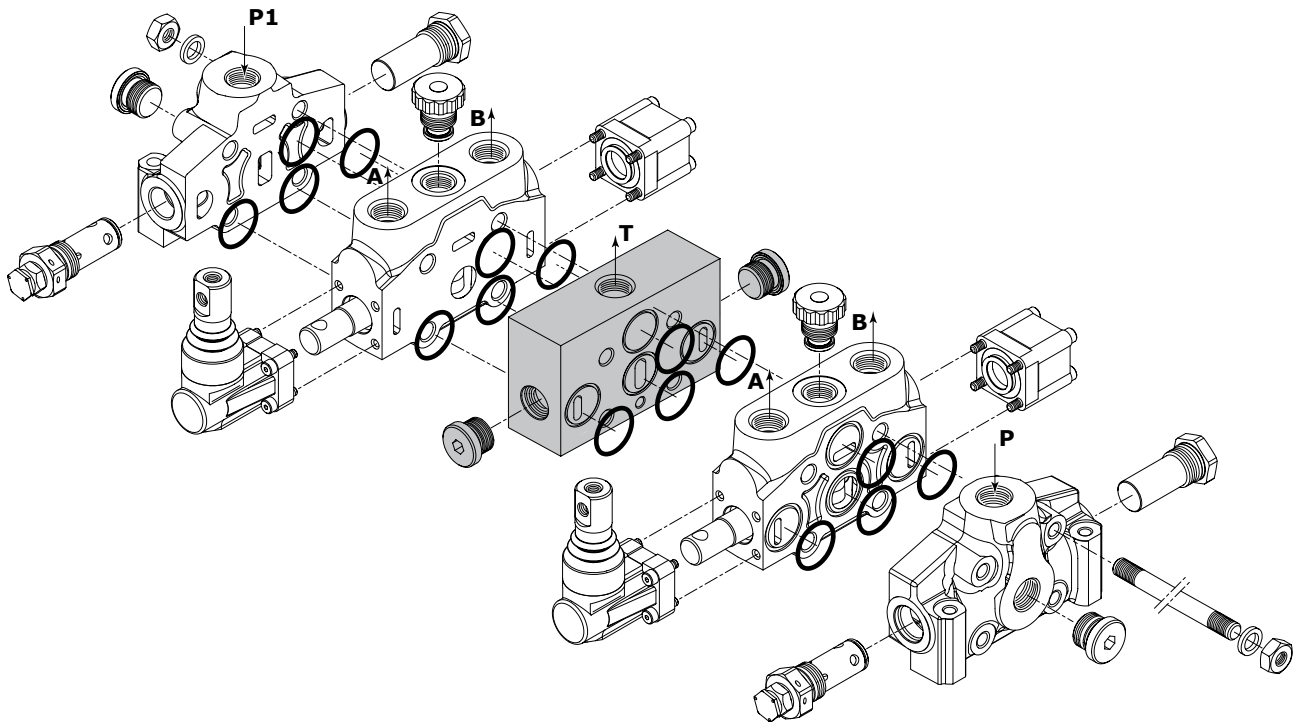
INTERMEDIATE OUTLET SECTION

Order example

BF

A G04

1. **BF** inlet side _____
2. **A G04** inlet position and available thread type _____



Rif.	Code	Type	Description	Page
1	BF		Intermediate outlet section with single tank return	
	BG		Intermediate outlet section with two tank returns	
2	A G04	for BF	Upper outlet (thread G 1/2)	32
	A G05		Upper outlet (thread G 3/4)	
	A U04		Upper outlet (thread 7/8"-14 UNF)	
	G G04		Front outlet side A (thread G 1/2)	
	G G05		Front outlet side A (thread G 3/4)	
	G U04		Front outlet side A (thread 7/8"-14 UNF)	
	H G04		Rear outlet side B (thread G 1/2)	
H G05	Rear outlet side B (thread G 3/4)			
H U04	Rear outlet side B (thread G 3/4)			
2	J G04	for	Upper outlet HPCO - front side A and rear side B to T (thread G 1/2)	
	J U04	BG	Upper outlet HPCO - front side A and rear side B to T (thread 7/8"-14 UNF)	



Intermediate outlet section classifications

intermediate outlet type

BF			Intermediate outlet section with single tank return
-----------	--	--	---

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.

BG			Intermediate outlet section with two tank returns
-----------	--	--	---

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)
A G05		
A U04		
G G04		Front outlet side A (T)
G G05		
G U04		
H G04		Rear outlet side B (T)
H U04		

Outlet position and available thread type (for BG intermediate)

Inlet combination and thread available

J G04		Upper outlet HPCO front side A and rear side B to T
J U04		



Complete configuration samples for D4/2 with intermediate outlet section (BF)

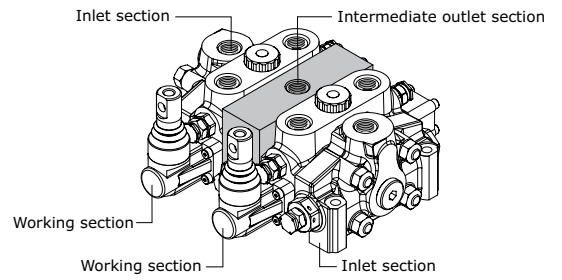
IR 009 150 A G04 Right inlet section

W001A H001 F001A RP G04 Working section

BF A G04Intermediate outlet section

W001A H001 F001A RP G04 Working section

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



Complete configuration samples for D4/2 with intermediate outlet section (BG)

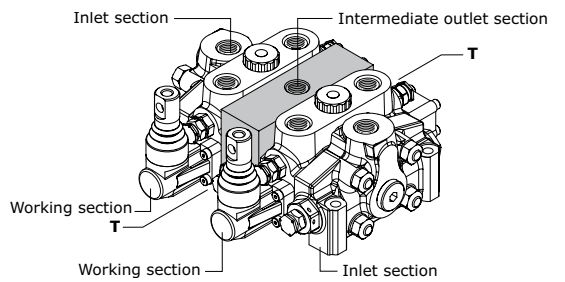
IR 009 150 A G04 Right inlet section

W001A H001 F001A RP G04 Working section

BG J G04Intermediate outlet section

W001A H001 F001A RP G04 Working section

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





INTERMEDIATE FLOW DIVIDERS

Operating principle

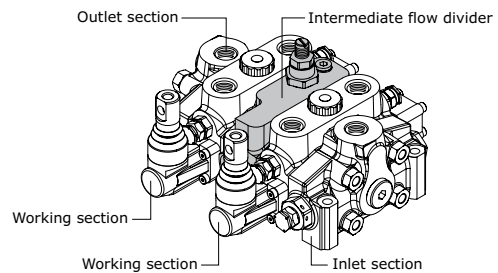
The intermediate section of the flow divider allows sections of the divider itself to be powered, with a flow rate set by the user and independent of the downstream load. The excess flow may power another directional control valve or be returned directly to tank. The flow adjustment range (Q = l/min) change between:

- Minimum Q = 3 l/min
- Maximum Q = 40 l/min

intermediate flow dividers type			
C001			Intermediate with screw-adjustable flow divider
C002			Intermediate with hand wheel-adjustable flow divider

Complete configuration samples for HC-D4/2 with intermediate flow divider

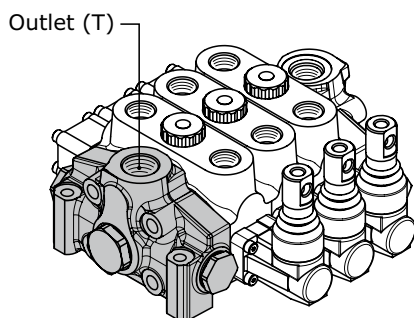
- IR 009 150 A G04 Right inlet section
- W001A H001 F001A RP G04 Working section
- C001**.....**Intermediate flow divider**
- W001A H001 F001A RP G04 Working section
- TJ A G04 Outlet section





OUTLET SECTION (VERSION 1 OUTLET)

Order example



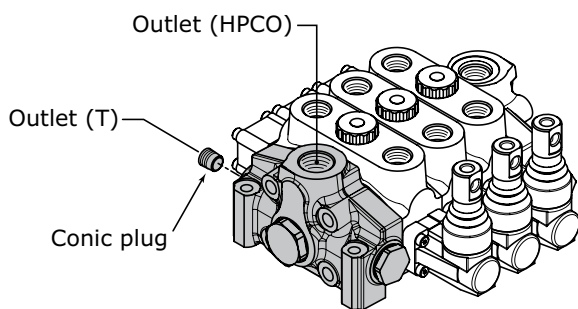
TJ | **A G04**

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

Rif.	Code	Description	Page
1	TJ	Outlet section with single return (T) right-side inlet (P)	36
	TK	Outlet section with single return (T) left-side inlet (P)	
2	A G04	Upper outlet (thread G 1/2)	36
	C G04	Central outlet (thread G 1/2)	
	G G04	Front outlet side A (thread G 1/2)	
	H G04	Rear outlet side B (thread G 1/2)	
	A U04	Upper outlet (thread 3/4" - 16 UNF)	
	C U04	Central outlet (thread 3/4" - 16 UNF)	
	H U04	Rear outlet side B (thread 3/4" - 16 UNF)	

OUTLET SECTION (HPCO VERSION OUTLET)

Order example - HPCO version Outlet



TM | **M G04**

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

Rif.	Code	Description	Page
1	TM	Outlet section with two return (T-HPCO) right-side inlet (P)	37
	TN	Outlet section with two return (T-HPCO) left-side inlet (P)	
2	M G04	HPCO upper outlet T (tank) rear side outlet B (thread G 1/2)	37
	N G04	HPCO upper outlet T (tank) front outlet side A (thread G 1/2)	
	P G04	HPCO central outlet T (tank) rear outlet side B (thread G 1/2)	
	Q G04	HPCO central outlet T (tank) front outlet side A (thread G 1/2)	
	M U04	HPCO upper outlet T (tank) rear side outlet B (thread 3/4" - 16 UNF)	
	N U04	HPCO upper outlet T (tank) front outlet side A (thread 3/4" - 16 UNF)	
	Q U04	HPCO central outlet T (tank) rear outlet side B (thread 3/4" - 16 UNF)	



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)

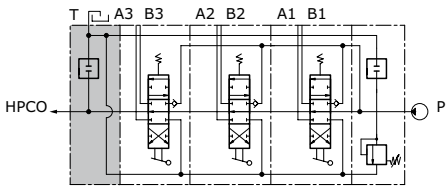
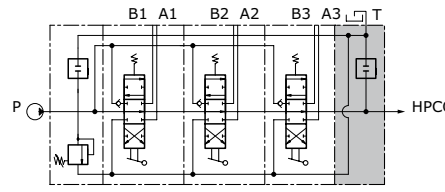
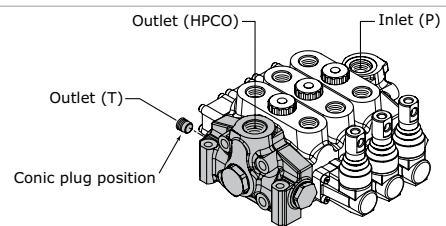
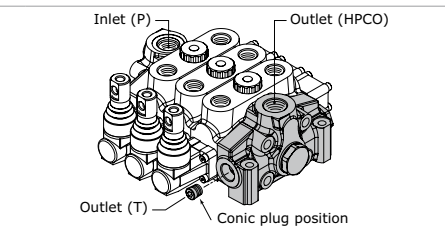
Outlet position

outlet combination and thread available		
A G04		Upper outlet (thread G 1/2)
A U03		Upper outlet (thread 3/4" - 16 UNF)
A U04		Upper outlet (thread 7/8" - 14 UNF)
A M02		Upper outlet (thread M22 x 1,5)
C G04		Central outlet (thread G 1/2)
C U03		Central outlet (thread 3/4" - 16 UNF)
C U04		Central outlet (thread 7/8" - 14 UNF)
C M02		Central outlet (thread M22 x 1,5)
G G04		Front outlet side A (thread G 1/2)
G U03		Front outlet side A (thread 3/4" - 16 UNF)
G U04		Front outlet side A (thread 7/8" - 14 UNF)
G M02		Front outlet side A (thread M22 x 1,5)
H G04		Rear outlet side B (thread G 1/2)
H U03		Rear outlet side B (thread 3/4" - 16 UNF)
H U04		Rear outlet side B (thread 7/8" - 14 UNF)
H M02		Rear outlet side B (thread M22 x 1,5)

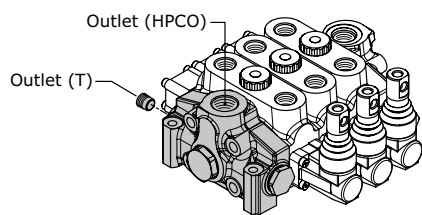
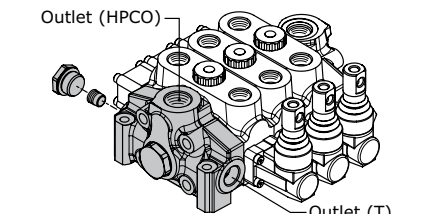
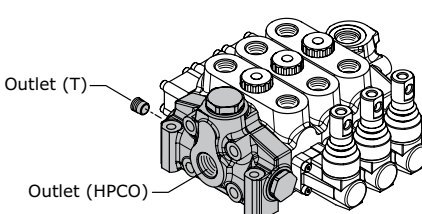
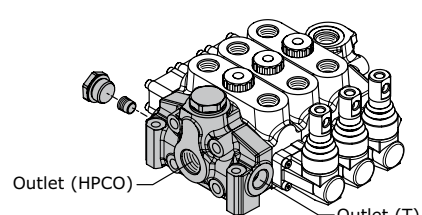


Outlet with two tanks classification

outlet identification	
TM	Outlet section with two return (T-HPCO) right-side inlet (P)
TN	Outlet section with two return (T-HPCO) left-side inlet (P)

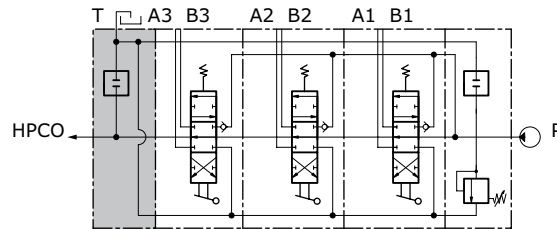
Outlet position

outlet combination and thread available		
M G04		HPCO upper outlet T (TANK) side outlet B (thread G 1/2)
M U03		HPCO upper outlet T (TANK) side outlet B (thread 3/4" - 16 UNF)
M U04		HPCO upper outlet T (TANK) side outlet B (thread 7/8" - 14 UNF)
M M02		HPCO upper outlet T (TANK) side outlet B (thread M22 x 1,5)
N G04		HPCO upper outlet T (TANK) front outlet side A (thread G 1/2)
N U03		HPCO upper outlet T (TANK) front outlet side A (thread 3/4" - 16 UNF)
N U04		HPCO upper outlet T (TANK) front outlet side A (thread 7/8" - 14 UNF)
N M02		HPCO upper outlet T (TANK) front outlet side A (thread M22 x 1,5)
P G04		HPCO central outlet T (TANK) rear outlet side B (thread G 1/2)
P U03		HPCO central outlet T (TANK) rear outlet side B (thread 3/4" - 16 UNF)
P U04		HPCO central outlet T (TANK) rear outlet side B (thread 7/8" - 14 UNF)
P M02		HPCO central outlet T (TANK) rear outlet side B (thread M22 x 1,5)
Q G04		HPCO central outlet T (TANK) front outlet side A (thread G 1/2)
Q U03		HPCO central outlet T (TANK) front outlet side A (thread 3/4" - 16 UNF)
Q U04		HPCO central outlet T (TANK) front outlet side A (thread 7/8" - 14 UNF)
Q M02		HPCO central outlet T (TANK) front outlet side A (thread M22 x 1,5)

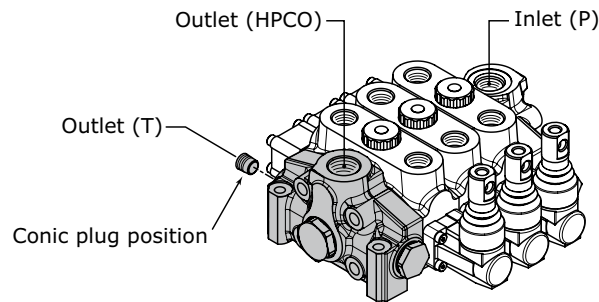


Carry-over connection (HPCO)

This option, available on all HC-D4, 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.



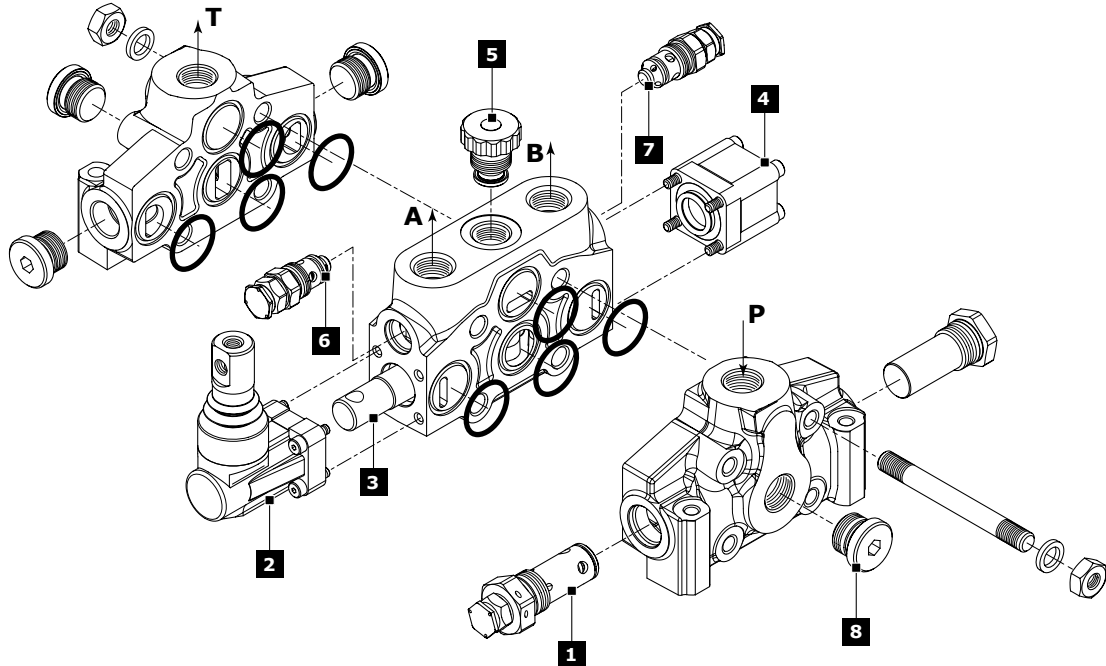
It is possible to transform sectional valve from standard to HPCO version just by ordering the appropriate conic plug:



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



D4 SPARE PARTS LIST



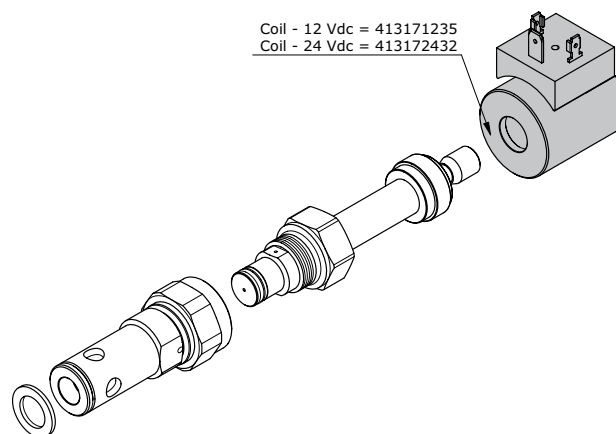
Ref.	Description	Order code	Q.ty	Code	Note
1	LS Direct acting pressure relief valve (*)	81451	1	-	Setting: 100 bar
		2723			Setting: 200 bar
		5371			Setting: 300 bar
	Pilot operated pressure relief valve (*)	48734	1	-	Setting: 100 bar
		4480			Setting: 200 bar
		7383			Setting: 300 bar
	Relief valve 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	421204023	1	W001A	for protected lever
		421204123		W001B	for protected lever
		421204019		W001A	for without lever
		421204063		W001B	for without lever
		421204016		W001A	for hydraulic actuation
		411204195		W001E	for direct electrical control
	3 positions double-acting A and B to tank spool	421204008	1	W002A	for protected lever
		421204121		W002B	for protected lever
		421204007		W002A	for without lever
		421204070		W002B	for without lever
		421204004		W002A	for hydraulic actuation
		3 positions single-acting on A		421204037	1
3 positions single-acting on B	421204042	1	W006A	for protected lever	
4 positions double-acting with float in the 4 th pos.	421204031	1	W012A	for protected lever	
	421204157			for hydraulic actuation	
3	Protected lever	320304001	1	H001 = H002	
		320304002			only for W012 spool
	Control without lever	320304013	1	H004	
		320304012			only for W012 spool
	Protected vertical safety lever	320304008	1	H015 = H016	
	Protected horizontal safety lever	320304005	1	H017 = H018	
	Hydraulic actuation with side ports	320504006	2	H005	
		320504009			only for W012 spool
	Hydraulic actuation with upper ports	320504012	2	H025	

Ref.	Description	Order code	Q.ty	Code	Note
4	3 position spring centred spool	320704004	1	F001A	
	Detent in A and B	320804001	1	F002A	
	Detent in A	320804002	1	F003A	
	Detent in B	320804003	1	F004A	
	Detent in 4 th position	320804036	1	F005A	only for W012 spool
	Prearrangement dual command	320704025	1	F013A	
	Pneumatic control ON-OFF	321104004	1	F020A=F021A	BSP ports
		321104006		F135A=F136A	NPT ports
	Proportional Pneumatic control	321204003	1	F022A=F023A	BSP ports
		321204005		F126A=F127A	NPT ports
	Electropneumatic control ON-OFF (12 vdc)	321604001	1	F0620	
	Electropneumatic control ON-OFF (24 vdc)	321604002	1	F0630	
	Load limit in A and B	320004037	1	F024A=F025A	
	Load limit in A	320004035	1	F026A=F027A	
	Load limit in B	320004036	1	F028A=F029A	for protected lever
	Electrical load limit (normally closed contacts)	320004027	1	F0360=F0370	for protected lever
	Electrical load limit (normally open contacts)	320004041	1	F0450=F0460	for without lever
	Electrohydraulic ON-OFF (12 vdc)	321404041	1	F1600	for without lever
	Electrohydraulic ON-OFF (24 vdc)	321404042	1	F1610	for hydraulic actuation
	Electrohydraulic Proportional (12 vdc)	322004001	1	F2600	for direct electrical control
	Electrohydraulic Proportional (24 vdc)	322004002	1	F2610	for protected lever
	Electrohydraulic ON-OFF (12 vdc) with reducing valve	321404043	1	F1500=F1520	BSP ports
	Electrohydraulic ON-OFF (24 vdc) with reducing valve	321404044	1	F1510=F1530	BSP ports
	Electrohydraulic Proportional (12 vdc) with reducing valve	322004003	1	F2500=F2520	BSP ports
	Electrohydraulic Proportional (24 vdc) with reducing valve	322004004	1	F2510=F2530	BSP ports
	Electrohydraulic ON-OFF (12 vdc) with reducing valve	321404054	1	F1500=F1520	UNF ports
	Electrohydraulic ON-OFF (24 vdc) with reducing valve	321404055	1	F1510=F1530	UNF ports
Electrohydraulic Proportional (12 vdc) with reducing valve	322004014	1	F2500=F2520	UNF ports	
Electrohydraulic Proportional (24 vdc) with reducing valve	322004015	1	F2510=F2530	UNF ports	
5 Check valve on the work section	320204008	1	-	only for RP and RT section	
6	Antishock valve on port A	7478	1		Setting: 100 bar
		2695		01 PA	Setting: 200 bar
		2827			Setting: 300 bar
	Anticavitation valve on port A	915080401		02 PA	
	Prearrangement for auxiliary valve on port A	430404001		05 PP	
7	Antishock valve on port B	7478	1		Setting: 100 bar
		2695		01 PB	Setting: 200 bar
		2827			Setting: 300 bar
	Anticavitation valve on port B	915080401		02 PB	
	Prearrangement for auxiliary valve on port B	430404001		05 PB	
8	Plug kit (G 1/2)	430000019	1	G04	
	Plug kit (G 3/4)	430000020		G05	
	Plug kit (3/4"-16 UNF)	300001006		U03	
	Plug kit (7/8"-14 UNF)	300004003		U04	



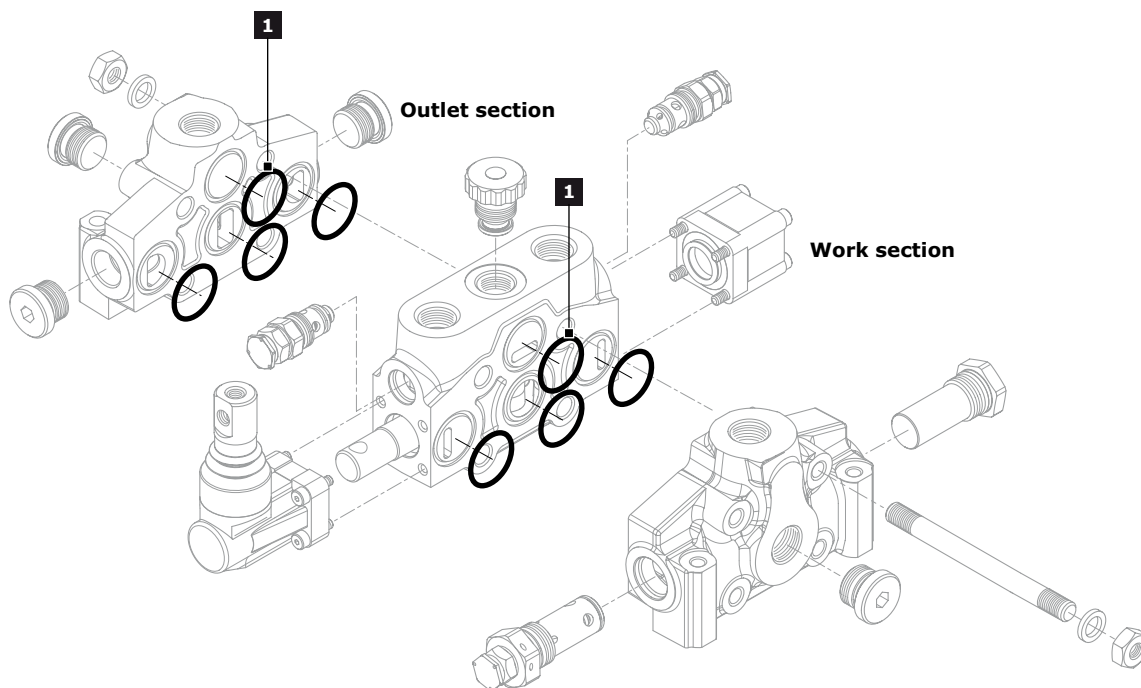
Note

- (*) = 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
- (#) = Detent in A and B Kick-out is available only with special spool assembly





Gasket kit



OUTLET AND WORK SECTION

Rif.	ORDER CODE	DESCRIPTION	Q.ty
1	412020116	O.R. 90SH 26,70 x 1,78 (2-23)	4

Complete Gasket kit: order code - 350904001



INSTALLATION AND MAINTENANCE

Guidelines

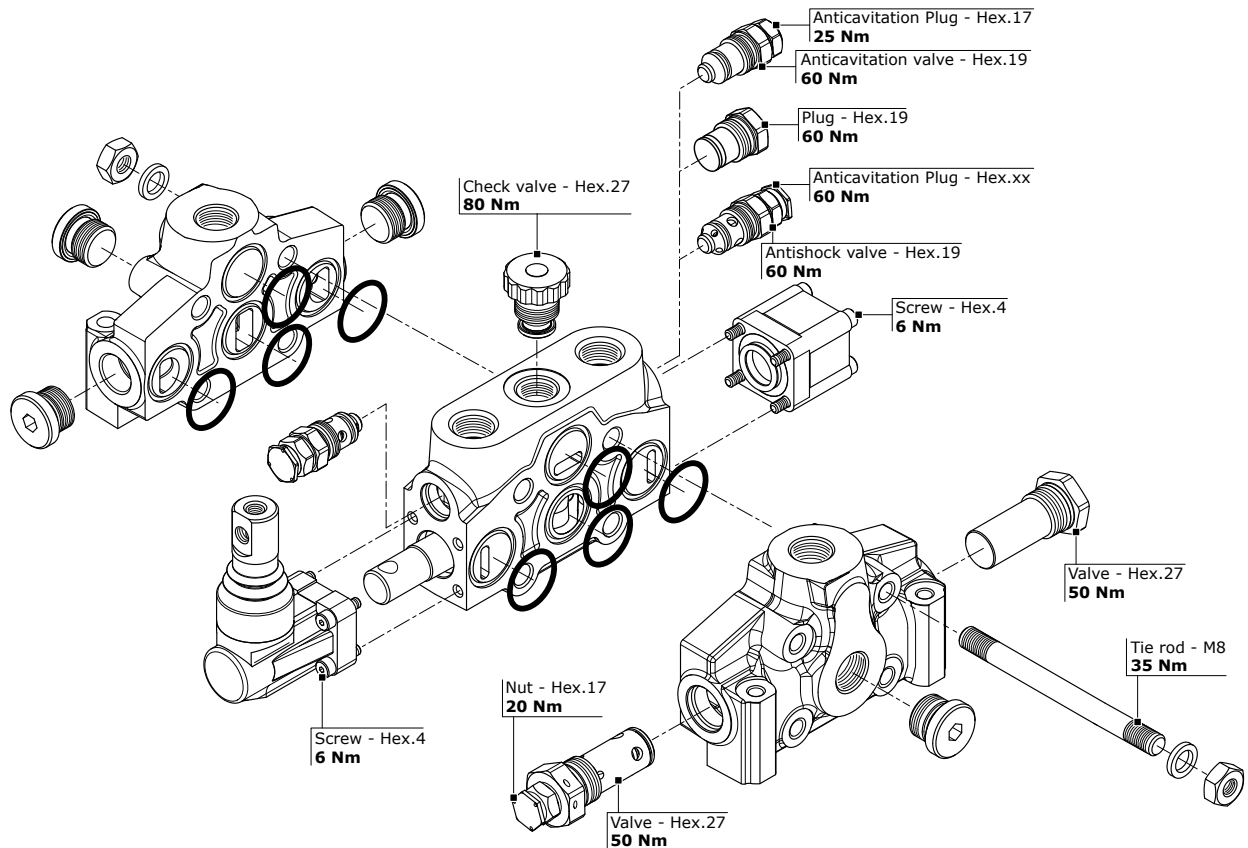
- Mount the control valve securely to a flat surface (recommended 3 point fixing); at the time do not use a hammer to positioning by hitting.
- When handling the control valve, be careful not hold the pilot cover or return spring cap of the spool or accessory valves such as main relief valves and anti-shock 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
BSP (ISO - 228)	G 1/2	G 1/2	G 1/2
with rubber sealing (DIN 3869)	60	60	60
with copper or steel and rubber washer	60	60	60
BSP (ISO - 228)			G 3/4
with rubber sealing (DIN 3869)			70
with copper or steel and rubber washer			70
UN-UNF (ISO - 725)	7/8" - 14 UNF	7/8" - 14 UNF	7/8" - 14 UNF
with O.R.	90	90	90
UN-UNF (ISO - 725)			1"1/16 - 12 UNF
with O.R.			95

General clamping torque

The following table provides the main tightening torques of the distributor HC-D4; are highlighted in 3 separate drawings depicting the inlet section, the working section and the outlet section.





Dimensions - Thread codes

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

METRIC THREAD (ISO 9974-1)

Type	M18x1,5	M22x1,5	M27x2
Code	M01	M02	M03

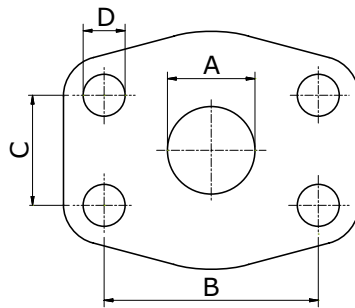
BSP THREAD (ISO 1179-1)

Type	1/4"	3/8"	1/2"	3/4"	1"	1"1/4	1"1/2	2"
Code	G02	G03	G04	G05	G06	G07	G08	G09

UN / UNF THREAD (ISO 11926-1)

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	U02	U03	U04	U05	U06	U07

Dimensions - SAE Flange codes



SAE / 3000 FLANGE (ISO 6162-1)

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	S03	S04	S05	S06	S07	S08	S09	S10	S11	S12	S15	S16
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

SAE / 6000 FLANGE (ISO 6162-2)

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	S33	S34	S35	S36	S37	S38	S39	S40
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

Introduction

These general conditions apply to all general supplies from Walvoil 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 Walvoil s.p.a. if Walvoil s.p.a. has not confirmed the order in writing. Walvoil 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 Walvoil 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 Walvoil 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, Walvoil 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, Walvoil 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 Walvoil s.p.a. agrees with the Customer that the shipment, or a part of it, will be arranged by Walvoil 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 Walvoil s.p.a. to the first carrier.

Product characteristics

Walvoil s.p.a. commits to supplying good quality products, compliant with the technical specifications declared on the technical tables and on the catalogue. Walvoil 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 Walvoil 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 Walvoil 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 Walvoil 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 Walvoil not be compliant or have the required quality and should this defect be due to Walvoil, Walvoil 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 Walvoil 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, Walvoil 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 Walvoil s.p.a. on the products supplied by Walvoil (as a mere example: damage refund, loss of profit, product recall campaign, etc). Walvoil s.p.a. has signed a product civil liability police, with a suitable maximum coverage.

Ownership retention

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

Obligation confidentiality

Walvoil 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 Walvoil s.p.a. previously issues its written authorization. Should Walvoil 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 Walvoil s.p.a. will stay Walvoil's property. The Customer commits to respecting the highest confidentiality.

Applicable law and court of jurisdiction

Walvoil 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 Walvoil s.p.a., where Walvoil s.p.a. is involved, will be exclusively dealt with by the Court of Bologna.



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