

EX72

LOAD SENSING VALVE



TECHNICAL CATALOGUE

1st edition EX72.01

*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.**

PATENTED SYSTEM

All the control valves belonging to the EX family work according to a principle designed by Hydrocontrol's R&D department and covered by patents EP1860327 (A1) EP1860327 (B1) US2008282691 (A1) and US7581487 (B2).

The valve LS signal is managed according to innovative technique which is an absolute first in the flow sharing world, ensuring:

- elimination of any LS signal bleed off, which can be observed in most systems currently available commercially, and is often the cause of poor compensation accuracy, slow response and excessive sensitivity to operating conditions.
- LS signal picking downstream of the local compensator: this will make signal detection "neater" improving control efficiency and accuracy.

RESPONSE RATE

The EX control valve's strength resides in its quick, prompt response, achieved thanks to the functional advantages built into our patented system. Even the most critical applications such as excavator bucket shacking and the swift dynamics of forestry machinery, usually hard to achieve on flow sharing systems, can be successfully implemented by using EX family products.

ACCURACY AND STABILITY

The unique technical characteristics of the Hydrocontrol's patent allows for outstanding flow control and compensation precision, not likely to be affected even by the most diverse operating conditions. Simultaneous functions are never mutually influenced, not even in the presence of the same load factors (an aspect best highlighted in crawler machinery travelling). System stability itself is greatly benefited by the EX design; the system, also in combination with traditional overcenter valves, appears well balanced and able to effectively reduce oscillation and dynamic instability.

EFFICIENCY

In addition to the well known advantages typically offered by flow sharing systems which, associated with a variable pump, will drastically reduce the machine operating consumption, the EX family introduces a number of interesting options, including pressure relief on the LS signal to further increase energy saving and guarantee top efficiency levels.

FLEXIBILITY

The EX family control valves can be easily adjusted to a variety of applications, thanks to the wide range of available options and different types of available control systems.

COMPACT DIMENSIONS

The carefully designed features and integrated electrohydraulic control ensure a highly compact and optimised layout. Integrated end plates are available in the final working section (only EX54 and EX72), adding to the system dimensional and functional efficiency.

PRIORITY

The EX family allow to install side by side pre-compensated section with post-compensated section. This feature allow to establish a priority in the way the oil is directed and increase the number of application where the EX family can be applied solving technical difficulties that before required external components. Both Inlets and Outlets remain common for the pre and post compensated sections making the assembling of the valve particularly convenient.

APPLICATIONS

Flow Sharing valve for 450 l/min inlet flow rate. Suitable application include drilling machines, wheeled loaders, telescoping cranes, marine cranes, mining and off-shore equipment.





QUICK REFERENCE GUIDE

| GENERAL SPECIFICATIONS | EX38 | EX46 | EX54 | EX72 |
|-------------------------------------|--------|--------|-------|-------|
| Working section number | 1 - 10 | 1 - 10 | 1 - 8 | 1 - 8 |
| CIRCUIT | | | | |
| Spool stroke (mm) | 7 | 7 | 9 | 11 |
| Spool pitch (mm) | 38 | 46 | 54 | 72 |
| RATED FLOW | | | | |
| Pump flow rate (l/min) | 150 | 220 | 300 | 450 |
| A/B port flow rate (l/min) (*) | 100 | 180 | 250 | 350 |
| RATED PRESSURE | | | | |
| working pressure inlet port P (bar) | 350 | 350 | 350 | 350 |
| BACK PRESSURE MAX | | | | |
| Max pressure outlet port T (bar) | 10 | 10 | 10 | 10 |

(*) with fixed Pump inlet compensator

| OPTION CHART | EX38 | EX46 | EX54 | EX72 |
|---|----------------|----------------|----------------|------|
| LS Signal pressure relief valve | • | • | • | • |
| Pump pressure relief valve | • | • | • | • |
| LS Signal dump valve (electric 12/24 Vdc) | • | • | • | • |
| Pump dump valve (electric 12/24 Vdc) | • | • | | |
| SPOOLS TYPE | | | | |
| Single acting | • | • | • | • |
| Double acting | • | • | • | • |
| Float spool | • | • | • | • |
| SPOOL ACTUATION | | | | |
| Hydraulic actuation | • | • | • | • |
| Mechanical lever actuation | • | • | • | |
| Mechanical cloche actuation | (•) | | | |
| Prop. electrohydraulic actuation 12-24 Vdc (*) | • | • | • | • |
| ON/OFF electrohydraulic actuation 12-24 Vdc (*) | • | • | • | • |
| CAN BUS interface actuation | on development | on development | on development | • |
| SPOOL RETURN ACTION | | | | |
| Return spring | • | • | • | • |
| Mechanical detent | • | • | | |
| Pneumatic control | • | • | | |
| Spools displacement sensor (HLPS) | • | • | • | • |
| PORT RELIEF VALVE | | | | |
| Direct operated antishock valve | | | • | • |
| Anticavitation valve | • | • | • | • |
| Pilot operated combined valve | | | • | • |
| Direct operated combined valve (fixed setting) | • | • | | |
| Plug | • | • | • | • |

• = available

(•) = available on request

(*) = we recommend to keep the T line for the electrohydraulic cartridges separate from the T line of the valve.



GENERAL INDEX

| | |
|-----------|--|
| 4 | GENERAL SPECIFICATIONS Standard working conditions Fluid options Operating principle |
| 6 | HYDRAULIC SCHEMA Post Compensated system - Electrohydraulic actuation Post Compensated system - Hydraulic actuation |
| 7 | ORDER EXAMPLE Standard thread Tie-rod kit classification Painting |
| 9 | DIMENSIONS EX72 with mechanical lever actuation EX72 with electrohydraulic actuation |
| 11 | TYPICAL CURVES |
| 13 | INLET SECTION Order example Inlet side classification Valve identification Combinations valve available Inlet body classification |
| 19 | WORKING SECTION Order example Spool identification Spool flow Spool end identification Spool actuation classification - side A Spool return action classification - side B Work section arrangement Auxiliary valves identification |
| 30 | INTEGRATED OUTLET SECTION Order example Integrated outlet section arrangement |
| 32 | EX72 SPARE PARTS LIST |
| 37 | INSTALLATION AND MAINTENANCE INSTRUCTIONS General clamping torque |
| 43 | GENERAL CONDITIONS AND PATENTS Product identification |



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 | β10 > 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

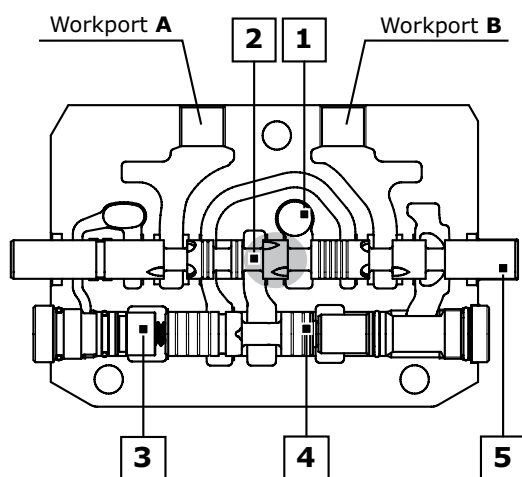
| Types of fluid (according to ISO 6743/4) Oil and Solutions | Temperature (°C) | | Compatible gasket |
|---|------------------|-----|-------------------|
| | min | max | |
| Mineral Oil HL, HM (or HLP acc. to DIN 51524) | -25 | +80 | NBR |
| Oil in water emulsions HFA | +5 | +55 | NBR |
| Water in oil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

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



Operating principle

The flow sharing technology applied to the standard load sensing system characterizes the new control valves EX. The valve, completely pressure compensated, guarantees great controllability to all actuations, making workport flow dependent only on metering area (spool position). When flow saturation occurs the system reacts by implementing an equal reduction of pressure margin across all spools, generating a proportional reduction of workport flow.



LEGEND:

1. Inlet line (High pressure)
2. Metering notches
3. Load sensing line
4. Local compensator
5. Metering spool

Single section

Referring to picture it's possible to remark some aspects of system functionality. Coming from the common inlet line the main flow, passing across the metering area, reaches local compensator. Metering area, according to the pressure margin, controls the total amount of flow to the workport selected by the main spool. The load sensing signal, picked up downstream the local compensator, feeds the common load-sensing line. When a single section is actuated, the local compensator fully opens to the left side, reaching its complete balanced position. The control of the LS system is made by the inlet compensator for fixed displacement pump or pump compensator for variable displacement pump.

Multi-section

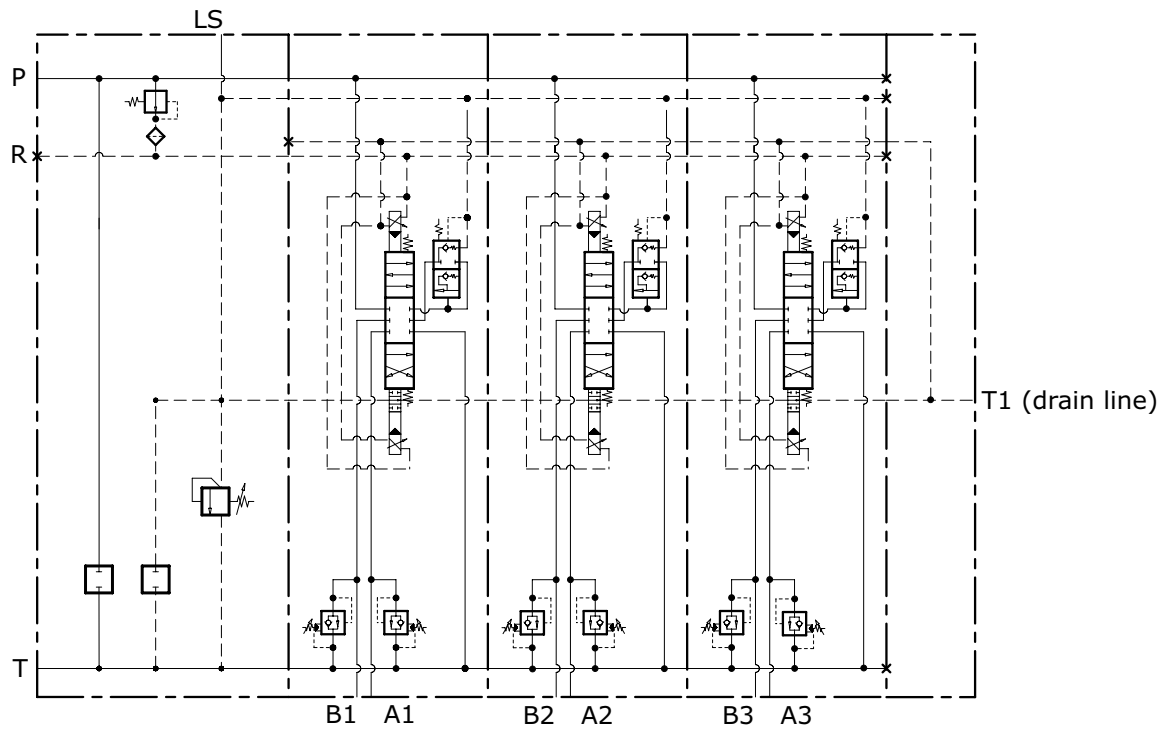
When two or more sections are actuated only one, characterized by the highest pressure (dominant), is involved in the LS signal transmission, working as briefly described in the previous paragraph. The other functions (slaves) become directly dependent on it. The common LS line transfers the information coming from the dominant local compensator to all dependent compensators. Driven by the LS signal, the unbalanced slave compensators activate the pressure compensation creating an artificial pressure drop able to keep pressure margin nominally the same on all the spools. Workport flow becomes only a function of metering area making the system totally load independent.

Flow Sharing function

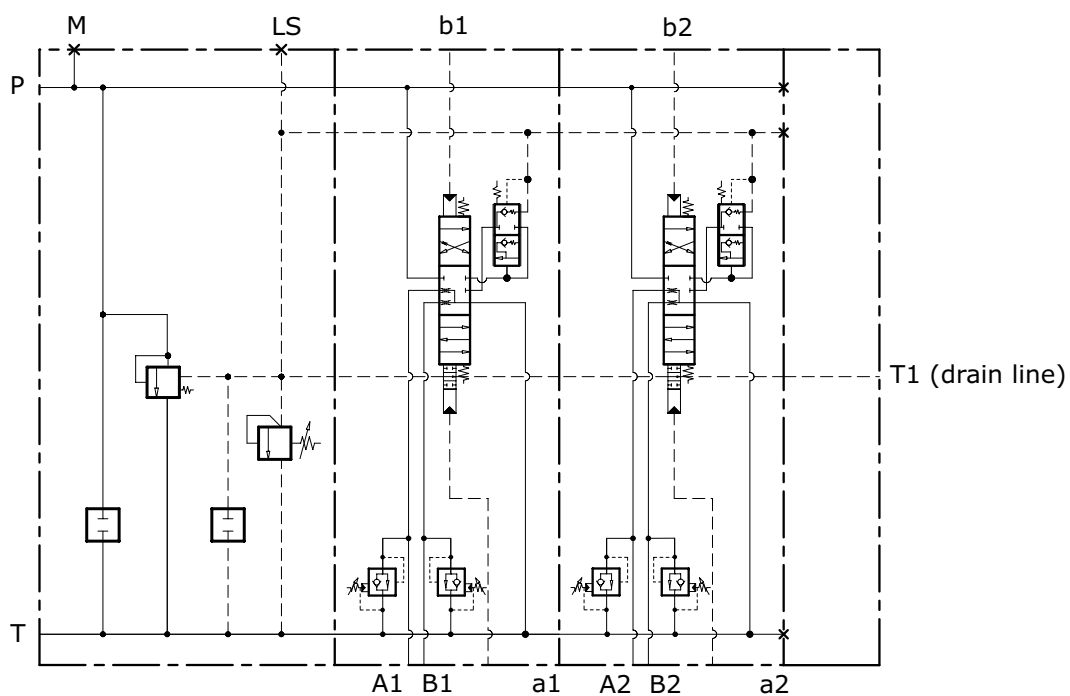
When saturation occurs the total amount of flow required by actuations is higher than the maximum pump flow rate. The system is able to keep the nominal pressure margin no more. The actual pressure margin reduces according to real flow demand. Since all the local compensators feel the same LS signal and the same pressure drop is applied to different metering areas, then workport flows are reduced proportionally in order to keep all actuations completely under control.

HYDRAULIC SCHEMA

Post compensated system - Electrohydraulic actuation



Post compensated system - Hydraulic actuation




ORDER EXAMPLE

EX72/2: MR V1A 200 V4B V11C C12AJ KV S37 W001C 200200 HP05A RC1 S35 04 PA 90 04 PB 90 W001C 200200 HP05A RCK1A S35 05 PA 05 PB

TYPE:

EX72: product type
/2: working section number

1) INLET ARRANGEMENT: p.13

MR Inlet side
V1A LS pressure relief valve on port A
200 Setting (bar)
V4B Full flow relief plug on port B
V11C LS electric dump valve on port C
C12AJ Connector kit type
KV S37 Inlet body arrangement

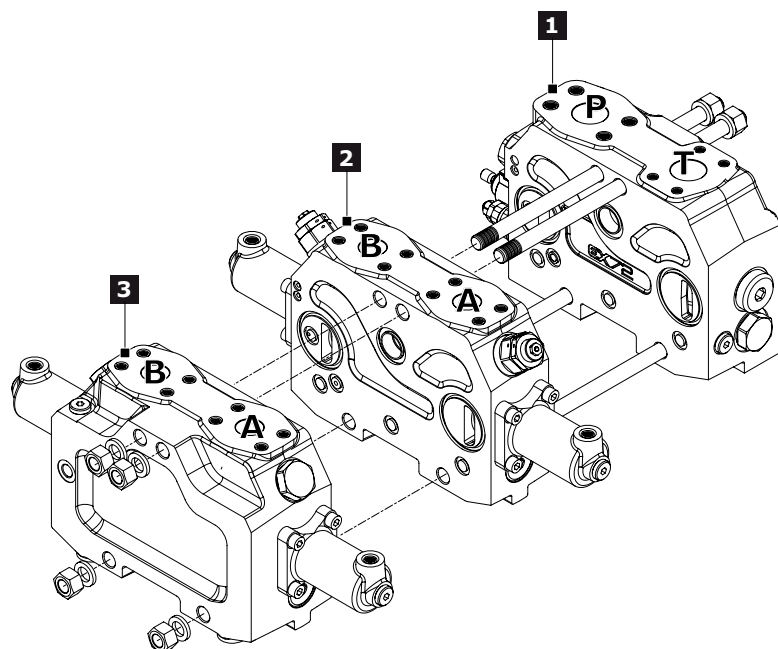
2) WORK SECTION ARRANGEMENT: p.19

W001C 200200 Spool delivery
HP05A Spool actuation type
RC1 S35 Section type and port threads
04 PA 90 Auxiliary valve (port A)
04 PB 90 Auxiliary valve (port B)

3) INTEGRATED OUTLET SECTION ARRANGEMENT: p.32

W001C 200200 Spool delivery
HP05A Spool actuation type
RCK1A S35 Section type and port threads
05 PA Auxiliary valve (port A)
05 PB Auxiliary valve (port B)

Ordering row 2 must be repeated for every work section

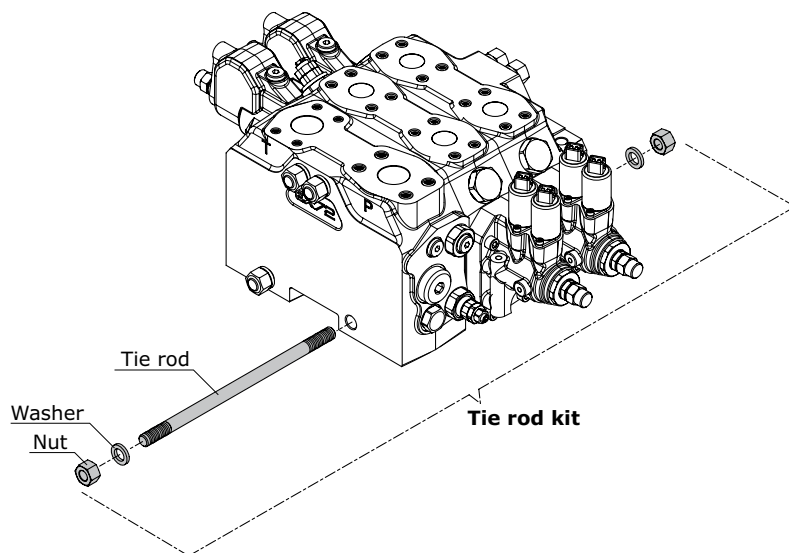

Standard thread

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

| Ports | BSP | Code | UN-UNF | Code | SAE 6000 | Code |
|---------|--------|------------|---------------|------------|--------------|----------------|
| (P) | | | | | 1"1/4 MA-UNC | S37-S38 |
| (T) | | | | | 1" MA-UNC | S35-S36 |
| (T1) | G 1/4" | G02 | 9/16" - 18 UN | U02 | | |
| (A - B) | | | | | 1" MA-UNC | S35-S36 |

**Tie-rod kit classification**

Tie rod kit allows the correct assembly of sectional valves. Tie rod's length depends on the number of sections; each valve is assembled with tie rod kits including a tie rod, nut and washer. EX72 requires 3 tie-rod kits



| Tie rod kit | Order Code | Lenght (mm) | Clamping Torque (Nm) | Quantity |
|-------------|------------|-------------|----------------------|----------|
| EX72/1 | 300195003 | 232 | 110 | 3 |
| EX72/2 | 300195002 | 304 | | |
| EX72/3 | 300195009 | 376 | | |
| EX72/4 | 300195001 | 448 | | |
| EX72/5 | 300195007 | 520 | | |
| EX72/6 | 300195004 | 592 | | |
| EX72/7 | 300195005 | 664 | | |
| EX72/8 | 300195006 | 736 | | |

Painting

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

Order example of EX72/2 painted:

EX72/2

MR V1A 200 V7B C12AJ V10C KV S37

W001C 200200 HP05A RC1 S35 04 PA 90 05 PB 90

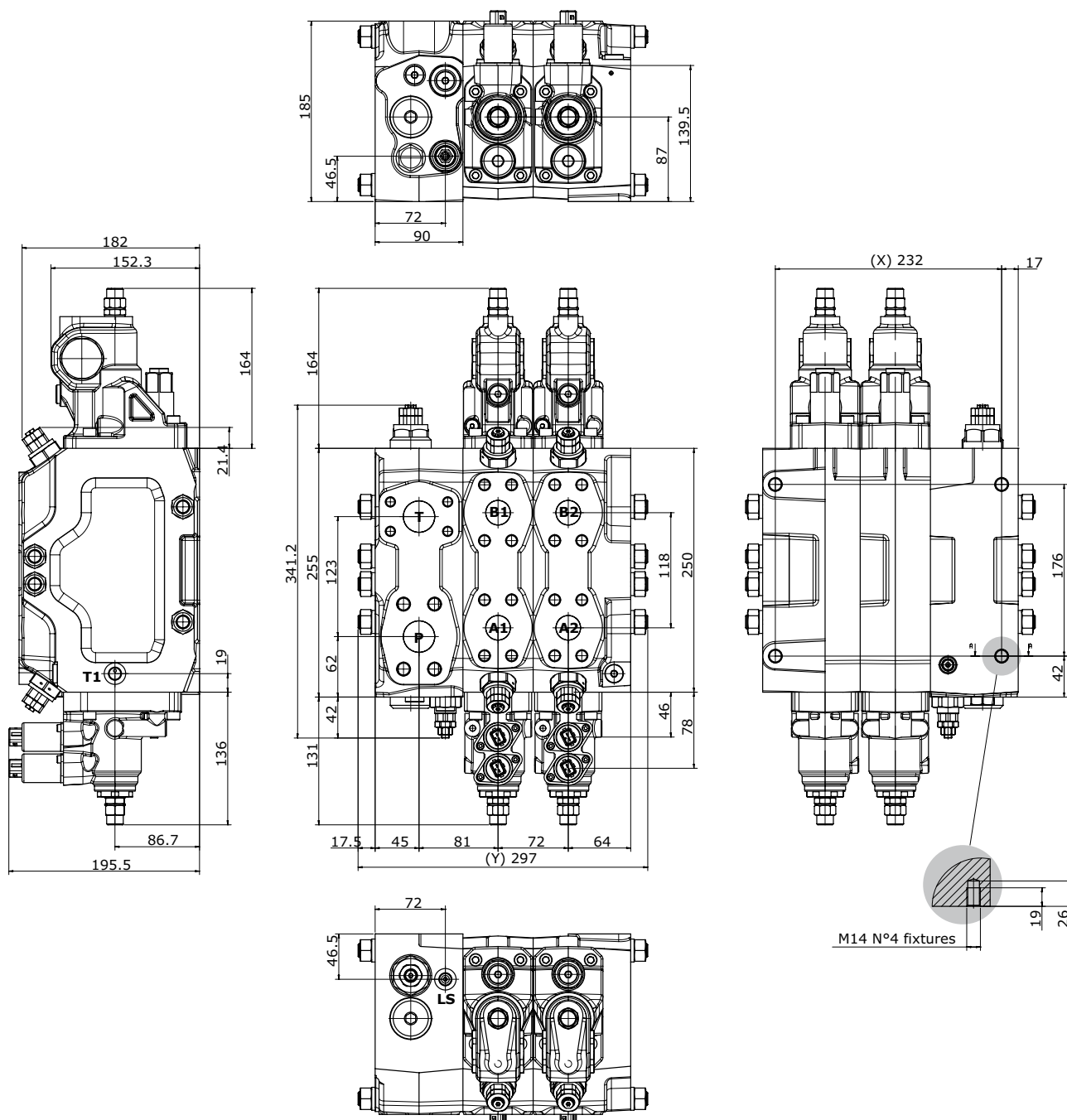
W001C 200200 HP05A RCK1A S35 05 PA 05 PB

P006/2 N10

The painting is indicated with the following value:

P006 - /2 - N10

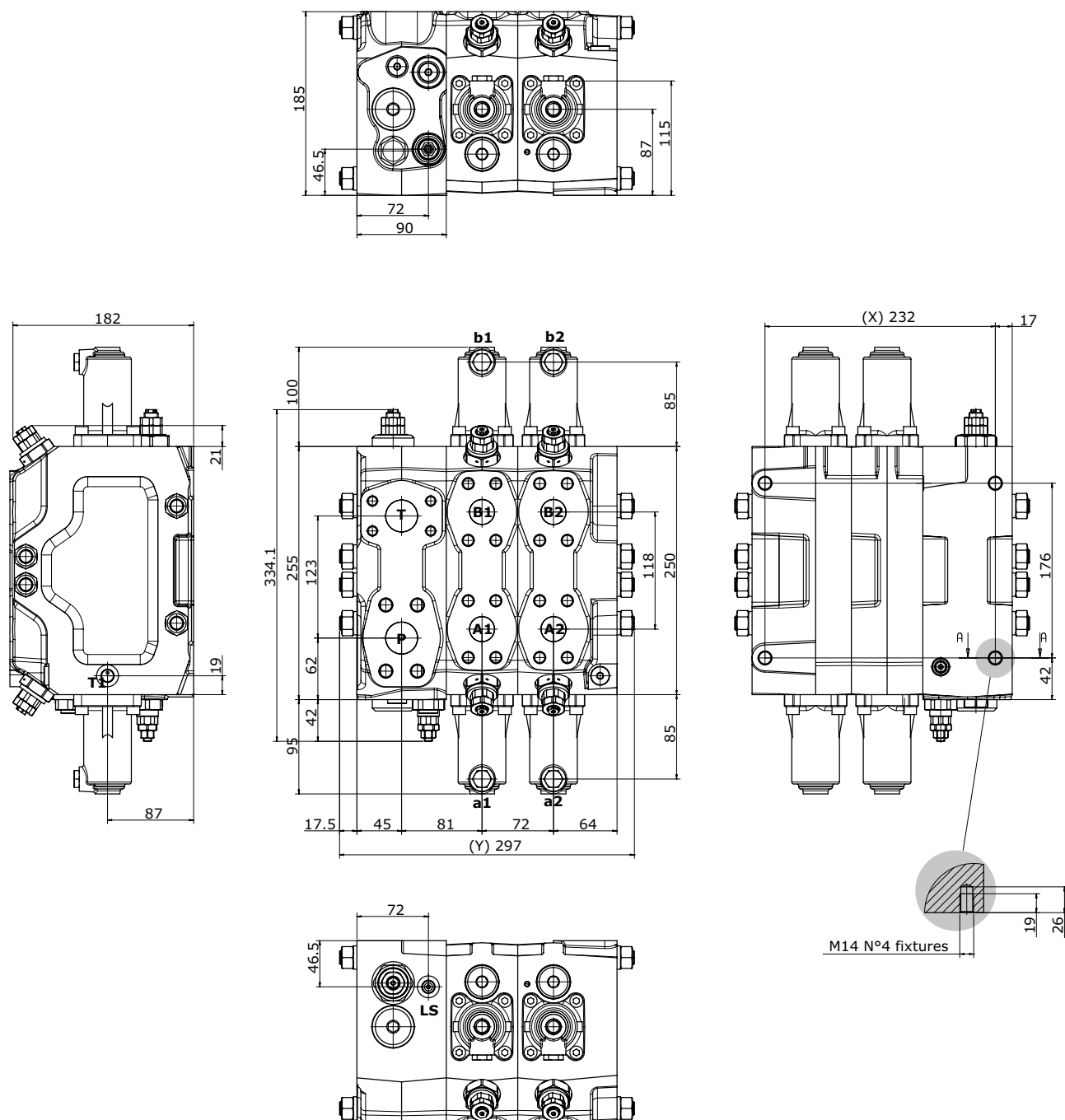
Color black
section number
Painted

DIMENSIONS
EX72 with Electrohydraulic actuation


| Type | /1 | /2 | /3 | /4 | /5 | /6 | /7 | /8 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|
| X (mm) | 160 | 232 | 304 | 376 | 448 | 520 | 592 | 664 |
| Y (mm) | 225 | 297 | 369 | 441 | 513 | 585 | 657 | 729 |
| Weights (kg) | 52 | 72 | 92 | 112 | 132 | 152 | 172 | 192 |



EX72 with Hydraulic actuation



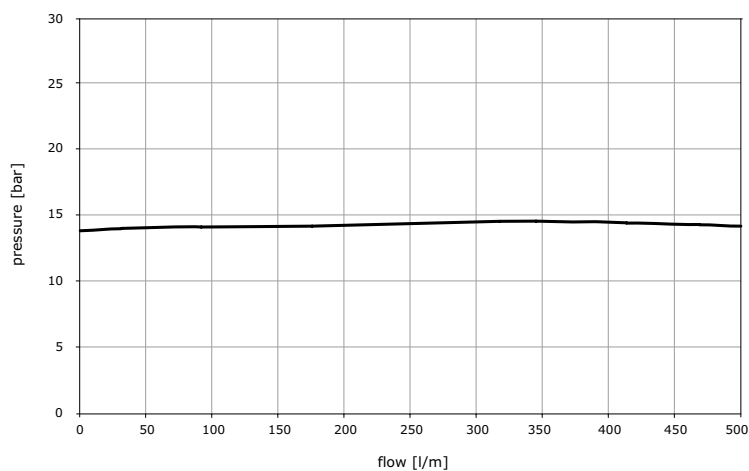
| Type | /1 | /2 | /3 | /4 | /5 | /6 | /7 | /8 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|
| X (mm) | 160 | 232 | 304 | 376 | 448 | 520 | 592 | 664 |
| Y (mm) | 225 | 297 | 369 | 441 | 513 | 585 | 657 | 729 |
| Weights (kg) | 52 | 72 | 92 | 112 | 132 | 152 | 172 | 192 |



TYPICAL CURVES

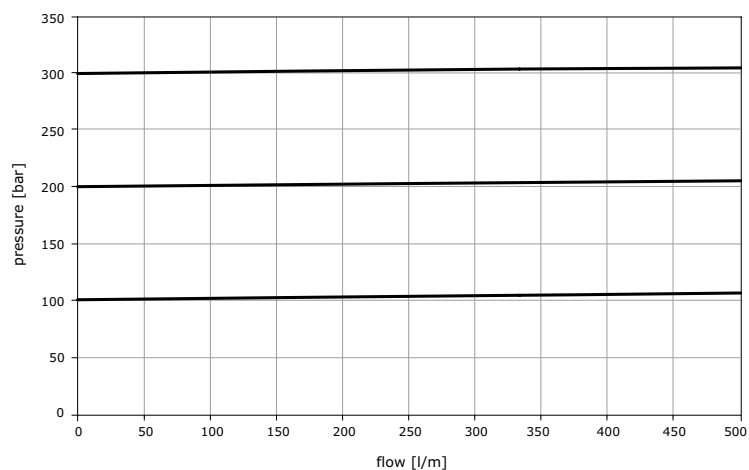
Inlet compensator Pressure drop (P-T)

Fixed displacement system (KV): pressure drop across the inlet compensator as function of pump flow



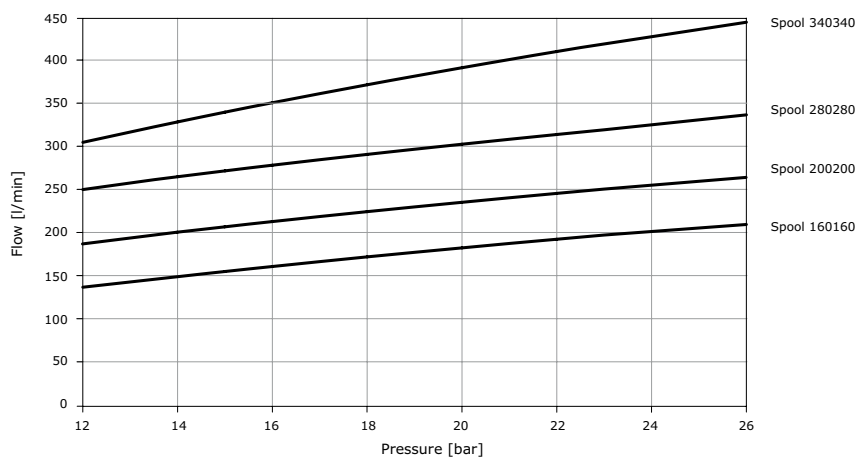
LS relief valve

Fixed displacement system (KV): LS relief valve characteristic



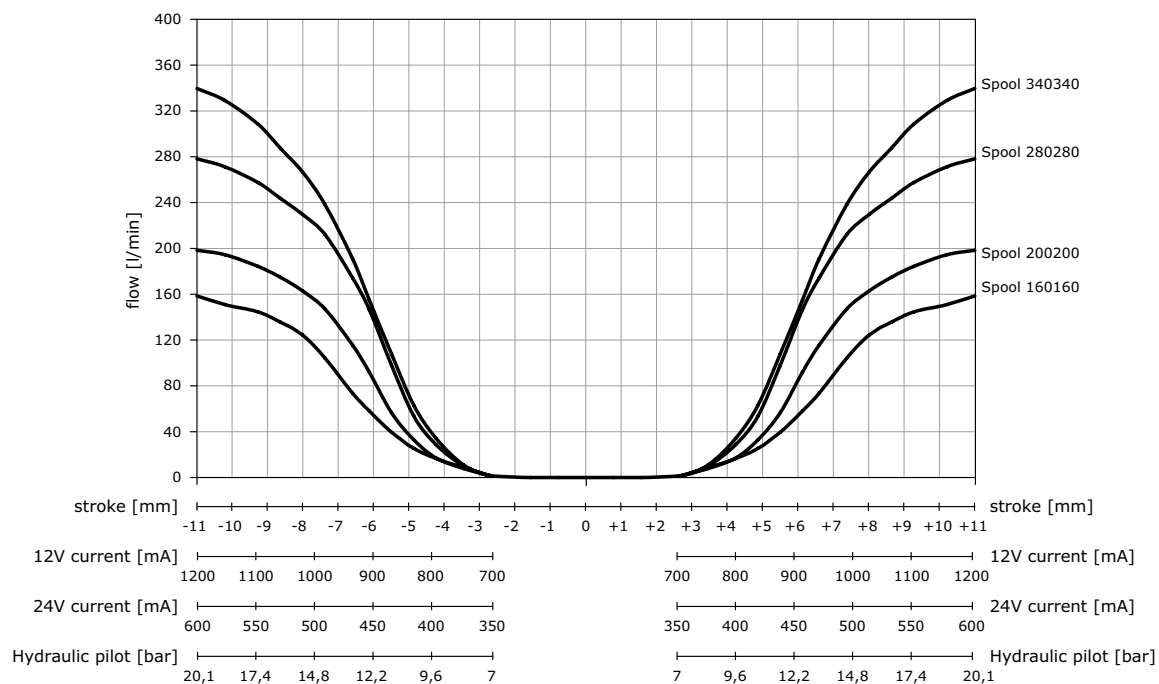
Post compensated spool flow with variable displacement pumps

Variable displacement systems (JV): spools maximum delivered flow as function of pump Δp setting



**Post compensated spool flow characteristic**

Fixed displacement systems (KV): flow on ports A and B as function of spool stroke, pilot pressure, control current
Inlet flow: 300 l/min - Pump inlet compensator at 16 bar Δp

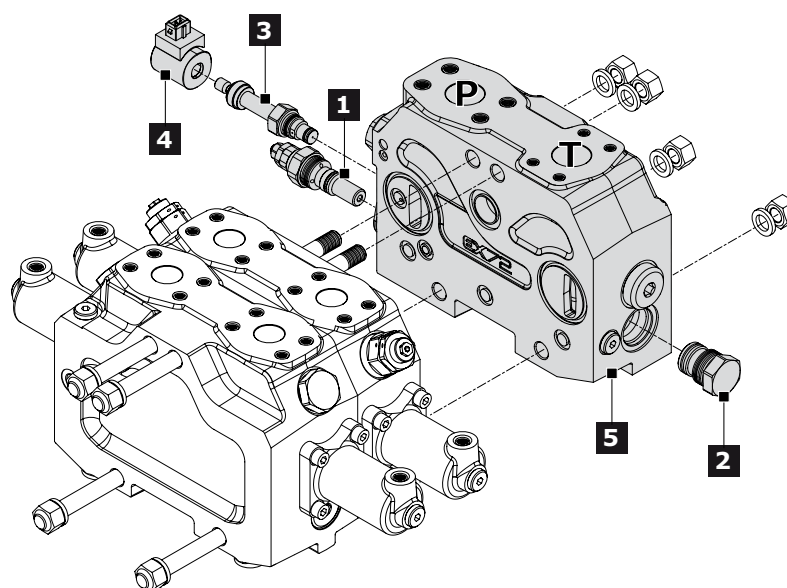




INLET SECTION

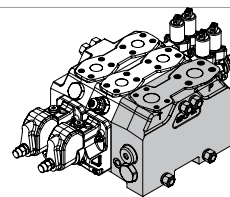
Order example

| | MR | V1A | 200 | V4B | V11C | C12AJ | KV S37 |
|----|---------------|--|-----|-----|------|-------|--------|
| 1. | MR | Inlet side | | | | | |
| | V1A | LS pressure relief valve on position A | | | | | |
| | 200 | setting (bar) | | | | | |
| 2. | V4B | Full flow relief plug on position B | | | | | |
| 3. | V11C | LS electric dump valve on position C | | | | | |
| 4. | C12AJ | Connector kit type | | | | | |
| 5. | KV S37 | Inlet body classification | | | | | |

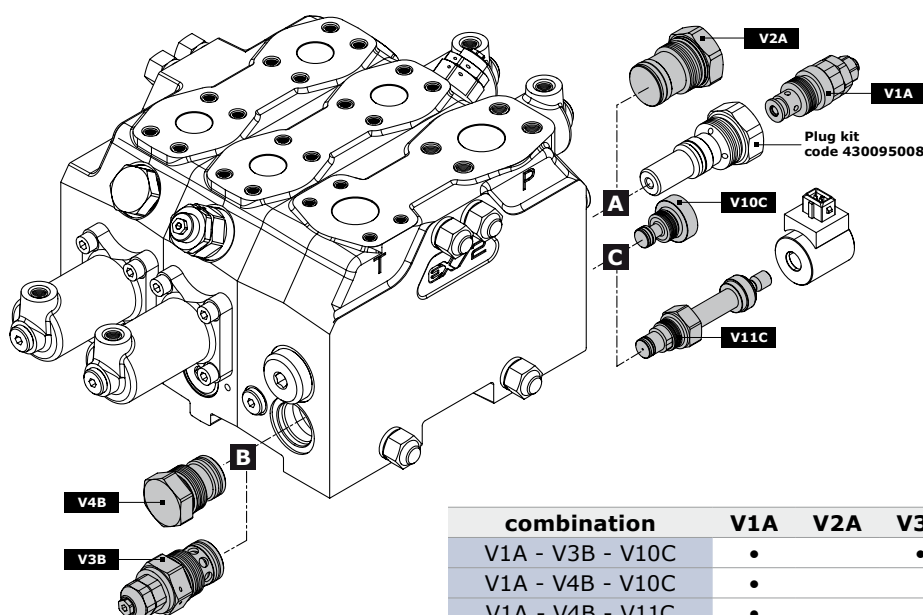


| Rif. | Code | Description | Page |
|------|--|--|-----------|
| - | MR | Flow sharing valve with right inlet section | 14 |
| 1 | V1A V2A | LS pressure relief valve - on position A LS relief plug - on position A | 14 |
| 2 | V3B V4B | Full flow direct operated pressure relief valve - on position B Full flow relief plug - on position B | 14 |
| 3 | V10C V11C | LS plug - on position C LS electric dump valve - on position C | 14 |
| 4 | C12AJ | AMP Junior connector - 12 Vdc | 16 |
| 5 | KV S37 JV S37 KVR S37 JVR S37 | Open centre inlet section for fixed displacement pumps (SAE 6000 1"1/4 MA) Closed centre inlet section for variable displacement pumps (SAE 6000 1"1/4 MA) Open centre inlet section with RDP for fixed displacement pumps (SAE 6000 1"1/4 MA) Closed centre inlet section with RDP for variable displacement pumps (SAE 6000 1"1/4 MA) | 17 |

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

**Inlet side classification****MR**Flow sharing valve with **RIGHT INLET** section**Valves identification**

| Order code | Schema | | Description | Setting Range (bar) |
|-------------|--------|--|---|------------------------|
| V1A | | | LS pressure relief valve | 120 - 250 251 - 350 |
| V2A | | | LS relief plug | |
| V3B | | | Full flow direct operated pressure relief valve | 50 - 350 |
| V4B | | | Full flow relief plug | |
| V10C | | | LS plug | |
| V11C | | | LS electric dump valve | |

Valves combination

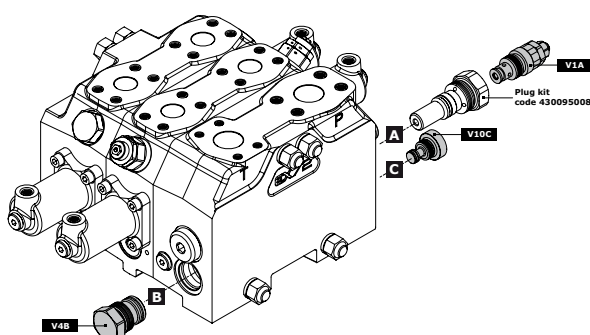
In the presence of LS pressure relief valve (V1A) is compulsory to order separately plug adapter kit that allows the correct assembly of the valve on the inlet section.

ORDER CODE: **430095008**

| combination | V1A | V2A | V3B | V4B | V7B | V10C | V11C |
|------------------|-----|-----|-----|-----|-----|------|------|
| V1A - V3B - V10C | • | | • | | | • | |
| V1A - V4B - V10C | • | | | • | | • | |
| V1A - V4B - V11C | • | | | • | | | • |
| V2A - V4B - V10C | | • | | • | | • | |
| V2A - V4B - V11C | | • | | • | | | • |

Inlet valve arrangement examples

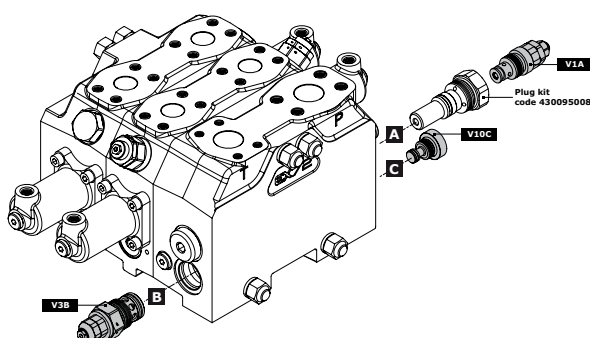
NOTE: when ordering a valve type V1A or V3B, it is necessary to specify pressure setting.



MR - V1A (200) - V4B - V10C - KV S35

- V1A** LS relief valve on position A
- 200** setting (bar)
- V4B** Full flow relief plug on position B
- V10C** LS plug on position C

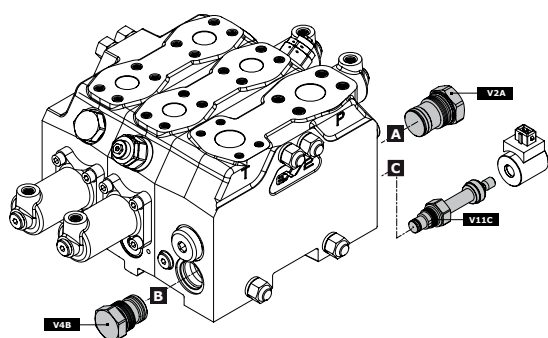
NOTE: requires minimum 40 bar difference in setting of valve V1A (LS relief valve) and valve V3B (Full flow relief valve)



MR - V1A (200) - V3B (240) - V10C - KV S35

- V1A** LS relief valve on position A
- 200** setting (bar)
- V3B** Full flow direct operated pressure relief valve on position B
- 240** setting (bar)
- V10C** Full flow direct operated pressure relief valve on position C

NOTE: when ordering a valve type V11C, it is necessary to specify connector type (see table "A" page 16)



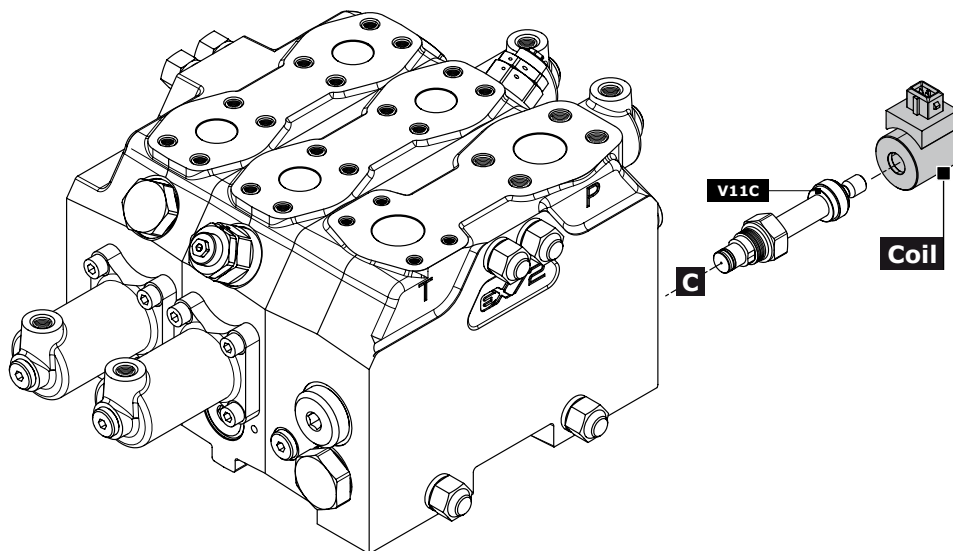
ML - V2A - V4B - V11C (C24AJ) - KV G05

- V2A** LS relief plug on position A
- V4B** Full flow relief plug on position B
- V11C** LS electric dump valve on position C
- C24AJ** Connector DIN - 24 Vdc



Table "A"
Coil and Connectors specifications for inlet section

Electric dump valve coil must be ordered separately



| Coil Type | Order Code | supply voltage (Vdc) | weather protection | Coil resistance R20 (Ω) | connector Material | coil body | duty cycle | Coil Insulation | power |
|-----------------------|--------------|----------------------|--------------------|-------------------------|--------------------|-------------------|------------|--------------------------------------|--------|
| DIN 43650 ISO 4400 | C12DI | 413171235 | 12 | 7 | Nylon | Zinc plated steel | ED 100% | Class H coil as from IEC 85 standard | 20.5 W |
| | C24DI | 413172432 | 24 | 28 | | | | | |
| DEUTSCH DT 4 | C12DE | 413171238 | 12 | 7 | | | | | |
| | C24DE | 413172440 | 24 | 28 | | | | | |
| AMP JUNIOR | C12AJ | 413171237 | 12 Vdc | 7 | | | | | |
| | C24AJ | 413172433 | 24 Vdc | 28 | | | | | |

NOTE: mating connector for DIN 43650 can be ordered separately with code 413000313.



Inlet body classification

The inlet section with KV configuration enables control valve usage with fixed displacement pumps. With this configuration the presence of LS relief valve (valve type 1) is suitable to adjust the system maximum pressure. The inlet section with JV configuration enables control valve usage with variable displacement pumps. With this configuration the presence of LS relief valve (valve type 1) is suitable to adjust the system maximum pressure. LS electric dump valve (valve type 11) can also be added as safety device. An additional full flow relief valve (valve type 3) can be added to protect the system from pump regulator failures. Additional solution for variable displacement pumps is available on request to allow a constant reduced free flow in stand by condition through the system: this is sometime required to guarantee a stand by flow for oil cooling.

| INLET BODY ARRANGEMENT AND THREAD AVAILABLE | | |
|---|--------|--|
| code | schema | description |
| KV S37 | | Open centre inlet section for fixed displacement pumps |
| KV S38 | | |
| JV S37 | | Closed centre inlet section for variable displacement pumps |
| JV S38 | | |
| KVR S37 | | Open centre inlet section with RDP for fixed displacement pumps |
| KVR S38 | | |
| JVR S37 | | Closed centre inlet section with RDP for variable displacement pumps |
| JVR S38 | | |

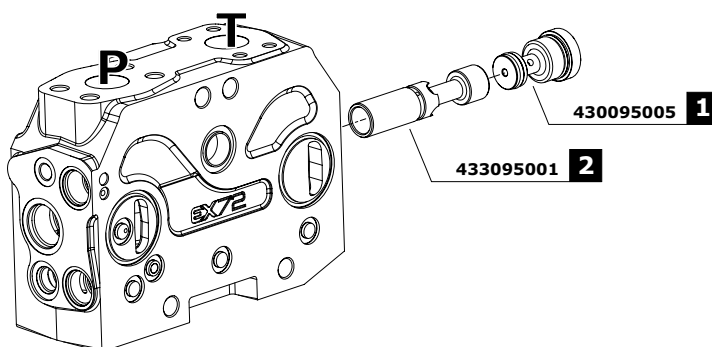
NOTE:

Electrohydraulic actuation requires inlet section with RDP.

Transformation of the inlet section from closed center to open center and vice versa is possible by ordering the appropriate kit 320095003 or 320095004 (see page 18)

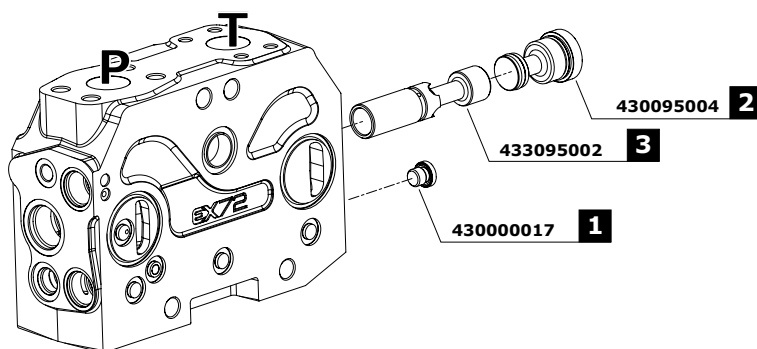
**Trasformation kits**

Transformation on the inlet section from open center to closed center is possible by ordering the complete kit code:
320095003 (transformation kit from KV to JV)



| OPEN CENTER CONFIGURATION (JV) - VARIABLE PUMP | | | |
|--|------------|-----------------------|------|
| Ref. | Order Code | Description | Q.ty |
| 1 | 430095005 | Inlet compensator kit | 1 |
| 2 | 433095001 | Spool assembly | 1 |
| Complete transformation kit: order code - 320095003 | | | |

Transformation on the inlet section from closed center to open center is possible by ordering the complete kit code:
320095004 (transformation kit from JV to KV)



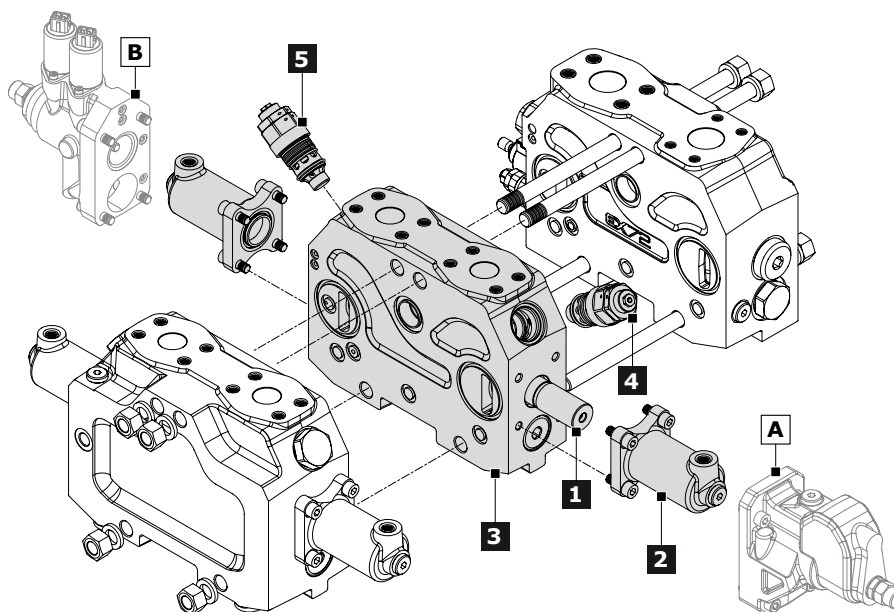
| OPEN CENTER CONFIGURATION (KV) - FIXED PUMP | | | |
|--|------------|----------------------------|------|
| Ref. | Order Code | Description | Q.ty |
| 1 | 430000017 | Plug G1/4" | 1 |
| 2 | 430095004 | Inlet compensator plug kit | 1 |
| 3 | 433095002 | Spool assembly | 1 |
| Complete transformation kit: order code - 320095004 | | | |



WORKING SECTION

Order example:

| | W001C 200200 | HP05A | RC1 S35 | 04 PA 90 | 04 PB 90 |
|------------------------|-------------------------------|-------|---------|----------|----------|
| 1. W001C 200200 | spool type | | | | |
| 2. HP05A | spool actuation type | | | | |
| 3. RC1 S35 | section type | | | | |
| 4. 04 PA 90 | auxiliary valve type (port A) | | | | |
| 5. 04 PB 90 | auxiliary valve type (port B) | | | | |



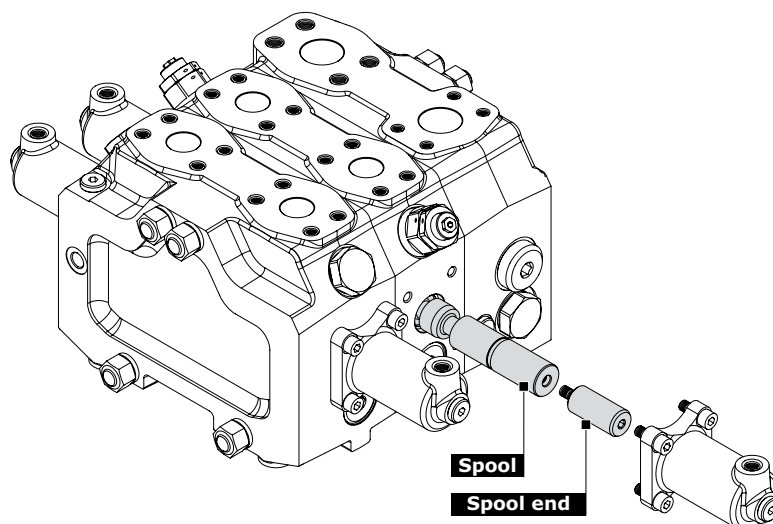
| Ref. | Code | Description | Page |
|------|---------------------|---|------|
| 1 | W001C 200200 | 3 positions double-acting (200200 = l/min Spool flow) | 20 |
| | W002C 200200 | 3 positions double-acting A-B to tank (200200 = l/min Spool flow) | |
| 2 | HP05A | hydraulic actuation (pilot ports on the top) | 22 |
| | HP05C | hydraulic actuation (pilot ports on the side) | |
| 3 | RC1 S35 | Post-Compensated section (SAE 6000 1"MA) | 29 |
| | RC1 S36 | Post-Compensated section (SAE 6000 1"UNC) | |
| | RCD1 S35 | Post-Compensated section with LS relief valve (SAE 6000 1"MA) | |
| | RCD1 S36 | Post-Compensated section with LS relief valve (SAE 6000 1"UNC) | |
| 4 | 04 PA 90 | Pilot combined valve (port A) | 31 |
| | 05 PA | Prearrangement for auxiliary valve (port A) | |
| 5 | 04 PB 90 | Pilot combined valve (port B) | 31 |
| | 05 PB | Prearrangement for auxiliary valve (port B) | |

EX72 work sections are available in one configuration: POST COMPENSATED

- RIF. A = spool actuation side A / RIF. B = Spool return action side B
 - Sections designed with electrohydraulic actuation require double choice on side A and side B
 - Leave out the spool return action code when choosing hydraulic actuation HP05A, HP05C and HP05L
 - Sections designed to house auxiliary valve option require double choice on work ports A and port B.
- Always indicate setting value when using antishock and pilot combined valve: 01 PA (120) - 04 PA (120)
- When ordering a section with electrohydraulic actuation, it is necessary to specify connector type. (see table on page 27).

**Spool identification**

Each work section contains a spool; each spool is compatible with all actuators.
For the correct operation of all actuators, each work section requires a spool end which changes according to the type of actuators. (see tables "C" on page 21)



| POST - COMPENSATED SECTION | | |
|----------------------------|---|--------|
| Code | Description | Schema |
| W001C | 3 positions double-acting | |
| W002C | 3 positions double-acting A and B to tank | |

Spool flow


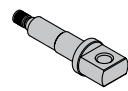
Flow rates delivered to the A and B ports are identified in following table. Rated flows refer to symmetrical spools.

| POST - COMPENSATED SECTION (FLOW RATES l/min) | | | | | |
|---|--------|--------|--------|--------|--------|
| Spool type | 160160 | 200200 | 250250 | 280280 | 340340 |
| W001C | • | • | • | • | • |
| W002C | • | • | • | • | • |

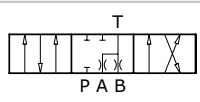
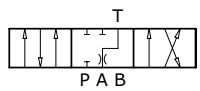
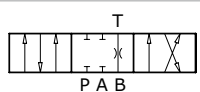


Spool end identification

All work section contain end spool, that changes as a function of spool actuation control.

| POST - COMPENSATED SECTION | | |
|----------------------------|--|---|
| Code | Description | Layout |
| 422501231 | Pin hole end (Available with hydraulic actuation) |  |
| 422501250 | Pin hole end (Available with electrohydraulic actuation) |  |

Spool with restricted service ports

| Code | Circuit | Restriction on diameter (mm) | Section (mm ²) | Schema |
|------------|----------|------------------------------|----------------------------|---|
| J10 | A-B IN T | 0,10 | 2,19 |  |
| K10 | A IN T | 0,10 | 2,19 |  |
| Y10 | B IN T | 0,10 | 2,19 |  |

Classification spool example

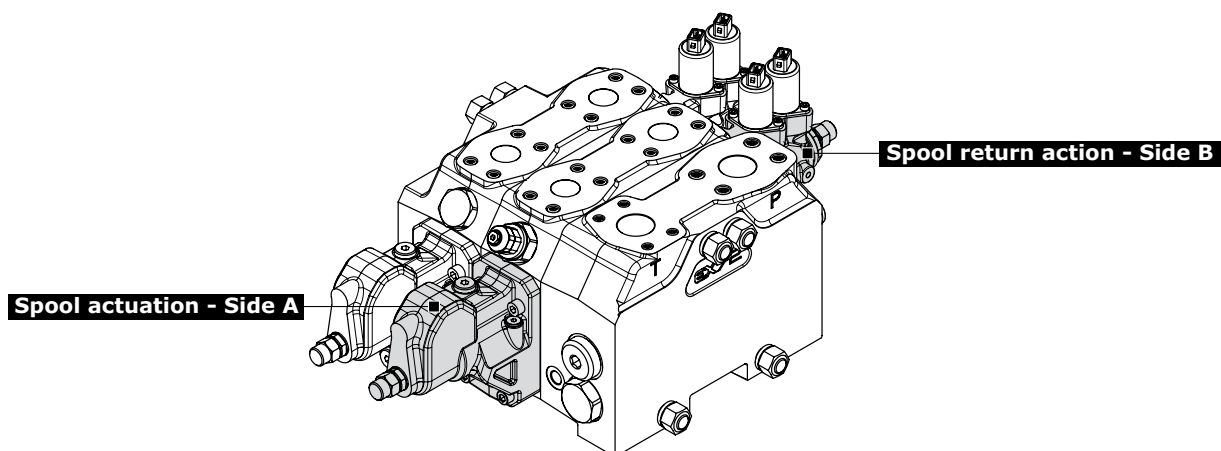
| | | W001C - 200200 - J10 |
|--------------|--|-----------------------------|
| W001C | 3 positions double-acting | |
| 200 | Flow on port A | |
| 200 | Flow on port B | |
| J10 | restriction on diameter (0,10 mm in A and B) | |

NOTE:

- not simmetric spools (such as 160200, 250280...) are available on request; for availability we suggest to contact our Sales department.
- rated flows are defined for 16 bar ΔP (as per KV inlet arrangement); for different ΔP values on variable pump systems, refer to diagram on page 12 (Post compensated spool flow with variable displacement pumps).

**Spool actuation classification - SIDE A**

Spool actuations are divided in two types: **Hydraulic actuation - Electrohydraulic actuation**

**COMPLETE HYDRAULIC ACTUATION**

| Code | Description | Dimensions | Configuration |
|--------------|--|------------|---------------|
| HP05A | Hydraulic actuation (pilot ports on the top) (only with manual and hydraulic section body) | | |
| HP05C | Hydraulic actuation (pilot ports on the sides) (only with manual and hydraulic section body) | | |
| HP05L | Hydraulic actuation with stroke limiter (only with manual and hydraulic section body) | | |

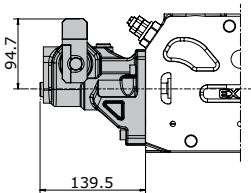
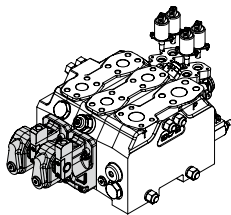
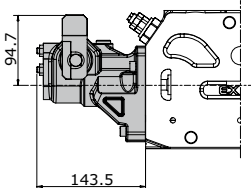
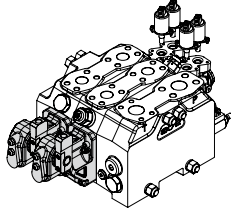
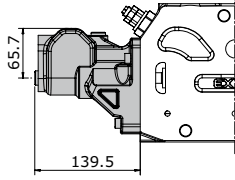
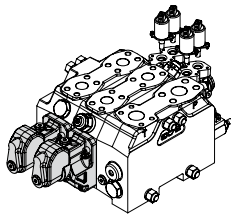
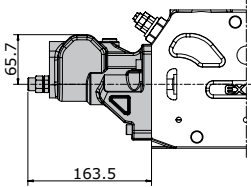
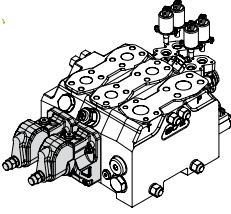
HYDRAULIC ACTUATION SPECIFICATIONS

| | |
|---------------------------------------|-------------------|
| Regulating pressure (bar) | 6,2 - 20,1 |
| Max Pressure on pilot line (bar) | 40 |
| Max Pressure on pilot Tank line (bar) | 5 |

NOTE:

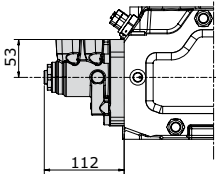
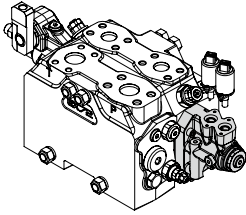
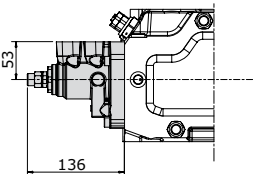
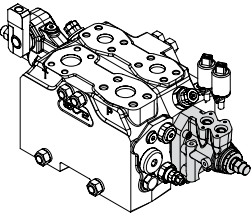
- Leave out the spool return action code when choosing hydraulic actuation HP05A, HP05C and HP05L
- HP05A, HP05C, HP05L requires a hydraulic version body.
- All hydraulics actuation are available in BSP or UNF version: (Port Pilot: 1/4" BSP or 9/16" UNF)
- Recommended control curve for HC Remote Control: A01 for standard spool



| ELECTROHYDRAULIC ACTUATION - SIDE A | | | |
|-------------------------------------|---|---|---|
| Code | Description | Dimensions | Configuration |
| HP04 | Lever actuation + electrohydraulic actuation |  |  |
| HP04L | Lever actuation + electrohydraulic actuation with stroke limiter |  |  |
| HP07 | Without lever + electrohydraulic actuation |  |  |
| HP07L | Without lever + electrohydraulic actuation with stroke limiter |  |  |

NOTE: Require electrohydraulic version body.

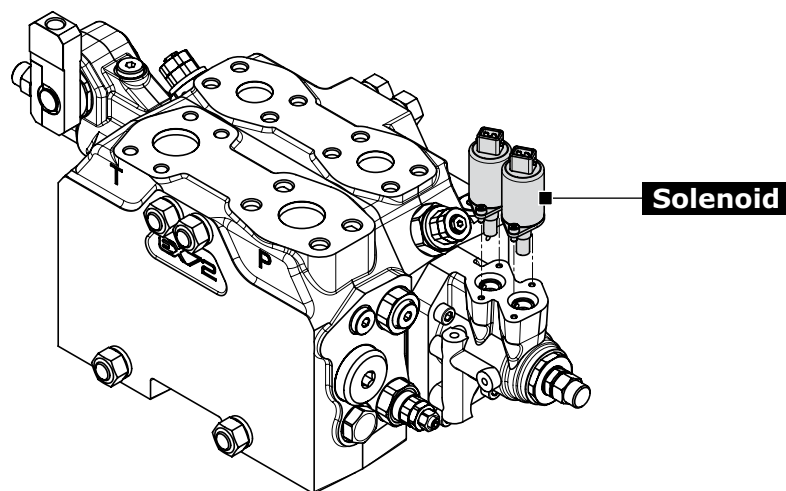
**Spools return action classification - SIDE B**

| ELECTROHYDRAULIC ACTUATION - SIDE B | | | |
|-------------------------------------|--|---|---|
| Code | Description | Dimensions | Configuration |
| FP04 | Lever actuation + electrohydraulic actuation available with HP04 - HP04L - HP07 |  |  |
| FP04L | Lever actuation + electrohydraulic actuation with stroke limiter Only available with HP07L |  |  |



Solenoid specifications for Electrohydraulic actuation

Solenoid kit must be ordered separately. Each work section require two solenoid kit.



| COIL AND CONNECTOR SPECIFICATIONS | | | | |
|---------------------------------------|--------------|-----------|------------------------|-----------|
| Type | DEUTSCH DT 4 | | AMP JUNIOR POWER TIMER | |
| Order Code | B12DE | B24DE | B12AJ | B24AJ |
| | 430093102 | 430093103 | 430093100 | 430093101 |
| Supply voltage (Vdc) | 12 | 24 | 12 | 24 |
| Coil resistance R20 (Ω) | 4,7 | 20,8 | 4,7 | 20,8 |
| ON-OFF control current (mA) | 2500 | 1150 | 2500 | 1150 |
| Proportional control current (mA) | 500 - 1300 | 250 - 650 | 500 - 1300 | 250 - 650 |
| PWM frequency suggested (Hz) | 70 - 90 | | 70 - 90 | |
| Connector | DEUTSCH DT 4 | | AMP Junior Power Timer | |
| Feeding reducing pressure (bar) | 40 | | 40 | |
| Max Pressure on pilot Tank line (bar) | 5 | | 5 | |

NOTE:

Mating connector for AMP Junior Power Timer can be ordered separately with code 413000223 (including 2 m wire).
Mating connector for Deutsch DT 4 can be ordered separately with code 487200802.



Compatibility table

| COMBINATION | | SPOOL ACTION AND RETURN SPRING TYPE - SIDE B | |
|--|-------|--|-------|
| | | FP04 | FP04L |
| SPOOL ACTION AND RETURN SPRING TYPE - SIDE A | HP05A | | |
| | HP05C | | |
| | HP05L | | |
| | HP04 | • | |
| | HP04L | • | |
| | HP07 | • | |
| | HP07L | | • |

NOTE: Leave out the spool return action code when choosing hydraulic actuation HP05A, HP05C and HP05L



Work section arrangement

Following pages are showing ordering code for post compensated section in their standard version and in combination with some specific applicable devices.

POST-COMPENSATED Section with local LS relief valve

Another feature not commonly found in flow sharing systems is the possibility to have a Load Sensing relief valve on individual sections. The purpose to use a local LS relief instead of a standard port shock relief is to improve the efficiency of the system. When a standard port shock relief is used, the full flow across the relief will be directed to tank, if the pressure system exceeds the setting. By using a local LS relief, only a very minimal part of oil will be directed to tank in the same condition, with great advantage for the system efficiency.

Furthermore, by saving oil from going to tank, more oil will be available for simultaneous operations and this will improve the performance of the machine.

The pressure limitation generated by the local LS relief applies to both section ports, A and B.

The local pressure limitation works properly if the section is actuated alone or if the section is the most charged.

The local LS relief can be easily installed as a retrofit too.

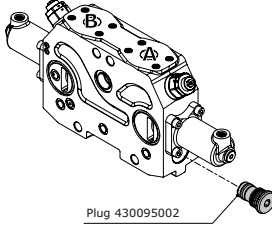
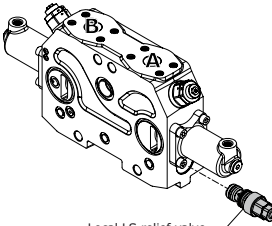
| Functions | Code | Setting range | Type | POST compensated |
|--|--------------------------------|--|----------------------|------------------|
| Standard section | RC1 | | with auxiliary valve | • |
| Section with local LS relief valve | RCD1 | <div>71 - 180</div> <div>181 - 280</div> <div>281 - 350</div> <div>351 - 420</div> | with auxiliary valve | • |
| Standard integrated outlet section | RCK1A RCK1C | | with auxiliary valve | • |
| Integrated outlet section with local LS relief valve | RCDK1A RCDK1C | <div>71 - 180</div> <div>181 - 280</div> <div>281 - 350</div> <div>351 - 420</div> | with auxiliary valve | • |

NOTE:

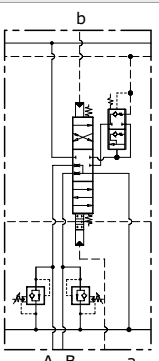
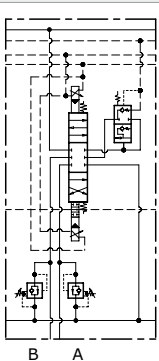
- Local LS relief valve work on both ports; setting for A and B ports is the same.
- LS relief valve setting must be specified as follow: RCD1 S35 (120) - RCDK1A S35 (120)

**Work section trasformation kits**

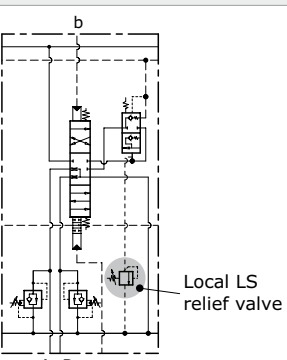
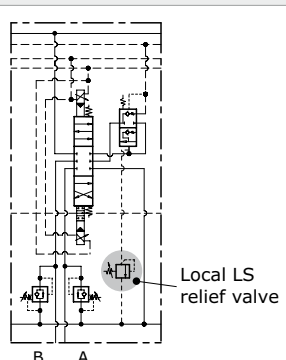
Transformation on the work section from RC type to RCD type and viceversa, is possible by ordering the following plug kit codes:

| Type | Order Code | Setting Range | Description | Configuration | Section Type |
|------------|------------------|---------------|------------------------------------|--|--------------------------|
| RC | 430095002 | | Standard section |  | Post compensated section |
| | | | | | |
| RCD | 915029506 | 71 - 180 | Section with local LS relief valve |  | |
| | 915029503 | 181 - 280 | | | |
| | 915029504 | 281 - 350 | | | |
| | 915029505 | 350 - 420 | | | |

POST compensated arrangement**POST-COMPENSATED SECTION STANDARD**

| code | schema for hydraulic lever actuation | schema for electrohydraulic actuation | description |
|----------------|---|---|--|
| RC1 S35 |  |  | POST compensated section Arranged for auxiliary valves |
| RC1 S36 | | | |


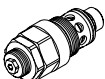

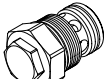

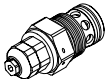

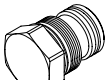
POST-COMPENSATED SECTION WITH LOCAL LS RELIEF VALVE


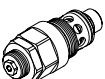

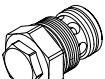

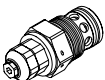


| code | schema for hydraulic lever actuation | schema for electrohydraulic actuation | description |
|-----------------|---|---|---|
| RCD1 S35 |  |  | POST compensated section with local Load Sensing relief valve Arranged for auxiliary valves |
| RCD1 S36 | | | |



Auxiliary valve identification

Valve setting is defined at 10 l/min flow. Look at Auxiliary valves diagram on page 14 to evaluate setting at actual flow.

| code | description | schema | configuration | setting range (bar) | | | |
|--------------|---|---|---|---------------------|--------------|----------|---------------|
| | | | | type | at full flow | type | at min. flow |
| 01 PA | Antishock valve (port A) |  |  | A | 60 / 100 | A | 10-A / 60-A |
| | | | | B | 101 / 160 | B | 61-A / 130-A |
| | | | | C | 161 / 250 | C | 131-A / 250-A |
| 02 PA | Anticavitation valve (port A) |  |  | | | | |
| 04 PA | Pilot combined valve (port A) |  |  | A | 50 / 390 | | |
| 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 | 60 / 100 | A | 10-A / 60-A |
| | | | | B | 101 / 160 | B | 61-A / 130-A |
| | | | | C | 161 / 250 | C | 131-A / 250-A |
| 02 PB | Anticavitation valve (port B) |  |  | | | | |
| 04 PB | Pilot combined valve (port B) |  |  | A | 50 / 390 | | |
| 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 or pilot combined valve:

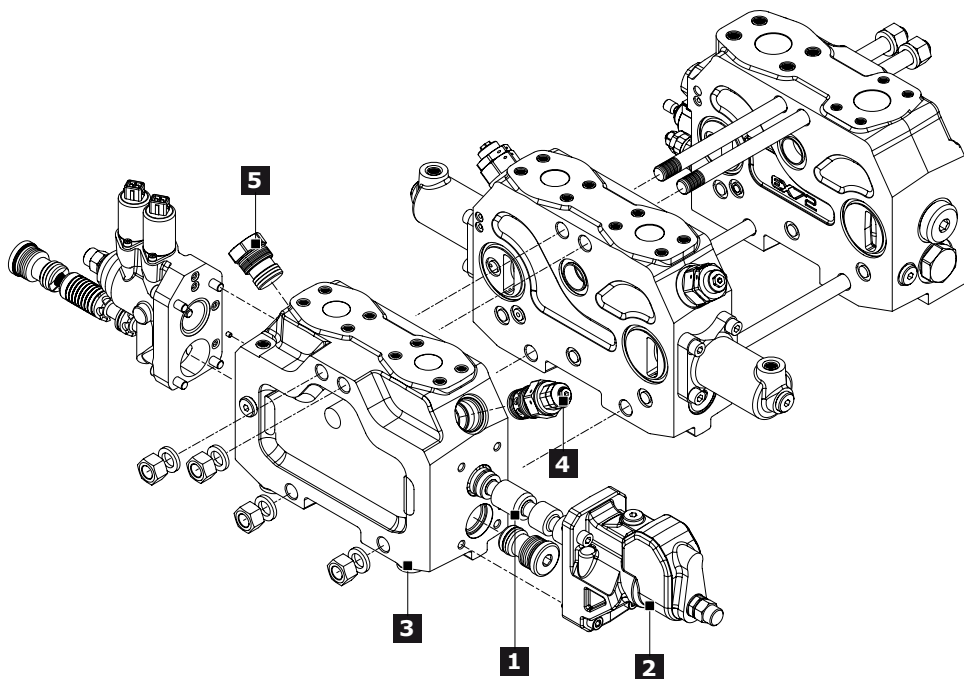
01 PA (120) = setting at full flow / 01 PA (120-A) = setting at min. flow

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

**INTEGRATED OUTLET SECTION**

Order example:

| | W001C 200200 | HP05A | RCK1A S35 | 05 PA | 05 PB |
|----|---------------------|--------------------------------------|------------------|--------------|--------------|
| 1. | W001C 200200 | spool type _____ | | | |
| 2. | HP05A | spool actuation type _____ | | | |
| 3. | RCK1A S35 | integrated outlet section type _____ | | | |
| 4. | 05 PA | auxiliary valve type (port A) _____ | | | |
| 5. | 05 PB | auxiliary valve type (port B) _____ | | | |



| Ref. | Code | Description | Page |
|----------|---------------------|--|-----------|
| 1 | W001C 200200 | 3 positions double-acting (200200 = l/min Spool flow) | 20 |
| | W002C 200200 | 3 positions double-acting A-B to tank (200200 = l/min Spool flow) | |
| 2 | HP05A | hydraulic actuation (pilot ports on the top) | 22 |
| | HP05C | hydraulic actuation (pilot ports on the side) | |
| 3 | RCK1A S35 | Integrated outlet section - LS drain Upper (SAE 6000 1"1/4 MA) | 33 |
| | RCK1A S36 | Integrated outlet section - LS drain Upper (SAE 6000 1"1/4 UNC) | |
| | RCDK1A S35 | Integrated outlet section with LS relief valve - LS drain Upper (SAE 6000 1"1/4 MA) | |
| | RCDK1A S36 | Integrated outlet section with LS relief valve - LS drain Upper (SAE 6000 1"1/4 UNC) | |
| 4 | 04 PA 90 | Pilot combined valve (port A) | 31 |
| | 05 PA | Prerangement for auxiliary valve (port A) | |
| 5 | 04 PB 90 | Pilot combined valve (port B) | 31 |
| | 05 PB | Prerangement for auxiliary valve (port B) | |

EX72 integrated outlet sections are available in one configuration: POST COMPENSATED

Integrated outlet sections are equipped with the same parts of work section, change only the body arrangement.

- RIF. A = spool actuation side A / RIF. B = Spool return action side B

Integrated outlet section designed with electrohydraulic actuation require double choice on side A and side B

- Leave out the spool return action code when choosing hydraulic actuation HP05A, HP05C and HP05L

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

Always indicate setting value when using antishock and pilot combined valve: 01 PA (120) - 04 PA (120)

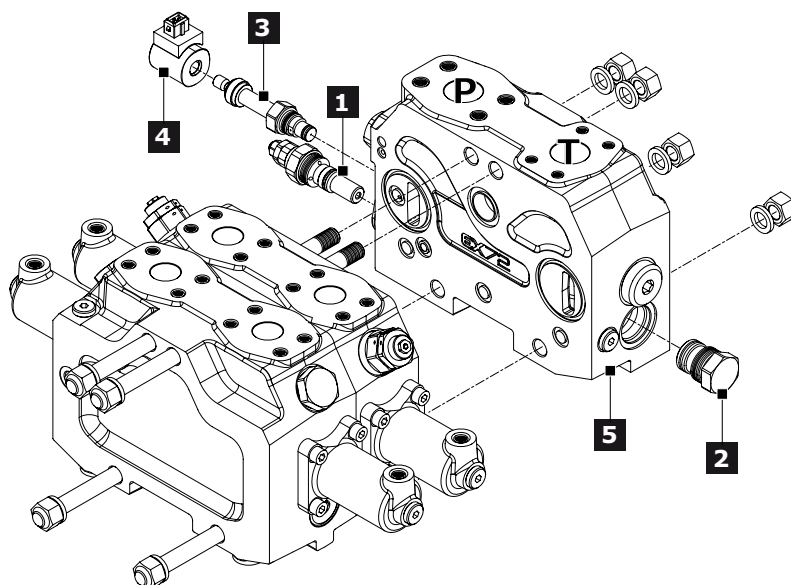
- When ordering a integrated outlet section with electrohydraulic actuation, it is necessary to specify connector type. (see table on page 27).



Integrated Outlet Section Arrangement

| POST-COMPENSATED INTEGRATED OUTLET SECTION STD | | | |
|--|--------|---------------|---|
| code | schema | configuration | description |
| RCK1A S35 | | | POST compensated integrated outlet section |
| RCK1A S36 | | | with LS drain - UPPER Arranged for auxiliary valves |
| RCK1C S35 | | | POST compensated integrated outlet section |
| RCK1C S36 | | | with LS drain - SIDE Arranged for auxiliary valves |

| POST-COMPENSATED INTEGRATED OUTLET SECTION WITH LOCAL LS RELIEF VALVE | | | |
|---|--------|---------------|---|
| code | schema | configuration | description |
| RCDK1A S35 | | | POST compensated integrated outlet section |
| RCDK1A S36 | | | with LS drain - UPPER Arranged for auxiliary valves |
| RCDK1C S35 | | | POST compensated integrated outlet section |
| RCDK1C S36 | | | with LS drain - SIDE Arranged for auxiliary valves |

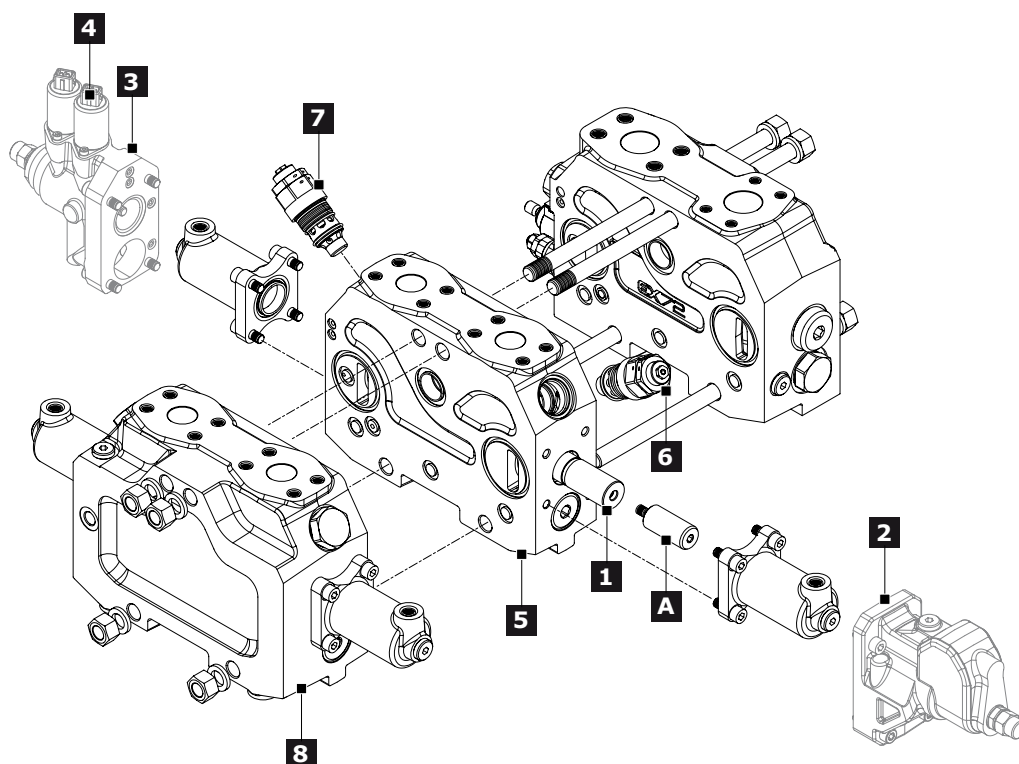
**EX72 SPARE PARTS LIST****Inlet Section**

| Rif. | Description | Order code | Q.ty | Code | Note |
|-----------|--|------------------|------|---------|---------------------------------|
| 1 | LS pressure relief valve | 915029501 | 1 | V1A | Setting range: 120-250 bar |
| | LS relief plug | 915029502 | 1 | V2A | Setting range: 251-350 bar |
| 2 | Full flow pilot operated pressure relief valve | 915078801 | 1 | V3B | Setting range: 50-390 bar |
| | Full flow relief plug | 430488001 | 1 | V4B | |
| 3 | LS plug | 430059003 | 1 | V10C | |
| | LS electric dump valve | 413150076 | 1 | V11C | |
| 4* | Electric dump valve coil | 413171235 | 1 | C12DI | DIN 43650 ISO 4400 - 12 Vdc |
| | | 413172432 | 1 | C24DI | DIN 43650 ISO 4400 - 24 Vdc |
| | | 413171238 | 1 | C12DE | DEUTSCH DT 4 - 12 Vdc |
| | | 413172440 | 1 | C24DE | DEUTSCH DT 4 - 24 Vdc |
| | | 413171237 | 1 | C12AJ | AMP JUNIOR - 12 Vdc |
| | | 413172433 | 1 | C24AJ | AMP JUNIOR - 24 Vdc |
| 5 | Open centre inlet section | 029500001 | 1 | KV S37 | for fixed displacement pumps |
| | | 029500002 | 1 | KV S38 | |
| | Closed centre inlet section | 029500003 | 1 | JV S37 | for variable displacement pumps |
| | | 029500004 | 1 | JV S38 | |
| | Open centre inlet section wih RDP | 029500011 | 1 | KVR S37 | for fixed displacement pumps |
| | | 029500012 | 1 | KVR S38 | |
| | Closed centre inlet section wih RDP | 029500013 | 1 | JVR S37 | for variable displacement pumps |
| | | 029500014 | 1 | JVR S38 | |

(*) = Electric dump valve coil must be ordered separately: see table "A" page 16.



Post-Compensated Work Section and Integrated Outlet Section



| Rif. | Description | Order code | Q.ty | Code | Note |
|----------|--|------------------|------|--------------|--------------------------------|
| 1 | 3 positions double-acting spool | 421295021 | 1 | W001C 160160 | spool 160 l/min |
| | | 421295007 | 1 | W001C 200200 | spool 200 l/min |
| | | 421295009 | 1 | W001C 250250 | spool 250 l/min |
| | | 421295005 | 1 | W001C 280280 | spool 280 l/min |
| | | 421295001 | 1 | W001C 340340 | spool 340 l/min |
| | 3 positions double-acting spool A and B to tank | 421295019 | 1 | W002C 160160 | spool 160 l/min |
| | | 421295008 | 1 | W002C 200200 | spool 200 l/min |
| | | 421295015 | 1 | W002C 250250 | spool 250 l/min |
| | | 421295006 | 1 | W002C 280280 | spool 280 l/min |
| | | 421295002 | 1 | W002C 340340 | spool 340 l/min |
| A | Spool end | - | 1 | | for hydraulic actuation |
| | | - | 1 | | for electrohydraulic actuation |
| 2 | Hydraulic actuation (ports on the top) | 320595100 | 1 | HP05A | BSP version |
| | Hydraulic actuation (ports on the sides) | 320595106 | 1 | HP05C | |
| | Hydraulic actuation with stroke limiter | 320595112 | 1 | HP05L | |
| | Hydraulic actuation (ports on the top) | 320595103 | 1 | HP05A | UNF version |
| | Hydraulic actuation (ports on the sides) | 320595109 | 1 | HP05C | |
| | Hydraulic actuation with stroke limiter | 320595115 | 1 | HP05L | |
| | Lever actuation + electrohydraulic actuation | 322595002 | 1 | HP04 | |
| | Lever actuation + electrohydraulic actuation with stroke limiter | 322595003 | 1 | HP04L | |
| | Without lever + electrohydraulic actuation | 322595004 | 1 | HP07 | |
| | Without lever + electrohydraulic actuation with stroke limiter | 322595005 | 1 | HP07L | |



| Rif. | Description | Order code | Q.ty | Code | Note |
|----------|--|------------------|------|------------------|-------------------------------------|
| 3 | Lever actuation + electrohydraulic actuation | 322595102 | 1 | FP04 | only with HP04-HP07 |
| | Without lever + electrohydraulic actuation with stroke limiter | 322595103 | 1 | FP04L | only with HP07L |
| 4 | Solenoid kit | 430093100 | 2 | B12AJ | AMP JUNIOR - 12 Vdc |
| | | 430093101 | 2 | B24AJ | AMP JUNIOR - 24 Vdc |
| | | 430093102 | 2 | B12DE | DEUTSCH DT 4 - 12 Vdc |
| | | 430093103 | 2 | B24DE | DEUTSCH DT 4 - 24 Vdc |
| | | | | | |
| 5 | Post compensated section standard with auxiliary valve | 039500001 | 1 | RC1 S35 | Only for Hydraulic actuation |
| | | 039500002 | 1 | RC1 S36 | |
| | Post compensated section with local LS relief valve with auxiliary valve | 039500003 | 1 | RCD1 S35 70/180 | |
| | | 039500004 | 1 | RCD1 S35 181/280 | |
| | | 039500005 | 1 | RCD1 S36 70/180 | |
| | | 039500006 | 1 | RCD1 S36 181/280 | |
| | | 039500007 | 1 | RCD1 S35 281/350 | |
| | | 039500008 | 1 | RCD1 S35 351/420 | |
| | | 039500009 | 1 | RCD1 S36 281/350 | |
| | | 039500010 | 1 | RCD1 S36 351/420 | |
| | Post compensated section standard with auxiliary valve | 039500101 | 1 | RC1 S35 | Only for Electrohydraulic actuation |
| | | 039500102 | 1 | RC1 S36 | |
| | Post compensated section with local LS relief valve with auxiliary valve | 039500103 | 1 | RCD1 S35 70/180 | |
| | | 039500104 | 1 | RCD1 S35 181/280 | |
| | | 039500105 | 1 | RCD1 S36 70/180 | |
| | | 039500106 | 1 | RCD1 S36 181/280 | |
| | | 039500107 | 1 | RCD1 S35 281/350 | |
| | | 039500108 | 1 | RCD1 S35 351/420 | |
| | | 039500109 | 1 | RCD1 S36 281/350 | |
| | | 039500110 | 1 | RCD1 S36 351/420 | |

Auxiliary valve

| Rif. | Description | Order code | Q.ty | Code | Note |
|----------|---|------------------|------|-------|-----------------------|
| 6 | Antishock valve - port A | 915068804 | 1 | | setting: 60/100 |
| | | 915068805 | 1 | 01 PA | setting: 101/160 |
| | | 915068806 | 1 | | setting: 161/250 |
| | Anticavitation valve - port A | 915088801 | 1 | 02 PA | |
| | Pilot Combined valve - port A | 915078801 | 1 | 04 PA | setting: (50/420 bar) |
| | Prearrangement for auxiliary valve - port A | 430488001 | 1 | 05 PA | |
| 7 | Antishock valve - port B | 915068804 | 1 | | setting: 60/100 |
| | | 915068805 | 1 | 01 PB | setting: 101/160 |
| | | 915068806 | 1 | | setting: 161/250 |
| | Anticavitation valve - port B | 915088801 | 1 | 02 PB | |
| | Pilot Combined valve - port B | 915078801 | 1 | 04 PB | setting: (50/420 bar) |
| | Prearrangement for auxiliary valve - port B | 430488001 | 1 | 05 PB | |



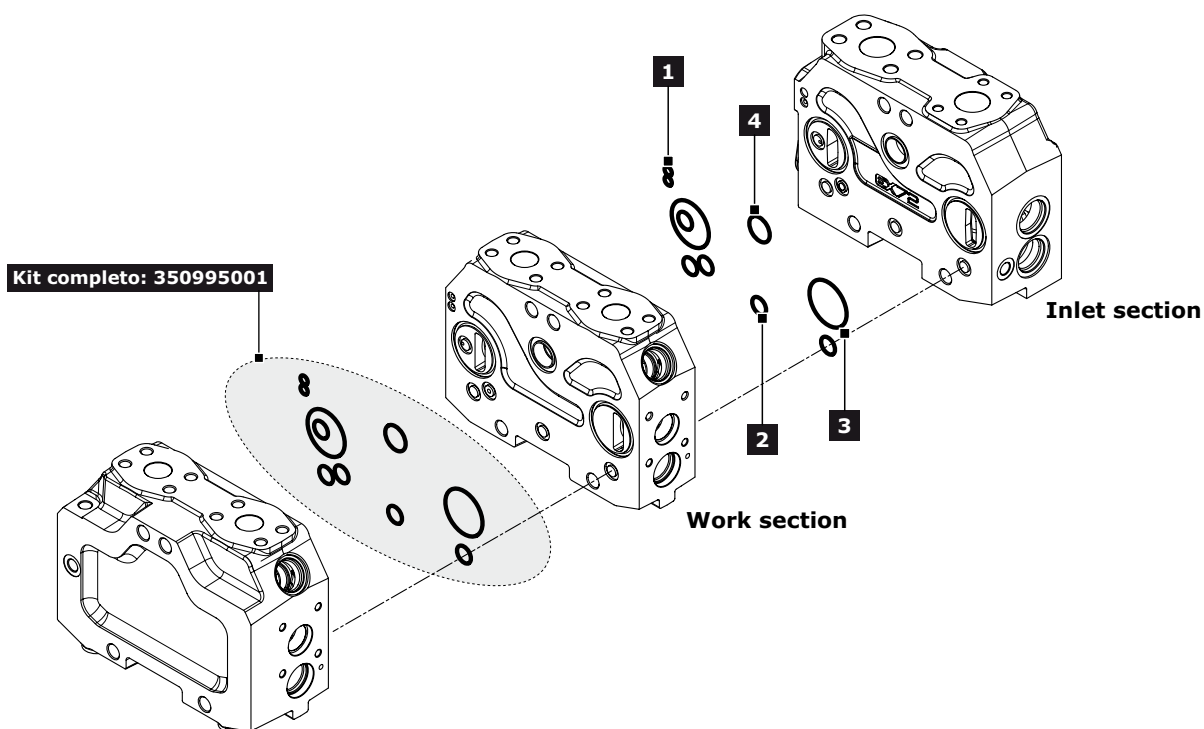
Post-Compensated Integrated Outlet Section

Integrated Outlet Sections are equipped with the same parts of work section, change only the body arrangement.

| Rif. | Description | Order code | Q.ty | Code | Note |
|------|---|------------|------|--------------------|-------------------------------------|
| 8 | Integrated outlet section with LS drain - UPPER | 039500201 | 1 | RCK1A S35 | Only for Hydraulic actuation |
| | | 039500202 | 1 | RCK1A S36 | |
| | Integrated outlet section with LS drain - SIDE | 039500203 | 1 | RCK1C S35 | |
| | | 039500204 | 1 | RCK1C S36 | |
| | Integrated outlet section with LS drain - UPPER with local LS relief valve with auxiliary valve | 039500211 | 1 | RCDK1A S35 71/180 | |
| | | 039500212 | 1 | RCDK1A S35 181/280 | |
| | | 039500213 | 1 | RCDK1A S36 71/180 | |
| | | 039500214 | 1 | RCDK1A S36 181/280 | |
| | | 039500215 | 1 | RCDK1C S35 71/180 | |
| | | 039500216 | 1 | RCDK1C S35 181/280 | |
| | Integrated outlet section with LS drain - SIDE with local LS relief valve with auxiliary valve | 039500217 | 1 | RCDK1C S36 71/180 | |
| | | 039500218 | 1 | RCDK1C S36 181/280 | |
| | | 039500219 | 1 | RCDK1A S35 281/350 | |
| | | 039500220 | 1 | RCDK1A S35 351/420 | |
| | Integrated outlet section with LS drain - UPPER with local LS relief valve with auxiliary valve | 039500225 | 1 | RCDK1A S36 281/350 | Only for Electrohydraulic actuation |
| | | 039500226 | 1 | RCDK1A S36 351/420 | |
| | | 039500227 | 1 | RCDK1C S35 281/350 | |
| | | 039500228 | 1 | RCDK1C S35 351/420 | |
| | Integrated outlet section with LS drain - SIDE with local LS relief valve with auxiliary valve | 039500229 | 1 | RCDK1C S36 281/350 | |
| | | 039500230 | 1 | RCDK1C S36 351/420 | |
| | Integrated outlet section with LS drain - UPPER | 039500221 | 1 | RCK1A S35 | |
| | | 039500222 | 1 | RCK1A S36 | |
| | Integrated outlet section with LS drain - SIDE | 039500223 | 1 | RCK1C S35 | |
| | | 039500224 | 1 | RCK1C S36 | |
| | Integrated outlet section with LS drain - UPPER with local LS relief valve with auxiliary valve | 039500231 | 1 | RCDK1A S35 71/180 | |
| | | 039500232 | 1 | RCDK1A S35 181/280 | |
| | | 039500233 | 1 | RCDK1A S36 71/180 | |
| | | 039500234 | 1 | RCDK1A S36 181/280 | |
| | Integrated outlet section with LS drain - SIDE with local LS relief valve with auxiliary valve | 039500235 | 1 | RCDK1C S35 71/180 | |
| | | 039500236 | 1 | RCDK1C S35 181/280 | |
| | | 039500237 | 1 | RCDK1C S36 71/180 | |
| | | 039500238 | 1 | RCDK1C S36 181/280 | |
| | Integrated outlet section with LS drain - UPPER with local LS relief valve with auxiliary valve | 039500239 | 1 | RCDK1A S35 281/350 | |
| | | 039500240 | 1 | RCDK1A S35 351/420 | |
| | | 039500241 | 1 | RCDK1A S36 281/350 | |
| | | 039500242 | 1 | RCDK1A S36 351/420 | |
| | Integrated outlet section with LS drain - SIDE with local LS relief valve with auxiliary valve | 039500243 | 1 | RCDK1C S35 281/350 | |
| | | 039500244 | 1 | RCDK1C S35 351/420 | |
| | | 039500245 | 1 | RCDK1C S36 281/350 | |
| | | 039500246 | 1 | RCDK1C S36 351/420 | |



Gasket kits



| Ref. | Order Code | Description | Q.ty |
|---|------------|--------------------------------|------|
| 1 | 412010122 | O.R. 70SH 6.07 x 1,78 (2-10) | 2 |
| 2 | 412020609 | O.R. 90SH 13.11 x 2.62 (5-616) | 5 |
| 3 | 612020501 | O.R. 90SH 50.39 x 3.53 (1BWG4) | 2 |
| 4 | 412020904 | O.R. 90SH 29.74 x 3.53 | 1 |
| Order code complete Gasket kit: 350995001 | | | |



INSTALLATION AND MAINTENANCE INSTRUCTIONS

Guidelines

- Never use the Control Valve at a pressure exceeding the rated pressure; if not, there is the possibility of breakage in the Control Valve;
- Use the Control Valve within the rated flow; if not there might be malfunction or a deterioration in heat balance. If it is unavoidable to use the Control Valve at a level exceeding the rated flow, carry out various confirmatory tests and use it within the verified range. If the Control Valve is used under a condition beyond the verified range, we shall not be responsible for any accidents occurred as a result of the use.
- Using low-cleanliness hydraulic fluid might cause seal failure or damage to the seal part, resulting in operation failure, or operation mistake of the machine; the customer is requested to check the cleanliness of the hydraulic fluid without fail.

Storage

Do not store the HC product in:

- Places where it might be damaged;
- Very hot/humid areas;
- Where it could get wet;
- Where it could come into contact with organic solvents, acids, alkalis and/or dangerous gases;
- In places subject to sudden, significant changes in temperature;
- only remove the packaging when you have decided to assemble the product.



Warning

- Hydrocontrol is not responsible for any damages due to a storage not in compliance with our prescriptions;
- For any doubts, please contact our aftersales department.

Installation procedures

On receiving the Hydrocontrol product make sure you:

- Check if there are some sign of damage of the packaging;
- Check that the dimensions of the product seat are compatible with those of the product itself;
- Check that assembly seat is compatible with the dimensions of the part and that it has been prepared for part set-up (connection hoses ready etc.);
- Remove the plastic caps that protect the service ports and be careful not to introduce any dirt or foreign matters inside the control valve as this could damage it;
- 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; any distortion in assembly can result in spool sticking and poor control;
- Clean piping materials sufficiently before use;
- Prevent the port openings from being entered with dust or foreign matters;
- Double check that hoses are correctly connected following prescription and indication of hydraulic schema, especially:
 - (in case of EH control) be sure that drain line is directly connected to tank (avoid any back pressure)
 - (in case of variable displacement system) be sure that LS signal line is correctly connected to the pump regulator.
- tighten the port connectors surely with the recommended fastening torques (Nm) as shown in the following table;
- If possible, install the valve in a protected environment, avoiding direct exposure to weathering, water, salt or any other corrosion substances

**INSTALLATION AND MAINTENANCE INSTRUCTIONS****Warning**

- Falling or hitting the Control Valve might bend the Spool so as to cause an accident due to an operation failure;
- If the Control Valve is mounted in a uneven surface, the Control Valve Body might be deformed, which results on a malfunction or external leakage;
- If there are foreign matters in each port, the Control Valve operation might fail so as to cause an accident;
- Do not tighten fittings with torque more than the recommended value; If not there might be strains or damage to Control Valve so as to cause a serious accident;
- If the piping are not connected to the correspondent ports, unintentional movements might cause a serious accident;
- Hydrocontrol is not responsible for any damages due to an installation procedure not in compliance with our prescriptions;
- For any doubts, please contact our aftersales department.

Handling Precautions

When the Control Valve is handled, ensure:

- that you do not drop, hit or damage the product;
- that you do 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

Handling Precautions

Disassembly and assembly should be carried out by Hydrocontrol technicians. If the Control Valve doesn't work in the adequate way, we advise you to contact our aftersales department. However if the disassembly and assembly operations are strictly unavoidable, you must observe the following prescriptions and charge the carrying out of the operations to technicians high qualified in hydraulic field.

- The Control Valve reaches high temperature after operating the machine; start the work only after checking that the temperature is low;
- The valve can hold high internal pressure; release the inside pressure and ensure all machine actuators are in a rest position before removing the piping. In any case safely and carefully unscrew connections and fittings. If not, there might be a fall of attachments or high-temperature hydraulic fluid jet. Remind to wear the safety equipment and goggles;
- Pay attention in removing electrical connectors;
- Since hydraulic devices are all machined precisely with very accurate clearances, carry out the disassembly adassembly work at a clean place;
- Make sure to prevent the device form being entered with dust, sand and the like;
- Before removing the pipes, attach suitable indications on them to be able to locate their positions late. It is also advisable to label dismounted parts and write down their original location;
- Before disassembly work, get the assembly instructions by requiring to our aftersales department and prepare all the material needed for the task;
- To disassemble and assemble the valve observe strictly our mounting instructions;
- Since there is the possibility of rust when the disassembled parts are left, apply anticorrosive oil to the parts and seal them;
- If it is unavoidable to dismount spring kit from the spool, ensure to clamp the spool through plastic or aluminum devices;
- Before remounting the Control Valve on the operating machine, ensure that the Control Valve has not been affected by carrying out various hydraulic tests (e.g. Relief Valve setting, Leak test..);
- Before reassembling electrical connectors, verify their integrity and check if they are dry

**Warning**

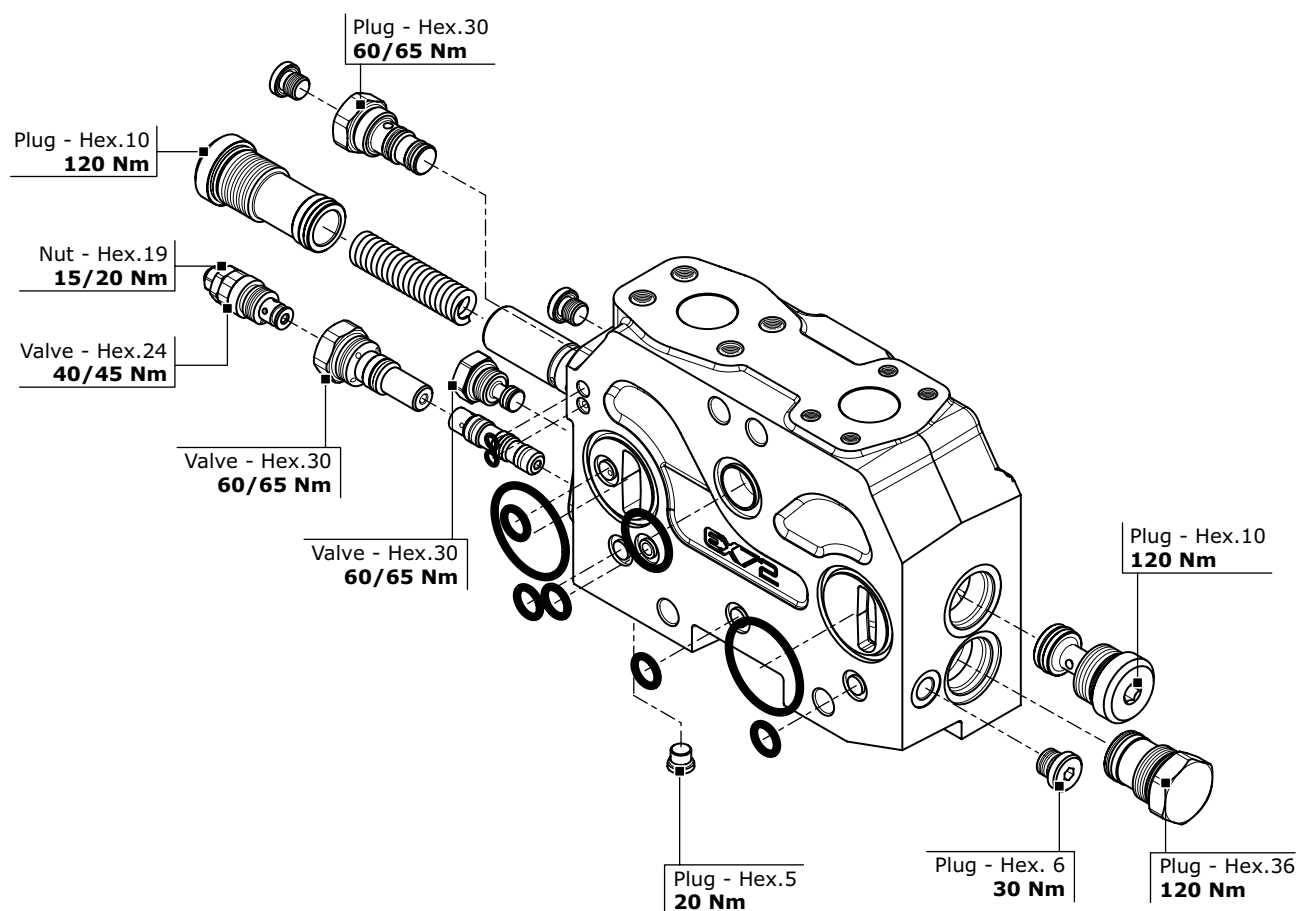
- Always bear in mind that "all workers must act responsibly to ensure their own health and safety"; use of personal protection equipment is therefore essential. All the disassembly and assembly operations must observe strictly the procedures listed in the Hydrocontrol Mounting Instruction.
- Hydrocontrol is not responsible for any damages due to disassembly and assembly procedures not in compliance with our prescriptions.
- For any doubts, please contact our aftersales department.



General clamping torque

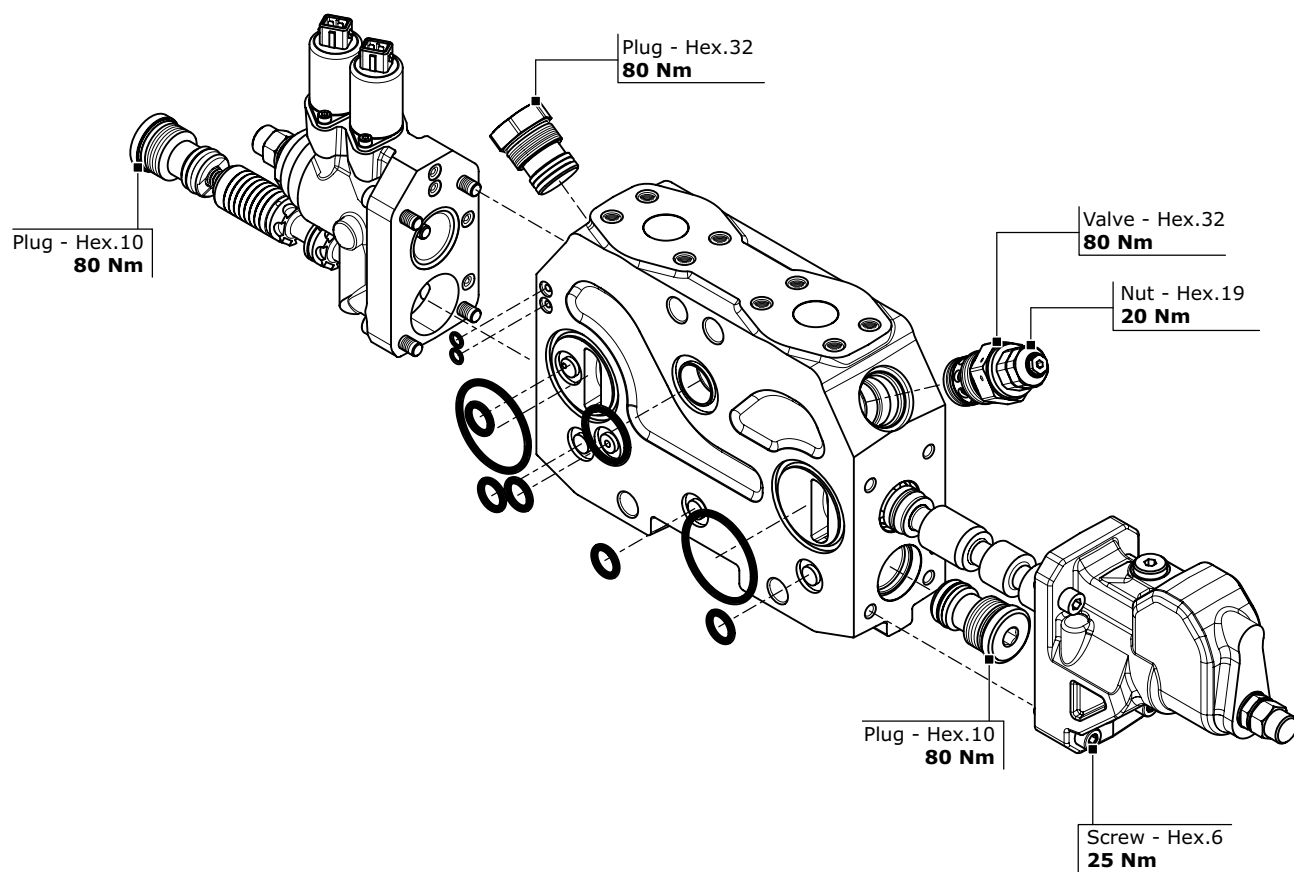
The following table provides the main tightening torques of the distributor EX72; are highlighted in 3 separate drawings depicting the inlet section, the working section and the integrated outlet section.

Inlet Section



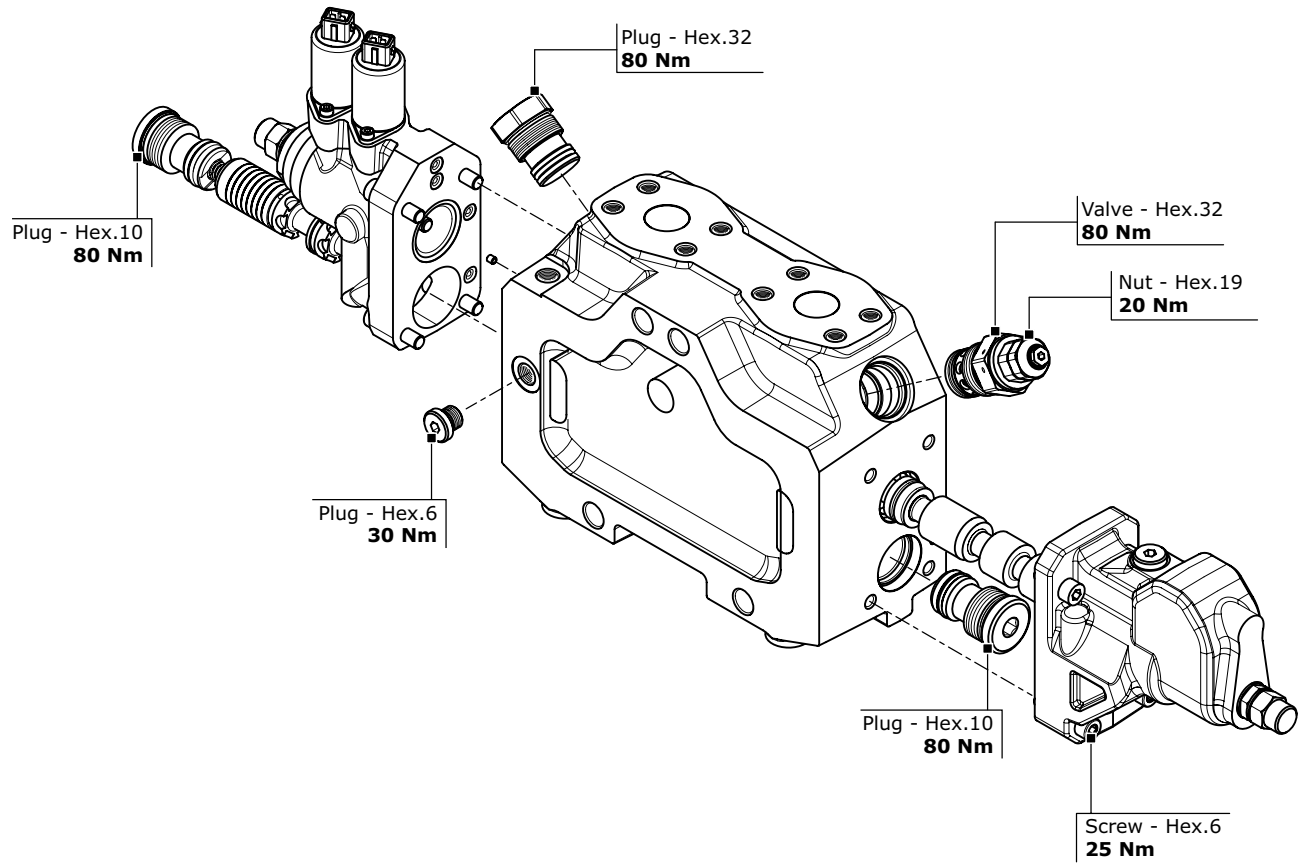


Work Section





Integrated Outlet Section



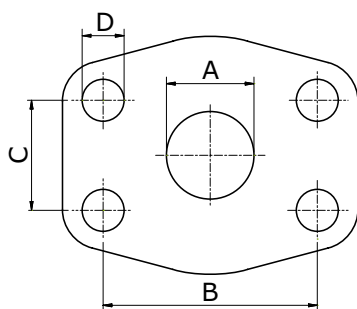
**Dimensions - Thread codes**

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

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

Product code

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 12 months from product delivery. On the products that have been fixed or replaced in accordance with what specified above, the above-mentioned warranty applies. The 12 month duration starts from the date of repair or replacement. In case of defects, lack of quality or in case of lack of compliance for the supplied products, with the exception of fraud or serious offence, Hydrocontrol s.p.a. only commits to repairing or replacing the faulty products, according to what specified above. This warranty replaces any other Supplier's warranty or liability established by the law. This warranty excludes any other liability contractual or extra-contractual by Hydrocontrol s.p.a. on the products supplied by Hydrocontrol (as a mere example: damage refund, loss of profit, product recall campaign, etc). Hydrocontrol s.p.a. has signed a product civil liability police, with a suitable maximum coverage.

Ownership retention

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

Obligation confidentiality

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

Patents

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

Applicable law and court of jurisdiction

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

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

Walvoil S.p.A. - Headquarters

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

Business Unit Hydrocontrol

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

Galtech Site

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

AUSTRALASIA

Walvoil Fluid Power Australasia Pty Ltd

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

BRASILE . BRAZIL

Interpump Hydraulics Brasil Ltda – Walvoil Division

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

CANADA

Galtech Canada Inc.

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

CINA . CHINA

Walvoil Fluid Power (Shanghai) Company Limited

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

Guangzhou Bushi Hydraulic Technology Ltd

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

COREA . KOREA

Walvoil Fluid Power Korea Ltd. - SOUTH KOREA

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

FRANCIA . FRANCE

Walvoil Fluid Power France

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

INDIA

HC Hydraulic Technology(P) LTD

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

Walvoil Fluid Power (India) PVT. LTD.

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

U.S.A.

Hydrocontrol Inc.

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

Walvoil Fluid Power Corporation

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

