

M50

MONOBLOCK VALVE



 **hydro
control**
TECHNICAL CATALOGUE

A member of



 **walvoil**
FLUID POWER EMOTION



1800-OILSOL
1800-645765

<https://oilsolutions.com.au/>

sales@oilsolutions.com.au

1st edition M50.06

*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

M50 valves have symmetric bodies: thanks to this design it is possible to change the control side in every moment, reversing the spool 180°. These monoblock valves can be easily transformed from right inlet (R) to left inlet (L) and vice versa.

In addition to the high flexibility of other families M50 monoblock valve allows the possibility to choose the control side, thanks to the symmetric body design; it can be easily adapted to many different applications always fitting the specific needs (Cranes and aerial platforms, Compactor, Hook and Skip loaders, Minidumper).

The valve is available with manual, cable, hydraulic remote, pneumatic, electrohydraulic and electropneumatic controls. Dump valve versions are available on request (hydraulic or electric 12 Vdc and 24 Vdc operated).

Special circuits and solutions are available for stabilizers applications. Special spools and options are available for truck mounted crane applications.





QUICK REFERENCE GUIDE

| GENERAL SPECIFICATION | M45 | M50 | TR55 |
|-----------------------------------|-------|-------|-------|
| Working sections number | 1 - 6 | 1 - 7 | 1 - 7 |
| CIRCUIT | | | |
| Parallel | • | • | • |
| Tandem | | • | |
| Parallel circuit stroke (mm) | 5 | 5,5 | 5 |
| Float spool extra stroke (mm) | 4 | 4,5 | 4,5 |
| Spools pitch (mm) | 35 | 35 | 36 |
| RATED FLOW | | | |
| Max recommended flow rate (l/min) | 45 | 50 | 50 |
| Max recommended flow rate (GPM) | 12 | 15 | 15 |
| RATED PRESSURE | | | |
| Max working pressure (bar) | 350 | 350 | 350 |
| Max working pressure (PSI) | 5000 | 5000 | 5000 |

| OPTION CHART | M45 | M50 | TR55 |
|---|-----|-----|------|
| Direct acting pressure relief valve | • | • | • |
| Clamping valve | | | (•) |
| Externally piloted valve | (•) | (•) | |
| Solenoid dump valve (12 Vdc) | (•) | (•) | |
| Solenoid dump valve (24 Vdc) | (•) | (•) | |
| SPOOL ACTUATION | | | |
| Manual control | • | • | • |
| Without lever | • | • | • |
| 90° joystick control | • | • | • |
| Hydraulic control | | • | • |
| Direct electric control (12-24 Vdc) | | • | |
| SPOOL RETURN ACTION | | | |
| Return spring | • | • | • |
| 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 | | | |
| Valves on port | | • | • |

(•) = the application requires special machining in the body

**GENERAL INDEX**

| | |
|-----------|--|
| 4 | General specifications Standard working conditions Fluid options |
| 5 | Order example Standard thread Painting Hydraulic circuit |
| 7 | Dimensions |
| 9 | Typical curves Pressure drop (P - T) Pressure drop (P - A/B) Pressure drop (A/B - T) Direct relief valve curve |
| 11 | Inlet arrangement Inlet side classification Valve identification Valve arrangement |
| 13 | Work section arrangement Spool identification Spool actuation classification Spool return action classification - Spring load values |
| 25 | Outlet arrangement Order example - version 1 outlet Order example - HPCO version outlet Outlet with single tank classification Outlet with two tanks classification Carry-over connection (HPCO) |
| 29 | M50 Spare parts list |
| 31 | Installation |
| 33 | General conditions and patents |

The specifications detailed in this catalogue show standard products. Special applications are available to order subject to contacting our Engineering Department for an estimate. The data and specifications indicated are to be considered a guide only and Hydrocontrol S.p.A. reserves the right to introduce improvements and modifications without prior notice. Hydrocontrol is not responsible for any damage caused by an incorrect use of the product.



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 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

M50/1: IRPV 301 150 W001A H001 F001A 01 PA 120 05 PB MJ A G030303

TYPE:

M50: product type
/1: working section number

1) INLET ARRANGEMENT: page 11

IRPV 301 inlet side and valve type
150 setting (bar)

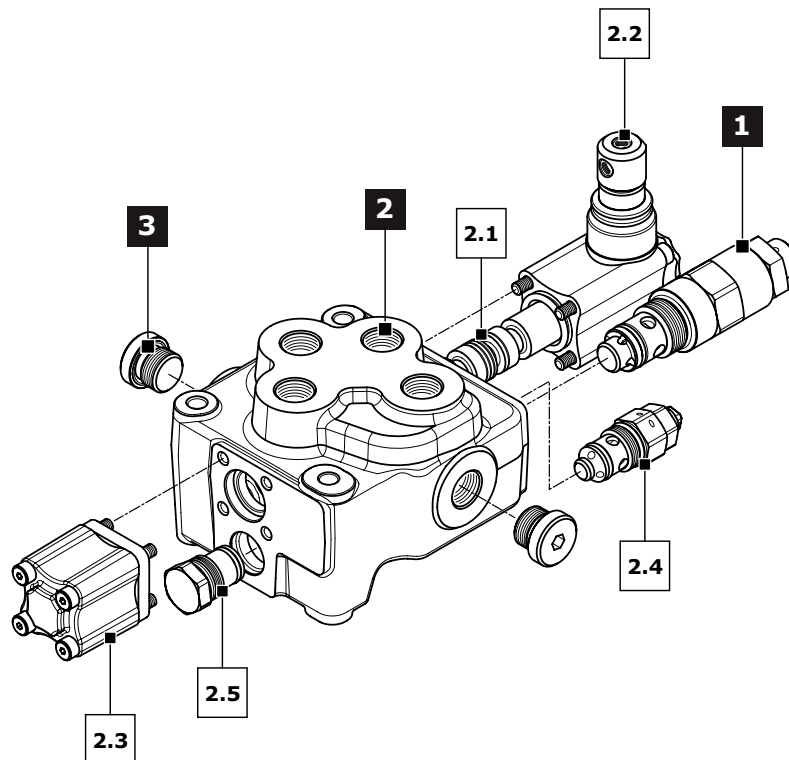
2) WORK SECTION ARRANGEMENT: page 13

2.1 W001A spool type
2.2 H001 spool actuation type
2.3 F001A spool return action type
2.4 01 PA 120 auxiliary valve (port A)
2.5 05 PB auxiliary valve (port B)

3) OUTLET ARRANGEMENT: page 25

MJA outlet type
G030303 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 32.

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



Painting

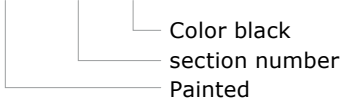
On request, all Hydrocontrol valves can be delivered painted (RAL 9005 black primer).

Order example of M50/1 painted:

M50/1
IRPV 301 150
W001A H001 F001A 01 PA 120 05 PB
MJA G030303
P006/1 N10

The painting is indicated with the following value:

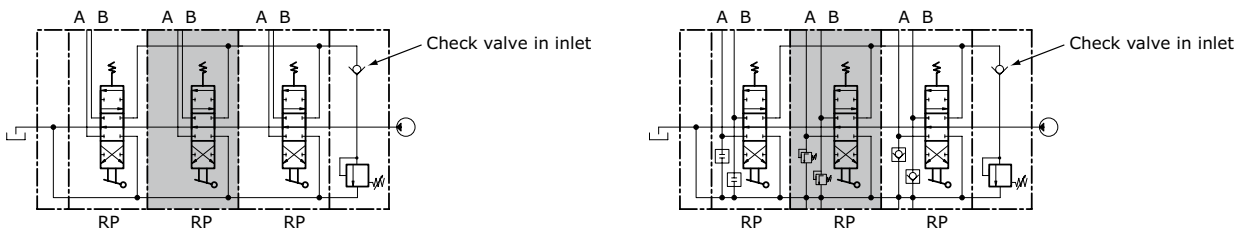
P006 - /1 - N10



Hydraulic schematic M50

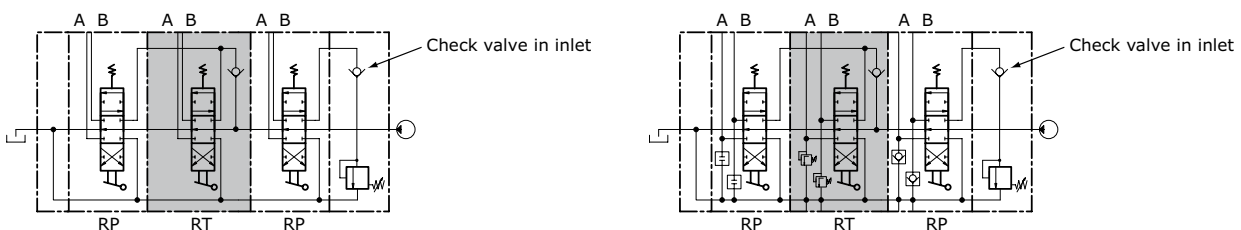
Parallel circuit

When the spool is operated it intercepts the switch 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 selecting the path with the least resistance; by throttling the spools, the flow of oil can be divided between two or more service ports.



Parallel-Tandem circuit

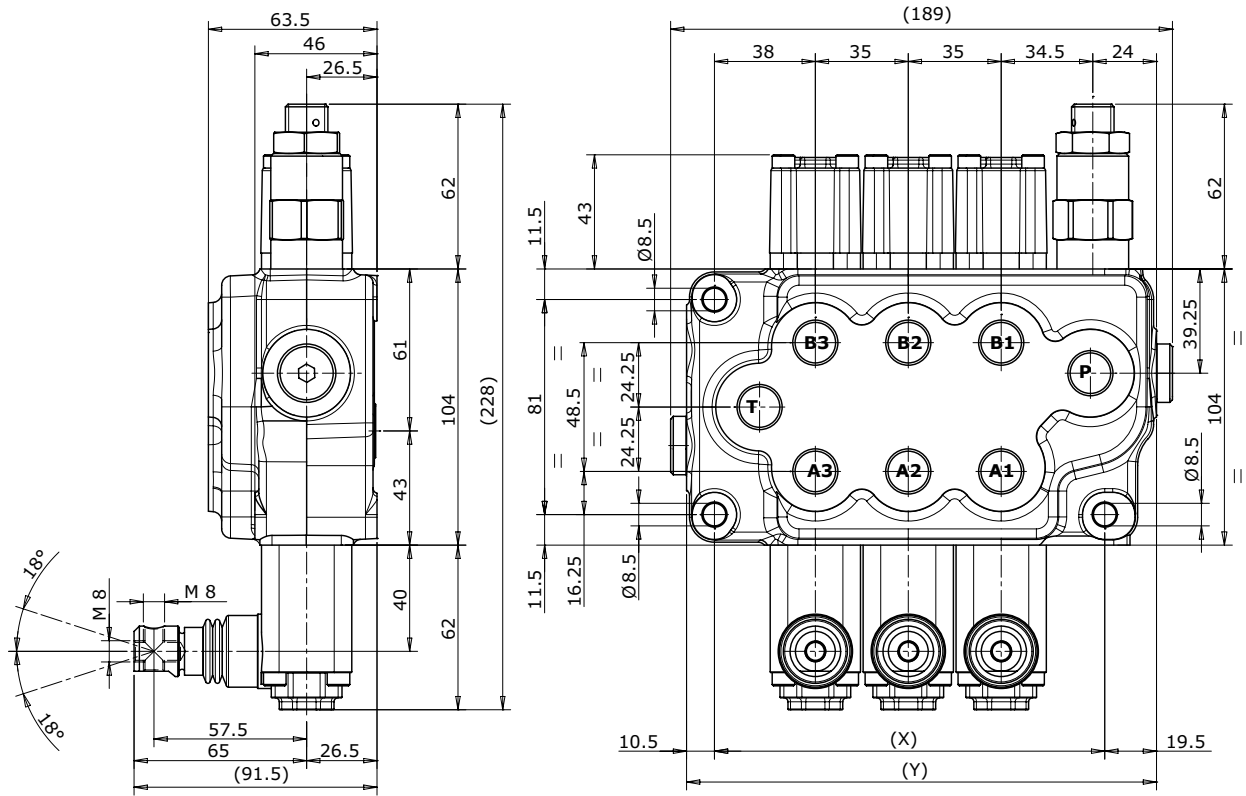
When the spool is operated it intercepts the switch gallery by diverting the flow of oil to service port A or B. The tandem circuit is powered by the switch gallery thus permitting the use of just one work section at a time. The section downstream from the tandem section that has been actuated does not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





DIMENSIONS

Dimensions M50 (PB-TB)



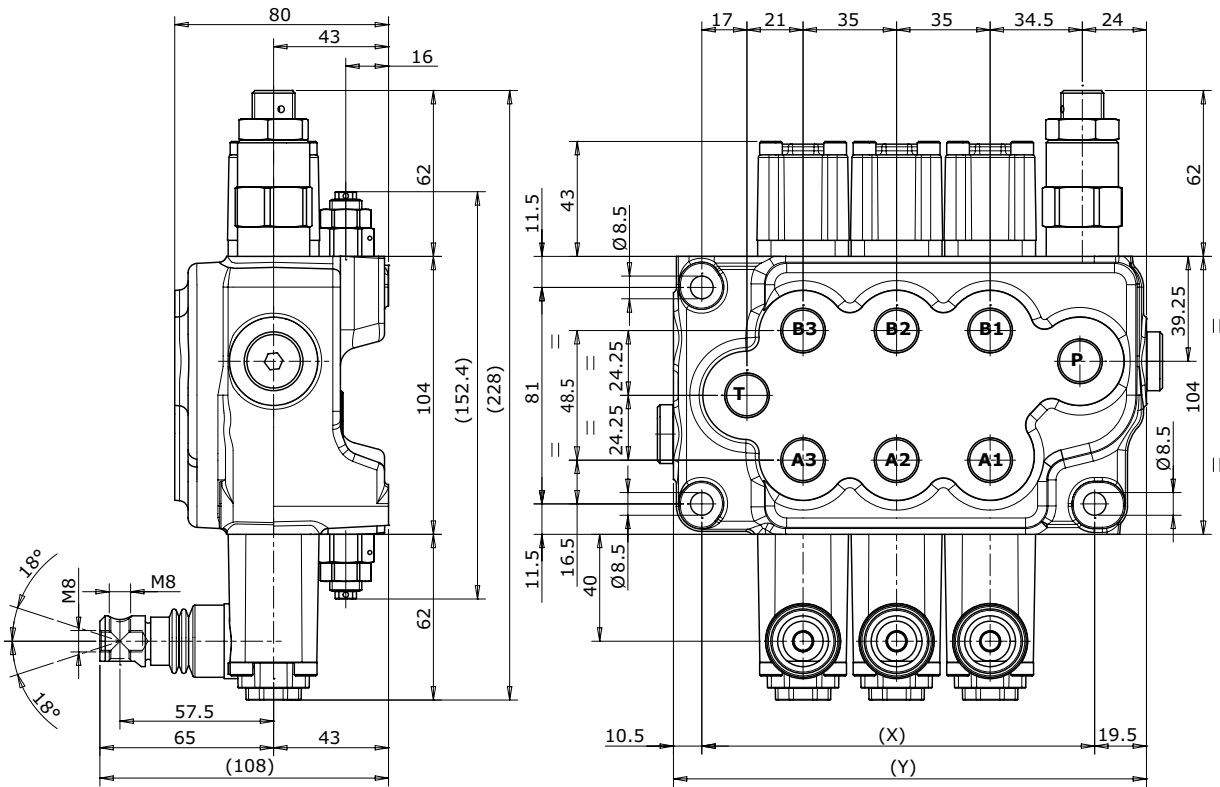
| TYPE | M50/1 | M50/2 | M50/3 | M50/4 | M50/5 | M50/6 | M50/7 |
|---------------------|-------|-------|-------|-------|-------|-------|-------|
| X (mm) | 73 | 110 | 147 | 184 | 221 | 258 | 295 |
| Y (mm) | 107 | 142 | 177 | 212 | 252 | 292 | 327 |
| Weights (kg) | 3,8 | 5,5 | 7,3 | 9,0 | 10,8 | 12,6 | 14,3 |

Fixing specifications:

HC-M50 PB / HC-M50 TB = N. 3 drills diameter 8,5 (length 46 mm)



Dimensions M50 (PV-TV)



| TYPE | M50/1 | M50/2 | M50/3 | M50/4 | M50/5 | M50/6 | M50/7 |
|---------------------|-------|-------|-------|-------|-------|-------|-------|
| X (mm) | 73 | 110 | 147 | 184 | 221 | 258 | 295 |
| Y (mm) | 107 | 142 | 177 | 212 | 252 | 292 | 327 |
| Weights (kg) | 4,9 | 6,8 | 8,7 | 10,8 | 12,7 | 15,0 | 16,9 |

Fixing specifications:

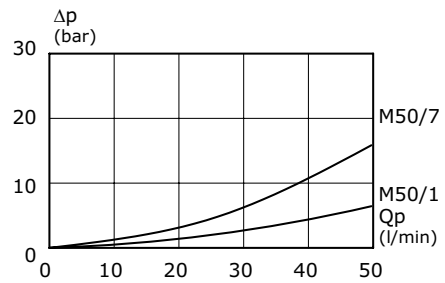
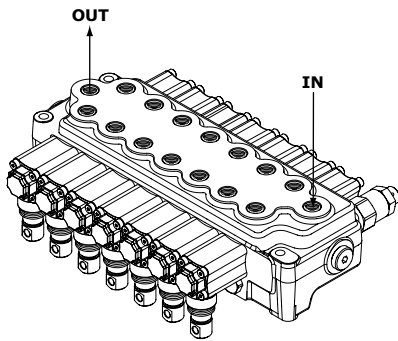
HC- M50 PV / HC-M50 TV = N. 3 drills diameter 8,5 (length 63 mm)



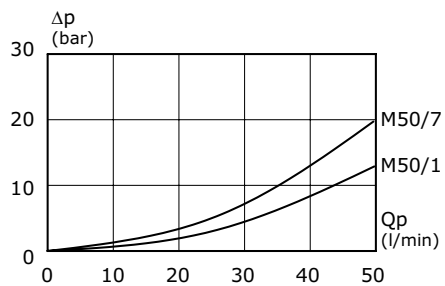
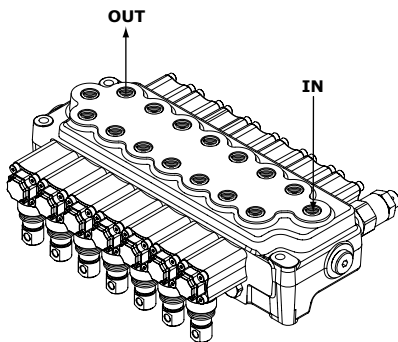
TYPICAL CURVES

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

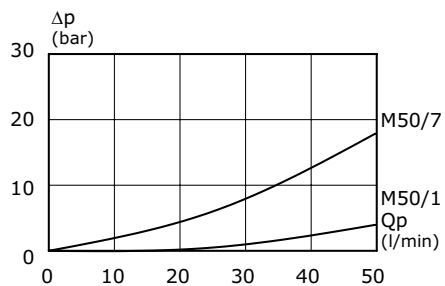
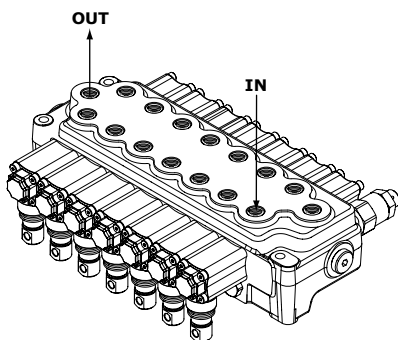
Pressure drop (P - T)



Pressure drop (P - A/B)

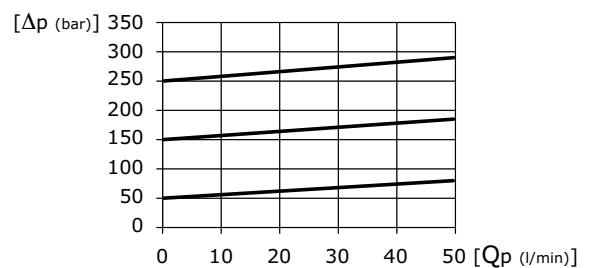


Pressure drop (A/B - T)



Direct relief valve curve

| Setting ranges | |
|----------------|----------------|
| type | pressure (bar) |
| A | 20 - 110 |
| B | 111 - 220 |
| C | 221 - 350 |

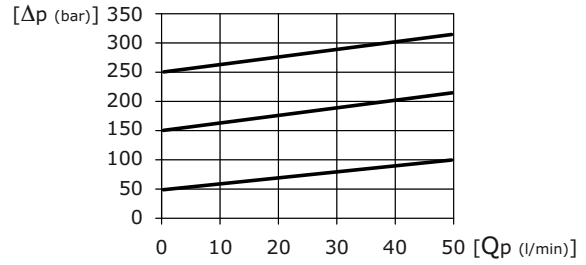




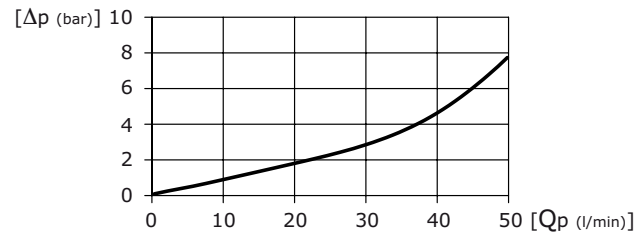
TYPICAL CURVES

Antishock valve curve

| Setting ranges | | |
|----------------|----------------|---------------|
| type | pressure (bar) | |
| | at full flow | at min. flow |
| A | 20 - 120 | |
| B | 121 - 150 | |
| C | 151 - 250 | 91-A / 220-A |
| D | 251 - 350 | 221-A / 380-A |



Anticavitation valve curve





INLET ARRANGEMENT

Depending on the circuit type and on the auxiliary valves presence, find four different kinds of models:

| Inlet side classification (parallel standard version) | | | |
|---|---|--------|---------------|
| code | description | schema | configuration |
| IRPB | Monoblock valve with right inlet section (standard version) | | |
| ILPB | Monoblock valve with left inlet section (standard version) | | |
| IRPV | Monoblock valve with right inlet section (with auxiliary valves) | | |
| ILPV | Monoblock valve with left inlet section (with auxiliary valves) | | |

| Inlet side classification (parallel-tandem version) | | | |
|---|--|--------|---------------|
| code | description | schema | configuration |
| IRTB | Monoblock valve with right inlet section (tandem version) | | |
| ILTB | Monoblock valve with left inlet section (tandem version) | | |
| IRTV | Monoblock valve with right inlet section (tandem version with auxiliary valves) | | |
| ILTV | Monoblock valve with left inlet section (tandem version with auxiliary valves) | | |



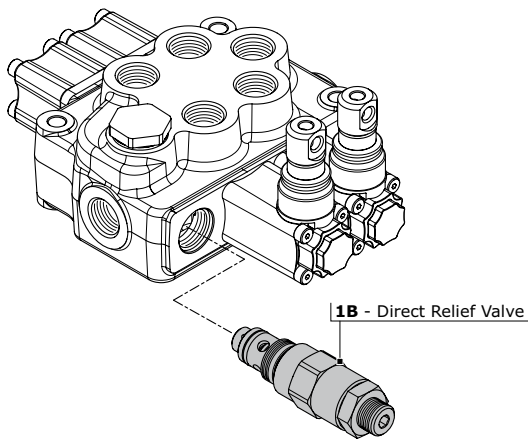
Valve identification

| type | schema | layout | description | type | schema | layout | description |
|------|--------|--------|-------------------------------------|------|--------|--------|----------------------|
| 1 | | | Direct acting pressure relief valve | 3 | | | Relief valve plugged |

NOTE:

Monoblock valves can be equipped with externally piloted valve, solenoid dump valve (12-24 Vdc), clamping valve. These applications needs a special valve body. Ask our commercial dept. for further informations.

Valve arrangement



Combination valve example: 301 = 1B

- 301 Combination valve
- 1B Pressure relief valve 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 (example 150 bar).

| valves combination | M50 - IR | M50 - IL |
|--------------------|----------|----------|
| 1A 201 | | • |
| 3A 203 | | • |
| 1B 301 | • | |
| 3B 303 | • | |



WORK SECTION ARRANGEMENT

Spool identification

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

W001 spool schema 3 positions double-acting
A spool type spool with 45 l/min inlet flow
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 | |
| W012 | 4 positions double-acting with float in the 4 th position | |

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



Depending on the inlet flow, it is possible to choose appropriate spool sizes.

| CODE | SPOOL TYPE AVAILABLE | | |
|-------------|---------------------------|---------------------------|---------------------------|
| | spool 50 l/min inlet flow | spool 30 l/min inlet flow | spool 15 l/min inlet flow |
| | A | B | C |
| W001 | W001A | W001B | W001C |
| W002 | W002A | W002B | W002C |
| W003 | W003A | W003A | W003C |
| W004 | W004A | W004A | W004C |
| W005 | W005A | W005B | |
| W006 | W006A | W006B | |
| W012 | W012A | | |

NOTE:

- W012 spool need a special machining on the valve body.
- Float spool (W012) need special detent kit (F005).
- 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 | | |
| H019 | Protected lever with stroke limiter | | |
| H020 | Protected lever rotated 180° with stroke limiter | | |

Spool actuation classification for Hydraulic control

| code | description | dimensions | configuration |
|-------------|---|------------|---------------|
| H005 | Hydraulic actuation with side ports BSP ports = G 1/4 UNF ports = 9/16-18 UNF | | |

leave out the spool return action code



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> |

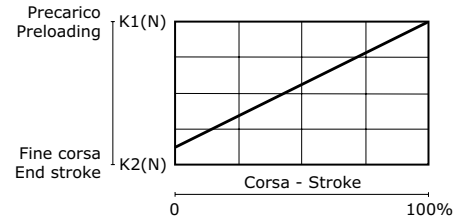
The second section concerned the configuration of the joystick control is always identified with code H120. Lever has to be ordered separately.



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 | 140 N | 130 N | 175 N |
| End of stroke | 200 N | 170 N | 235 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 | 2 positions in A spring-centred spool | | | |
| F010A | 2 positions in B spring-centred spool | | | |
| F011A | 2 positions detent in A spring-centred spool | | | |
| F012A | 2 positions detent in B spring-centred spool | | | |



| code | description | schema | dimensions | configuration |
|--------------|---|--------|------------|---------------|
| F013A | 3 positions spring-centred spool prearrangement dual command | | | |
| F014A | 3 positions spring-centred spool with stroke limiter | | | |
| F149 | 3 positions detent without return spring | | | |

Pneumatic control classification

| code | description | schema | dimensions | configuration |
|--------------|---|--------|---|---------------|
| F020A | Pneumatic control ON - OFF | | Proportional control with port BSP: G 1/8 | |
| F021A | Pneumatic control ON - OFF rotated 180° | | | |
| F022A | Proportional Pneumatic control | | | |
| F023A | Proportional Pneumatic control rotated 180° | | | |



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.

Electropneumatic control identification

| code | description | dimensions | configuration |
|--------------|---|--------------------------------|---------------|
| F0620 | 3 positions electropneumatic control ON-OFF (12 vdc) 7 W - 0,58 A | Minimum working pressure 5 bar | |
| F0630 | 3 positions electropneumatic control ON-OFF (24 vdc) 7 W - 0,29 A | | |

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:

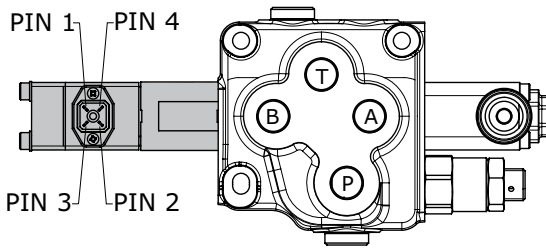
- 320103013** = control tie rod /1
- 320102007** = control tie rod /2
- 320102008** = control tie rod /3
- 320102009** = control tie rod /4
- 320102010** = control tie rod /5
- 320102011** = control tie rod /6
- 320102012** = control tie rod /7



Electrical load limit kit classification

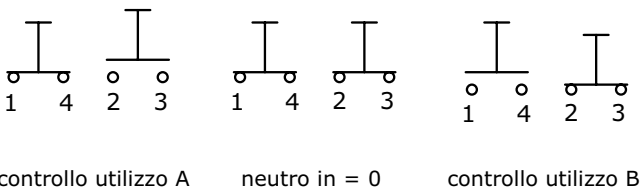
| ELECTRICAL LOAD LIMIT KIT SPECIFICATIONS | | | |
|--|-------------------|-------------------|-------------------|
| Power supply | Contacts capacity | Protection degree | temperature range |
| 12 vdc | 3 A | IP 65 | da -25°C a +90°C |
| 24 vdc | 1,5 A | | |

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.

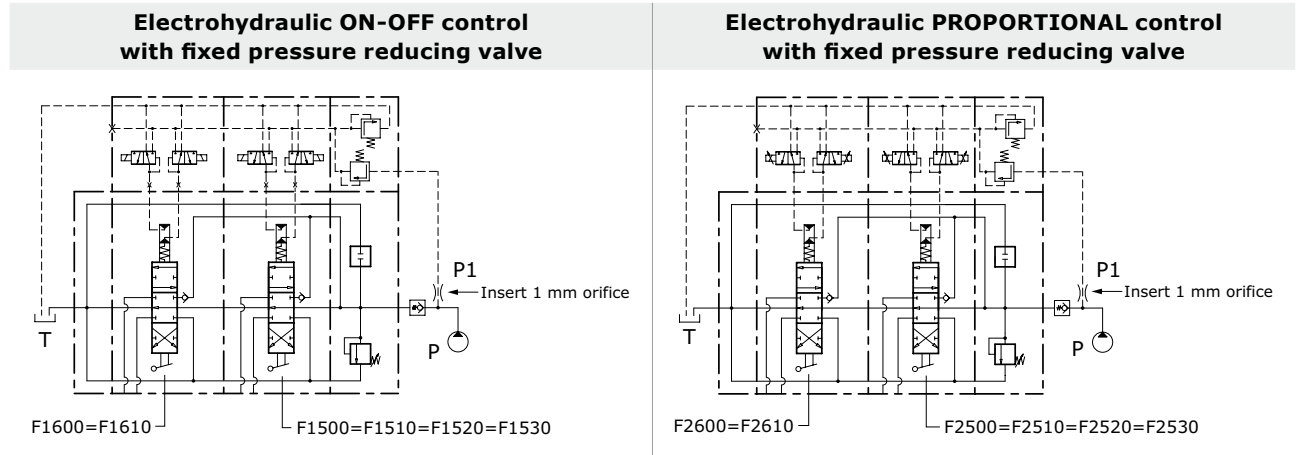
| code | description | dimensions | configuration |
|--------------|---|------------|---------------|
| F0360 | Electrical load limit (normally closed contacts) | | |
| F0370 | Electrical load limit rotated 180° (normally closed contacts) | | |
| F0450 | Electrical load limit (normally open contacts)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

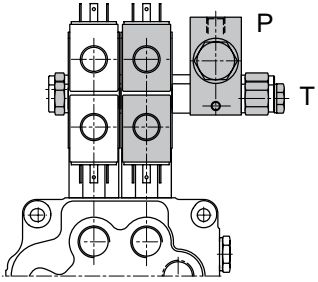
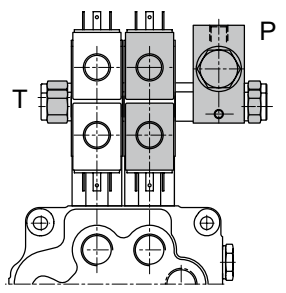
Electrohydraulic control classification

| 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.

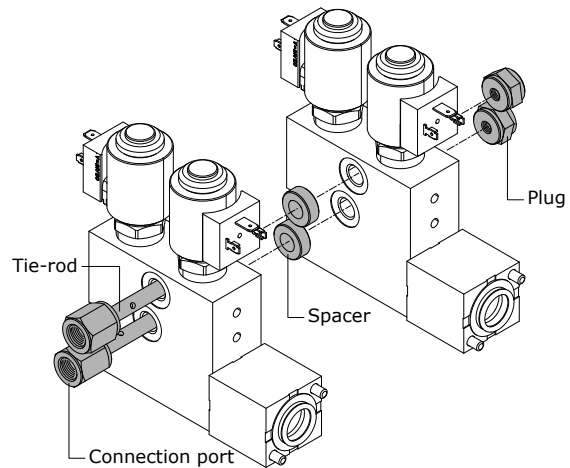
NOTE: the control tie rod kit has always to be ordered separately.

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

320102001 = control tie rod /2

320102002 = control tie rod /3

320102003 = control tie rod /4

320102004 = control tie rod /5

320102005 = control tie rod /6

320102006 = control tie rod /7



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 / 80 | A | |
| | | | | B | 81 / 120 | B | |
| | | | | C | 121 / 150 | C | |
| | | | | D | 151 / 250 | D | 95-A / 220-A |
| | | | | E | 251 / 350 | D | 221-A / 350-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 / 80 | A | |
| | | | | B | 81 / 120 | B | |
| | | | | C | 121 / 150 | C | |
| | | | | D | 151 / 250 | D | 95-A / 220-A |
| | | | | E | 251 / 350 | D | 221-A / 350-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**



Tandem circuit identification

Three different solutions are available for tandem circuit monoblocks:

- tandem circuit on 1st section
- tandem circuit on 2nd section
- tandem circuit on 1st and 2nd section

| code | description | hydraulic schema |
|------------|---|------------------|
| T1 | Tandem circuit on 1 st section | |
| T2 | Tandem circuit on 2 nd section | |
| T12 | Tandem circuit on 1 st and 2 nd section | |

Order example

M50/1: IRTB 301 150 W001A H001 F001A **MJA T1 G030303**

- MJA** P - T on the top / top ports A - B
- T1** Tandem circuit on 1st section
- G030303** P - T - A - B (thread G 3/8)

NOTE:

choosing a tandem circuit means using a special valve body. For different circuit combinations, ask our Technical-Sales Dpt.

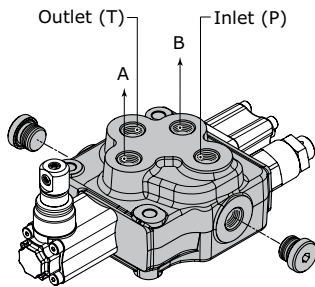


OUTLET ARRANGEMENT

This code indicates characteristics for outlet section: ports position and thread, simple T port or HPCO connection. It is possible to have simple T port or two ports configuration for HPCO connection: HPCO allows to extend by-pass channel and connect to a second valve. T ports dimensions and threads depends on the valve size.

Order example - version 1 Outlet

M50/1: IRPB 301 150 | W001A H001 F001A | **MJ A G030303**



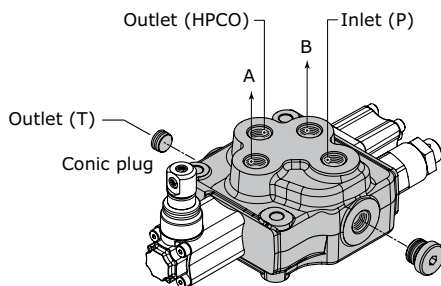
OUTLET ARRANGEMENT:

- 1. **MJ** outlet type
- 2. **A G030303** outlet position and available thread type

| Rif. | Code | Description | Page |
|------|------------------|---|------|
| 1 | MJ | Monoblock valve with single outlet (T) right-side inlet (P) | |
| | MK | Monoblock valve with single outlet (T) left-side inlet (P) | |
| 2 | A G030303 | P - T on the top / top ports A - B (thread G 3/8) | 26 |
| | A U030303 | P - T on the top / top ports A - B (thread 3/4"-16 UNF) | |
| | C G030303 | P - T on sides / top ports A - B (thread G 3/8) | |
| | C U030303 | P - T on sides / top ports A - B (thread 3/4"-16 UNF) | |

Order example - HPCO version Outlet

M50/1: IRPB 301 150 | W001A H001 F001A | **MM K G030303**



OUTLET ARRANGEMENT:

- 1. **MM** outlet type
- 2. **K G030303** outlet position and available thread type

| Rif. | Code | Description | Page |
|------|------------------|---|------|
| 1 | MM | Monoblock valve with two return (T - HPCO) right-side inlet (P) | |
| | MN | Monoblock valve with two return (T - HPCO) left-side inlet (P) | |
| 2 | A G030303 | HPCO on the top / P - T on sides / top ports A - B (thread G 3/8) | 27 |
| | A U030303 | HPCO on the top / P - T on sides / top ports A - B (thread 3/4"-16 UNF) | |
| | K G030303 | HPCO - P on the top / T on sides / top ports A - B (thread G 3/8) | |
| | K U030303 | HPCO - P on the top / T on sides / top ports A - B (thread 3/4"-16 UNF) | |

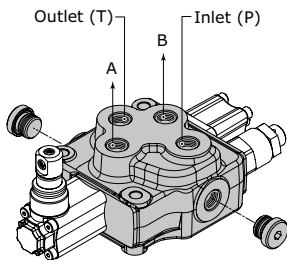
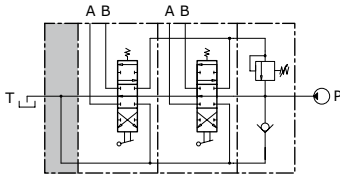


Outlet with single tank classification

outlet identification

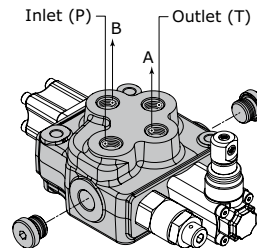
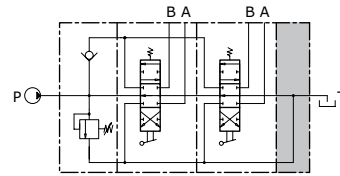
MJ

monoblock valve with single outlet (T)
right-side inlet (P)



MK

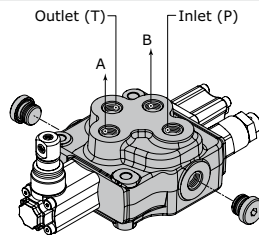
monoblock valve with single outlet (T)
left-side inlet (P)



Outlet position

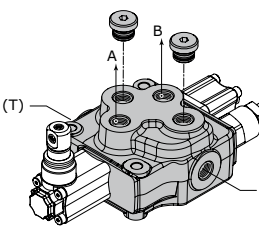
outlet combination and thread available

A G030303



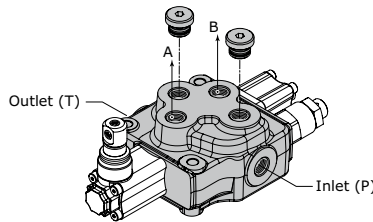
P - T on the top
top ports A - B
(thread G 3/8)

A U030303



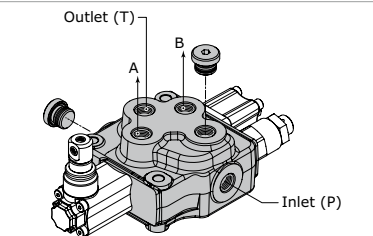
P - T on the top
top ports A - B
(thread 3/4" - 16 UNF)

C G030303



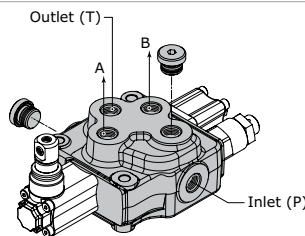
P - T on sides
top ports A - B
(thread G 3/8)

C U030303



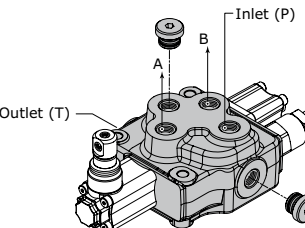
P - T on sides
top ports A - B
(thread 3/4" - 16 UNF)

K G030303



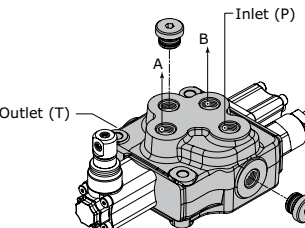
P on side - T on the top
top ports A - B
(thread G 3/8)

K U030303



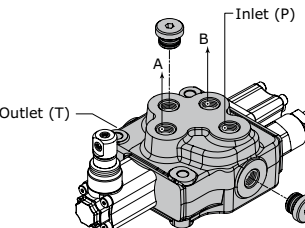
P on side - T on the top
top ports A - B
(thread 3/4" - 16 UNF)

L G030303



P on the top - T on side
top ports A - B
(thread G 3/8)

L U030303



P on the top - T on side
top ports A - B
(thread 3/4" - 16 UNF)



Outlet with two tanks classification

| outlet identification | |
|-----------------------|--|
| MM | <p>monoblock valve with two return (T-HPCO) right-side inlet (P)</p> |
| MN | <p>monoblock valve with two return (T-HPCO) left-side inlet (P)</p> |

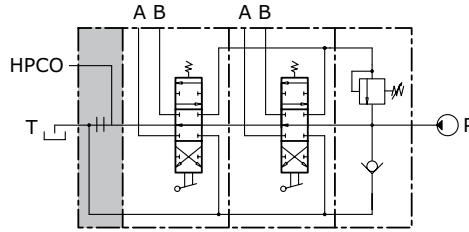
Outlet position

| outlet combination and thread available | |
|---|--|
| A G030303 | <p>HPCO on the top P - T on sides top ports A - B (thread G 3/8)</p> |
| A U030303 | <p>HPCO on the top P - T on sides top ports A - B (thread 3/4" - 16 UNF)</p> |
| K G030303 | <p>HPCO - P on the top T on side top ports A - B (thread G 3/8)</p> |
| K U030303 | <p>HPCO - P on the top T on side top ports A - B (thread 3/4" - 16 UNF)</p> |

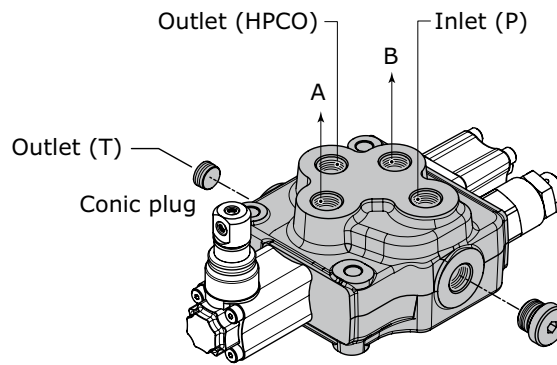


CARRY-OVER CONNECTION (HPCO)

This option, available on all M45, 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.



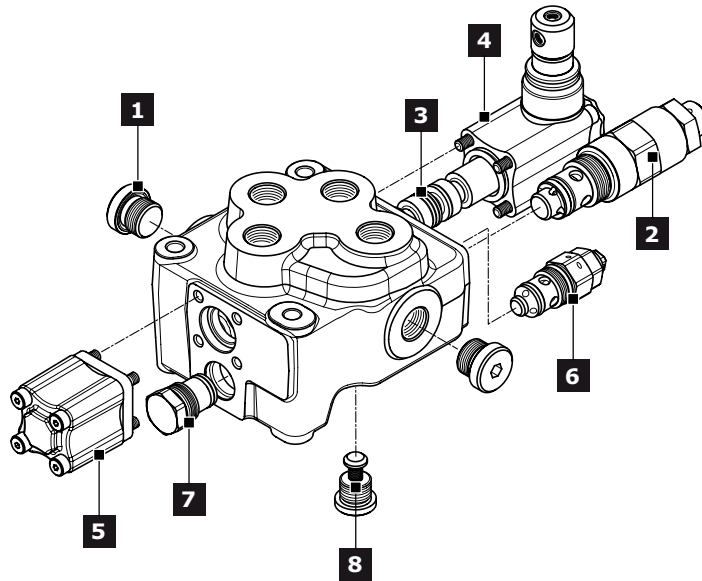
It is possible to transform monoblock valve from standard to HPCO version just by ordering the appropriate conic plug:



| code (HPCO Plug identification) | description | q.ty |
|---------------------------------|-----------------------|------|
| 413010210 | conic plug 1/4" x 6,5 | 1 |



M50 SPARE PARTS LIST



| Ref. | Description | Order code | Q.ty | Code | Note |
|---|--|------------------|-------------------------|----------------------|-------------------------|
| 1 | Plug kit (G 3/8) | 430000018 | 1 | G03 | |
| | Plug kit (G 1/2) | 430000019 | | G04 | |
| | Plug kit (3/4" - 16 UNF) | 300001006 | | U03 | |
| | Relief valve plugged | 430172001 | | | |
| 2 | Direct acting pressure relief valve (*) | 57548 | 1 | | Setting: 100 bar |
| | | 43151 | | | Setting: 200 bar |
| | | 47555 | | | Setting: 300 bar |
| 3 | 3 positions double-acting spool (50 l/min) | 421259017 | 1 | W001A | fo protected lever |
| | | 421259018 | | | for without lever |
| | | 421259052 | | | for hydraulic actuation |
| | 3 positions double-acting spool (30 l/min) | 421259045 | | W001B | for protected lever |
| | | 421259012 | | | for without lever |
| | | 421259015 | | | for hydraulic actuation |
| | 3 positions double-acting spool (15 l/min) | 421259016 | | W001C | for protected lever |
| | 3 positions double-acting A and B to tank spool (50 l/min) | 421259019 | | W002A | for protected lever |
| | | 421259068 | | | for without lever |
| 3 positions double-acting A and B to tank spool (30 l/min) | 421259088 | W002B | for hydraulic actuation | | |
| | 421259046 | | for protected lever | | |
| 3 positions double-acting A and B to tank spool (15 l/min) | 421259014 | W002C | for without lever | | |
| | 421259089 | | for hydraulic actuation | | |
| 4 positions double-acting with float in the 4 th pos. (50 l/min) | 421259043 | W002C | for protected lever | | |
| | 421259020 | W012A | for protected lever | | |
| 4 | Protected lever | 320359006 | 1 | H001 = H002 | only for W012 spool |
| | | 320359002 | | | |
| | Control without lever | 320359003 | 1 | H004 | |
| | Hydraulic actuation | 320503001 | 2 | H005 | BSP version |
| | | 320503010 | | | UNF version |
| | Protected lever with stroke limiter | 320359008 | 1 | H019 = H020 | |
| Joystick control | 320659001 | 1 | H009 = H012 | | |
| | 320659002 | | | H010 = H011 | |
| 5 | 3 position spring centred spool | 320759005 | 1 | F001A | |
| | Detent in A and B | 320859002 | | F002A | |
| | Detent in A | 320859004 | | F003A | |
| | Detent in B | 320859005 | | F004A | |
| | Detent in 4 th position | 320859003 | | F005A | only for W012 spool |
| | Prearrangement dual command | 320759008 | | F013A | |
| | Pneumatic control ON-OFF | 321159001 | | F020A = F021A | |
| | Proportional pneumatic control | 321259001 | | F022A = F023A | BSP ports |



| Ref. | Description | Order code | Q.ty | Code | Note |
|--|--|------------------|----------------------|----------------------|------------------|
| 6 | Load limit in A and B | 320059001 | | F024A = F025A | |
| | Load limit in A | 320059003 | | F026A = F027A | |
| | Load limit in B | 320059004 | | F028A = F029A | |
| | Electrical load limit (normally closed contacts) | 320059002 | | F0360 = F0370 | |
| | Electrical load limit (normally open contacts) | 320059006 | | F0450 = F0460 | |
| | Electrohydraulic ON - OFF (12 vdc) | 321459001 | | F1600 | |
| | Electrohydraulic ON - OFF (24 vdc) | 321459002 | | F1610 | |
| | Electrohydraulic Proportional (12 vdc) | 322059001 | 1 | F2600 | |
| | Electrohydraulic Proportional (24 vdc) | 322059002 | | F2610 | |
| | Electrohydraulic ON - OFF (12 vdc) with reducing valve | 321459003 | | F1500 = F1520 | BSP ports |
| | Electrohydraulic ON - OFF (24 vdc) with reducing valve | 321459004 | | F1510 = F1530 | |
| | Electrohydraulic ON - OFF (12 vdc) with reducing valve | 321459006 | | F1500 = F1520 | UNF ports |
| | Electrohydraulic ON - OFF (24 vdc) with reducing valve | 321459007 | | F1510 = F1530 | |
| | Electrohydraulic Proportional (12 vdc) with reducing valve | 322059003 | | F2500 = F2520 | BSP ports |
| | Electrohydraulic Proportional (24 vdc) with reducing valve | 322059004 | | F2510 = F2530 | |
| | Electrohydraulic Proportional (12 vdc) with reducing valve | 322059011 | | F2500 = F2520 | UNF ports |
| Electrohydraulic Proportional (24 vdc) with reducing valve | 322059012 | | F2510 = F2530 | | |
| | | 34155 | | | setting: 100 bar |
| Antishock valve on port A | | 36582 | | 01 PA | setting: 200 bar |
| | | 82475 | 1 | | setting: 300 bar |
| | Anticavitation valve on port A | 915080401 | | 02 PA | |
| Prearrangement for auxiliary valve on porta A | 430404001 | | 05 PA | | |
| | | 34155 | | | setting: 100 bar |
| Antishock valve on port B | | 36582 | | 01 PB | setting: 200 bar |
| | | 82475 | 1 | | setting: 300 bar |
| | Anticavitation valve on port B | 915080401 | | 02 PB | |
| Prearrangement for auxiliary valve on porta B | 430404001 | | 05 PB | | |
| Check valve | 320259003 | | 1 | | |



INSTALLATION

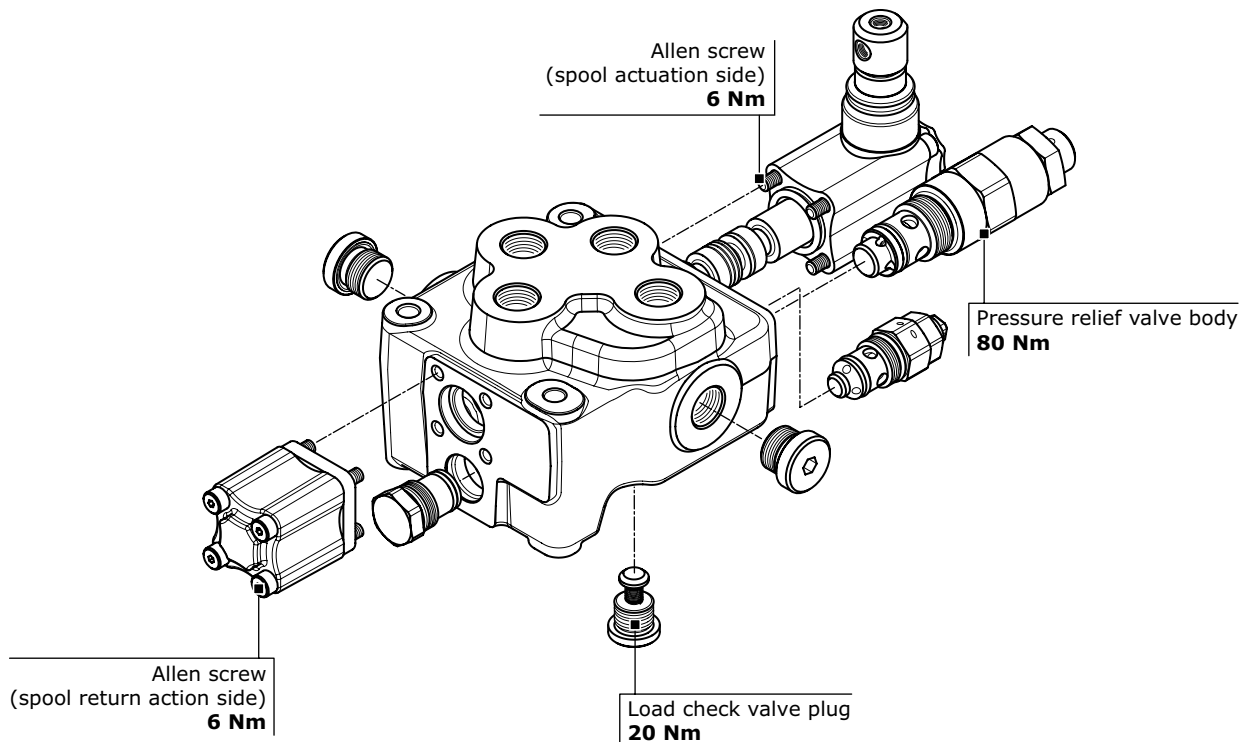
Guidelines

- 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 monoblock valve, be careful not hold the pilot cover or return spring cap of the spool or accessory valves such as main 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/HPCO |
|--|----------------------|----------------------|----------------------|
| BSP (ISO - 228) | G 3/8 | G 3/8 | G 3/8 |
| with rubber sealing (DIN 3869) | 40 | 40 | 40 |
| with copper or steel and rubber washer | 40 | 40 | 40 |
| 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 |
| UN-UNF (ISO - 725) | 3/4" - 16 UNF | 3/4" - 16 UNF | 3/4" - 16 UNF |
| with O.R. | 40 | 40 | 40 |

General Clamping torque (Nm)





Dimensions - Thread codes

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

METRIC THREAD (ISO 9974-1)

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

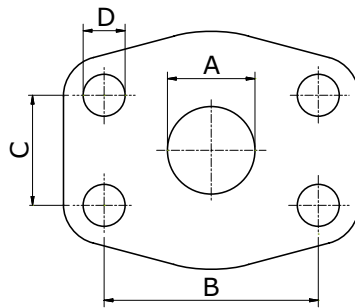
BSP THREAD (ISO 1179-1)

| 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)

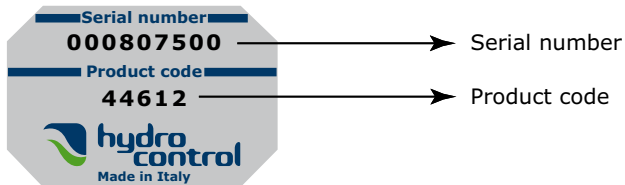
| Type | 3/4" (MA) | 3/4" (UNC) | 1" (MA) | 1" (UNC) | 1"1/4 (MA) | 1"1/4 (UNC) | 1"1/2 (MA) | 1"1/2 (UNC) |
|------|------------|------------|------------|------------|------------|-------------|------------|-------------|
| Code | S33 | S34 | S35 | S36 | S37 | S38 | S39 | S40 |
| A | 19 | 19 | 25 | 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

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. - Sede principale - Headquarters

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

Business Unit Hydrocontrol

Via Natale Salieri, 6 . 40024
Castel S. Pietro Terme . Bologna . Italy
TEL. +39 051 6959411

Galtech Site

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

AUSTRALASIA . *AUSTRALASIA*

Walvoil Fluid Power Australasia Pty Ltd

13 Vanessa Way . Delahey VIC 3037 . Melbourne . Australia
TEL. +61 458 918 750 . australasia@walvoil.com

BRASILE . *BRAZIL*

Interpump Hydraulics Brasil Ltda - Walvoil Division

Gilberto de Zorzi, 525 . Forqueta Caxias do Sul (RS)
TEL. +55 54 3223 2373 . infobrasil@walvoil.com

CANADA . *CANADA*

Galtech Canada Inc.

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

CINA . *CHINA*

Walvoil Fluid Power (Dongguan) Co. Ltd

1st Floor, the Third Factory Area, Sijia, Shijie Town, Dongguan City, Guangdong province, China.
TEL. +86 769 81816189-8020 . FAX. +86 769 81816589
info@walvoil.com.cn . www.walvoil.com.cn

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 . www.walvoil.co.kr

FRANCIA . *FRANCE*

Walvoil Fluid Power France

362 rue de Bretagne . Vritz . 44540 Vallons-de-l'Erdre
TEL. +33 2 41 94 41 06 . france@walvoil.com

INDIA . *INDIA*

Walvoil Fluid Power (India) PVT. LTD.

No. 19, 2nd Cross, 2nd Main, KIADB Industrial Area, Attibele,
Anekal Taluk, Bangalore - 562107 . TEL. +91 80 0614 24000 info@walvoil.co.in . www.walvoil.co.in

U.S.A. . *U.S.A.*

Walvoil Fluid Power Corp.

4111 North Garnett Tulsa, OK 74116, USA
TEL. +1 918 858 7100 . info@walvoilusa.com .
www.walvoilusa.com

Walvoil Fluid Power Corp. Hydrocontrol Business Unit

1109, Technology Drive . Red Wing . MN 55066 . U.S.A.
TEL. +1 651 212 6400 . info@walvoilusa.com .
www.walvoilusa.com

1st edition M50.06

www.walvoil.com



D1WHEA02E

