

D20

SECTIONAL VALVE



TECHNICAL CATALOGUE

A member of



 **walvoil**
FLUID POWER EMOTION

1st edition 8&\$\$.0)

*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

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

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

Special versions for LS variable pumps can be realised on request.

Suitable for applications including Wheel loaders, Truck cranes, Drilling machines, Sea platform cranes, Presses, Compactor, Hook and Skip loaders.





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) | 350 | 350 | 350 | 350 | 350 | 350 | 350 | 250 | 350 | 350 | 350 |
| Max working pressure (PSI) | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 | 4000 | 5000 | 5000 | 5000 |

| OPTION CHART | D9 | D3M | DVS10 | D4 | D6 | D16 | D12 | DVS20 | D20 | D25 | D40 |
|---|----|-----|-------|----|----|-----|-----|-------|-----|-----|-----|
| Direct acting pressure relief valve | • | • | • | • | | | | | | | |
| Pilot operated pressure relief valve | | • | | • | • | • | • | • | • | • | • |
| 2 stage pilot operated relief valve | | • | | • | • | • | • | | • | • | • |
| Externally piloted valve | • | • | • | • | • | • | • | | • | • | • |
| Solenoid dump valve (12 Vdc) | • | • | • | • | • | • | • | | | | |
| Solenoid dump valve (24 Vdc) | • | • | • | • | • | • | • | | | | |
| Main anticavitation check valve | | • | | • | • | • | • | • | • | • | • |
| Clamping valve | | • | • | • | | | | | | | |
| 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 | | | | | | • | | • | • | • | • |



GENERAL INDEX

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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

D20/1: IR 009 150 A G06 W001A H005 RP G06 01 PA 100 01 PB 100 TJ A G07

TYPE:

D20: product type
/1: working section number

1) INLET ARRANGEMENT: pag. 10

IR 009 inlet side and valve type
150 setting (bar)
A G06 inlet position and available thread type

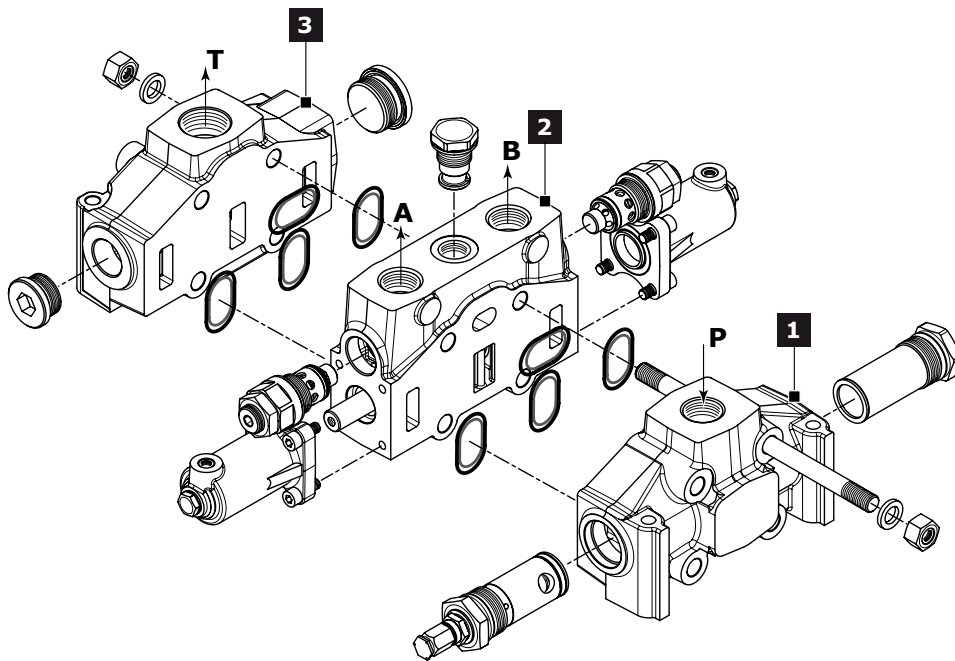
2) WORK SECTION ARRANGEMENT: pag. 14

W001A spool type
H005 spool actuation type
RP G06 type and thread section
01 PA 100 auxiliary valve (port A)
01 PB 100 auxiliary valve (port B)

3) OUTLET ARRANGEMENT: pag. 32

TJ outlet type
A G07 outlet position and available thread type

Ordering row 2 must be repeated for every work section



Standard thread

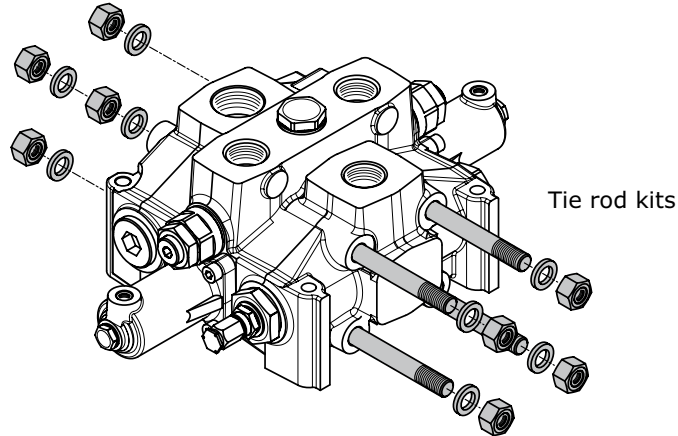
The connection ports size is indicated by an ordering code common for all Hydrocontrol products. Following table shows all available connections; for ordering code refer to table on page 40.

| ports | BSP (ISO-228) | UN-UNF (ISO-725) | SAE 3000 (ISO 6162-1) | SAE 6000 (ISO 6162-6) |
|--------------------------|------------------------------|----------------------------|-------------------------------------|-----------------------------------|
| Inlet Port (P) | G 1 - G 1 1/4 G06-G07 | 1 5/16 - 12 UNF U06 | 1" MA - 1" UNC S05-S06 | 3/4" MA - 3/4" UNC S33-S34 |
| Ports (A - B) | G 1 - G 1 1/4 G06-G07 | 1 5/16 - 12 UNF U06 | 1" MA - 1" UNC S05-S06 | 3/4" MA - 3/4" UNC S33-S34 |
| Outlet (T) | G 1 1/4 G07 | 1 5/16 - 12 UNF U06 | 1 1/4 MA - 1 1/4 UNC S07-S08 | - |
| Carry over (HPCO) | G 1 1/4 G07 | 1 5/8 - 12 UNF U07 | 1 1/4 MA - 1 1/4 UNC S07-S08 | 1" MA - 1" UNC S35-S36 |
| 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. D20 requires 4 tie-rod kits.



| Tie rod kit | Order Code | Length (mm) | Clamping Torque (Nm) | Quantity |
|-------------|------------|-------------|----------------------|----------|
| D20/1 | 300108001 | 248 | | |
| D20/2 | 300108002 | 312 | | |
| D20/3 | 300108003 | 376 | | |
| D20/4 | 300108004 | 440 | | |
| D20/5 | 300108005 | 504 | | |
| D20/6 | 300108006 | 568 | | |
| D20/7 | 300108007 | 632 | 110 | 4 |
| D20/8 | 300108008 | 696 | | |
| D20/9 | 300108009 | 760 | | |
| D20/10 | 300108010 | 824 | | |
| D20/11 | 300108011 | 888 | | |
| D20/12 | 300108012 | 952 | | |

Painting

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

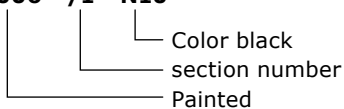
Order example of D20/1 painted:

D20/1
 IR 009 150 A G06
 W001A H001 F001A RP G06 01 PA 100 01 PB 100
 TJ A G07

P006/1 N10

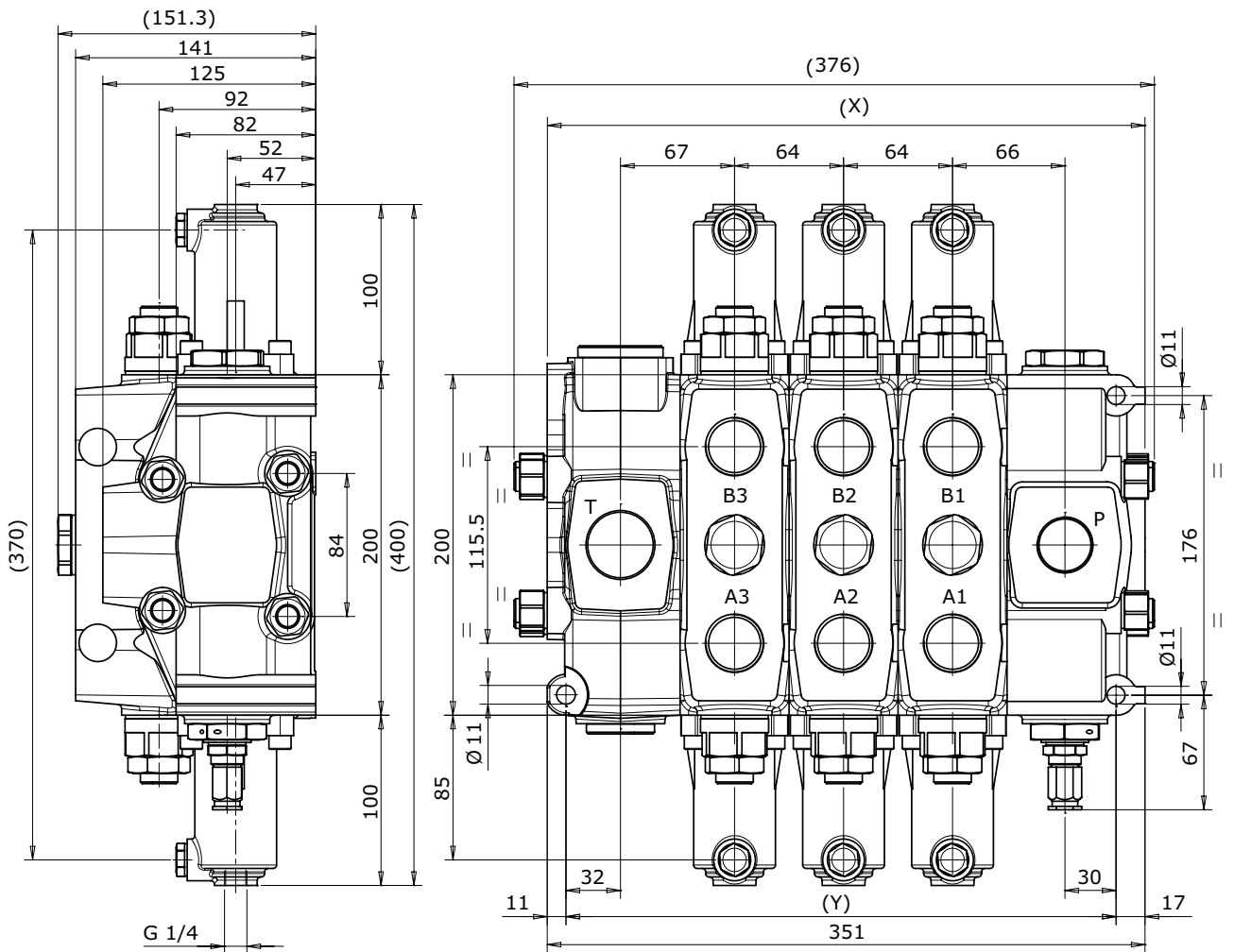
The painting is indicated with the following value:

P006 - /1 - N10





DIMENSIONS



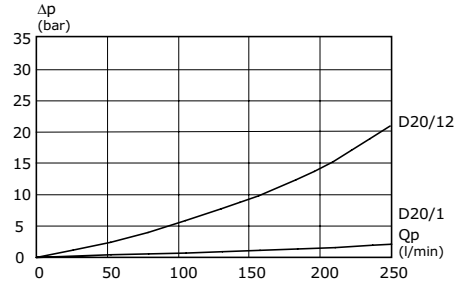
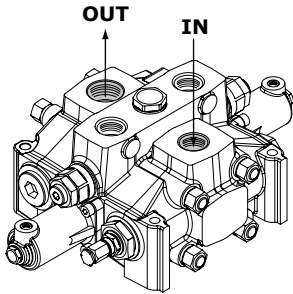
| TYPE | /1 | /2 | /3 | /4 | /5 | /6 | /7 | /8 | /9 | /10 | /11 | /12 |
|---------------------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|
| X (mm) | 195 | 259 | 323 | 387 | 451 | 515 | 579 | 643 | 707 | 771 | 835 | 899 |
| Y (mm) | 223 | 287 | 351 | 415 | 479 | 543 | 607 | 671 | 735 | 799 | 863 | 927 |
| Weights (kg) | 28,6 | 39,6 | 50,6 | 61,6 | 72,6 | 83,6 | 94,6 | 105,5 | 116,4 | 127,4 | 138,4 | 149,4 |



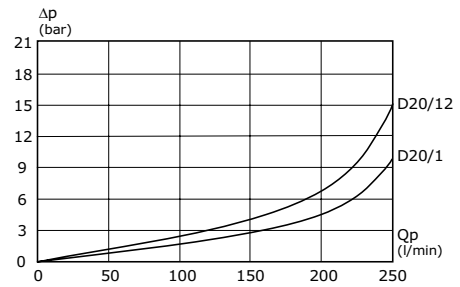
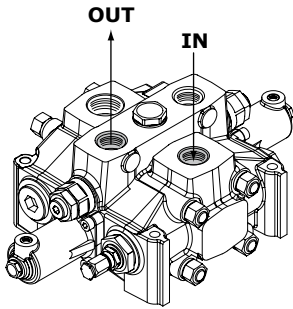
TYPICAL CURVES

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

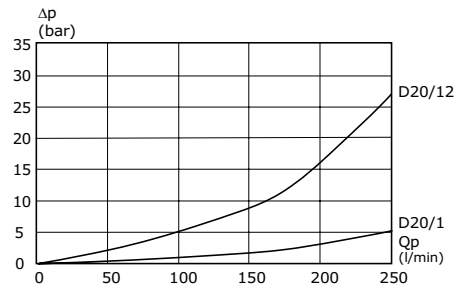
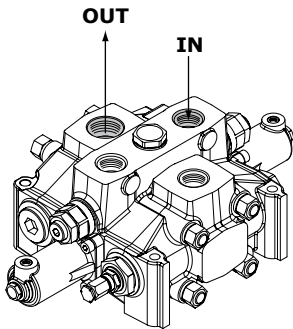
Pressure drop (P - T)



Pressure drop (P - A/B)

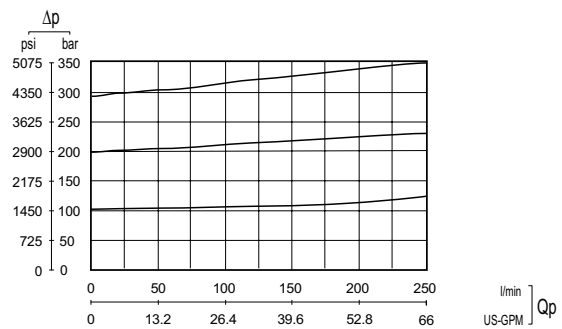


Pressure drop (A/B - T)



Pilot operated relief valve curve

| Setting ranges | |
|----------------|----------------|
| type | pressure (bar) |
| A | 0 - 350 |



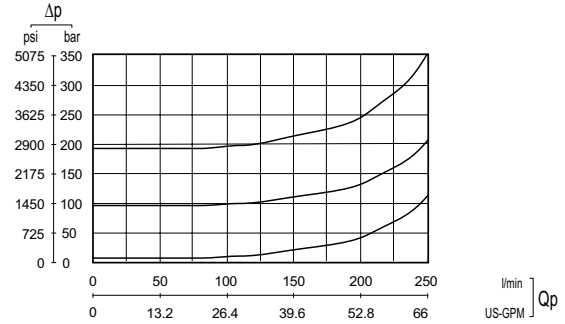


TYPICAL CURVES

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

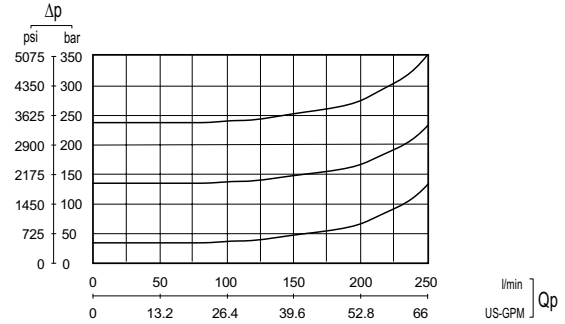
Antishock valve curve

| Setting ranges | | |
|----------------|----------------|---------------|
| type | pressure (bar) | |
| | at full flow | at min. flow |
| A | 0 - 70 | 0-A / 50-A |
| A | 71 - 120 | 51-A / 70-A |
| B | 121 - 150 | 71-A / 110-A |
| C | 151 - 300 | 111-A / 240-A |
| D | 301 - 350 | 241-A / 350-A |

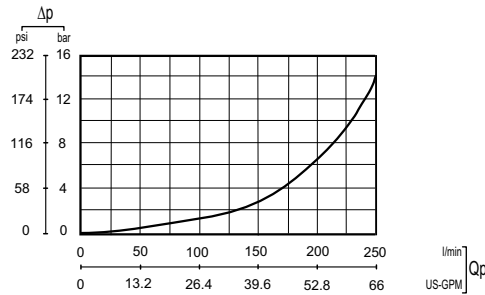


Combined valve curve

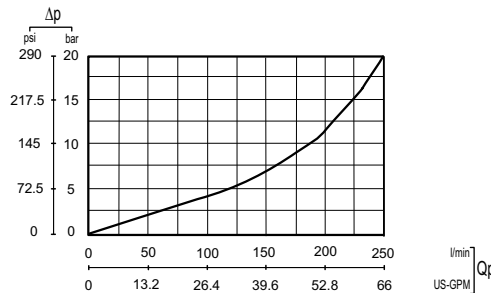
| Setting ranges | | |
|----------------|----------------|---------------|
| type | pressure (bar) | |
| | at full flow | at min. flow |
| A | 50 - 130 | 20-A / 100-A |
| B | 131 - 220 | 101-A / 220-A |
| C | 221 - 260 | 221-A / 350-A |



Main anticavitation check valve curve



Anticavitation check valve curve



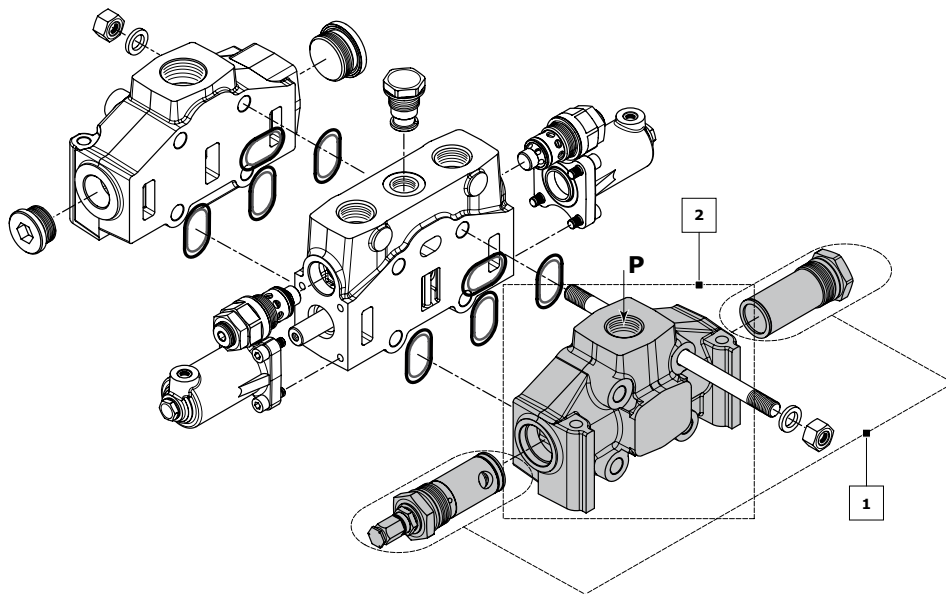


INLET SECTION

Order example

| | | | |
|----|-----|-----|-------|
| IR | 009 | 150 | A G05 |
|----|-----|-----|-------|

- 1. **IR** inlet side classification _____
- 009** valve arrangement _____
- 150** setting (bar) _____
- 2. **A G06** 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 | |
| 1 | 009 | Pilot operated pressure relief valve | |
| | 010 | Pilot operated pressure relief valve and Main anticavitation check valve | 12 |
| | 019 | Without valves | |
| 2 | A G06 | Upper inlet (thread G 1) | |
| | A G07 | Upper inlet (thread G 1"1/4) | |
| | A U07 | Upper inlet (thread 1"5/8 - 12 UNF) | 13 |
| | A S05 | Upper inlet (thread SAE 3000 1" MA) | |
| | A S33 | Upper inlet (thread SAE 6000 3/4" MA) | |

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



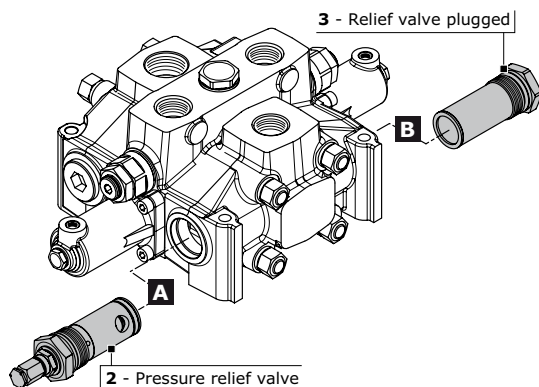
Inlet side classifications

| | Sectional valve with right inlet section | Sectional valve with right inlet section |
|-----------|---|---|
| IR | | |
| | | |
| IL | | |
| | | |

Valve identification

| type | schema | layout | description | type | schema | layout | description |
|----------|--------|--------|--------------------------------------|-----------|--------|--------|-------------------------------------|
| 2 | | | Pilot operated pressure relief valve | 5 | | | 2 stage pilot operated relief valve |
| 3 | | | Relief valve plugged | 6 | | | Externally piloted valve |
| 4 | | | Main anticavitation check 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 | | | | | | |
|---------------------------------|---|---|---|---|---|---|---|-----|
| | |  |  |  |  |  |  | |
| | | 2 | 3 | 4 | 5 | 6 | 11 | |
| Valve type on port A |  | 2 | | 009 | 010 | | 011 | 016 |
| |  | 3 | 018 | 019 | 020 | 021 | 022 | 027 |
| |  | 4 | 029 | 030 | | 031 | 032 | 037 |
| |  | 5 | | 038 | | | | |
| |  | 6 | 047 | 048 | | | | |
| |  | 11 | 085 | | | | | |

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

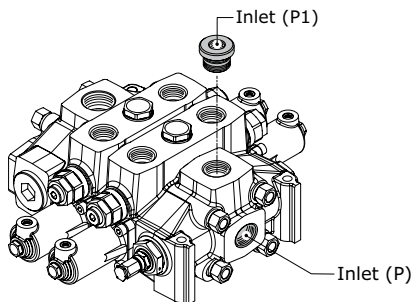
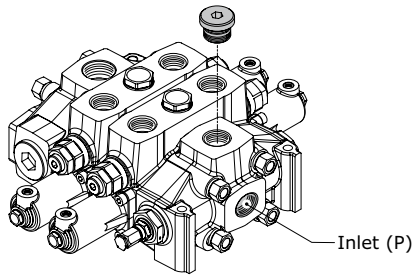
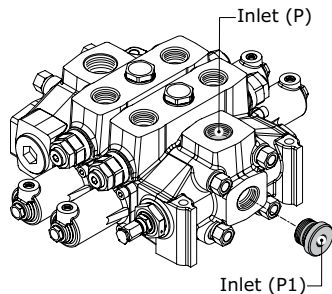
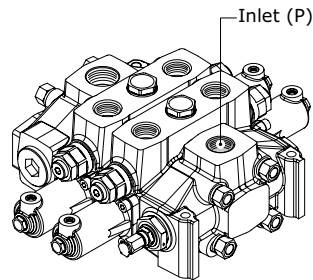
Order example for inlet section: IR **038 200*280** A G05

038
200*380

valve combination _____
double range setting (bar) _____



| Inlet combination and thread available | |
|--|--|
| A G06 | Upper inlet (thread G 1) |
| A G07 | Upper inlet (thread G 1 1/4) |
| A U07 | Upper inlet (thread 1 5/8 - 12 UNF) |
| A S05 | Upper inlet (thread SAE 3000 - 1" MA) |
| A S06 | Upper inlet (thread SAE 3000 - 1" UNC) |
| A S33 | Upper inlet (thread SAE 6000 - 3/4" MA) |
| A S34 | Upper inlet (thread SAE 6000 - 3/4" UNC) |
| B G06 | Upper inlet P1 with pressure-gauge connection G 1/4 (thread G 1) |
| B G07 | Upper inlet P1 with pressure-gauge connection G 1/4 (thread G 1 1/4) |
| B U07 | Upper inlet P1 with pressure-gauge connection G 1/4 (thread 1 5/8 - 12 UNF) |
| B S05 | Upper inlet P1 with pressure-gauge connection G 1/4 (thread SAE 3000 - 1" MA) |
| B S06 | Upper inlet P1 with pressure-gauge connection G 1/4 (thread SAE 3000 - 1" UNC) |
| B S33 | Upper inlet P1 with pressure-gauge connection G 1/4 (thread SAE 6000 - 3/4" MA) |
| B S34 | Upper inlet P1 with pressure-gauge connection G 1/4 (thread SAE 6000 - 3/4" UNC) |
| C G06 | Central side inlet (thread G 1) |
| C G07 | Central side inlet (thread G 1 1/4) |
| C U07 | Central side inlet (thread 1 5/8 - 12 UNF) |
| C S05 | Central side inlet (thread SAE 3000 - 1" MA) |
| C S06 | Central side inlet (thread SAE 3000 - 1" UNC) |
| C S33 | Central side inlet (thread SAE 6000 - 3/4" MA) |
| C S34 | Central side inlet (thread SAE 6000 - 3/4" UNC) |
| D G06 | Central side inlet P1 with pressure-gauge connection G 1/4 (thread G 1) |
| D G07 | Central side inlet P1 with pressure-gauge connection G 1/4 (thread G 1 1/4) |
| D U07 | Central side inlet P1 with pressure-gauge connection G 1/4 (thread 1 5/8 - 12 UNF) |
| D S05 | Central side inlet P1 with pressure-gauge connection G 1/4 (thread SAE 3000 - 1" MA) |
| D S06 | Central side inlet P1 with pressure-gauge connection G 1/4 (thread SAE 3000 - 1" UNC) |
| D S33 | Central side inlet P1 with pressure-gauge connection G 1/4 (thread SAE 6000 - 3/4" MA) |
| D S34 | Central side inlet P1 with pressure-gauge connection G 1/4 (thread SAE 6000 - 3/4" UNC) |



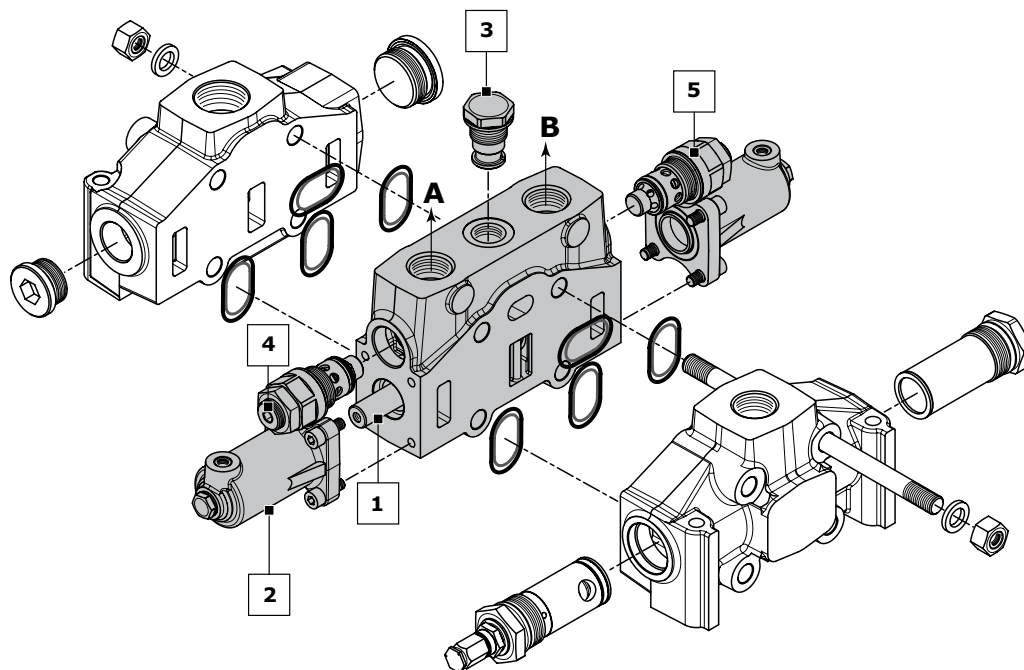


WORKING SECTION

Order example:

| | | | | |
|--------------|-------------|---------------|------------------|------------------|
| W001A | H005 | RP G06 | 01 PA 100 | 01 PB 100 |
|--------------|-------------|---------------|------------------|------------------|

- 1. **W001A** spool type
- 2. **H005** spool actuation type
- 3. **RP G06** section and thread type
- 4. **01 PA 100** auxiliary valve (port A - handle side)
- 5. **01 PB 100** auxiliary valve (port B - cap side)



| Rif. | Code | Description | Page |
|------|------------------|---|------|
| 1 | W001 | 3 positions double-acting | 15 |
| | W002 | 3 positions double-acting A-B to tank | |
| 2 | H101 | Unprotected lever | 17 |
| | H005* | hydraulic actuation | |
| 3 | RP G06 | Parallel circuit (G 1) | 23 |
| | RP U06 | Parallel circuit (1"5/16-12 UNF) | |
| | RS G06 | Series circuit (G 1) | |
| | RS U06 | Series circuit (1"5/16-12 UNF) | |
| 4 | 01 PA 100 | Antishock valve (port A) | 24 |
| | 05 PA | Prearrangement for auxiliary valve (port A) | |
| 5 | 01 PB 100 | Antishock valve (port B) | 24 |
| | 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 (100)**



Spool identification

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

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

| | | |
|-------------|--|--|
| 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 | 4,08 | |
| K10 | A IN T | 0,10 | 4,08 | |
| Y10 | B IN T | 0,10 | 4,08 | |

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

Please contact our Sales department for more information.



Spool actuation classification for manual control

| code | description | dimensions | configuration |
|-------------|--------------------------------|------------|---------------|
| H004 | Control without lever | | |
| H101 | Unprotected lever | | |
| H102 | Unprotected lever rotated 180° | | |

Spool actuation classification for Hydraulic control

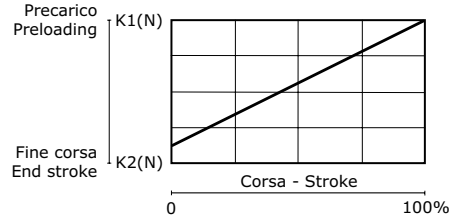
| code | description | dimensions | configuration |
|---|--|------------|---------------|
| H005 leave out the spool return action code | Hydraulic actuation with side ports BSP ports = G 1/4 UNF ports = 9/16-18 UNF | | |
| H006 leave out the spool return action code | Hydraulic actuation with side ports and cast-iron end caps BSP ports = G 1/4 UNF ports = 9/16-18 UNF | | |



Spool return action classification - Springs load values

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

| Spring type | | | |
|--|---------------------|-----------------|------------------|
| Code | A (standard spring) | B (soft spring) | C (heavy spring) |
| Preloading | 196.2 N | 145.1 N | 313.9 N |
| End of stroke | 245.2 N | 176.6 N | 412 N |
| Spool return action identification example | | | |
| Code | F001A | F001B | F001C |



Spool return action classification

| 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) | | | |
| F013A F013B F013C | 3 positions spring-centred spool prearrangement dual command | | | |

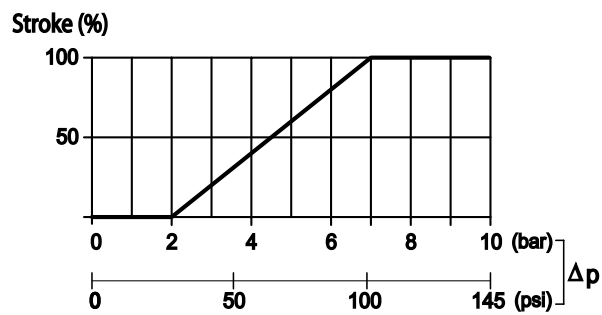


Pneumatic control classification

| 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 1/4 | |
| 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° | | | |

Proportional pneumatic control curve

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

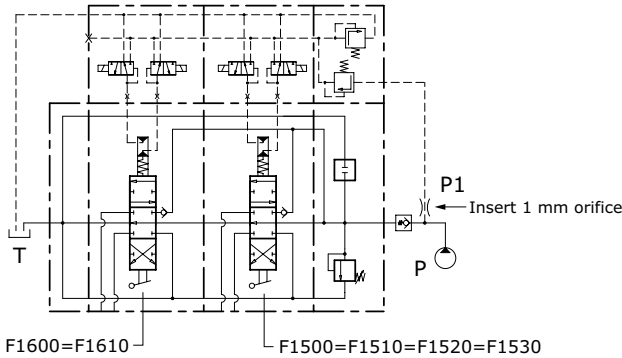




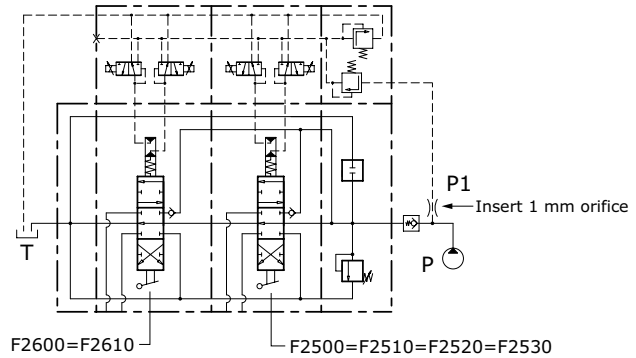
Electrohydraulic control specifications

| | |
|-----------------------------|----------------|
| 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 |
| Raccomanded pilot pipe size | Ø 6 mm - G 1/4 |

Electrohydraulic ON-OFF control with fixed pressure reducing valve



Electrohydraulic PROPORTIONAL control with fixed pressure reducing valve



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.

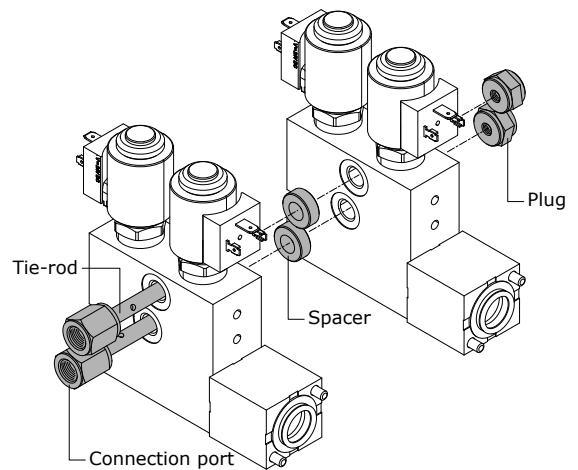
NOTE: the control tie rod kit has always to be ordered separately.

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
- 320108001** = control tie rod /2
- 320108002** = control tie rod /3
- 320108003** = control tie rod /4
- 320108004** = control tie rod /5
- 320108005** = control tie rod /6
- 320108006** = control tie rod /7
- 320108007** = control tie rod /8
- 320108008** = control tie rod /9

Order code for control tie rod (UNF):

- 320103026** = control tie rod /1
- 320108012** = control tie rod /2
- 320108013** = control tie rod /3
- 320108014** = control tie rod /4
- 320108015** = control tie rod /5
- 320108016** = control tie rod /6
- 320108017** = control tie rod /7
- 320108018** = control tie rod /8
- 320108019** = control tie rod /9



Compatibility table

| SPOOL ACTION TYPE | SPOOL TYPE | | | | | | | | | | | | | | | | | | | | |
|--------------------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|
| | W001A | W001B | W002A | W002B | W003A | W003B | W004A | W004B | W005A | W005B | W006A | W006B | W009A | W009B | W010A | W011A | W012A | W013A | W015A | W016A | |
| H101 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| H102 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| H004 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| H005 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| H006 | • | • | • | • | • | • | • | • | | | | | • | • | | | • | | • | • | • |
| SPOOL RETURN ACTION TYPE | SPOOL TYPE | | | | | | | | | | | | | | | | | | | | |
| | W001A | W001B | W002A | W002B | W003A | W003B | W004A | W004B | W005A | W005B | W006A | W006B | W009A | W009B | W010A | W011A | W012A | W013A | W015A | W016A | |
| F001 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |
| F002 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | | • | • | • |
| F003 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | | • | • | • |
| F004 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | | • | • | • |
| F005 | | | | | | | | | | | | | | | | | • | | | | |
| F013 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |
| F020=F021 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |
| F022=F023 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |
| F135=F136 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |
| F126=F127 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |
| F0620=F0630 | • | • | • | • | • | • | • | • | | | | | • | • | • | • | | • | • | • | • |
| F1500=F1510 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |
| F1520=F1530 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |
| F2500=F2510 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |
| F2520=F2530 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |
| F1600=F1610 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | | • | • | • | • |



Work section identification

| working section type | |
|----------------------|--|
| RP G06 | |
| RP G07 | |
| RP U06 | |
| RP S05 | |
| RP S06 | |
| RP S33 | |
| RP S34 | |

Parallel circuit section

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.


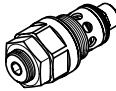

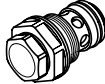

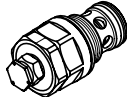


| | |
|---------------|--|
| RS G06 | |
| RS G07 | |
| RS U06 | |
| RS S05 | |
| RS S06 | |
| RS S33 | |
| RS S34 | |


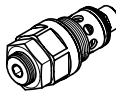



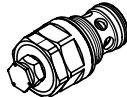


Series circuit section

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



Auxiliary valve identification

| code | description | schema | configuration | setting range (bar) | | | |
|-------|---|---|---|---------------------|--------------|------|---------------|
| | | | | type | at full flow | type | at min. flow |
| 01 PA | Antishock valve (port A) |  |  | A | 0 / 70 | A | 0-A / 50-A |
| | | | | B | 71 / 120 | B | 51-A / 70-A |
| | | | | C | 121 / 150 | C | 71-A / 110-A |
| | | | | D | 151 / 300 | D | 111-A / 240-A |
| | | | | E | 301 / 350 | E | 241-A / 350-A |
| 02 PA | Anticavitation valve (port A) |  |  | | | | |
| 04 PA | Pilot combined valve (port A) |  |  | A | 30 / 110 | | |
| | | | | B | 111 / 350 | | |
| 05 PA | Prearrangement for auxiliary valve (port A) |  |  | | | | |

| code | description | schema | configuration | setting range (bar) | | | |
|-------|---|---|---|---------------------|--------------|------|---------------|
| | | | | type | at full flow | type | at min. flow |
| 01 PB | Antishock valve (port B) |  |  | A | 0 / 70 | A | 0-A / 50-A |
| | | | | B | 71 / 120 | B | 51-A / 70-A |
| | | | | C | 121 / 150 | C | 71-A / 110-A |
| | | | | D | 151 / 300 | D | 111-A / 240-A |
| | | | | E | 301 / 350 | E | 241-A / 350-A |
| 02 PB | Anticavitation valve (port B) |  |  | | | | |
| 04 PB | Pilot combined valve (port B) |  |  | A | 30 / 110 | | |
| | | | | B | 111 / 350 | | |
| 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 and pilot combined valve:

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

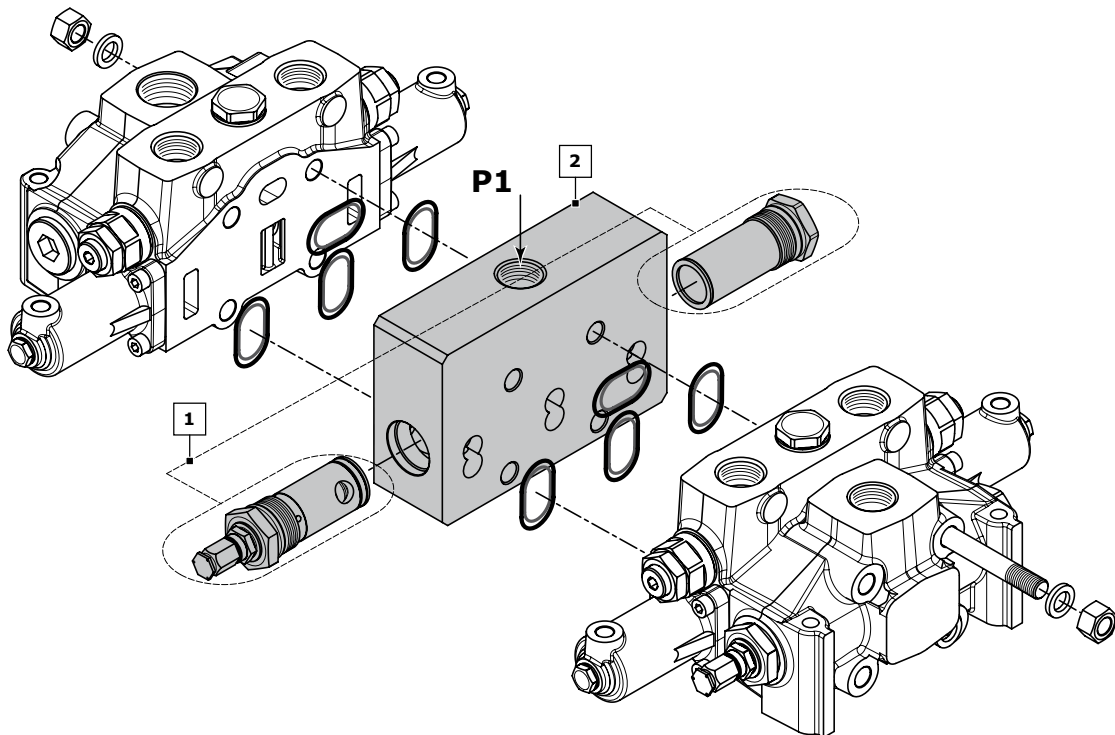


INTERMEDIATE INLET SECTION

Order example

| | | | |
|----|-----|-----|-------|
| BE | 009 | 150 | A G06 |
|----|-----|-----|-------|

- 1. **BE** inlet side _____
- 1. **009** valve arrangement _____
- 1. **150** setting (bar); when ordering a main relief valve it is necessary to specify setting _____
- 2. **A G06** inlet position and available thread type _____



| Rif. | Code | Description | Page |
|------|--------------|--|-----------|
| - | BE | Intermediate inlet section | 26 |
| | BV* | Intermediate inlet section with pressure relief valve | |
| 1 | 009 | Pilot operated pressure relief valve | 27 |
| | 010 | Pilot operated pressure relief valve and Main anticavitation check valve | |
| | 019 | Without valves | |
| | 020 | Main anticavitation check valve | |
| 2 | A G06 | Upper inlet (thread G 1) | |
| | A U06 | Upper inlet (thread 1"5/16-12 UNF) | |

NOTE: when ordering a relief valve it is necessary to specify factory setting (example 150).
 * = omit the code for inlet positioning and thread



Intermediate inlet section classifications

intermediate inlet type

| | | | |
|-----------|--|--|----------------------------|
| 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.

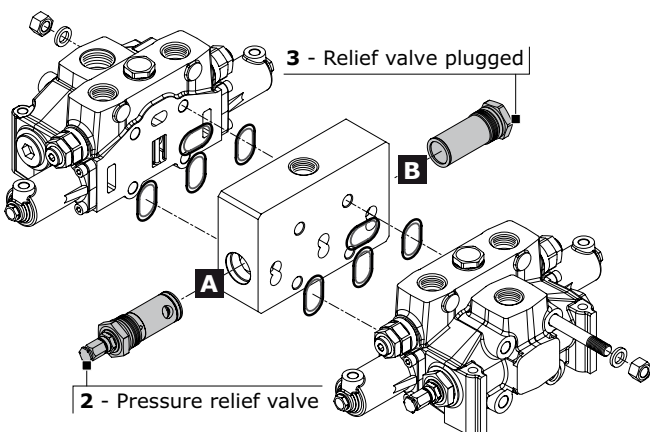
| | | | |
|-----------|--|--|---|
| BV | | | Intermediate inlet section with pressure relief valve |
|-----------|--|--|---|

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 |
|----------|--------|--------|--------------------------------------|-----------|--------|----------------|-------------------------------------|
| 2 | | | Pilot operated pressure relief valve | 4 | | | Externally piloted valve |
| 3 | | | Relief valve plugged | 11 | | | Plug with pressure-gauge connection |

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.

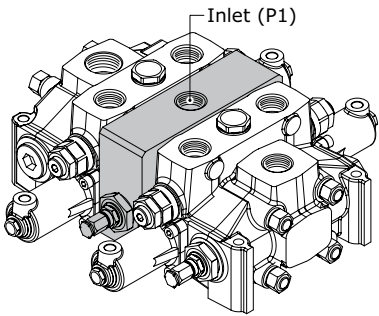
(A) = spool action side

(B) = spool return action side

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



| | | Valve type on port B | | | |
|---------------------------------|---|---|---|--|---|
| | |  |  |  |  |
| VALVE COMBINATION INLET SECTION | | 2 | 3 | 4 | 11 |
| Valve type on port A |  | 2 | 009 | 010 | 016 |
| |  | 3 | 018 | 019 | 027 |
| |  | 4 | 029 | 030 | |
| |  | 11 | 085 | 086 | |

| Inlet combination and thread available | |
|--|---|
| A G06 |  <p>Upper inlet</p> |
| A G07 | |
| A U06 | |
| A S05 | |
| A S06 | |
| A S33 | |
| A S34 | |



Complete configuration samples for D20/2 with intermediate inlet section (BE)

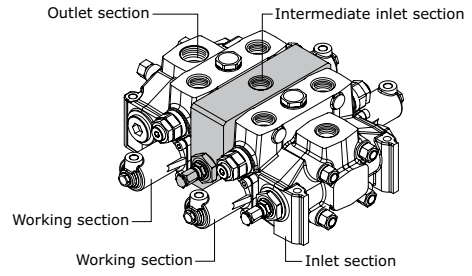
IR 009 150 A G06 Right inlet section

W001A H101 F001A RP G06..... Working section

BE 009 150 A G06Intermediate inlet section

W001A H101 F001A RP G06..... Working section

TJ A G07 Outlet section



Complete configuration samples for D20/2 with intermediate inlet section (BV)

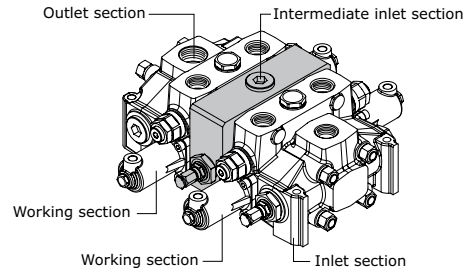
IR 009 150 A G06 Right inlet section

W001A H101 F001A RP G06..... Working section

BV 009 150Intermediate inlet section

W001A H101 F001A RP G06..... Working section

TJ A G07 Outlet section



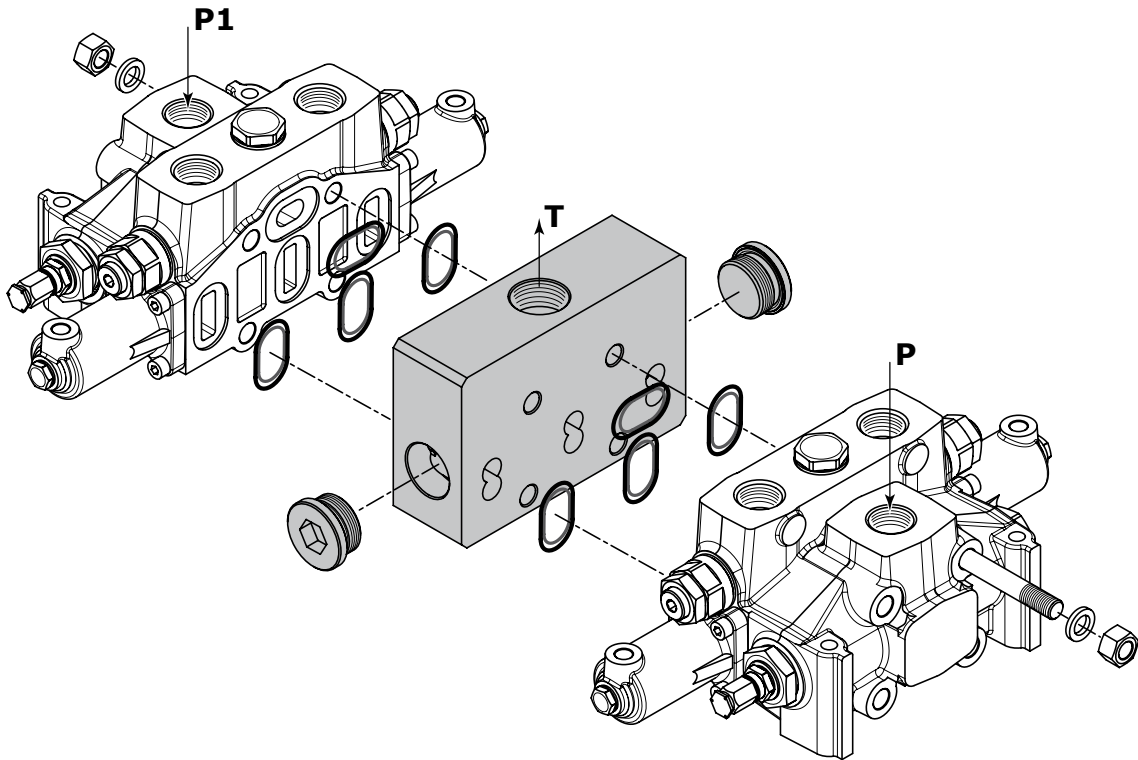


INTERMEDIATE OUTLET SECTION

Order example

BF | **A G07**

1. **BF** inlet side _____
A G07 inlet position and available thread type _____



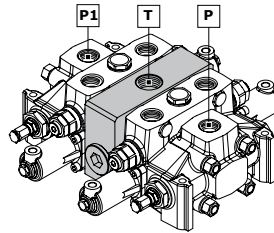
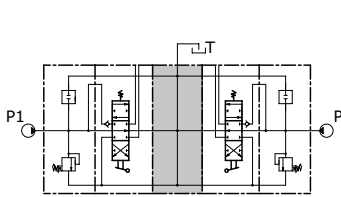
| Rif. | Code | Type | Description | Page |
|------|--------------|------|---|------|
| - | BF | | Intermediate outlet section with single tank return | |
| | BG | | Intermediate outlet section with two tank returns | |
| 1 | A G07 | | Upper outlet (thread G 1"1/4) | 30 |
| | A U07 | | Upper outlet (thread 1"5/8-12 UNF) | |
| | G G07 | for | Front outlet side A (thread G 1"1/4) | |
| | G U07 | BF | Front outlet side A (thread 1"5/8-12 UNF) | |
| | H G07 | | Rear outlet side B (thread G 1"1/4) | |
| | H U07 | | Rear outlet side B (thread 1"5/8-12 UNF) | |
| | J G07 | for | Upper outlet HPCO - front side A and rear side B to T (thread G 1"1/4) | |
| | J U07 | BG | Upper outlet HPCO-front side A and rear side B to T (thread 1"5/8-12 UNF) | |



Intermediate outlet section classifications

intermediate outlet type

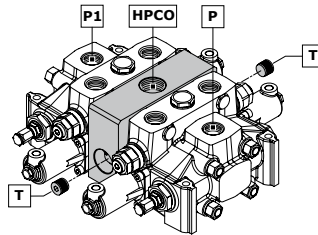
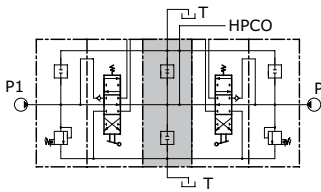
BF



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



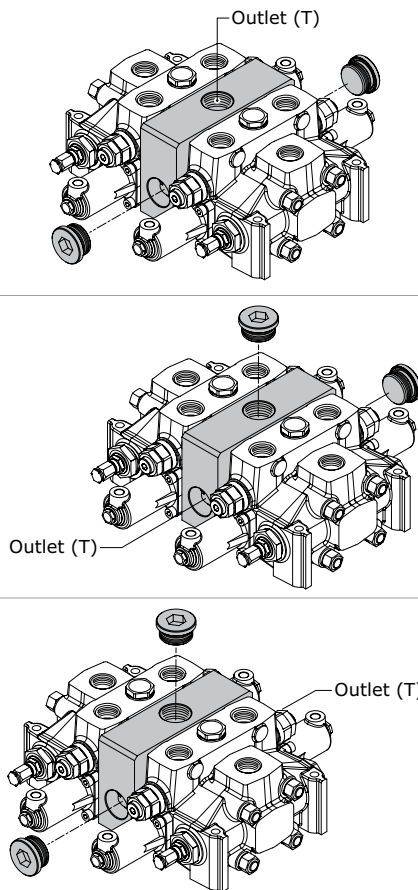
Intermediate outlet section with **two tank returns**

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 G07
A U07
A S07
A S08
G G07
G U07
G S07
G S08
H G07
H U07
H S07
H S08



Upper outlet (T)

Front outlet side A (T)

Rear outlet side B (T)



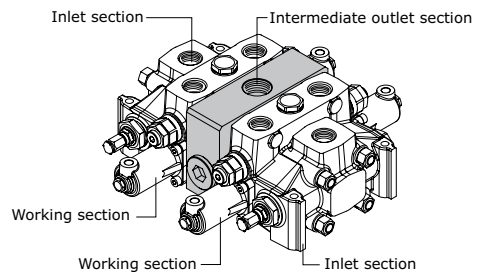
Outlet position and available thread type (for BG intermediate)

| Inlet combination and thread available | |
|--|--|
| J G07 | |
| J U07 | |
| J S07 | |
| J S08 | |

Upper outlet HPCO front side A and rear side B to T

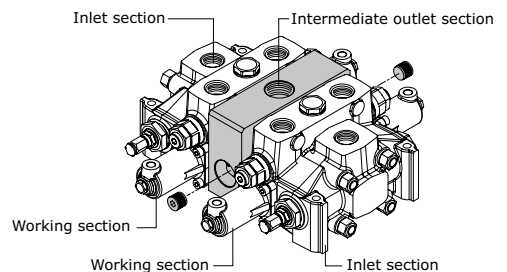
Complete configuration samples for D20/2 with intermediate outlet section (BF)

- IR 009 150 A G06 Right inlet section
- W001A H101 F001A RP G06..... Working section
- BF A G07Intermediate outlet section**
- W001A H101 F001A RP G06..... Working section
- IL 009 150 A G06 Left inlet section



Complete configuration samples for D20/2 with intermediate outlet section (BG)

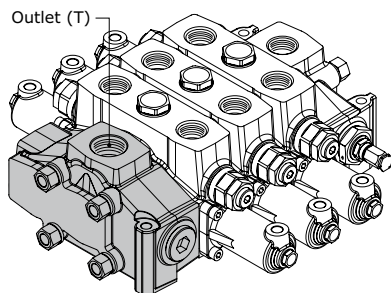
- IR 009 150 A G06 Right inlet section
- W001A H101 F001A RP G06..... Working section
- BG J G07Intermediate outlet section**
- W001A H101 F001A RP G06..... Working section
- IL 009 150 A G06 Left inlet section





OUTLET SECTION (VERSION 1 OUTLET)

Order example



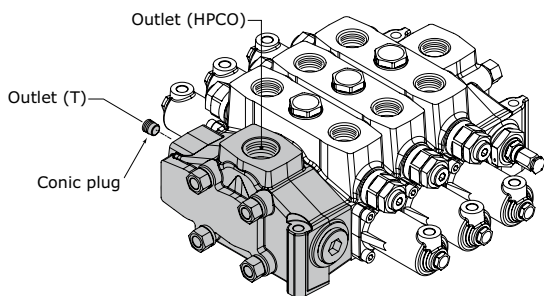
TJ | **A G07**

1. **TJ** outlet section type
2. **A G07** outlet position and available thread type

| Rif. | Code | Description | Page |
|--------------|--|--|------|
| 1 | TJ | Outlet section with single return (T) right-side inlet (P) | |
| | TK | Outlet section with single return (T) left-side inlet (P) | |
| 2 | A G07 | Upper outlet (thread G 1"1/4) | 33 |
| | A U07 | Upper outlet (thread 1"5/8-12 UNF) | |
| | A S07 | Upper outlet (thread SAE 3000 - 1"1/4 MA) | |
| | A S08 | Upper outlet (thread SAE 3000 - 1"1/4 UNC) | |
| | C G07 | Central outlet (thread G 1"1/4) | |
| | C U07 | Central outlet (thread 1"5/8-12 UNF) | |
| | C S07 | Central outlet (thread SAE 3000 - 1"1/4 MA) | |
| C S08 | Central outlet (thread SAE 3000 - 1"1/4 UNC) | | |

OUTLET SECTION (HPCO VERSION OUTLET)

Order example - HPCO version Outlet



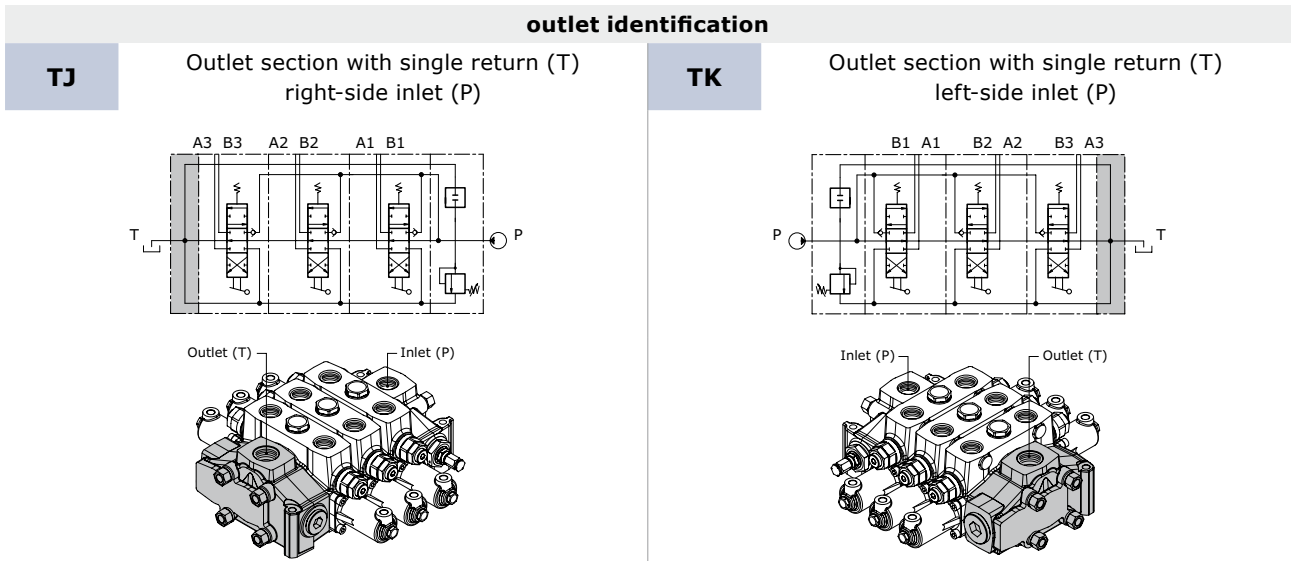
TM | **M G07**

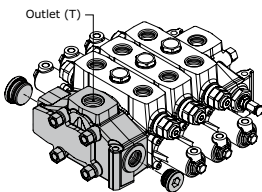
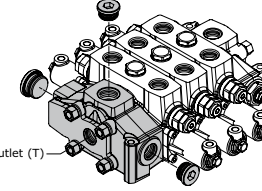
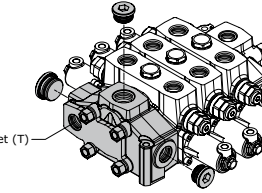
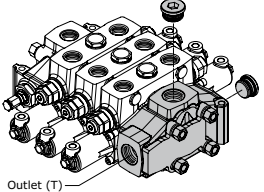
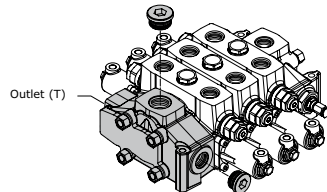
1. **TM** outlet section type
2. **M G07** outlet position and available thread type

| Rif. | Code | Description | Page |
|------|--------------|--|------|
| 1 | TM | Outlet section with two return (T-HPCO) right-side inlet (P) | |
| | TN | Outlet section with two return (T-HPCO) left-side inlet (P) | |
| 2 | M G07 | HPCO upper outlet T (tank) rear outlet side B (thread G 1"1/4) | 34 |
| | M U07 | HPCO upper outlet T (tank) rear outlet side B (thread 1"5/8-12 UNF) | |
| | M S07 | HPCO upper outlet T (tank) rear outlet side B (thread SAE 3000 - 1"1/4 MA) | |
| | M S08 | HPCO upper outlet T (tank) rear outlet side B (thread SAE 3000 - 1"1/4 UNC) | |
| | N G07 | HPCO upper outlet T (tank) front outlet side A (thread G 1"1/4) | |
| | N U07 | HPCO upper outlet T (tank) front outlet side A (thread 1"5/8-12 UNF) | |
| | N S07 | HPCO upper outlet T (tank) front outlet side A (thread SAE 3000 - 1"1/4 MA) | |
| | N S08 | HPCO upper outlet T (tank) front outlet side A (thread SAE 3000 - 1"1/4 UNC) | |



Outlet with single tank classification



| outlet combination and thread available | | | |
|---|---|---|--|
| A G07 |  | Upper outlet (thread G 1"1/4) | |
| A U07 | | Upper outlet (thread 1"5/8 - 12 UNF) | |
| A S07 | | Upper outlet (thread SAE 3000 - 1"1/4 MA) | |
| A S08 | | Upper outlet (thread SAE 3000 - 1"1/4 UNC) | |
| C G07 |  | Central outlet (thread G 1"1/4) | |
| C U07 | | Central outlet (thread 1"5/8 - 12 UNF) | |
| C S07 | | Central outlet (thread SAE 3000 - 1"1/4 MA) | |
| C S08 | | Central outlet (thread SAE 3000 - 1"1/4 UNC) | |
| F G07 |  | Lateral outlet (thread G 1"1/4) | |
| F U07 | | Lateral outlet (thread 1"5/8 - 12 UNF) | |
| G G07 |  | only for TK | Front outlet side A (thread G 1"1/4) |
| G U07 | | | Front outlet side A (thread 1"5/8 - 12 UNF) |
| G S07 | | | Front outlet side A (thread SAE 3000 - 1"1/4 MA) |
| G S08 | | | Front outlet side A (thread SAE 3000 - 1"1/4 UNC) |
| H G07 |  | only for TJ | Rear outlet side B (thread G 1"1/4) |
| H U07 | | | Rear outlet side B (thread 1"5/8 - 12 UNF) |
| H S07 | | | Rear outlet side B (thread SAE 3000 - 1"1/4 MA) |
| H S08 | | | Rear outlet side B (thread SAE 3000 - 1"1/4 UNC) |

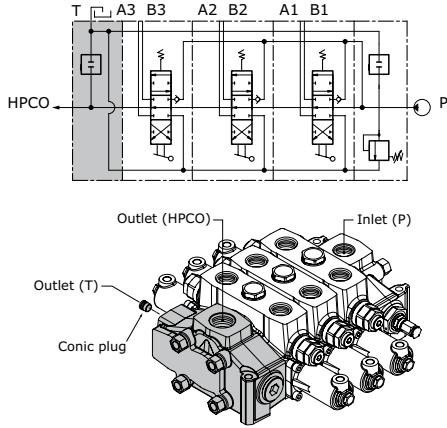


Outlet with two tanks classification

outlet identification

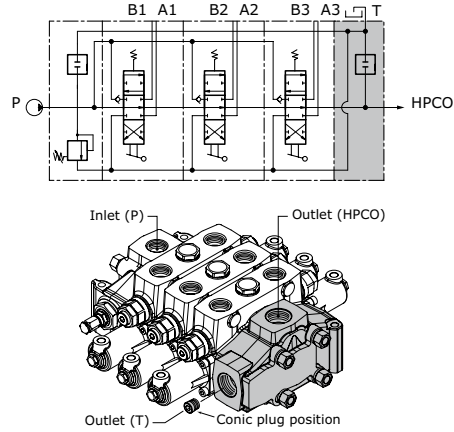
TM

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



TN

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



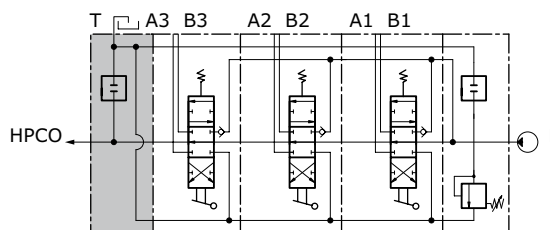
outlet combination and thread available

| | | | | | | | | |
|--------------|--|--------------------|--|--------------|--|--------------------|---|--|
| M G07 | | only for TM | HPCO Upper outlet T rear outlet side B (thread G 1"1/4) | Q G07 | | only for TN | HPCO Central outlet T front outlet side A (thread G 1"1/4) | |
| M U07 | | | HPCO Upper outlet T rear outlet side B (thread 1"5/8-12 UNF) | Q U07 | | | HPCO Central outlet T front outlet side A (thread 1"5/8-12 UNF) | |
| M S07 | | | HPCO Upper outlet T rear outlet side B (thread SAE 3000 3/4 MA) | Q S07 | | | HPCO Central outlet T front outlet side A (thread SAE 3000 3/4 MA) | |
| M S08 | | | HPCO Upper outlet T rear outlet side B (thread SAE 3000 3/4 UNC) | Q S08 | | | HPCO Central outlet T front outlet side A (thread SAE 3000 3/4 UNC) | |
| M S35 | | | HPCO Upper outlet T rear outlet side B (thread SAE 6000 1" MA) | Q S35 | | | HPCO Central outlet T front outlet side A (thread SAE 6000 1" MA) | |
| M S36 | | | HPCO Upper outlet T rear outlet side B (thread SAE 6000 1" UNC) | Q S36 | | | HPCO Central outlet T front outlet side A (thread SAE 6000 1" UNC) | |
| N G07 | | only for TN | HPCO Upper outlet T front outlet side A (thread G 1"1/4) | R G07 | | only for TM | HPCO Upper outlet T rear outlet side B (thread G 1"1/4) | |
| N U07 | | | HPCO Upper outlet T front outlet side A (thread 1"5/8-12 UNF) | | | | R U07 | HPCO Upper outlet T rear outlet side B (thread 1"5/8-12 UNF) |
| N S07 | | | HPCO Upper outlet T front outlet side A (thread SAE 3000 3/4 MA) | | | | | HPCO Upper outlet T rear outlet side B (thread SAE 3000 3/4 MA) |
| N S08 | | | HPCO Upper outlet T front outlet side A (thread SAE 3000 3/4 UNC) | | | | | HPCO Upper outlet T rear outlet side B (thread SAE 3000 3/4 UNC) |
| N S35 | | | HPCO Upper outlet T front outlet side A (thread SAE 6000 1" MA) | | | | | HPCO Upper outlet T rear outlet side B (thread SAE 6000 1" MA) |
| N S36 | | | HPCO Upper outlet T front outlet side A (thread SAE 6000 1" UNC) | | | | | HPCO Upper outlet T rear outlet side B (thread SAE 6000 1" UNC) |
| P G07 | | only for TM | HPCO Central outlet T rear outlet side B (thread G 1"1/4) | S G07 | | only for TN | | HPCO Upper outlet T side outlet A (thread G 1"1/4) |
| P U07 | | | HPCO Central outlet T rear outlet side B (thread 1"5/8-12 UNF) | | | | S U07 | HPCO Upper outlet T side outlet A (thread 1"5/8-12 UNF) |
| P S07 | | | HPCO Central outlet T rear outlet side B (thread SAE 3000 3/4 MA) | | | | | HPCO Upper outlet T side outlet A (thread SAE 3000 3/4 MA) |
| P S08 | | | HPCO Central outlet T rear outlet side B (thread SAE 3000 3/4 UNC) | | | | | HPCO Upper outlet T side outlet A (thread SAE 3000 3/4 UNC) |
| P S35 | | | HPCO Central outlet T rear outlet side B (thread SAE 6000 1" MA) | | | | | HPCO Upper outlet T side outlet A (thread SAE 6000 1" MA) |
| P S36 | | | HPCO Central outlet T rear outlet side B (thread SAE 6000 1" UNC) | | | | | HPCO Upper outlet T side outlet A (thread SAE 6000 1" UNC) |

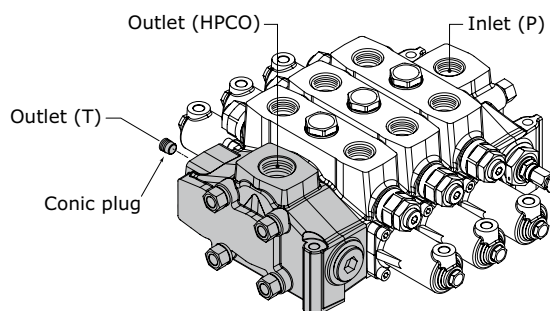


CARRY-OVER CONNECTION (HPCO)

This option, available on all D20, 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.



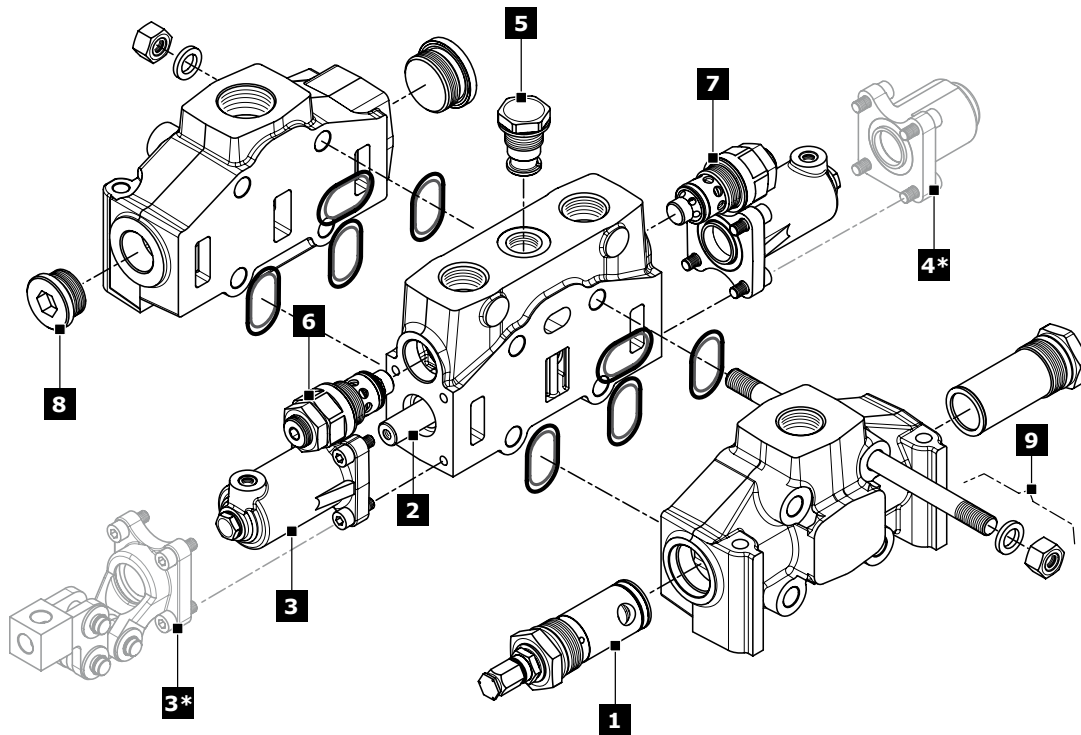
It is possible to transform sectional valve from standard to HPCO version just by ordering the appropriate conic plug:



| code (HPCO Plug identification) | description | q.ty |
|---------------------------------|-----------------------|------|
| 413010201 | conic plug G 1/2 x 17 | 1 |



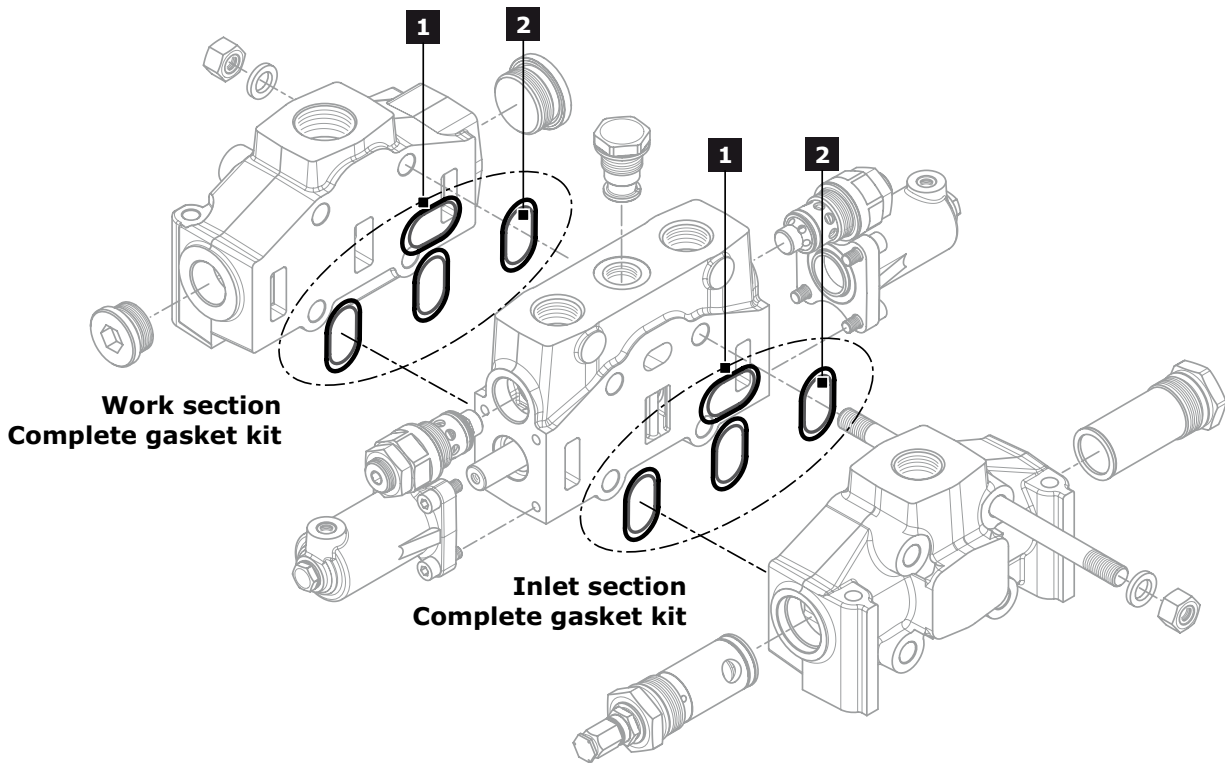
D20 SPARE PARTS LIST



| Ref. | Description | Order code | Q.ty | Code | Note |
|---------------------------------|--|-----------------------|------------------|--------------------|---------------------------------------|
| 1 | Pilot operated pressure relief valve (*) | 30168 | | | Setting: 100 bar |
| | | 3143 | 1 | | Setting: 200 bar |
| | | 4383 | | | Setting: 300 bar |
| | Relief valve plugged | 430109001 | 1 | - | |
| | Main Anticavitation check valve | 915050901 | 1 | | |
| 2 | 3 positions double-acting spool | 421208010 | | W001A | |
| | | 421208022 | 1 | W001B | |
| | | 421208001 | | W001A | for hydraulic actuation |
| | 3 positions double-acting A and B to tank spool | 421208005 | | W002A | |
| | | 421208002 | 1 | W002B | |
| | 3 positions single-acting on A | 421208015 | 1 | W005A | |
| | 3 positions single-acting on B | 421208017 | 1 | W006A | |
| | 4 positions double-acting with float in the 4 th pos. | 421208012 | | W012A | |
| | | 421208011 | 1 | | for hydraulic actuation |
| | 3* | Control without lever | 320308002 | 1 | H004 |
| 320308005 | | | | | only for W012 spool |
| Protected vertical safety lever | | 320308001 | 1 | H101 = H102 | |
| 3 | Hydraulic actuation with side ports | 320308003 | | | only for W012 spool |
| | | 320508001 | 2 | | for BSP version |
| | | 320508005 | 1 | H005 | only for W012 spool - for BSP version |
| | | 320508023 | 2 | | for UNF version |
| | | 320508024 | 1 | | only for W012 spool - for UNF version |



| Ref. | Description | Order code | Q.ty | Code | Note |
|--|--|------------------|--------------------|----------------------------|---------------------|
| 4* | 3 position spring centred spool | 320708001 | 1 | F001A | |
| | Detent in A and B | 320808001 | 1 | F002A | |
| | Detent in A | 320808002 | 1 | F003A | |
| | Detent in B | 320808003 | 1 | F004A | |
| | Detent in 4 th position | 320808004 | 1 | F005A | only for W012 spool |
| | Prearrangement dual command | 320708005 | 1 | F013A | |
| | Pneumatic control ON-OFF | 321108003 | 1 | F020A=F021A | BSP ports |
| | Proportional Pneumatic control | 321208002 | 1 | F022A=F023A | BSP ports |
| | | 321208004 | 1 | F126A=F127A | NPT ports |
| | Electrohydraulic ON-OFF (12 vdc) | 321408021 | 1 | F1600 | |
| | Electrohydraulic ON-OFF (24 vdc) | 321408022 | 1 | F1610 | |
| | Electrohydraulic Proportional (12 vdc) | 322008001 | 1 | F2600 | |
| | Electrohydraulic Proportional (24 vdc) | 322008002 | 1 | F2610 | |
| | Electrohydraulic ON-OFF (12 vdc) with reducing valve | 321408023 | 1 | F1500=F1520 | BSP ports |
| | Electrohydraulic ON-OFF (24 vdc) with reducing valve | 321408024 | 1 | F1510=F1530 | BSP ports |
| | Electrohydraulic Proportional (12 vdc) with reducing valve | 322008003 | 1 | F2500=F2520 | BSP ports |
| | Electrohydraulic Proportional (24 vdc) with reducing valve | 322008004 | 1 | F2510=F2530 | BSP ports |
| | Electrohydraulic ON-OFF (12 vdc) with reducing valve | 321408025 | 1 | F1500=F1520 | UNF ports |
| Electrohydraulic ON-OFF (24 vdc) with reducing valve | 321408025 | 1 | F1510=F1530 | UNF ports | |
| Electrohydraulic Proportional (12 vdc) with reducing valve | 322008005 | 1 | F2500=F2520 | UNF ports | |
| Electrohydraulic Proportional (24 vdc) with reducing valve | 322008006 | 1 | F2510=F2530 | UNF ports | |
| 5 Check valve on the work section | 320208001 | 1 | - | only for RP and RT section | |
| Antishock valve on port A | 3027 | | | | Setting: 100 bar |
| | 2647 | | 01 PA | | Setting: 200 bar |
| | 2781 | | | | Setting: 300 bar |
| 6 Anticavitation valve on port A | 915080801 | 1 | 02 PA | | |
| | 15888 | | | | Setting: 100 bar |
| Pilot combined valve on port A | 5091 | | 04 PA | | Setting: 200 bar |
| | 8943 | | | | Setting: 300 bar |
| Prearrangement for auxiliary valve on port A | 430409001 | | 05 PP | | |
| Antishock valve on port B | 3027 | | | | Setting: 100 bar |
| | 2647 | | 01 PB | | Setting: 200 bar |
| | 2781 | | | | Setting: 300 bar |
| 7 Anticavitation valve on port B | 915080801 | 1 | 02 PB | | |
| | 15888 | | | | Setting: 100 bar |
| Pilot combined valve on port B | 5091 | | 04 PB | | Setting: 200 bar |
| | 8943 | | | | Setting: 300 bar |
| Prearrangement for auxiliary valve on port B | 430409001 | | 05 PB | | |
| 8 Plug kit (G 1) | 430000021 | | G06 | | |
| | 430000022 | | G07 | | |
| | 300008002 | 1 | U06 | | |
| | 300009002 | | U07 | | |



| Inlet and work section | | | |
|------------------------|------------|-------------------|------|
| Rif. | Order code | Description | Q.ty |
| 1 | 423401017 | Ring | 4 |
| 2 | 412020603 | O.R. 90SH (2-129) | 4 |

Complete Gasket kit: order code - 350909001



INSTALLATION

Guidelines

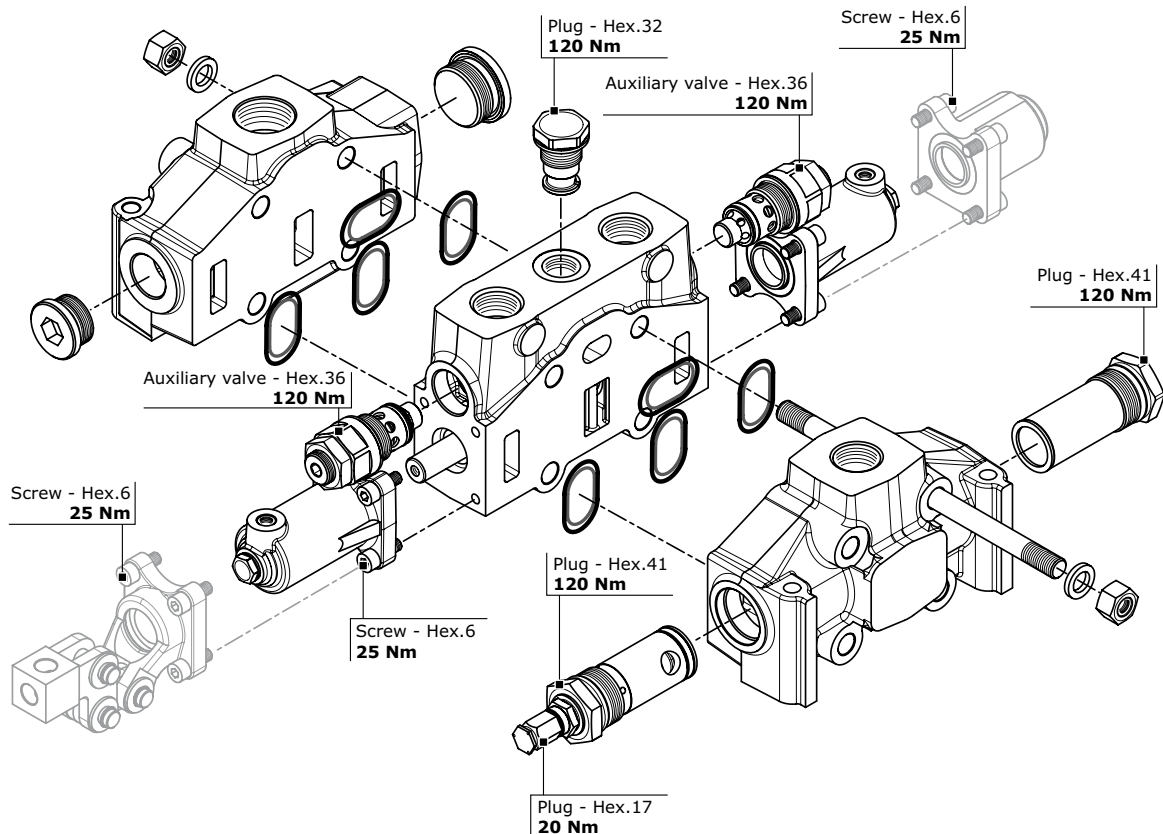
- Mount the control valve securely to a flat surface (recommended 3 point fixing); at the time do not use a hammer to positioning by hitting.
- When handling the control valve, be careful not hold the pilot cover or return spring cap of the spool or accessory valves such as main relief valves and anti-shock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

Fittings tightening torque (Nm)

| thread type | port P | Port A - B | Port T |
|--|----------------------|----------------------|----------------------|
| BSP (ISO - 228) | G 1 | G 1 | G 1 |
| with rubber sealing (DIN 3869) | 120 | 120 | 120 |
| with copper or steel and rubber washer | 120 | 120 | 120 |
| BSP (ISO - 228) | G 1 1/4 | G 1 1/4 | G 1 1/4 |
| with rubber sealing (DIN 3869) | 120 | 120 | 120 |
| with copper or steel and rubber washer | 120 | 120 | 120 |
| UN-UNF (ISO - 725) | 1 1/16 12 UNF | 1 1/16 12 UNF | 1 1/16 12 UNF |
| with O.R. | 120 | 120 | 120 |
| UN-UNF (ISO - 725) | 1 5/16 12 UNF | 1 5/16 12 UNF | 1 5/16 12 UNF |
| with O.R. | 120 | 120 | 120 |

General clamping torque

The following table provides the main tightening torques of the distributor D20:





Dimensions - Thread codes

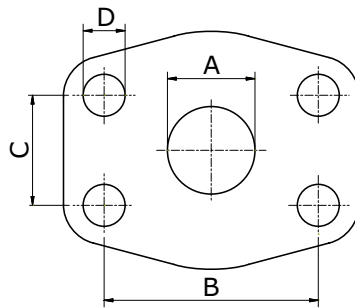
The connection ports size is indicated by an ordering code common for all Hydrocontrol products. Following table shows all available connections.

| 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 |

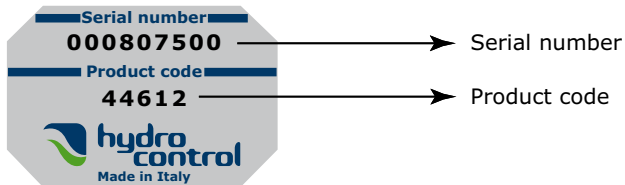
| SAE / 6000 FLANGE (ISO 6162-2) | | | | | | | | |
|---------------------------------------|------------|------------|------------|------------|------------|-------------|------------|-------------|
| Type | 3/4" (MA) | 3/4" (UNC) | 1" (MA) | 1" (UNC) | 1"1/4 (MA) | 1"1/4 (UNC) | 1"1/2 (MA) | 1"1/2 (UNC) |
| 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.

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