EX38

LOAD SENSING VALVE

hydro control

TECHNICAL CATALOGUE

A member of INTERPUMP GROUP

walvoil FLUID POWER E|MOTION

1st edition EX38.03

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.

EX38

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 tecnique 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 feauture allow to establish a priority in the way the oil is directed and increse 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 150 l/min inlet flow rate. Suitable applications including truck-mounted cranes up to 25 tm, forestry cranes, tractors and mini-excavators up to 6 t.




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

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)

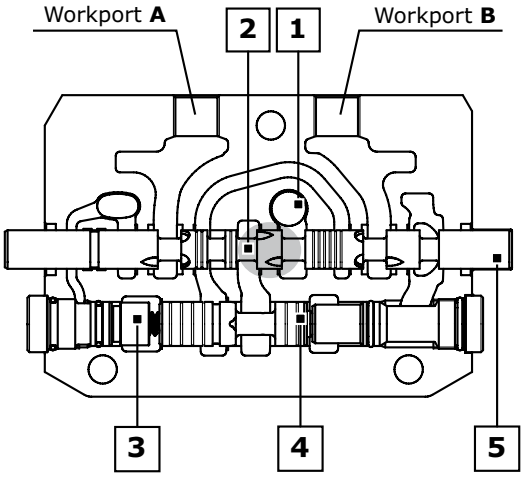
Fluid options

Types of fluid (according to IS0 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.

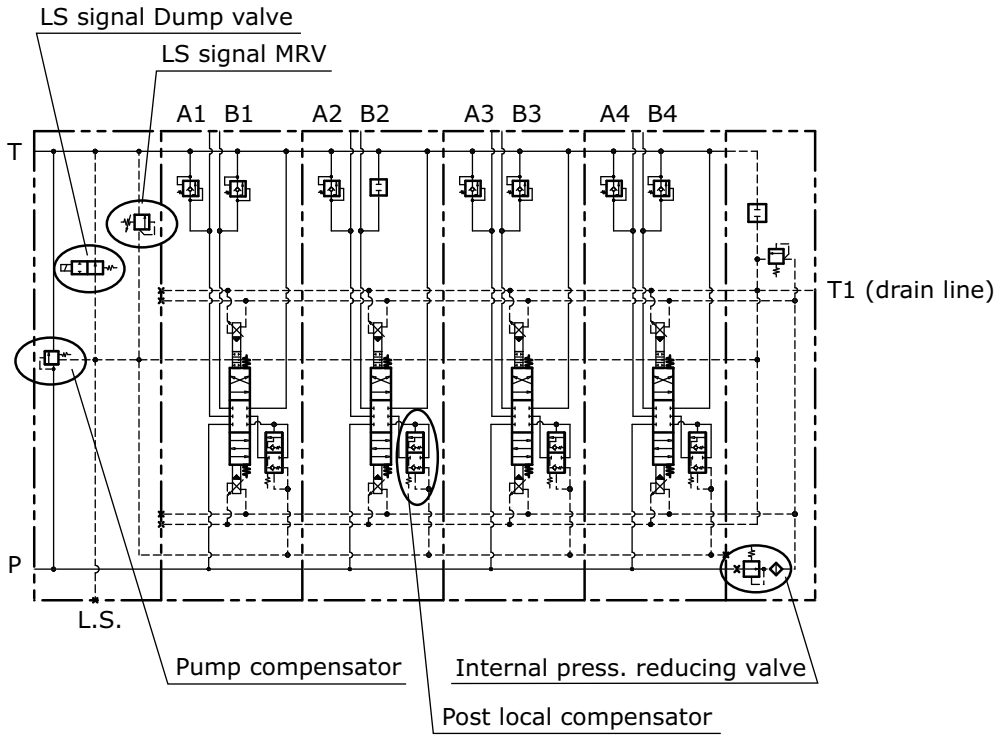
Flow Sharing function

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.

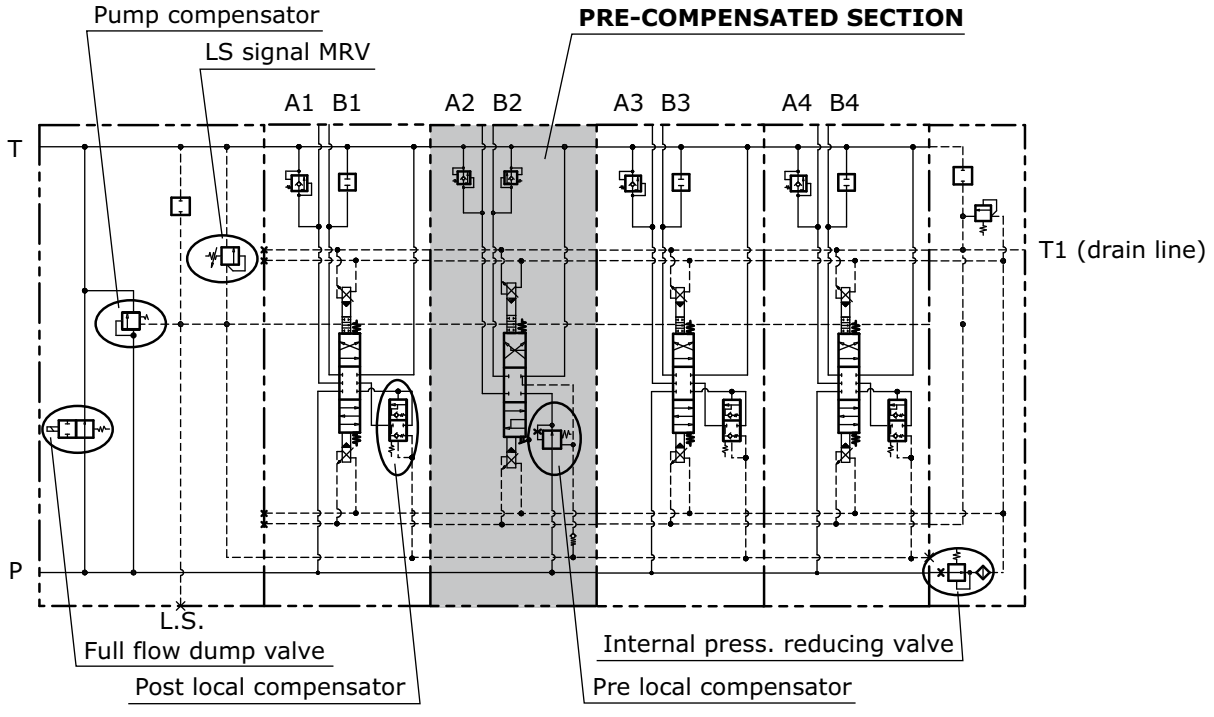
HYDRAULIC SCHEMA

EX38 family offers a precious additional feature: the possibility to mix pre and post compensated technologies, to improve the control capabilities and manage flows with different priorities. Following schematics show an example for a full post-compensated system and for mixed system. Further detail are explained on page 35.

Post compensated system



Pre compensated system



ORDER EXAMPLE

EX38/1: | **ML V1A 200 V7B C12AJ V10C KV G05** | **W001C 2525 HP04 FP04 B12AJ RC1 G04 05TF PA 05TF PB** | **KZ20EH**

TYPE:

EX38: product type
/1: working section number

1) INLET ARRANGEMENT: p. 15

ML	Inlet side
V1A	LS pressure relief valve on port A
200	Setting (bar)
V7B	Full flow relief plug on port B
C12AJ	Coil-connector kit type
V10C	LS plug on port C
KV G05	Inlet body arrangement

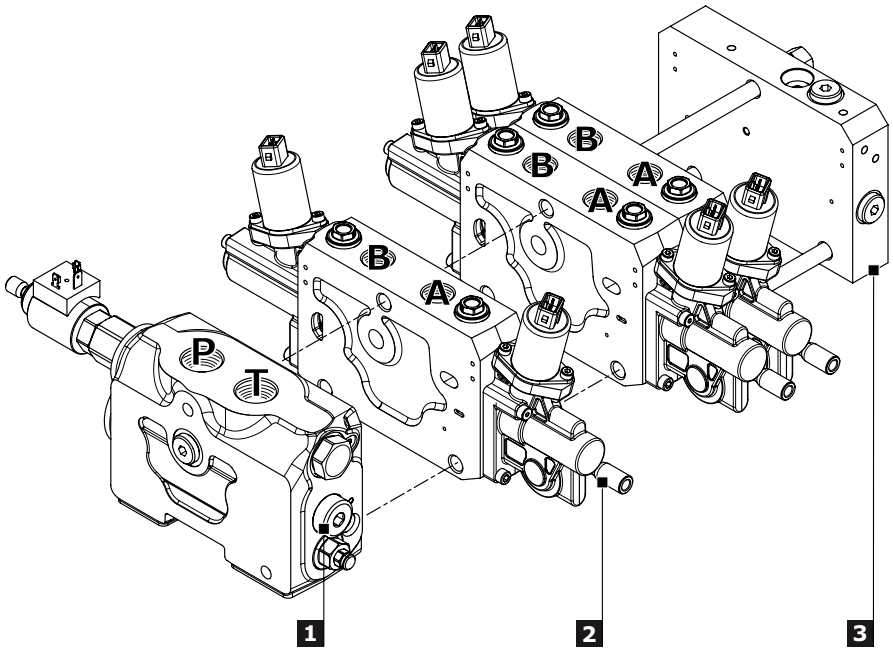
2) WORK SECTION ARRANGEMENT: p. 21

W001C 2525	Spool delivery
HP04	Spool actuation type
FP04	Spool return action type
B12AJ	Coil-connector kit type
RC1 G04	Work section arrangement
05TF PA	Auxiliary valve (port A)
05TF PB	Auxiliary valve (port B)

3) OUTLET ARRANGEMENT (END PLATE): p. 44

KZ20EH	Plate type

Ordering row 2 must be repeated for every work section



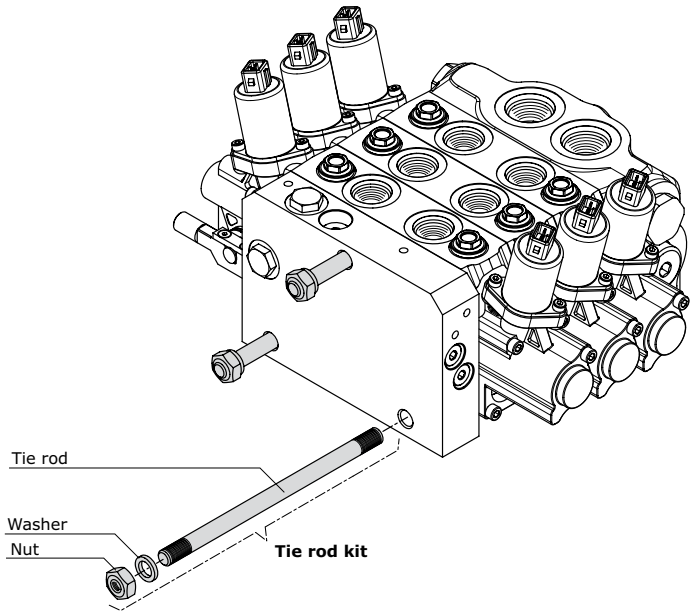
Standard thread

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 60.

Ports	BSP (ISO - 228)	Code	UN-UNF (ISO - 725)	Code
(P - T)	G 3/4	**G05**	1”1/16 - 12 UNF	**U05**
(A - B)	G 1/2	**G04**	7/8” - 14 UNF	**U04**

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. EX38 requires 3 tie-rod kits.



Tie rod kit	Order Code	Lenght (mm)	Clamping Torque (Nm)	Quantity
EX38/1	300193022	95	40	3
EX38/2	300193015	133		
EX38/3	300193016	172		
EX38/4	300193017	210		
EX38/5	300193010	248		
EX38/6	300193011	287		
EX38/7	300193012	324		
EX38/8	300193013	361		
EX38/9	300193014	400		
EX38/10	300193018	438		

Painting

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

Order example of EX38/1 painted:

EX38/1
ML V1A 200 V7B C12AJ V10C KV G05
W001C 2525 HP04 FP04 B12AJ RC1 G04 05TF PA 05TF PB
KZ20EH
P006/1 N10

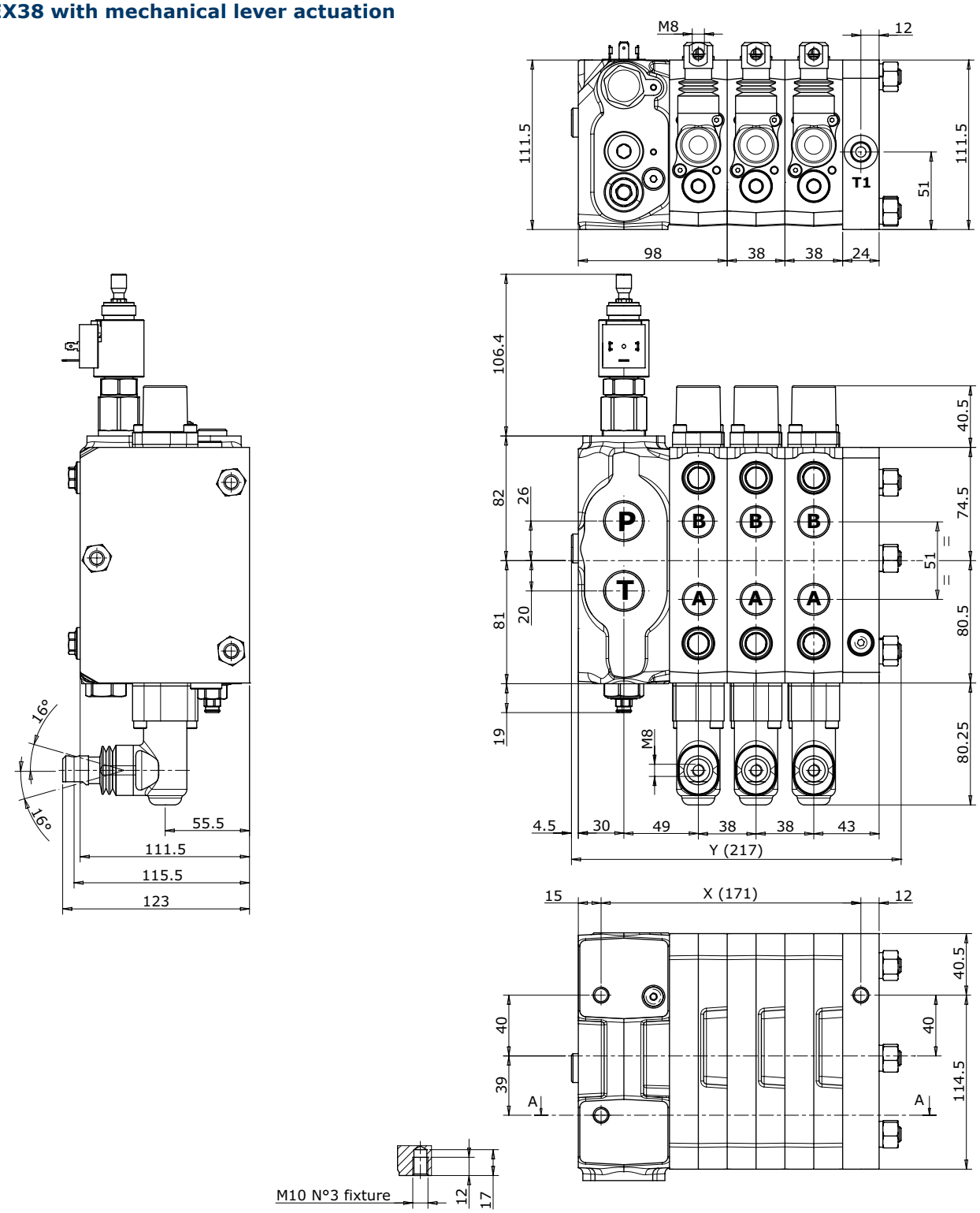
The painting is indicated with the following value:

P006 - /1 - N10

- N10 — Color black
- /1 — section number
- P006 — Painted

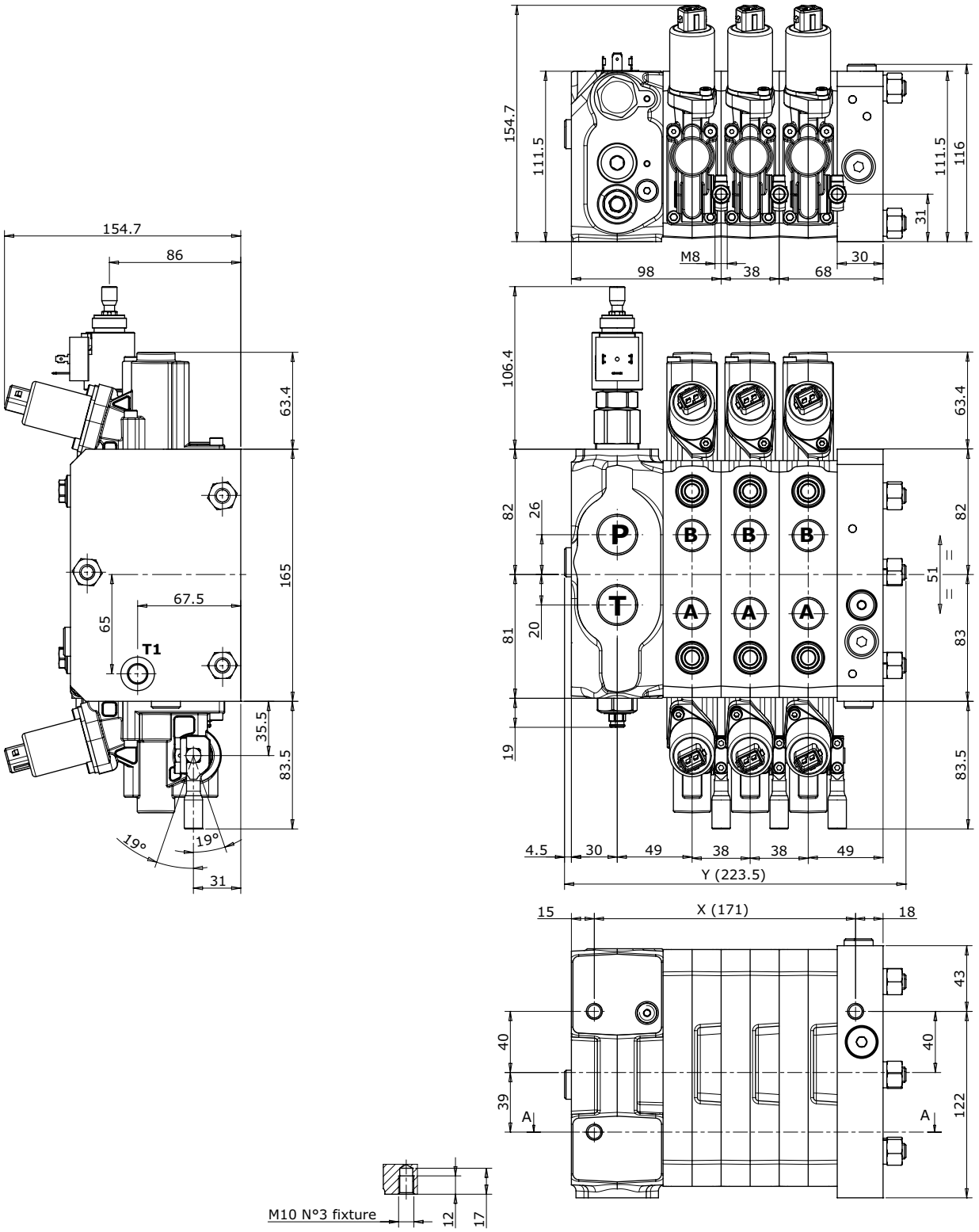
DIMENSIONS

EX38 with mechanical lever actuation



Type	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10
X (mm)	95	133	171	209	247	285	323	361	399	437
Y (mm)	141	179	217	255	293	331	369	407	445	483
Weights (kg)	14,5	18,5	22,5	26,5	30,5	34,5	38,5	42,5	46,6	50,5

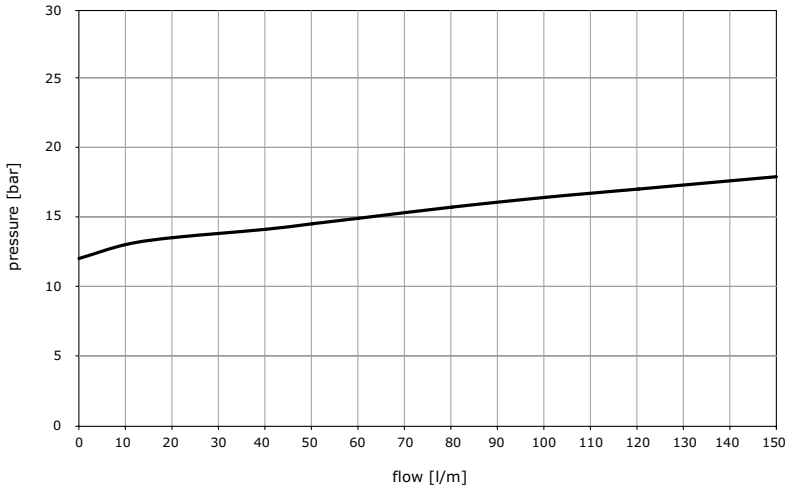
EX38 with electrohydraulic actuation



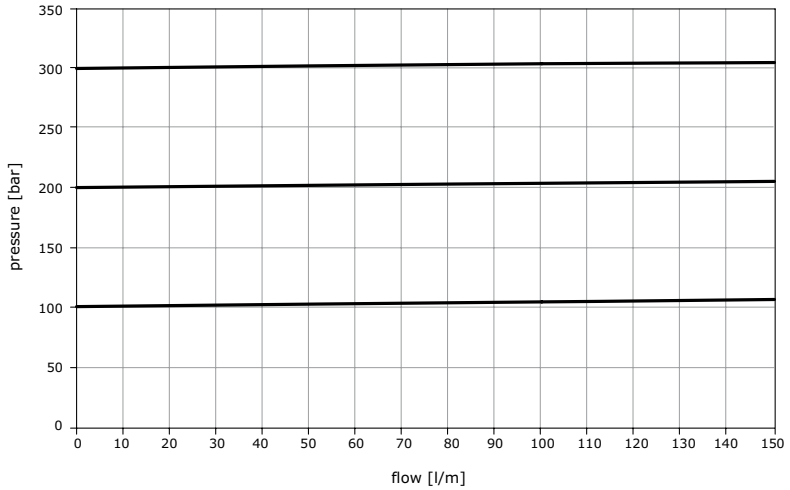
Type	/1	/2	/3	/4	/5	/6	/7	/8	/9	/10
X (mm)	95	133	171	209	247	285	323	361	399	437
Y (mm)	147.5	185.5	223.5	261.5	299.5	337.5	375.5	413.5	451.5	489.5
Weights (kg)	15	19.5	24	28.5	33	37,5	42	46.5	51	55.5

TYPICAL CURVES

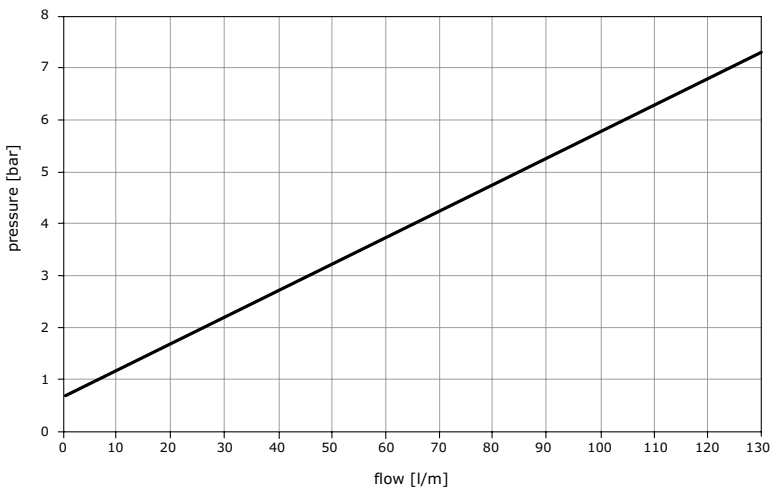
Inlet compensator Pressure drop (P-T)
Fixed displacement system (KV): pressure drop across the inlet compensator as function of pump flow



LS Signal pressure relief valve
Fixed displacement system (KV): LS Signal pressure relief valve characteristic



Full flow dump valve (valve type 7, 8)
Fixed displacement systems (KV): pressure drop across open electric dump valve as function of pump flow

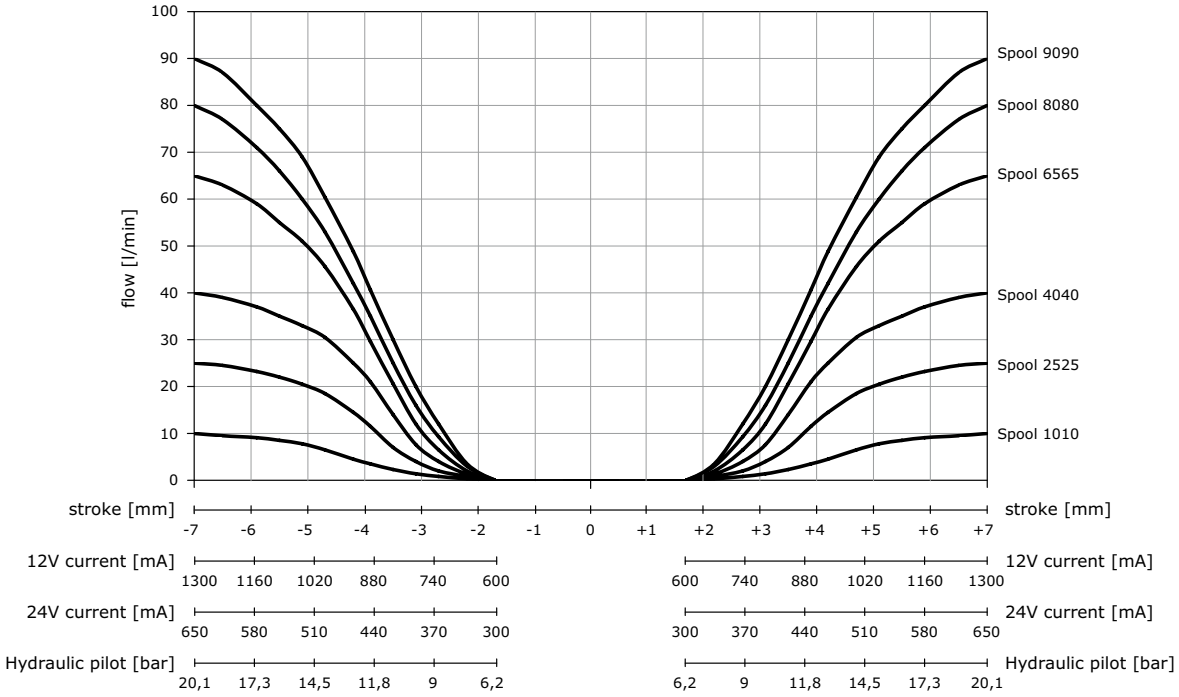


Post compensated spool flow characteristic

Fixed displacement systems (KV): flow on ports A and B as function of spool stroke, pilot pressure, control current

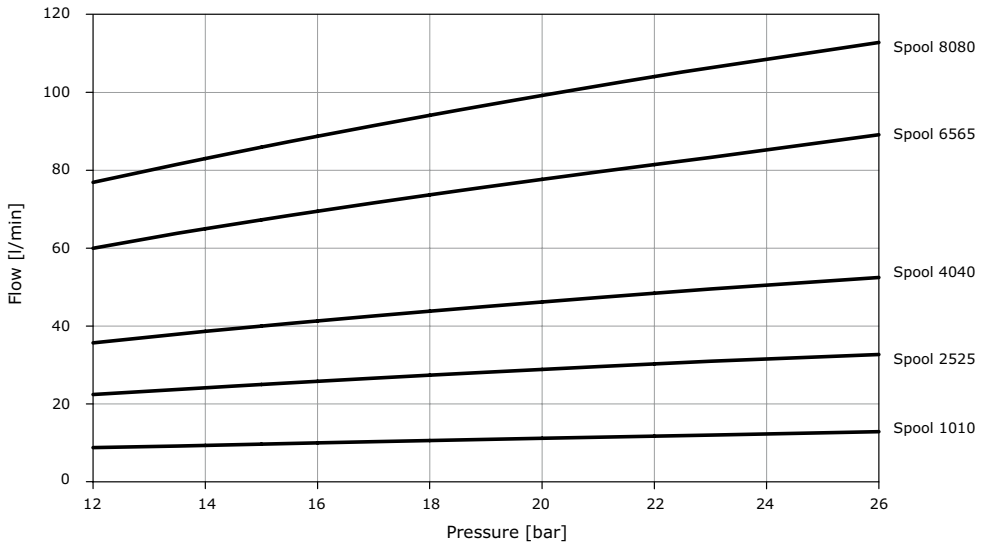
Inlet flow: 120 l/min

Pump inlet compensator at 14 bar Δp



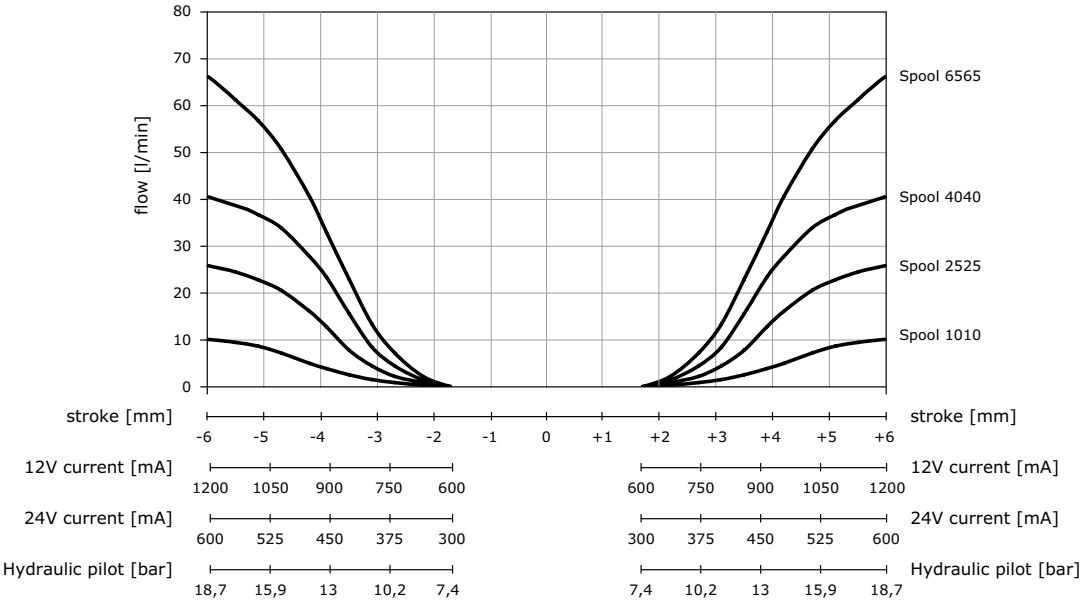
Post compensated spool flow with variable displacement pumps

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



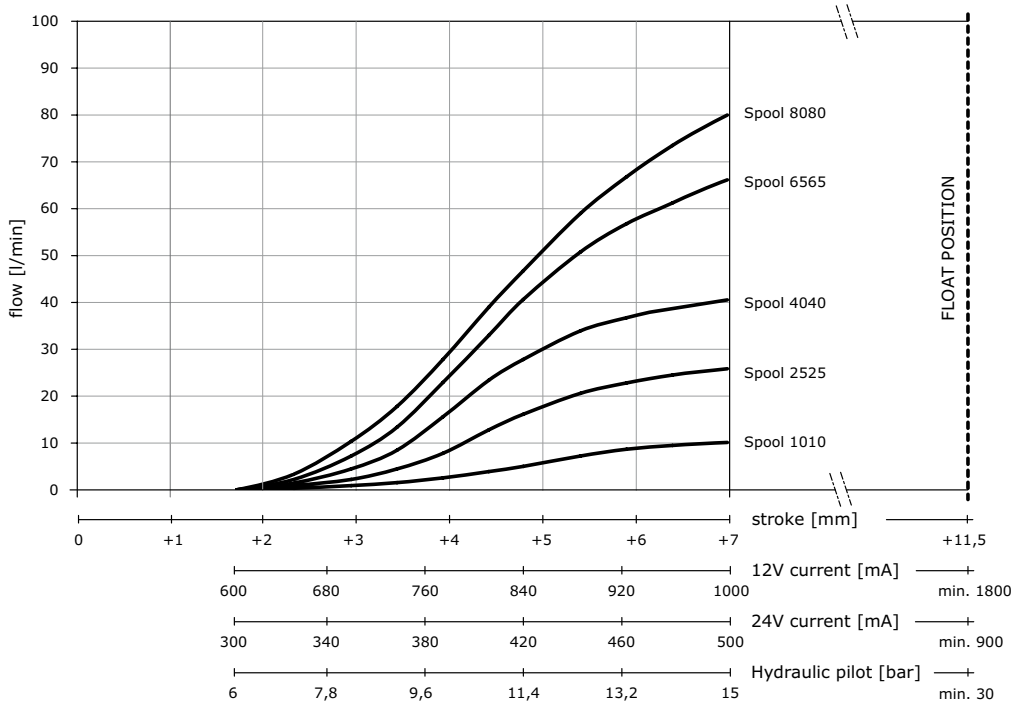
Pre compensated spool flow characteristic

Fixed displacement systems (KV): flow on ports A and B as function of spool stroke, pilot pressure, control current
Inlet flow: 120 l/min

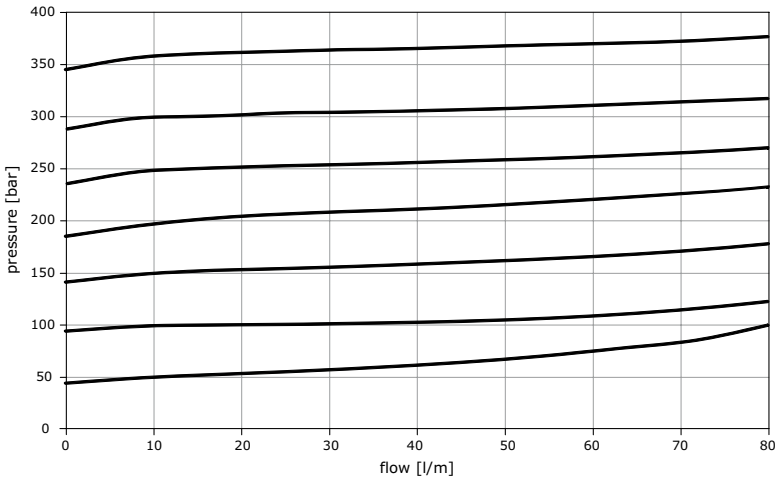


Post compensated float spool characteristic

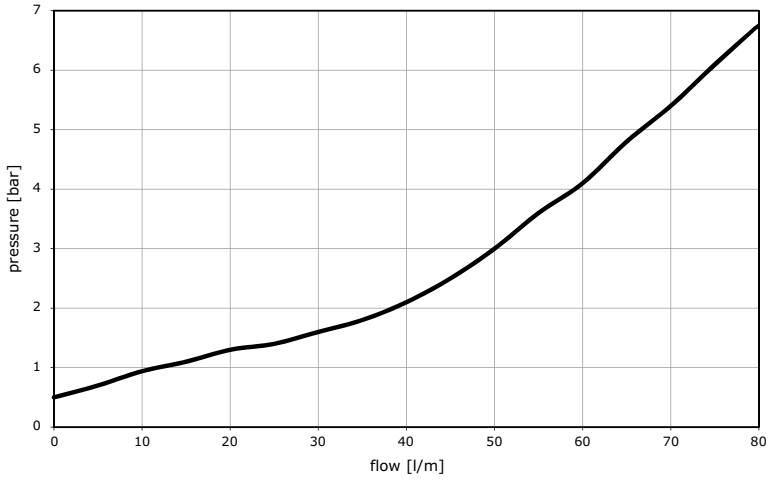
Fixed displacement systems (KV): flow and float position as function of spool stroke, pilot pressure, control current
Inlet flow: 120 l/min



Combined valves (antishock function)
Pressure characteristic as function of flow



Combined valves (anticavitation function)
Opening and pressure characteristic as function of flow

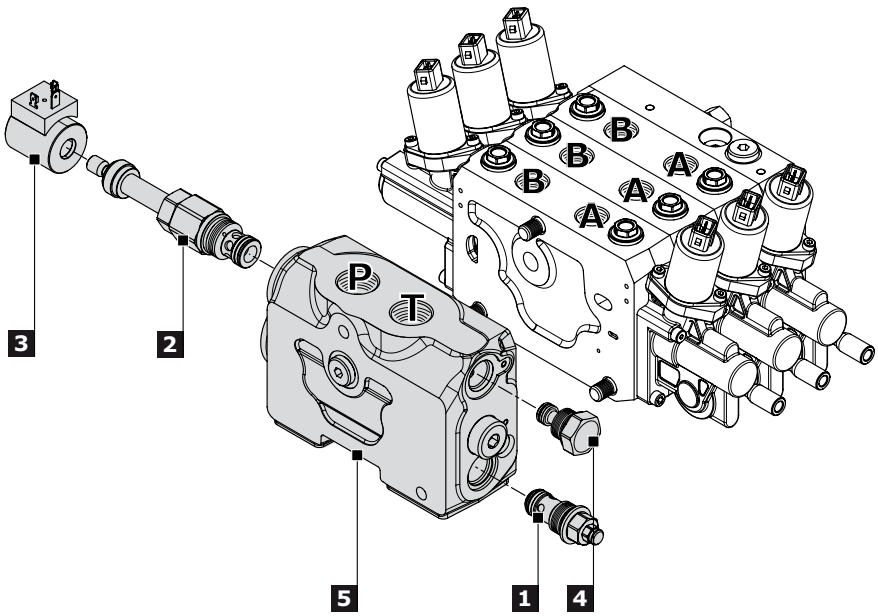


INLET SECTION

Order example

ML	V1A	200	V7B	C12AJ	V10C	KV G05

	ML	Inlet side
1.	**V1A**	LS pressure relief valve on position A
	200	setting (bar)
2.	**V7B**	Full flow electric dump valve on position B
3.	**C12AJ**	Coil-Connector kit type
4.	**V10C**	LS plug on position C
5.	**KV G05**	Inlet body classification



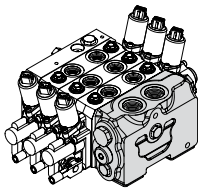
Rif.	Code	Description	Page
-	**MR**	Flow sharing valve with right inlet section	**16**
	ML	Flow sharing valve with left inlet section	
1	**V1A**	LS pressure relief valve - on position A	**16**
	V2A	LS relief plug - on position A	
2	**V3B**	Full flow direct operated pressure relief valve - on position B	**16**
	V4B	Full flow relief plug - on position B	
	V7B	Full flow electric dump valve - on position B	
3	**C12AJ**	AMP Junior connector - 12 Vdc	**18**
4	**V10C**	LS plug - on position C	**16**
	V11C	LS electric dump valve - on position C	
5	**KV G05**	Open centre inlet section for fixed displacement pumps (G 3/4)	**19**
	JV G05	Closed centre inlet section for variable displacement pumps (G 3/4)	
	KV U05	Open centre inlet section for fixed displacement pumps (1”1/16 - 12 UN)	
	JV U05	Closed centre inlet section for variable displacement pumps (1”1/16 - 12 UN)	

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

Inlet side classification

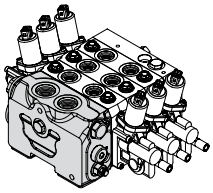
MR

Flow sharing valve with **RIGHT INLET** section



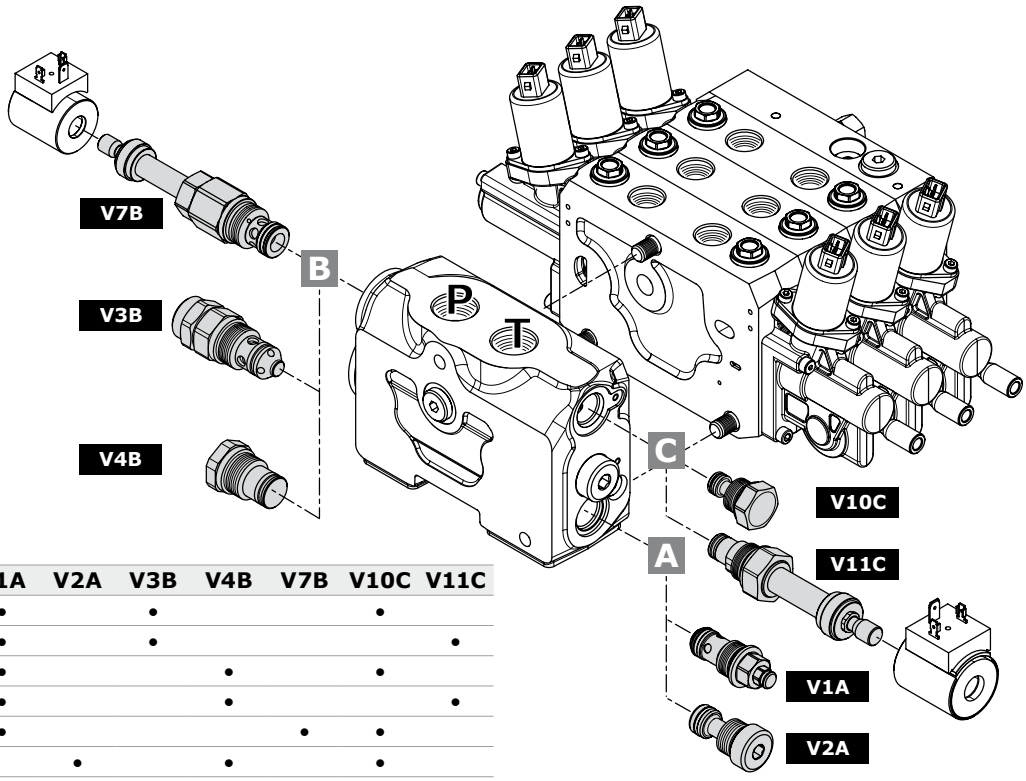
ML

Flow sharing valve with **LEFT INLET** section



Order code	Schema	Description	Setting Range (bar)
V1A		LS pressure relief valve	50 - 250 251 - 350
V2A		LS relief plug	
V3B		Full flow direct operated pressure relief valve	40 - 200 201 - 420
V4B		Full flow relief plug	
V7B		Full flow electric dump valve	
V10C		LS plug	
V11C		LS electric dump valve	

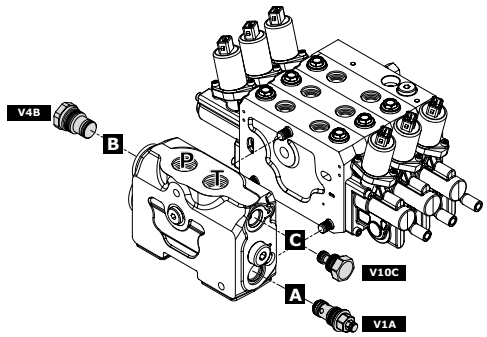
Combinations valve available



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

Inlet valve arrangement examples

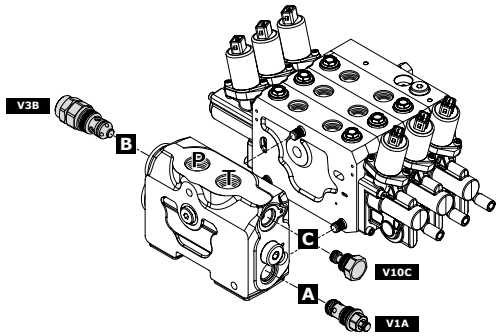
NOTE:
when ordering a valve type V1A or V3B, it is necessary to specify pressure setting.



ML - **V1A (200)** - **V4B** - **V10C** - KV G05

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

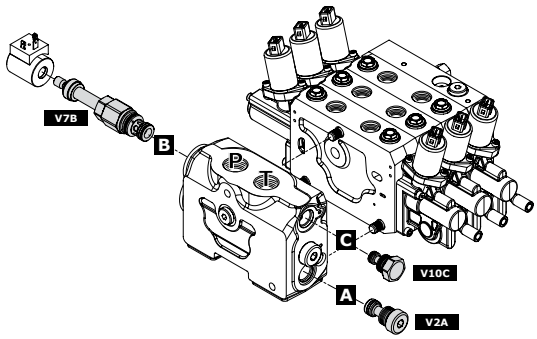
NOTE:
requires minimum 40 bar difference in setting of valve V1A (LS relief valve) and v alve V3B (Full flow relief valve)



ML - **V1A (200)** - **V3B (240)** - **V10C** - KV G05

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

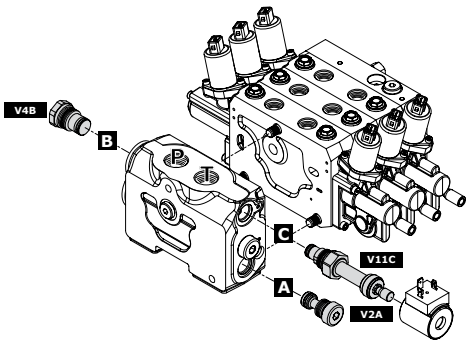
NOTE:
when ordering a valve type V7B, it is necessary to specify connector type (see table "A" page 18)



ML - **V2A** - **V7B (C12AJ)** - **V10C** - KV G05

V2A LS relief plug on position A
V7B Full flow electric dump valve
C12DI Connector DIN - 12 Vdc
V10C LS plug on position C

NOTE:
when ordering a valve type V11C, it is necessary to specify connector type (see table "A" page 18)

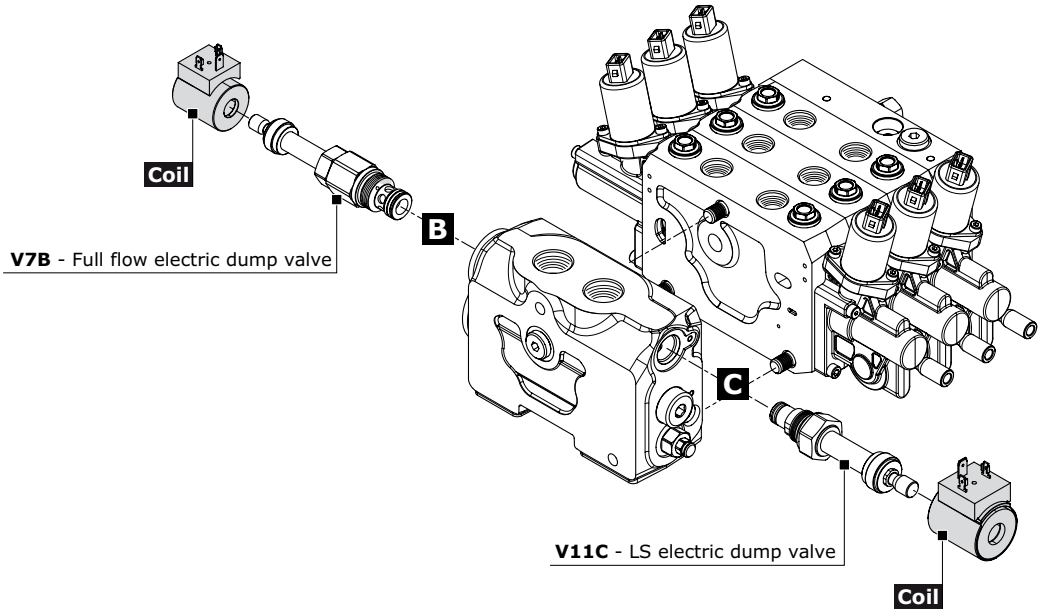


ML - V2A - V4B - V11C (C24DE) - KV G05

V2A LS relief plug on position A
V4B Full flow relief plug on position B
V11C LS electric dump valve on position C
C24DE Connector DEUTSCH - 24 Vdc

Table "A"
Coil and Connectors specifications for inlet section

Coil kit must be ordered separately

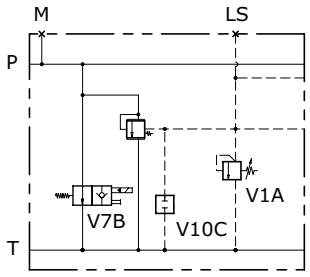
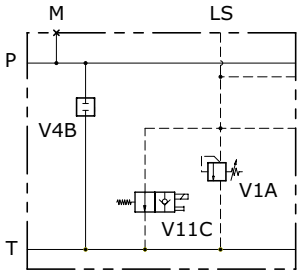


Coil Type	Order Code		supply voltage (Vdc)	wheather protection	Coil resistance R20 (Ω)	connector Material	coil body	duty cycle	Coil Insulation	power
DIN 43650 ISO 4400	**C12DI**	413171235	12	IP65	7	Nylon	Zinc plated steel	ED 100%	Class H coil as from IEC 85 standard	20.5 W
	C24DI	413172432	24		28					
DEUTSCH DT 4	**C12DE**	413171238	12	IP67	7					
	C24DE	413172440	24		28					
AMP JUNIOR	**C12AJ**	413171237	12 Vdc	IP65	7					
	C24AJ	413172433	24 Vdc		28					

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

Inlet body classification

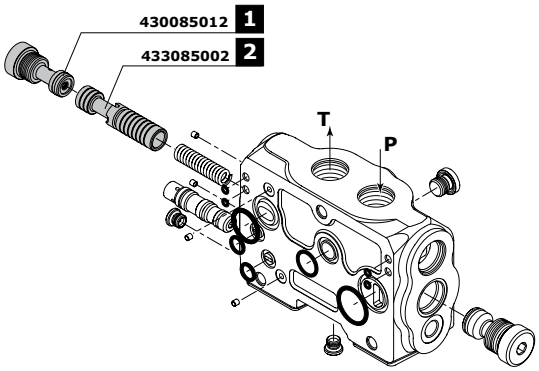
The inlet section with KV configuration enables control valve usage with fixed displacement pumps. With this configuration the presence of LS relief valve (valve type 1) is suitable to adjust the system maximum pressure. Full flow electric dump valve (valve type 7) can also be added as safety device. 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 G05 **KV U05**		**Open centre inlet section** for fixed displacement pumps
JV G05 **JV U05**		**Closed centre inlet section** for variable displacement pumps

NOTE:
transformation of the inlet section from closed center to open center and vice versa is possible by ordering the appropriate kit 320093007 or 320093008 (see page 20)

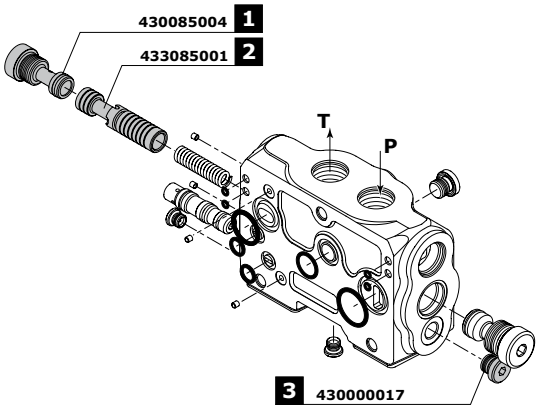
Trasformation kits

Transformation on the inlet section from open center to closed center is possible by ordering the complete kit code:
320093007 (transformation kit from KV to JV)



CLOSED CENTER CONFIGURATION (JV) VARIABLE PUMP			
Ref.	order code	Description	Q.ty
1	430085012	Inlet compensator kit	1
2	433085002	Spool assembly	1
Complete transformation kit: order code - 320093007			

Transformation on the inlet section from closed center to open center is possible by ordering the complete kit code:
320093008 (transformation kit from JV to KV)



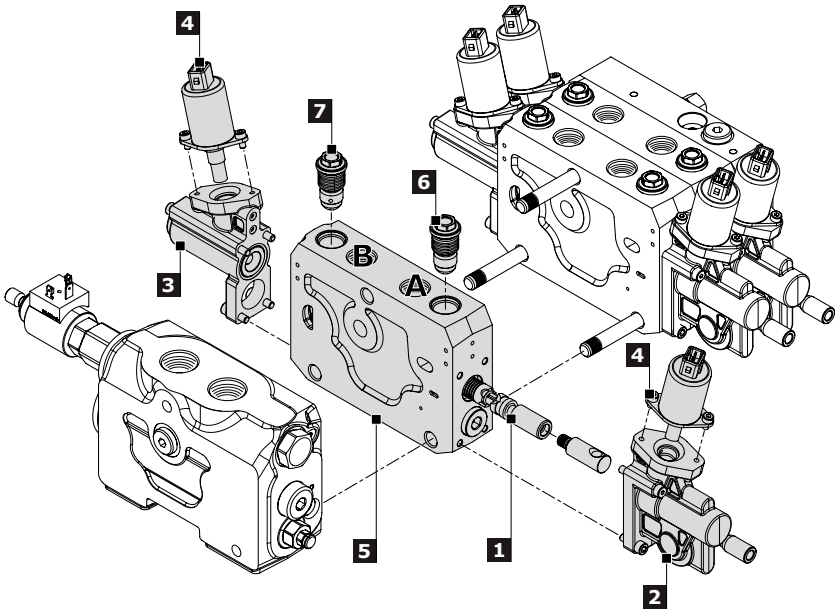
OPEN CENTER CONFIGURATION (KV) FIXED PUMP			
Ref.	order code	Description	Q.ty
1	430085004	Inlet compensator kit	1
2	433085001	Spool assembly	1
3	430000017	Plug G1/4”	1
Complete transformation kit: order code - 320093008			

WORKING SECTION

Order example:

W001C 2525	HP04	FP04	B12AJ	RC1 G04	05TF PA	05TF PB

1. **W001C 2525** spool type
2. **HP04** spool actuation type
3. **FP04** spool return action type
4. **B12AJ** coil-connector kit type
5. **RC1 G04** section type
6. **05TF PA** auxiliary valve type (port A)
7. **05TF PB** auxiliary valve type (port B)

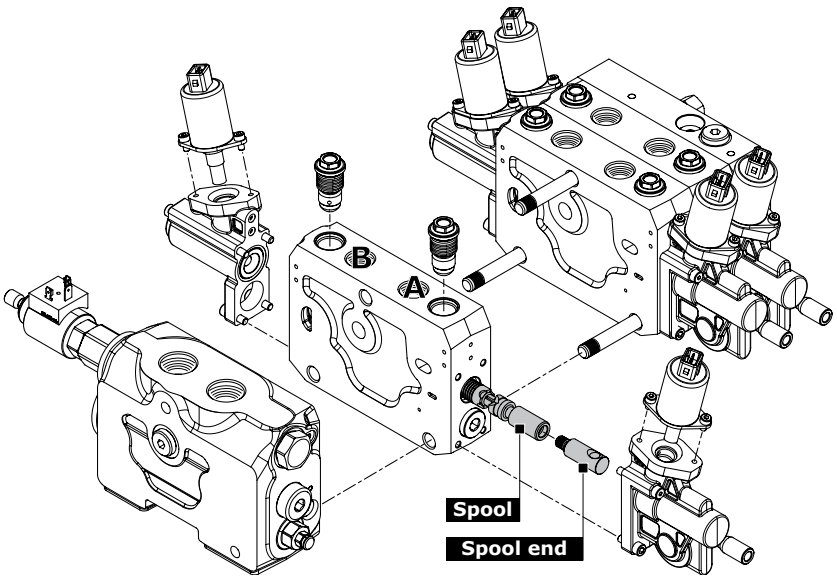


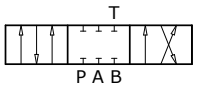
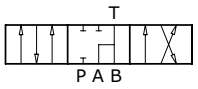
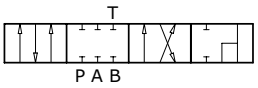
Rif.	Code	Description	Page
1	**W001C 2525** **W002C 2525**	3 positions double-acting (2525 = l/min Spool flow) 3 positions double-acting A-B to tank (2525 = l/min Spool flow)	**22**
2	**H001** **HP04** **HP05A**	Lever actuation Lever actuation + electrohydraulic actuation hydraulic actuation (pilot ports on the top)	**25**
3	**F001A** **FP04**	3 positions spring-centred spool (spring A) Electrohydraulic return action	**28**
4	**B12AJ** **B24AJ**	Solenoid kit 12 vdc (AMP connector) Solenoid kit 24 vdc (AMP connector)	**33**
5	**RC1 G04** **RC2 G04** **RC1 U04** **RC2 U04**	Post-Compensated section with auxiliary valve (G 1/2) Post-Compensated section without auxiliary valve (G 1/2) Post-Compensated section with auxiliary valve (7/8”-14 UN) Post-Compensated section without auxiliary valve (7/8”-14 UN)	**35**
6	**03TF PA 350** **05TF PA**	Fixed setting combined valve (port A) Fixed setting Prearrang. for aux. valve (port A)	**43**
7	**03TF PB 350** **05TF PB**	Fixed setting combined valve (port B) Fixed setting Prearrang. for aux. valve (port B)	**43**

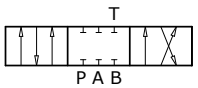
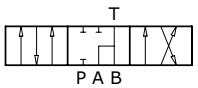
EX38 work sections are available in two configuration: POST COMPENSATED - PRE COMPENSATED
- Sections designed to house auxiliary valve option require double choice on work ports A and port B.
- Always indicate setting value when using fixed setting combined valve: 03TF PA (120) - 03TF PB (120)
- When ordering a section with electrohydraulic actuation, it is necessary to specify Solenoid type (page 33).

Spool identification

EX38 spools are available in two configurations: **POST COMPENSATED** and **PRE COMPENSATED**.
Each work section contains a spool; each spool is compatible with all actuations.
For the correct operation of all actuations, each work section requires a spool end which changes according to the type of actuations. (see tables "C" on page 23)



POST - COMPENSATED SECTION		
Code	Description	Schema
W001C	3 positions double-acting	
W002C	3 positions double-acting A and B to tank	
W012C	4 positions double-acting with float in the 4th position	

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

Spool flow

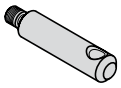
Flow rates delivered to the A and B ports are identified in following table. Rated flows refer to simmetrical spools.

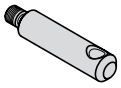
POST - COMPENSATED SECTION (FLOW RATES L/MIN)									
Spool type	0505	1010	1515	2525	3535	5050	6565	8080	100100
W001C	•	•	•	•	•	•	•	•	•
W002C	•	•	•	•	•	•	•	•	•
W012C		•			•		•	•	

PRE - COMPENSATED SECTION (flow rates l/min)				
Spool type	1515	2525	4040	6565
W001C	•	•	•	•
W002C	•	•	•	•

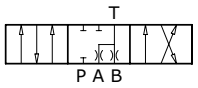
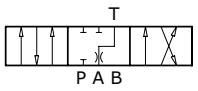
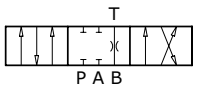
Spool end identification (Tables "C")

All work section contain end spool, that changes as a function of spool actuation control.
Ends spool are different between Post-compensated and Pre-compensated sections.

POST - COMPENSATED SECTION		
Code	Description	Layout
422501205	Pin hole end (only available with H001 actuation)	
422501153	Male clevis end (only available with H004 actuation)	
422501217	Pin hole end (Available with hydraulic and electrohydraulic actuation)	

PRE - COMPENSATED SECTION		
Code	Description	Layout
430085044	Pin hole end (only available with H001 actuation)	
430085045	Male clevis end (only available with H004 actuation)	
430085026	Pin hole end (Available with hydraulic and electrohydraulic actuation)	

Spool with restricted service ports

Code	Circuit	Restriction on diameter (mm)	Section (mm2)	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 - 2525 - J10

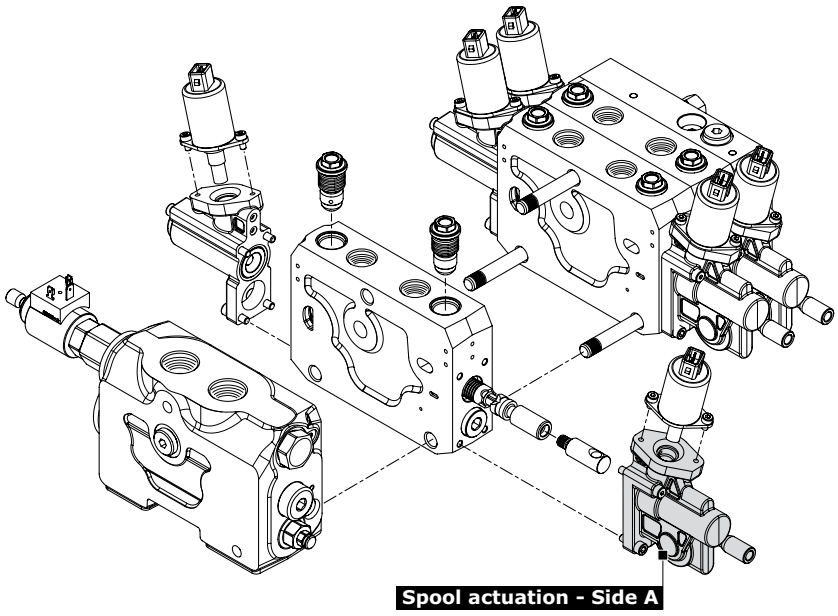
W001C 3 positions double-acting
25 Flow on port A
25 Flow on port B
J10 restriction on diameter (0,10 mm in A and B)

NOTE:
- not simmetric spools (such as 1025, 6535...) are available on request; for availability we suggest to contact our Sales department.
- rated flows are defined for 14 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).
- Regenerative spools and spools with restricted service ports are available on request. Plaese contact our Sales department for more information.
- Regenerative spools needs a special machining on the valve body.
- W012 spool needs a special machining on the valve body and a special detent kit.
- W012 spool is available only as float-in and right inlet

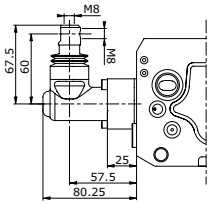
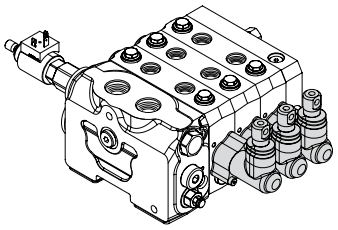
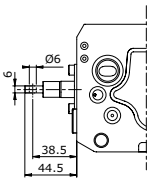
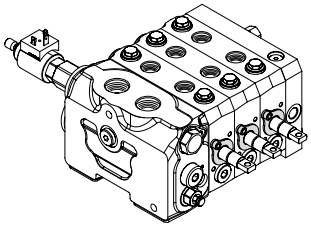
Spool actuation classification - SIDE A

Spool actuations are divided in three types:

- Mechanical lever actuation
- Hydraulic actuation
- Electrohydraulic actuation

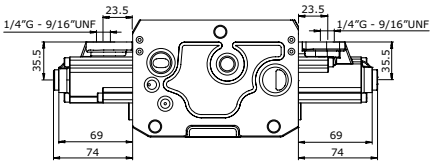
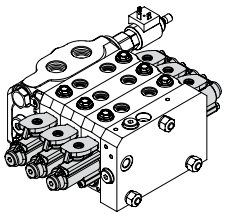
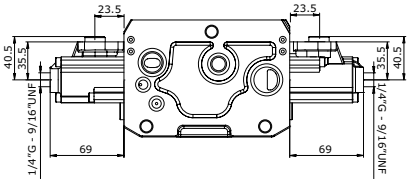
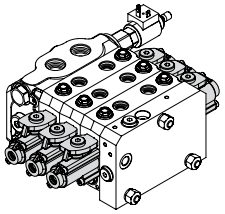
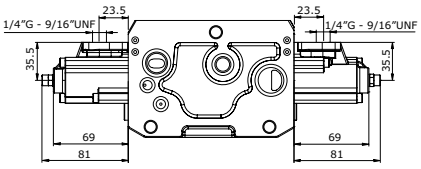
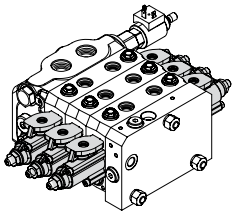


Spool actuation - Side A

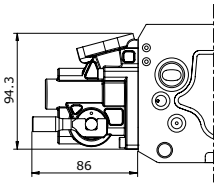
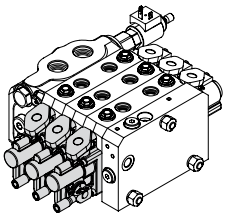
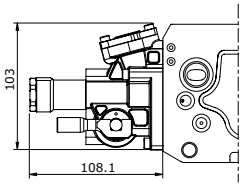
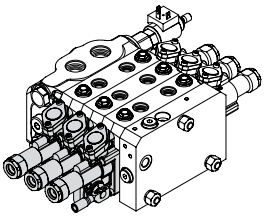
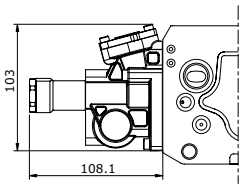
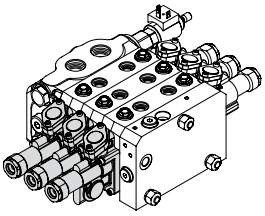
MECHANICAL LEVER ACTUATION			
Code	Description	Dimensions	Configuration
H001	**Lever actuation** (only with manual and hydraulic section body)		
H004	**Without lever actuation** (only with manual and hydraulic section body)		

Note:
- H001 and H004 require the choice of spool return action (side B)
- H001 and H004 require a mechanical version body.

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)		

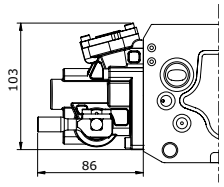
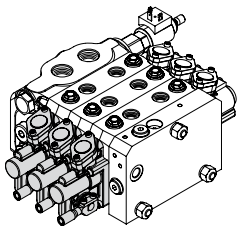
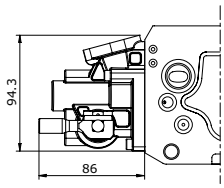
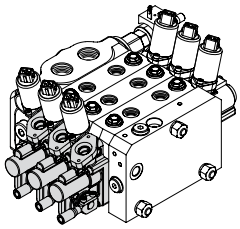
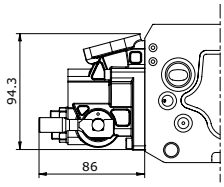
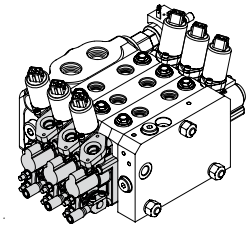
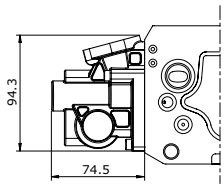
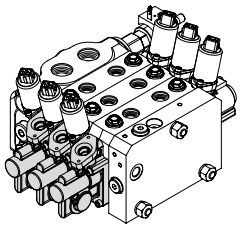
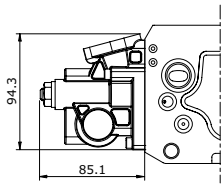
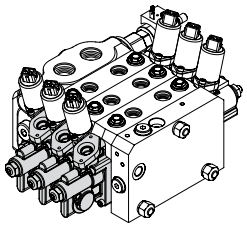
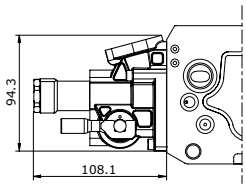
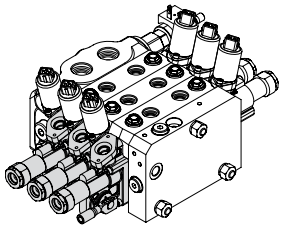
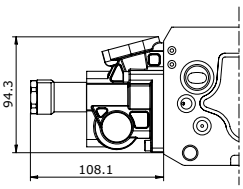
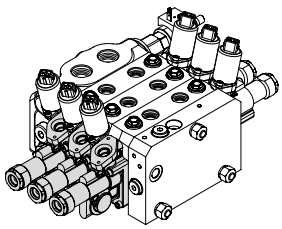
HYDRAULIC ACTUATION - SIDE A

Code	Description	Dimensions	Configuration
HP01	**Lever actuation + hydraulic actuation**		
HP02	**lever + hydraulic actuation with electrohydraulic arrangement**		
HP03	**Without lever + hydraulic actuation with electrohydraulic arrangement**		

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:
- HP05A, HP05C, HP05L are different between Post-compensated and Pre-compensated sections.
- Leave out the spool return action code when choosing hydraulic actuation HP05A, HP05C and HP05L
- H001, H004, HP05A, HP05C, HP05L requires a mechanical version body.
- All hydraulics actuation are availale 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, A07 for float spool

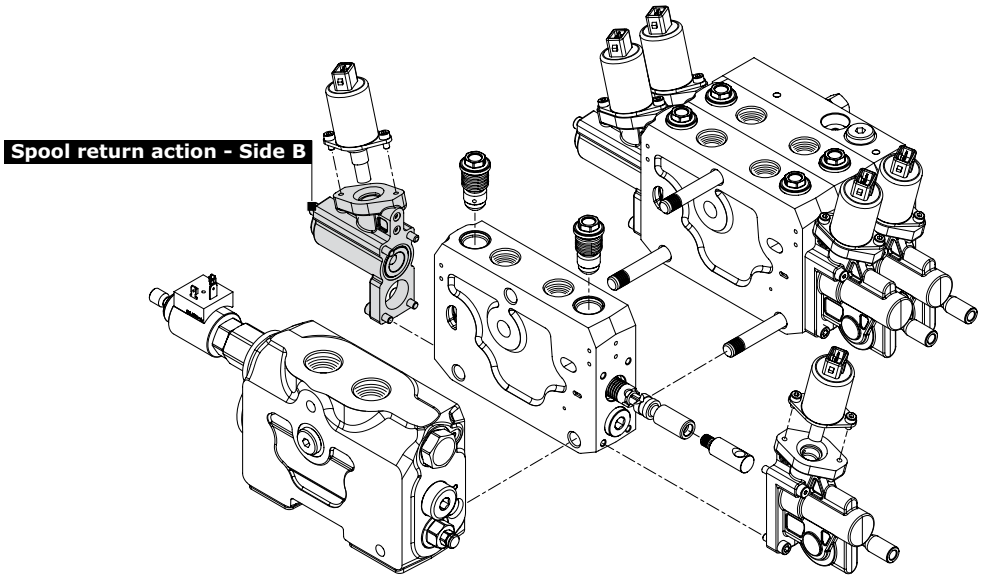
ELECTROHYDRAULIC ACTUATION - SIDE A			
Code	Description	Dimensions	Configuration
HP00	**Lever actuation + electrohydraulic arrangement**		
HP04	**Lever actuation + electrohydraulic actuation**		
HP04L	**Lever actuation + electrohydraulic actuation with stroke limiter**		
HP07	**Without lever + electrohydraulic actuation**		
HP07L	**Without lever + electrohydraulic actuation with stroke limiter**		
HP08	**lever + hydraulic actuation electrohydraulic actuation**		
HP09	**Without lever + hydraulic actuation electrohydraulic actuation**		

Note: Require electrohydraulic version body. External drenage recommended (see page 44).

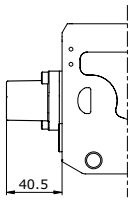
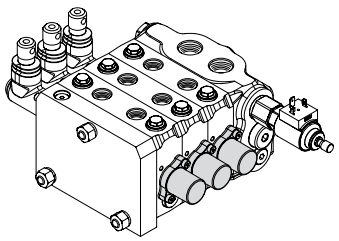
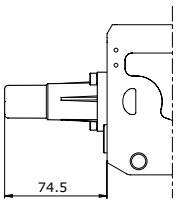
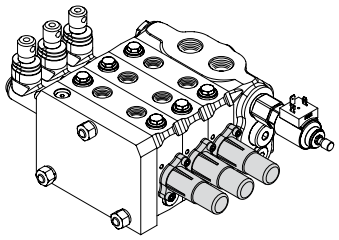
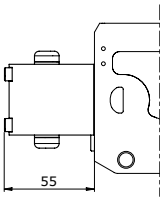
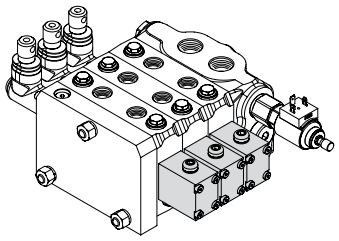
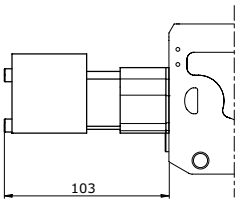
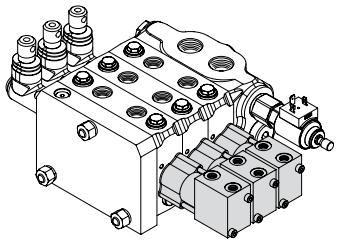
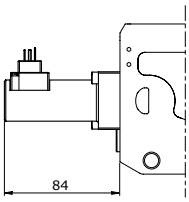
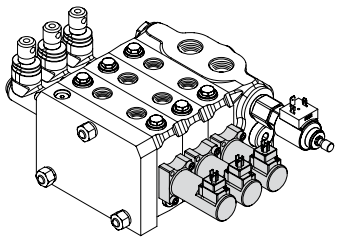
Spools return action classification - SIDE B

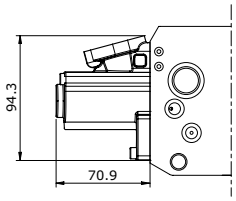
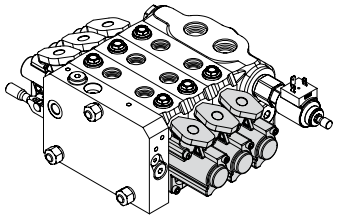
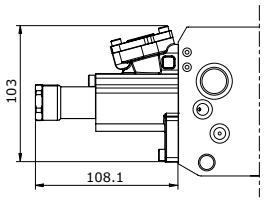
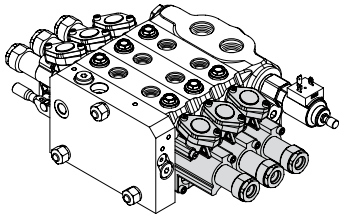
Spool return action are mandatory for all mechanical actuations and for all electrohydraulics actuation; only HP01, HP02 and HP03 hydraulic actuations requires spool return action.
Also Spool return action are divided in three types:

- Mechanical lever spool return action
- Hydraulic spool return action
- Electrohydraulic spool return action

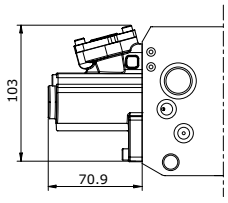
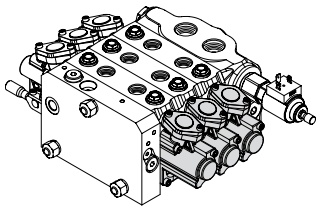
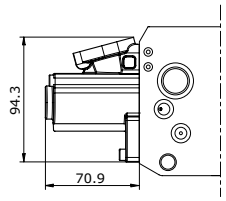
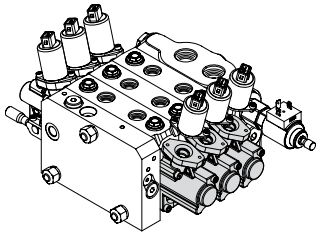
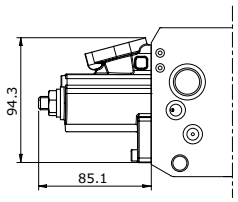
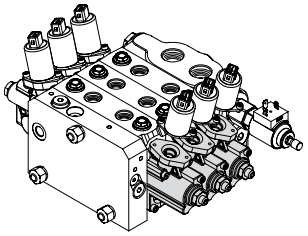
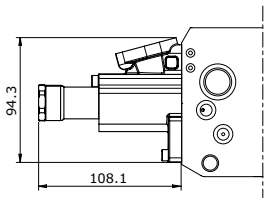
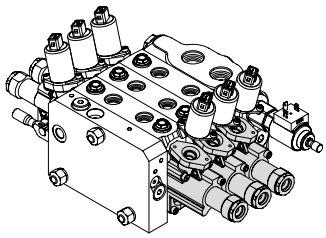


NOTE:
- F001A and F001B are different between Post-compensated and Pre-compensated sections.
- F002A, F005A, F145, F022A, F023A, F126A, F127A and F0470 are available only with Post-compensated version.
- F005A and available only with W012 spool
- F001A, F001B, F002A, F005A, F145, F022A, F023A, F126A, F127A and F0470 requires a special body

MECHANICAL LEVER ACTUATION - SIDE B			
Code	Description	Dimensions	Configuration
F001A	**3 position spring centered spool** Standard spring		
F001B	**3 position spring centered spool** Soft spring		
F002A	**Detent in A and B**		
F005A	**Detent in 4th position** (only with W012 spool)		
F145	**Friction kit**		
F022A	**Proportional Pneumatic control** (port BSP: G 1/8)		
F023A	**Proportional Pneumatic control rotated 180°** (port BSP: G 1/8)		
F126A	**Proportional Pneumatic control** (port NPTF: 1/8-27)		
F127A	**Proportional Pneumatic control rotated 180°** (port NPTF: 1/8-27)		
F0470	**Spool position indicator for mechanical lever actuation**		

HYDRAULIC ACTUATION - SIDE B			
Code	Description	Dimensions	Configuration
FP01	Hydraulic actuation **Only available with HP01**		
FP02	Hydraulic actuation with electrohydraulic arrangement **available with HP02 - HP03**		

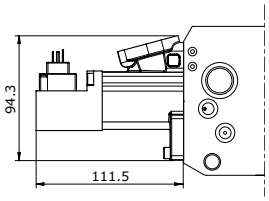
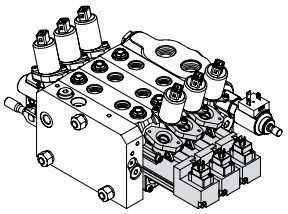
NOTE: FP01 and FP02 are availale in BSP or UNF version: (Port Pilot: 1/4” BSP or 9/16” UNF)

ELECTROHYDRAULIC ACTUATION - SIDE B			
Code	Description	Dimensions	Configuration
FP00	Electrohydraulic arrangement **Only available with HP00**		
FP04	Electrohydraulic actuation **available with HP04 - HP04L - HP07**		
FP04L	Electrohydraulic actuation with stroke limiter **Only available with HP07L**		
FP08	Electrohydraulic actuation and hydraulic actuation **available with HP08 - HP09**		

NOTE: FP08 is availale in BSP or UNF version: (Port Pilot: 1/4” BSP or 9/16” UNF)

Hall effect Linear Position Sensor HLPS

HLPS is a Hall effect sensor based device used in conjunction with spool position transducer kits available for EX38. HC-HLPS is based on a state of the art programmable Hall effect sensor device; after the final assembly of the valve a computer assisted calibration procedure is performed that compensates for mechanical inaccuracies and uncertainties allowing to attain high accuracy and linearity in spool position detection. Spool position is output as an analog voltage signal in the 0.5 - 4.5V range. The unit works in 12V and 24V environments and is protected against load-dump and other major electrical faults. Fault signalling is carried out through the output signal. HLPS with the companion mechanical kit is therefore applicable in close loop feedback control applications and whenever determining spool position reliably is, as in safety functions, a major concern.

ELECTROHYDRAULIC ACTUATION - SIDE B			
Code	Description	Dimensions	Configuration
FP04S	Spool position indicator for electrohydraulic actuation **Only available with HP04 - HP07**		

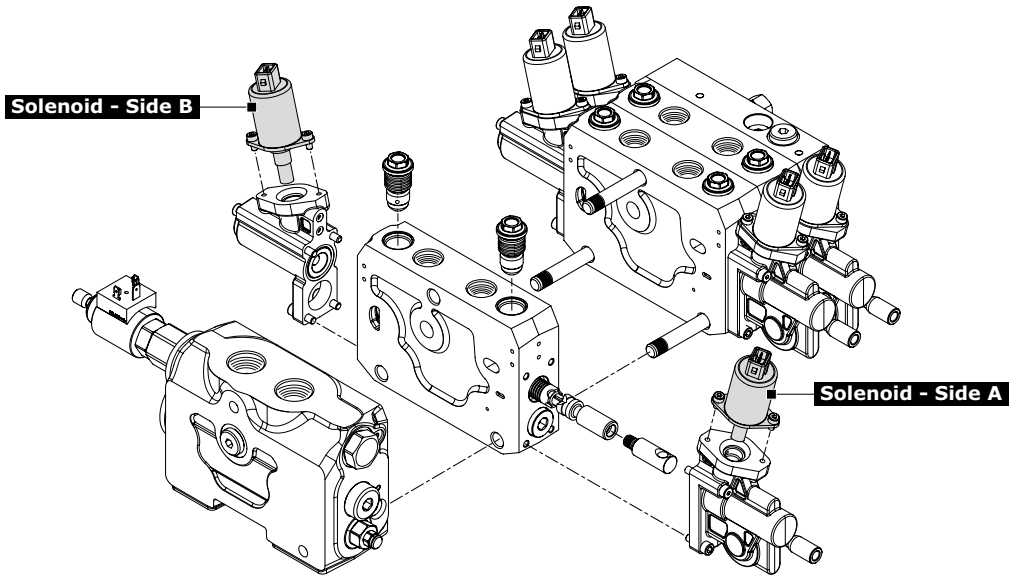
Technical specifications

Electrical	
Operating voltage	6 - 30 Vdc
Max current consumption	20.5 mA
Output	
Output voltage spanning	0.5 - 4.5 Vdc
Quiescent voltage	2.5 Vdc
Output current	-1 - +1 mA
Minimum output load resistance	4.5 kOhm
Overall accuracy	± 2.5%
Resolution	12 bit
Fault signalling levels	4.8V < Vout < 0.2 Vdc
Protections	short circuit protection, reverse,battery protection, thermal shutdown, overvoltage, undervoltage, load-dump
EM Immunity	> 60 Vdc/m
Mechanical, Environmental	
Operating temperature	-40 / +85 °C
Ingress Protection Rating	IP 65
Dimensions	28 x 18 x 23 mm (L x W x H)
Connections	
I/O	DIN 43650-C male
PIN 1	Vout
PIN 2	Vcc
PIN 3	OV
PIN 4	Chassis (connected to valve body)
Applied Standards	
Immunity for industrial environments	EN 61000-6-2
Emission standard for residential commercial and light-industrial environments	EN 61000-6-3
EMC - Agricultural and forestry machines	EN 14982
EMC - Earth-moving machinery	ISO 13766

NOTE: mating connector for DIN 43650-C can be ordered separately with code 487200314

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	

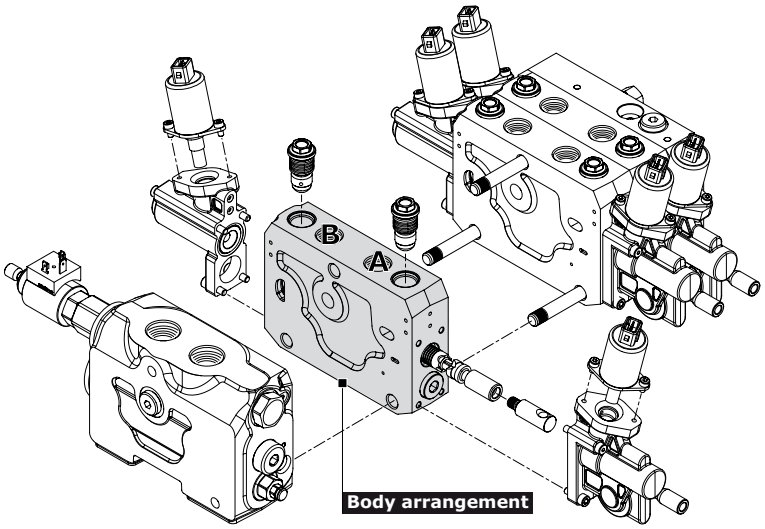
NOTE:
Mating connector for AMP Junior Power Timer can be ordered separately with code 413000223 (including 2 m wire).
Mating connector for Deutsch DT 4 can be ordered separately with code 5CON140031.

Compatibility table

COMBINATION		SPOOL ACTION AND RETURN SPRING TYPE - SIDE B															
		F001A	F001B	F002A*	F005A*	F145*	F022A*	F023A*	F126A*	F127A*	F0470*	FP00	FP01	FP02	FP04	FP04L	FP04S	FP08
SPOOL ACTION AND RETURN SPRING TYPE - SIDE A	H001	•	•	•	•	•	•	•	•	•	•							
	H004	•	•	•	•	•	•	•	•	•	•							
	HP05A																	
	HP05C																	
	HP05L																	
	HP00											•						
	HP01												•					
	HP02													•				
	HP03													•				
	HP04														•		•	
	HP04L														•			
	HP07														•		•	
	HP07L															•		
	HP08																	•
	HP09																	•

NOTE:
Leave out the spool return action code when choosing hydraulic actuation HP05A, HP05C and HP05L
***=** Available only with Post-Compensated section

Work section arrangement



EX38 has been conceived as a post compensated flow sharing valve, but completely interchangeable pre compensated sections are also available.

Pre compensated section can be freely mixed with post compensated ones.

When using a pre-compensated section between post-compensated, priority is established for this section; if the system reaches flow saturation condition, all post compensated sections will reduce proportionally their delivered flows, while the pre compensated will keep a constant delivered flow.
This function is particularly appreciated on applications where the loss of the speed for a specific function must be avoided when other functions are simultaneously activated.

Work section available

Functions	Order code	Setting range	Type	PRE compensated	POST compensated
Standard section	**RC1**		with auxiliary valve		•
	RC2		without auxiliary valve		•
	RL1		with auxiliary valve	•	
	RL2		without auxiliary valve	•	
Section with local LS relief valve	**RCD1**	30 - 80	with auxiliary valve		•
		81 - 200			•
		201 - 350			•
	RCD2	30 - 80	without auxiliary valve		•
		81 - 200			•
		201 - 350			•
	RLD1	50 - 170	with auxiliary valve	•	
		171 - 350		•	
	RLD2	50 - 170	without auxiliary valve	•	
		171 - 350		•	
Section with additional port for remoted LS relief valve	**RCS1**		with auxiliary valve		•
	RCS2		without auxiliary valve		•
	RLS1		with auxiliary valve	•	
	RLS2		without auxiliary valve	•	
Section with local Flow limiter	**RCE1**		with auxiliary valve		•
	RCE2		without auxiliary valve		•

NOTE:
- Local LS relief valve work on both ports; setting for A and B ports is the same.
- Local LS relief valve setting must be specified as follow: RCD1 G04 (120) - RLD1 G04 (120)
- RCD1, RCD2, RCS1, RCS2 in combination with HP01, HP02, HP03, HP04, HP07, HP08, HP09, requires left inlet assembly (ML)
- RLD1, RLD2, RLS1, RLS2 in combination with HP01, HP02, HP03, HP04, HP07, HP08, HP09, requires right inlet assembly (MR)
- RCE1, RCE2 in combination with HP01, HP02, HP03, HP04, HP07, HP08, HP09, requires right inlet assembly (MR)

PRE-COMPENSATED Section with local LS relief valve

The purpouse 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.
A typical case showcasing the advantages offered by this design is the grab function in loading cranes, or any other feature requiring that applied pressure be maintained, without affecting the speed of other simultaneous movements.
The local LS relief can be easily installed as a retrofit too.

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 purpouse 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 properely 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.

PRE-COMPENSATED section with additional port for remoted LS relief valve

Similarly to RLD option, it is possible to bring local signal to a remoted relief valve by means of a dedicated 1/4 BSP or 9/16” UNF port.
Remoted relief valve must be provided separately in the hydraulic circuit. The pressure limitation generated by relieving the local LS applies to both section ports, A and B.
The additional port can be easily installed as a retrofit too.

POST-COMPENSATED section with additional port for remoted LS relief valve

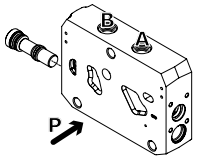
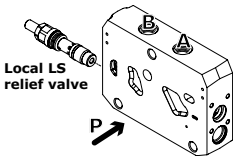
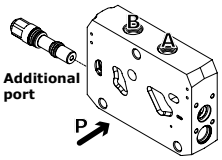
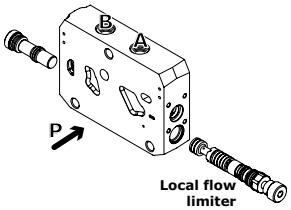
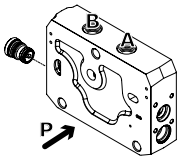
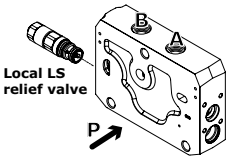
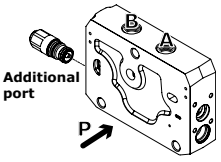
Similarly to RCD option, it is possible to bring local signal to a remoted relief valve by means of a dedicated 1/4 BSP or 9/16” UNF port.
Remoted relief valve must be provided separately in the hydraulic circuit. The pressure limitation generated by relieving the local LS applies to both section ports, A and B.
The local pressure limitation works properely if the section is actuated alone or if the section is the most charged.
The additional port can be easily installed as a retrofit too.

POST-COMPENSATED section with local Flow limiter

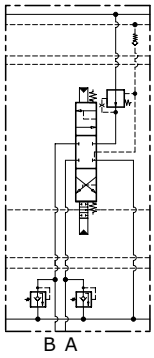
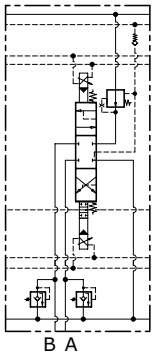
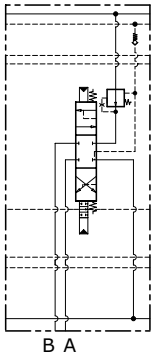
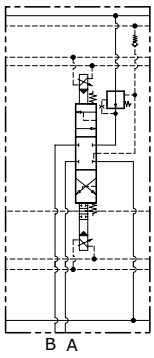
The local compensator of a section can be equipped with a special knob which can be operated to adjust the maximum flow delivered by the section concerned.
This device acts by limiting the working flow of the local compensator and is working properely when a single section is operated.
This feature is highly appreciated because it ensures a certain degree of operating flexibility especially for those machines which must be equipped with different accessories (tractors and farming applications in general being a typical example).
The flow control device can be easily installed as a retrofit kit too.

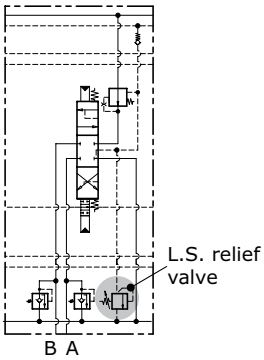
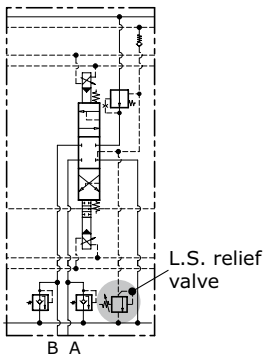
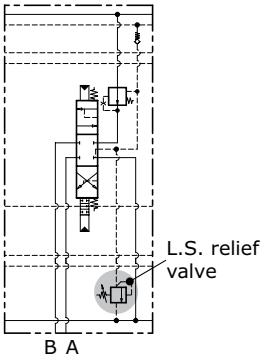
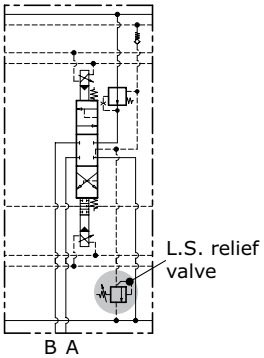
Work section trasformation kits

Transformation on the work section from RC/RL type to RCD, RCS, RCE, RLD and RLS types is possible by ordering the following plug kit codes. Configurations below are from EX38 flow sharing valve, with left inlet (ML).

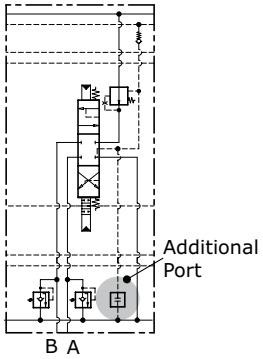
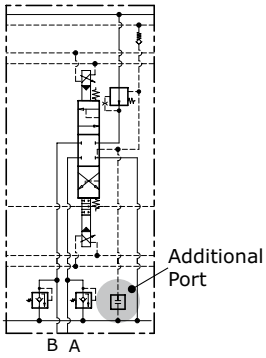
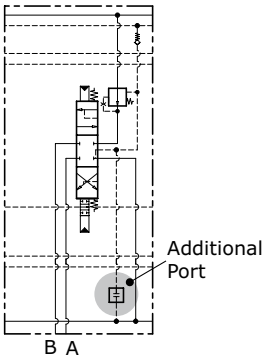
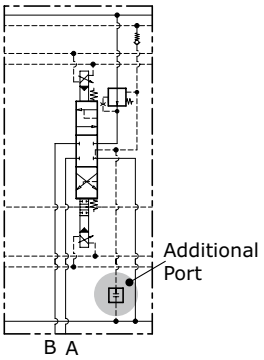
Section Type		Order Code	Setting Range	Thread	Description	Configuration
POST - COMPENSATED SECTION	**RC**	**430085006**			Standard section	
	RCD	**915008501**	30 - 80		Section with local LS relief valve	
		915008502	81 - 200			
		915008503	201 - 350			
	RCS	**430085041**		GAS	Section with additional port for remoted LS relief valve	
		430085035		UNF		
	RCE	**320085002**			Section with local flow limiter	
PRE - COMPENSATED SECTION	**RL**	**430085029**			Standard section	
	RLD	**915008504**	50 - 170		Section with local LS relief valve	
		915008505	171 - 350			
	RLS	**430085042**		GAS	Section with additional port for remoted LS relief valve	
		430085066		UNF		

PRE compensated section arrangement

STANDARD SECTION			
code	schema for mechanical lever actuation	schema for electrohydraulic actuation	description
RL1 G04 **RL1 U04**			**PRE compensated section** Arranged for auxiliary valves
RL2 G04 **RL2 U04**			**PRE compensated section** Not arranged for auxiliary valves

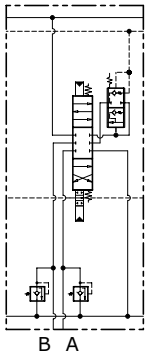
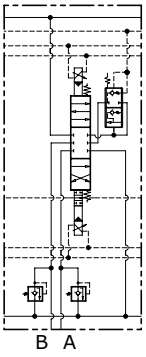
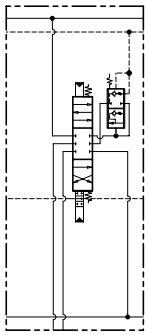
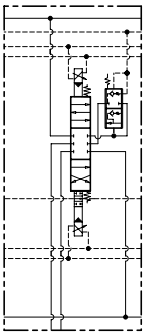
PRE-COMPENSATED SECTION WITH LOCAL LS RELIEF VALVE			
code	schema for mechanical lever actuation	schema for electrohydraulic actuation	description
RLD1 G04 **RLD1 U04**			**PRE compensated section with local LS relief valve** Arranged for auxiliary valves
RLD2 G04 **RLD2 U04**			**PRE compensated section with local LS relief valve** Not arranged for auxiliary valves

PRE compensated section arrangement

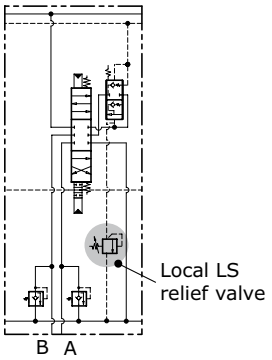
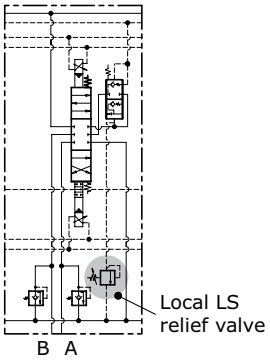
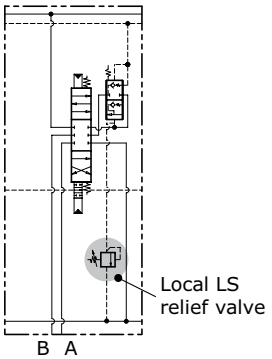
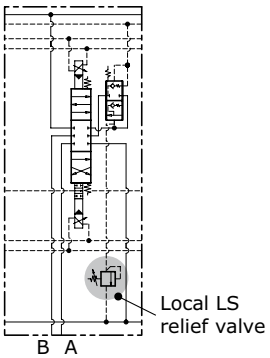
SECTION WITH ADDITIONAL PORT FOR REMOTED LS RELIEF VALVE			
code	schema for mechanical lever actuation	schema for electrohydraulic actuation	description
RLS1 G04 **RLS1 U04**			**PRE compensated section with additional port for remoted LS relief valve** Arranged for auxiliary valves
RLS2 G04 **RLS2 U04**			**PRE compensated section with additional port for remoted LS relief valve** Not arranged for auxiliary valves

POST compensated arrangement

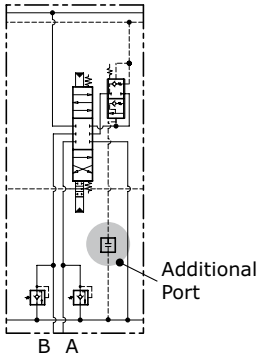
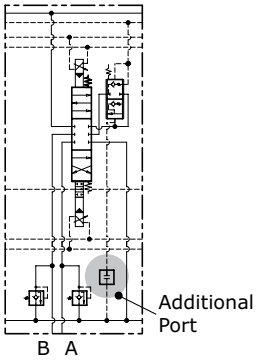
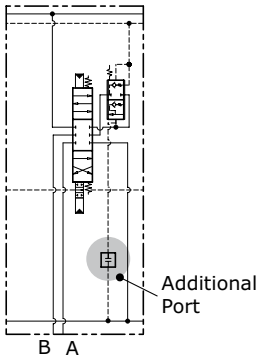
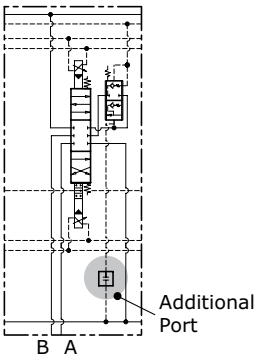
STANDARD SECTION

code	schema for mechanical lever actuation	schema for electrohydraulic actuation	description
RC1 G04 **RC1 U04**			**POST compensated section** Arranged for auxiliary valves
RC2 G04 **RC2 U04**			**POST compensated section** Not arranged for auxiliary valves

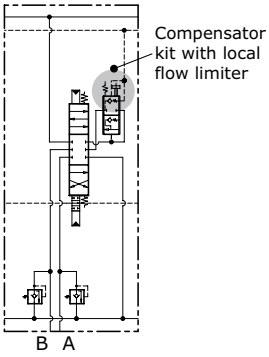
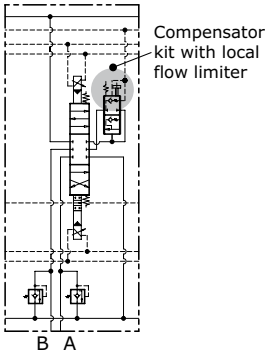
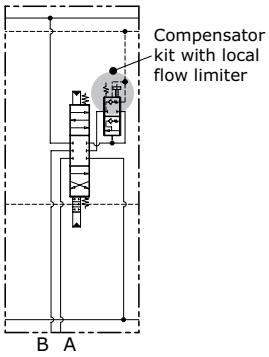
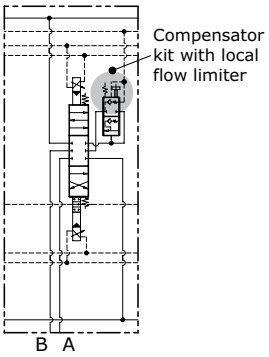
SECTION WITH LOCAL LS RELIEF VALVE

code	schema for mechanical lever actuation	schema for electrohydraulic actuation	description
RCD1 G04 **RCD1 U04**			**POST compensated section with local Load Sensing relief valve** Arranged for auxiliary valves
RCD2 G04 **RCD2 U04**			**POST compensated section with local Load Sensing relief valve** Not arranged for auxiliary valves

POST compensated arrangement

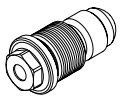
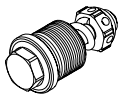
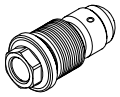
SECTION WITH ADDITIONAL PORT FOR REMOTED LS RELIEF VALVE			
code	schema for mechanical lever actuation	schema for electrohydraulic actuation	description
RCS1 G04 **RCS1 U04**			**POST compensated section with additional port for remoted LS relief valve** Arranged for auxiliary valves
RCS2 G04 **RCS2 U04**			**POST compensated section with additional port for remoted LS relief valve** Not arranged for auxiliary valves

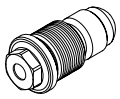
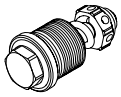
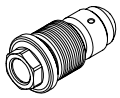
POST compensated arrangement

SECTION WITH LOCAL FLOW LIMITER			
code	schema for mechanical lever actuation	schema for electrohydraulic actuation	description
RCE1 G04 **RCE1 U04**			**POST compensated section with local flow limiter** arranged for auxiliary valves
RCE2 G04 **RCE2 U04**			**POST compensated section with local flow limiter** Not arranged for auxiliary valves

Auxiliary valves identification

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

code	description	schema	configuration		setting range (bar)
02TF PA	**Fixed setting Anticavitation valve** (port A)				
03TF PA	**Fixed setting combined valve** (port A)			**A**	40 / 350
05TF PA	**Fixed setting Prearrangement for auxiliary valve** (port A)				

code	description	schema	configuration		setting range (bar)
02TF PB	**Fixed setting Anticavitation valve** (port B)				
03TF PB	**Fixed setting combined valve** (port B)			**A**	40 / 350
05TF PB	**Fixed setting Prearrangement for auxiliary valve** (port B)				

Auxiliary valve - Setting range

Sections designed to house auxiliary valve option require double choise on work ports A and B.
Always indicate setting value when using fixed setting combined valve:
03TF PA (120) = setting

NOTE: Auxiliary valves are not adjustable: factory settings are available from 40 to 350 bar with 10 bar steps

OUTLET SECTION (END PLATE)

There are two main types of End Plate:

- **Manual and Hydraulic actuation version**: to be used when no electrohydraulic controls are present in the valve: this plate is simply collecting the LS signal drain that can be connected to tank internally or externally without significant differences

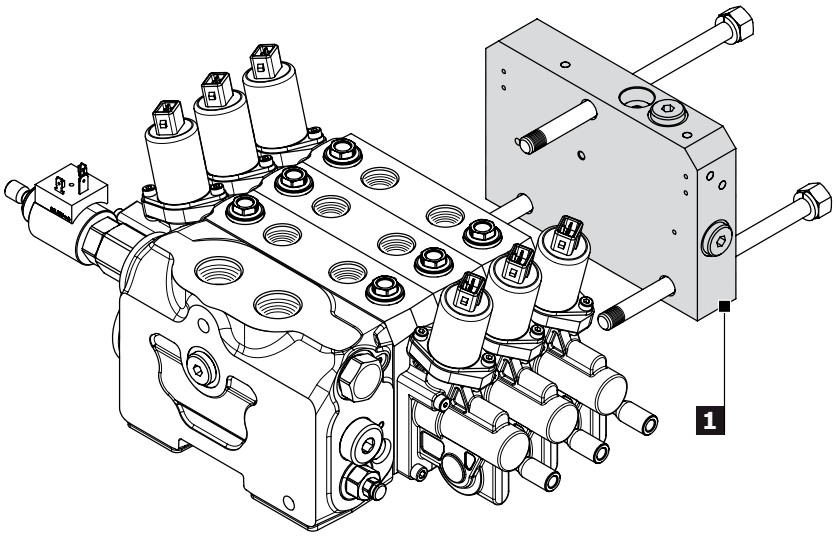
- **Electrohydraulic version**: to be used when at least one section in the valve has electrohydraulic actuation: this plate is collecting LS signal and electrohydraulic controls drain and is providing electrohydraulic actuation feeding by means of a pressure reducing valve

IMPORTANT:
with electrohydraulic actuation, only external drain outlet is provided. We recommend to connect drain directly to tank without any other additional pressure drop, in order to avoid control system damages and poor control properties.

Order example

KZ20EH

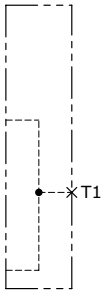
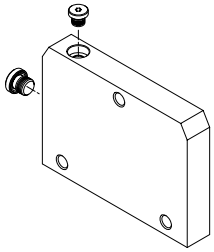
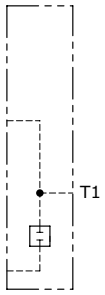
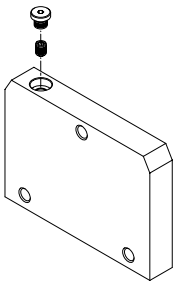
1. **KZ20EH** Outlet section type

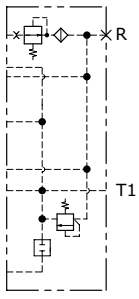
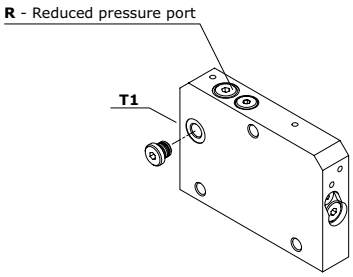
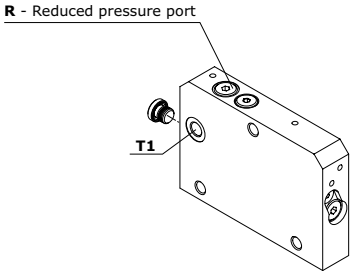


Rif.	Code	Description	Page
1	**KZ10I**	End plate without RDP internal drain (only for manual and hydraulic actuation)	**45**
	KZ10E	End plate without RDP external drain (only for manual and hydraulic actuation)	
	KZ20EC	End plate with RDP external drain (only for electrohydraulic actuation)	
	KZ20EH	End plate with RDP external-side drain (only for electrohydraulic actuation)	

NOTE: we recommend to keep the T line for the electrohydraulic cartridges separate from the T line of the valve.

End plate classification

END PLATE FOR MECHANICAL LEVER ACTUATION AND HYDRAULIC ACTUATION			
code	schema	configuration	description
KZ10I			**End plate without RDP internal drain** to be used with: H001-H004 HP05A-HP05C-HP05L HP01-HP02-HP03
KZ10E			**End plate without RDP external drain** to be used with: H001-H004 HP05A-HP05C-HP05L HP01-HP02-HP03

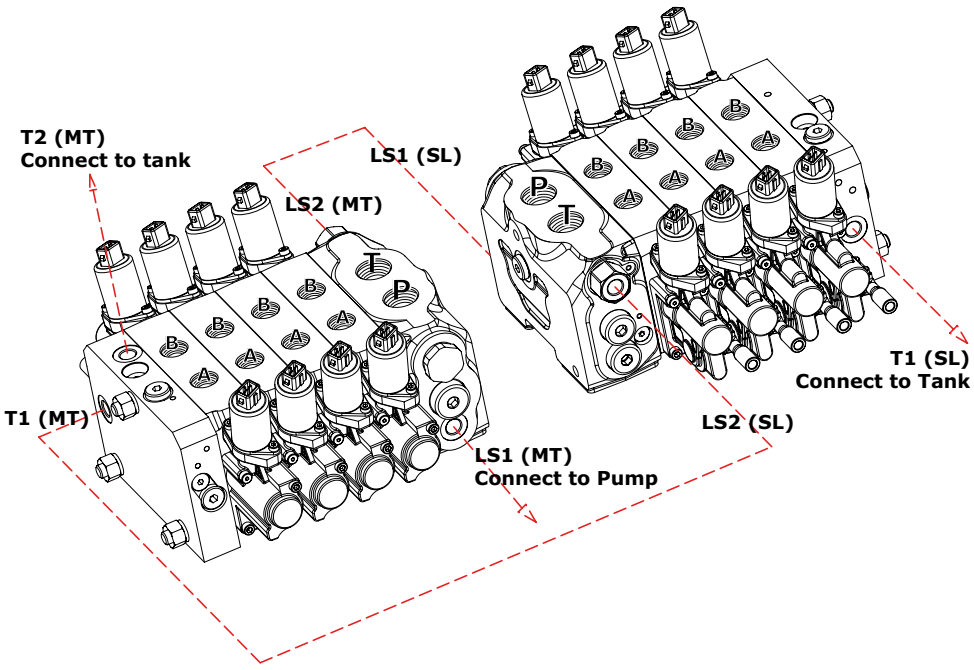
END PLATE FOR ELECTROHYDRAULIC ACTUATION			
code	schema	configuration	description
KZ20EC			**End plate with RDP external drain** to be used with: HP04-HP07 HP08-HP09
KZ20EH			**End plate with RDP external-side drain** to be used with: HP04-HP07 HP08-HP09

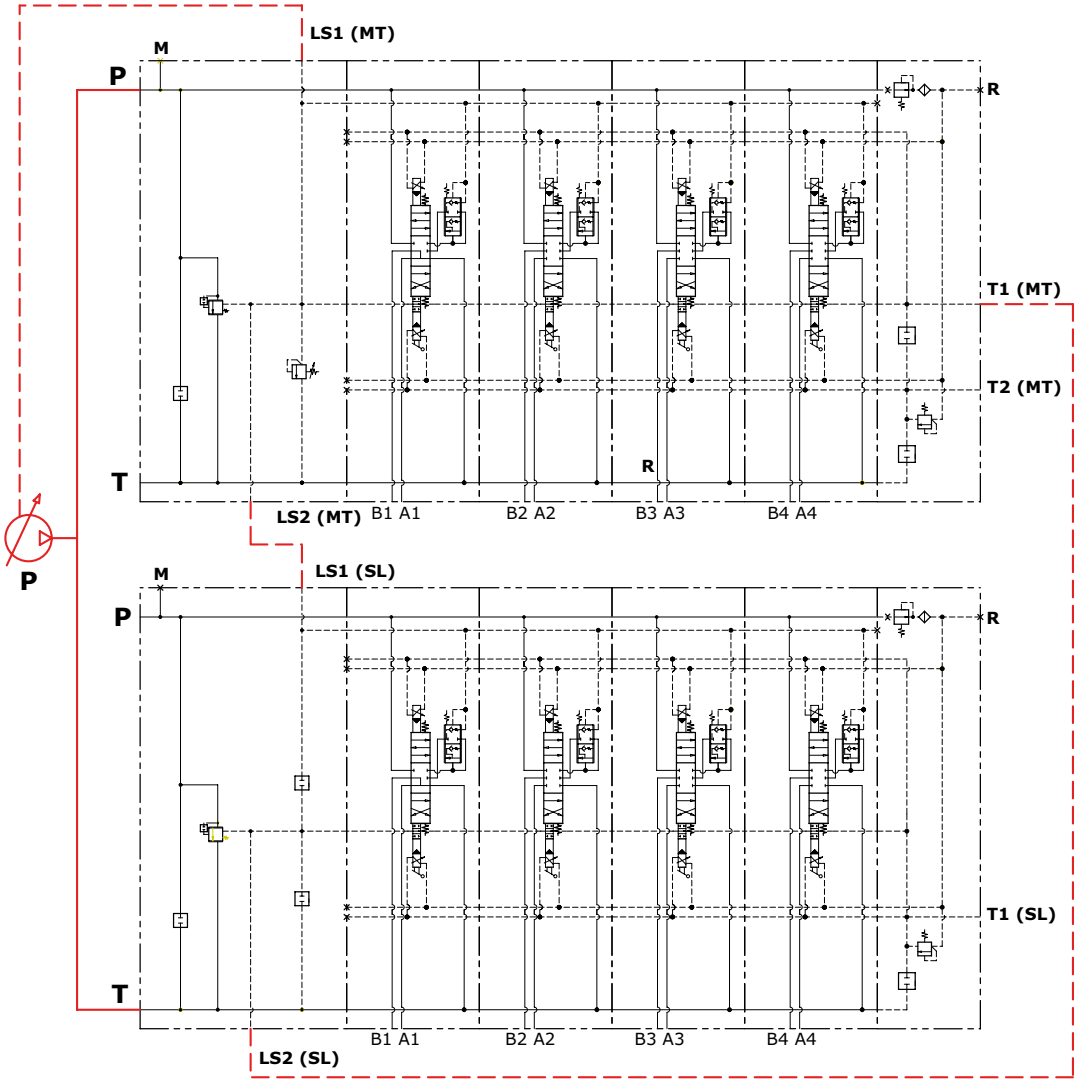
NOTE:
Left inlet assembled valve with lever kit HP01, HP02, HP03, HP04 and HP08 on the last section accepts only KZ20EH and KZ10I end plate.

SPECIAL FUNCTIONS

Parallel connection of several valves

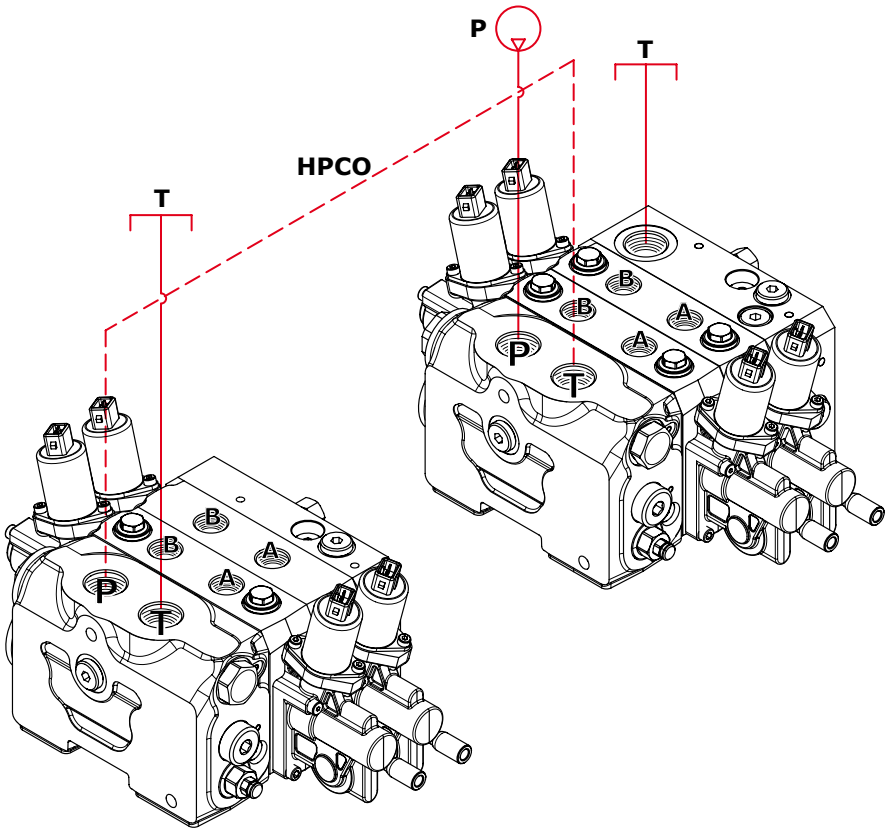
Thanks to an interesting construction design, it is possible to obtain parallel connection of several control valves without that the flow sharing function efficiency and simultaneity of movement being affected. The circuit available either for fixed or variable pump, requires P, T and LS signal connection according to the following diagram.
This solution is especially successful in the loading crane or forestry crane industries for single pump circuits.



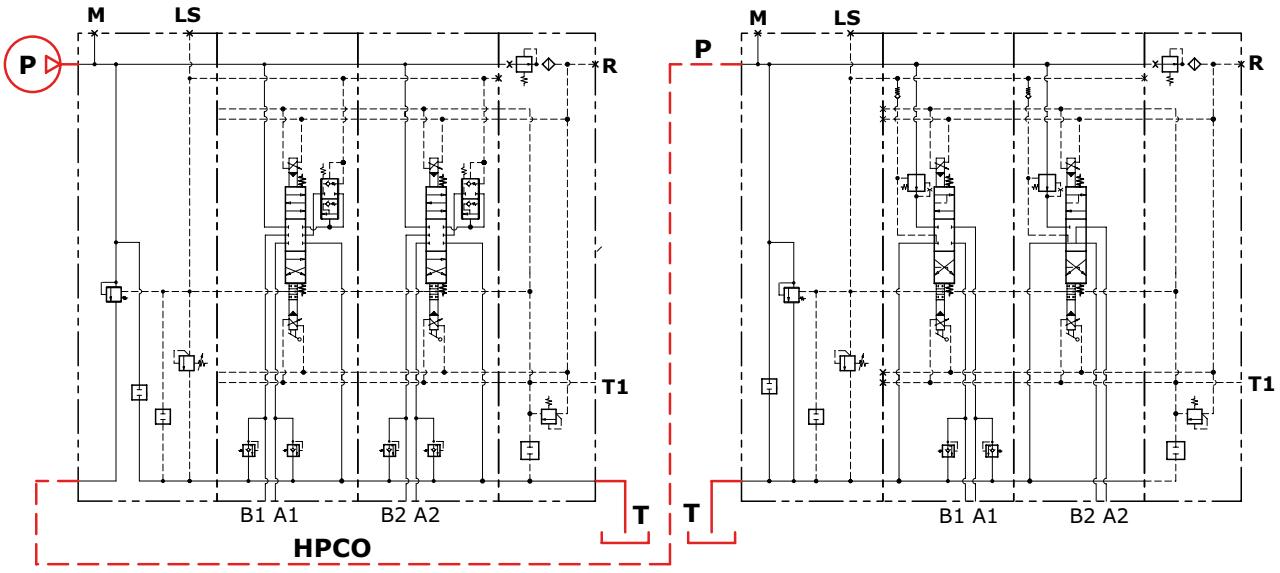


SPECIAL FUNCTIONS

High pressure carry over function

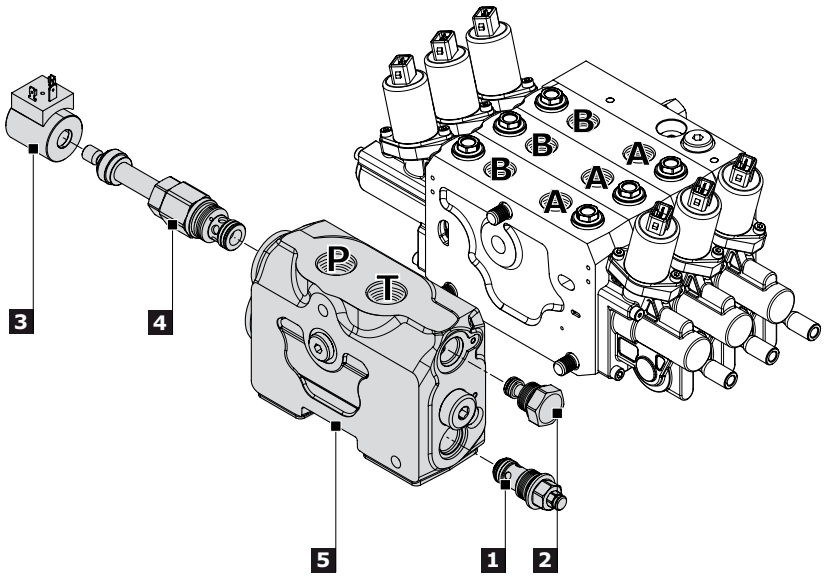


The Carry Over function is yet another unique option offered by the EX family.
In fixed pump circuits, two control valves connected in succession can be used to ensure flow through both valves' inlet compensators.
This special design is obtained by using a special inlet cover on the first valve.
This circuit is ideally suitable for trailer-equipped machines, since the connection between the two control valves is achieved by simply using one pipe for P and one pipe for T (no additional LS signal connections are necessary).



EX38 SPARE PARTS LIST

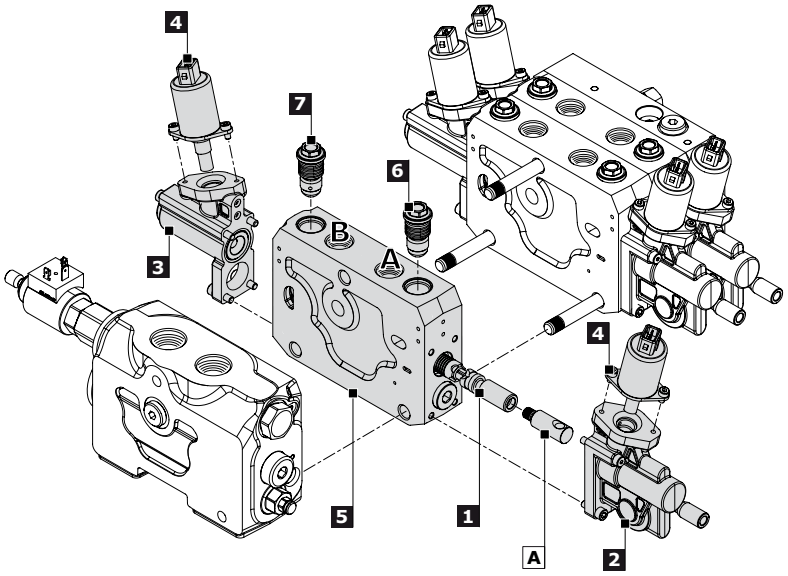
Inlet Section



Ref.	Description	Order code	Q.ty	Code	Note
1	LS pressure relief valve	**915028503**	1	V1A	Setting range: 50-250 bar
		915028504	1		Setting range: 251-420 bar
	LS relief plug	**430085034**	1	V2A	
2	LS plug	**430059003**	1	V10C	
	LS electric dump valve (*)	**413150077**	1	V11C	
3*	Coil kit	**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
4	Full flow direct operated pressure relief valve	**915065501**	1	V3B	Setting range: 40-200 bar
		915065502	1		Setting range: 201-420 bar
	Full flow relief plug	**430175001**	1	V4B	
	Full flow electric dump valve	**915049301**	1	V7B	
5	Open centre inlet section	**029300001**	1	KV G05	for fixed displacement pumps
		029300002	1	KV U05	
	Closed centre inlet section	**029300011**	1	JV G05	for variable displacement pumps
		029300012	1	JV U05	

(*) = Coil kit must be ordered separately: see table “A” pg. 18

Post-Compensated Section



Ref.	Description	Order code	Q.ty	Code	Note
1	3 positions double-acting spool	**421293035**	1	W001C 1010	spool 10 l/min
		421293040	1	W001C 2525	spool 25 l/min
		421293015	1	W001C 3535	spool 35 l/min
		421293010	1	W001C 5050	spool 50 l/min
		421293020	1	W001C 6565	spool 65 l/min
		421293032	1	W001C 100100	spool 100 l/min
	3 positions double-acting spool A and B to tank	**421293049**	1	W002C 1010	spool 10 l/min
		421293043	1	W002C 2525	spool 25 l/min
		421293131	1	W002C 3535	spool 35 l/min
		421293130	1	W002C 5050	spool 50 l/min
		421293039	1	W002C 6565	spool 65 l/min
		421293132	1	W002C 100100	spool 100 l/min
	4 positions double-acting with float in the 4th pos.	**421293093**	1	W012C 1010	spool 10 l/min
		421293092	1	W012C 8080	spool 80 l/min
A	Spool end kit	**422501217**	1		
		422501205	1		only for h001
		422501153	1		only for h004
2	Lever actuation kit	**320366001**	1	H001	
	Without lever actuation kit	**320366003**	1	H004	
	Hydraulic actuation (ports on the top)	**320593100**	1	HP05A	BSP version
	Hydraulic actuation (ports on the sides)	**320593106**	1	HP05C	
	Hydraulic actuation with stroke limiter	**320593112**	1	HP05L	
	Lever actuation + hydraulic actuation	**320593130**	1	HP01	
	Lever actuation + hydraulic actuation with electrohydraulic arrangement	**320593134**	1	HP02	
	Without lever actuation + hydraulic actuation with electrohydraulic arrangement	**320593138**	1	HP03	
	Hydraulic actuation (ports on the top)	**320593103**	1	HP05A	UNF version
	Hydraulic actuation (ports on the sides)	**320593109**	1	HP05C	
	Hydraulic actuation with stroke limiter	**320593115**	1	HP05L	
	Lever actuation + hydraulic actuation	**320593132**	1	HP01	
	Lever actuation + hydraulic actuation with electrohydraulic arrangement	**320593136**	1	HP02	
	Without lever actuation + hydraulic actuation with electrohydraulic arrangement	**320593139**	1	HP03	
	Lever actuation + electrohydraulic arrangement	**322593001**	1	HP00	
	Lever actuation + electrohydraulic actuation	**322593002**	1	HP04	
	Lever actuation + electrohydraulic actuation with stroke limiter	**322593003**	1	HP04L	
	Without lever + electrohydraulic actuation	**322593004**	1	HP07	
	Without lever + electrohydraulic actuation with stroke limiter	**322593005**	1	HP07L	
	Lever + hydraulic actuation + electrohydraulic actuation	**322593006**	1	HP08	BSP version
		322593007			UNF version
	Wuthout Lever + hydraulic actuation + electrohydraulic actuation	**322593008**	1	HP09	BSP version
		322593009			UNF version

Ref.	Description	Order code	Q.ty	Code	Note
3	3 position spring centered spool	**320793001**	1	F001A	
		320793002	1	F001B	
	Detent in A and B	**320893001**	1	F002A	
	Detent in 4th position	**320874005**	1	F005A	only with W012 spool
	Friction kit	**320085011**	1	F145	
	Proportional pneumatic control	**321293002**	1	F022A=F023A	BSP version
		321293001	1	F126A=F127A	NPT version
	Spool position indicator for mechanical lever	**320093001**	1	F0470	
	Lever actuation + hydraulic actuation (BSP)	**320593131**	1	FP01	only with HP01
	Lever actuation + hydraulic actuation (UNF)	**320593133**			
	Lever + hydraulic actuation with electrohydraulic arrangement (BSP)	**320593135**	1	FP02	only with HP02-HP03
	Lever + hydraulic actuation with electrohydraulic arrangement (UNF)	**320593137**			
	Lever actuation + electrohydraulic arrangement	**322593101**	1	FP00	only with HP00
	Lever actuation + electrohydraulic actuation	**322593102**	1	FP04	only with HP04-HP07
	Without lever + electrohydraulic actuation with stroke limiter	**322593103**	1	FP04L	only with HP07L
	Lever + hydraulic actuation + electrohydraulic actuation (BSP version)	**322593104**	1	FP08	only with HP08-HP09
	Lever + hydraulic actuation + electrohydraulic actuation (UNF version)	**322593105**			
	Spool position indicator for electrohydraulic actuation	**322593106**	1	FP04S	only with HP04-HP07
4	Coil-connector kit	**430093100**	2	B12AJ	AMP JUNIOR - 12 Vdc
		430093101	2	B24AJ	AMP JUNIOR - 12 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	**039300001**	1	RC1 G04	(BSP version) only for manual and hydraulic actuation
	Post compensated section standard without auxiliary valve	**039300003**	1	RC2 G04	
	Post compensated section with local LS relief valve with auxiliary valve	**039300005**	1	RCD1 G04 30/80	
		039300006	1	RCD1 G04 81/200	
		039300007	1	RCD1 G04 201/350	
	Post compensated section with local LS relief valve without auxiliary valve	**039300011**	1	RCD2 G04 30/80	
		039300012	1	RCD2 G04 81/200	
		039300013	1	RCD2 G04 201/350	
	Post compensated section with additional port for remoted LS relief valve with auxiliary valve	**039300021**	1	RCS1 G04	
	Post compensated section with additional port for remoted LS relief valve without auxiliary valve	**039300023**	1	RCS2 G04	
	Post compensated section with flow limiter with auxiliary valve	**039300017**	1	RCE1 G04	
	Post compensated section with flow limiter without auxiliary valve	**039300018**	1	RCE2 G04	
	Post compensated section standard with auxiliary valve	**039300002**	1	RC1 U04	(UNF version) only for manual and hydraulic actuation
	Post compensated section standard without auxiliary valve	**039300004**	1	RC2 U04	
	Post compensated section with local LS relief valve with auxiliary valve	**039300008**	1	RCD1 U04 30/80	
		039300009	1	RCD1 U04 81/200	
		039300010	1	RCD1 U04 201/350	
	Post compensated section with local LS relief valve without auxiliary valve	**039300014**	1	RCD2 U04 30/80	
		039300015	1	RCD2 U04 81/200	
		039300016	1	RCD2 U04 201/350	
	Post compensated section with additional port for remoted LS relief valve with auxiliary valve	**039300022**	1	RCS1 U04	
	Post compensated section with additional port for remoted LS relief valve without auxiliary valve	**039300024**	1	RCS2 U04	
	Post compensated section with flow limiter with auxiliary valve	**039300019**	1	RCE1 U04	
	Post compensated section with flow limiter without auxiliary valve	**039300020**	1	RCE2 U04	

Ref.	Description	Order code	Q.ty	Code	Note
5	Post compensated section standard with auxiliary valve	**039300101**	1	RC1 G04	BSP version only for electrohydraulic actuation
	Post compensated section standard without auxiliary valve	**039300103**	1	RC2 G04	
	Post compensated section with local LS relief valve with auxiliary valve	**039300105**	1	RCD1 G04 30/80	
		039300106	1	RCD1 G04 81/200	
		039300107	1	RCD1 G04 201/350	
	Post compensated section with local LS relief valve without auxiliary valve	**039300111**	1	RCD2 G04 30/80	
		039300112	1	RCD2 G04 81/200	
		039300113	1	RCD2 G04 201/350	
	Post compensated section with additional port for remoted LS relief valve with auxiliary valve	**039300121**	1	RCS1 G04	
	Post compensated section with additional port for remoted LS relief valve without auxiliary valve	**039300123**	1	RCS2 G04	
	Post compensated section with flow limiter with auxiliary valve	**039300117**	1	RCE1 G04	
	Post compensated section with flow limiter without auxiliary valve	**039300118**	1	RCE2 G04	
	Post compensated section atandard with auxiliary valve	**039300102**	1	RC1 U04	UNF version only for electrohydraulic actuation
	Post compensated section atandard without auxiliary valve	**039300104**	1	RC2 U04	
	Post compensated section with local LS relief valve with auxiliary valve	**039300108**	1	RCD1 U04 30/80	
		039300109	1	RCD1 U04 81/200	
		039300110	1	RCD1 U04 201/350	
	Post compensated section with local LS relief valve without auxiliary valve	**039300114**	1	RCD2 U04 30/80	
		039300115	1	RCD2 U04 81/200	
		039300116	1	RCD2 U04 201/350	
	Post compensated section with additional port for remoted LS relief valve with auxiliary valve	**039300122**	1	RCS1 U04	
	Post compensated section with additional port for remoted LS relief valve without auxiliary valve	**039300124**	1	RCS2 U04	
	Post compensated section with flow limiter with auxiliary valve	**039300119**	1	RCE1 U04	
	Post compensated section with flow limiter without auxiliary valve	**039300120**	1	RCE2 U04	

Auxiliary valve

Post-compensated and Pre-compensated sections use the same auxiliary valves.

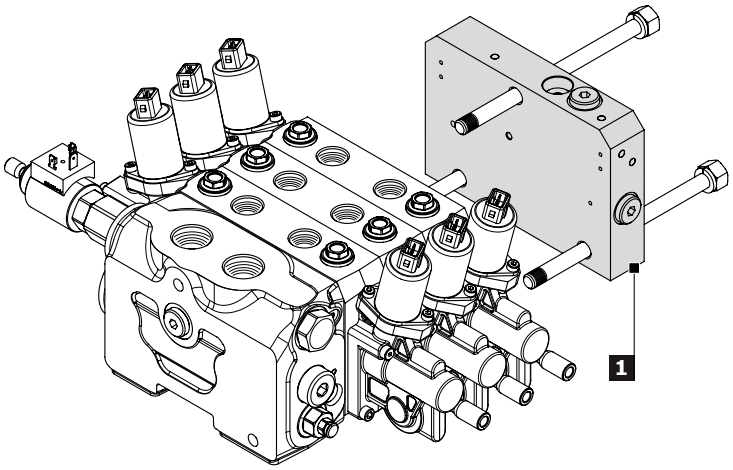
Ref.	Description	Order code	Q.ty	Code	Note
6	Anticavitation valve on port A	**915089001**	1	02TF PA	
	Combined valve fixed setting on port A (*)	**915870100**	1	03TF PA	fixed setting: 100 bar
		915870150	1		fixed setting: 150 bar
		915870200	1		fixed setting: 200 bar
		915870250	1		fixed setting: 250 bar
		915870300	1		fixed setting: 300 bar
		915870350	1		fixed setting: 350 bar
	Prearrangement for auxiliary valve on port A	**430490001**	1	05TF PA	
7	Anticavitation valve on port B	**915089001**	1	02TF PB	
	Combined valve fixed setting on port B (*)	**915870100**	1	03TF PB	fixed setting: 100 bar
		915870150	1		fixed setting: 150 bar
		915870200	1		fixed setting: 200 bar
		915870250	1		fixed setting: 250 bar
		915870300	1		fixed setting: 300 bar
		915870350	1		fixed setting: 350 bar
	Prearrangement for auxiliary valve on port B	**430490001**	1	05TF PB	

Pre-Compensated Section

Ref.	Description	Order code	Q.ty	Code	Note
1	3 positions double-acting spool	**421293048**	1	W001C 1515	spool 15 l/min
		421294063	1	W001C 2525	spool 25 l/min
		421293064	1	W001C 4040	spool 40 l/min
		421293075	1	W001C 6565	spool 65 l/min
	3 positions double-acting spool A and B to tnak	**421293091**	1	W002C 1515	spool 15 l/min
		421293082	1	W002C 2525	spool 25 l/min
		421293081	1	W002C 4040	spool 40 l/min
		421293080	1	W002C 6565	spool 65 l/min
A	Spool end kit	**430085026**	1		
		430085044	1		only for h001
		430085045	1		only for h004
2	Lever actuation kit	**320366001**	1	H001	
	Without lever actuation kit	**320366003**	1	H004	
	Hydraulic actuation (ports on the top)	**320593200**	1	HP05A	BSP version
	Hydraulic actuation (ports on the sides)	**320593206**	1	HP05C	
	Hydraulic actuation with stroke limiter	**320593212**	1	HP05L	
	Lever actuation + hydraulic actuation	**320593130**	1	HP01	
	Lever actuation + hydraulic actuation with electrohydraulic arrangement	**320593134**	1	HP02	
	Without actuation + hydraulic actuation with electrohydraulic arrangement	**320593138**	1	HP03	
	Hydraulic actuation (ports on the top)	**320593203**	1	HP05A	UNF version
	Hydraulic actuation (ports on the sides)	**320593209**	1	HP05C	
	Hydraulic actuation with stroke limiter	**320593215**	1	HP05L	
	Lever actuation + hydraulic actuation	**320593132**	1	HP01	
	Lever actuation + hydraulic actuation with electrohydraulic arrangement	**320593136**	1	HP02	
	Without lever + hydraulic actuation with electrohydraulic arrangement	**320593139**	1	HP03	
	Lever actuation + electrohydraulic arrangement	**322593001**	1	HP00	
	Lever actuation + electrohydraulic actuation	**322593002**	1	HP04	
	Lever actuation + electrohydraulic actuation with stroke limiter	**322593003**	1	HP04L	
	Without lever + electrohydraulic actuation	**322593004**	1	HP07	
	Without lever + electrohydraulic actuation with stroke limiter	**322593005**	1	HP07L	
	Lever + hydraulic actuation + electrohydraulic actuation	**322593006**	1	HP08	BSP version
		322593007			UNF version
	Wuthout Lever + hydraulic actuation + electrohydraulic actuation	**322593008**	1	HP09	BSP version
		322593009			UNF version
3	3 position spring centered spool	**320785001**	1	F001A	
		320785002	1	F001B	
	Lever actuation + hydraulic actuation (BSP)	**320593231**	1	FP01	only with HP01
	Lever actuation + hydraulic actuation (UNF)	**320593233**			
	Lever + hydraulic actuation with electrohydraulic arrangement (BSP)	**320593233**	1	FP02	only with HP02-HP03
	Lever + hydraulic actuation with electrohydraulic arrangement (UNF)	**320593234**			
	Lever actuation + electrohydraulic arrangement	**322593201**	1	FP00	only with HP00
	Lever actuation + electrohydraulic actuation	**322593202**	1	FP04	only with HP04-HP07
	Without lever + electrohydraulic actuation with stroke limiter	**322593203**	1	FP04L	only with HP07L
	Lever + hydraulic actuation + electrohydraulic actuation (BSP)	**322593204**	1	FP08	only with HP08-HP09
	Lever + hydraulic actuation + electrohydraulic actuation (UNF)	**322593205**			
	Spool position indicator for electrohydraulic actuation	**322593206**	1	FP04S	only with HP04-HP07
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

Ref.	Description	Order code	Q.ty	Code	Note
5	Pre compensated section atandard with auxiliary valve	**039300051**	1	RL1 G04	(BSP version) only for manual and hydraulic actuation
	Pre compensated section atandard without auxiliary valve	**039300053**	1	RL2 G04	
	Pre compensated section with local LS relief valve with auxiliary valve	**039300055**	1	RLD1 G04 50/170	
		039300056	1	RLD1 G04 171/350	
	Pre compensated section with local LS relief valve without auxiliary valve	**039300059**	1	RLD2 G04 50/170	
		039300060	1	RLD2 G04 171/350	
	Pre compensated section with additional port for remoted LS relief valve with auxiliary valve	**039300063**	1	RLS1 G04	
	Pre compensated section with additional port for remoted LS relief valve without auxiliary valve	**039300065**	1	RLS2 G04	
	Pre compensated section standard with auxiliary valve	**039300052**	1	RL1 U04	(UNF version) only for manual and hydraulic actuation
	Pre compensated section standard without auxiliary valve	**039300054**	1	RL2 U04	
	Pre compensated section with local LS relief valve with auxiliary valve	**039300057**	1	RLD1 U04 50/170	
		039300058	1	RLD1 U04 171/350	
	Pre compensated section with local LS relief valve without auxiliary valve	**039300061**	1	RLD2 U04 50/170	
		039300062	1	RLD2 U04 171/350	
	Pre compensated section with additional port for remoted LS relief valve with auxiliary valve	**039300064**	1	RLS1 U04	
	Pre compensated section with additional port for remoted LS relief valve without auxiliary valve	**039300066**	1	RLS2 U04	
	Pre compensated section standard with auxiliary valve	**039300151**	1	RL1 G04	(BSP version) only for electrohydraulic actuation
	Pre compensated section standard without auxiliary valve	**039300153**	1	RL2 G04	
	Pre compensated section with local LS relief valve with auxiliary valve	**039300155**	1	RLD1 G04 50/170	
		039300156	1	RLD1 G04 171/350	
	Pre compensated section with local LS relief valve without auxiliary valve	**039300159**	1	RLD2 G04 50/170	
		039300160	1	RLD2 G04 171/350	
	Pre compensated section with additional port for remoted LS relief valve with auxiliary valve	**039300163**	1	RLS1 G04	
	Pre compensated section with additional port for remoted LS relief valve without auxiliary valve	**039300165**	1	RLS2 G04	
	Pre compensated section atandard with auxiliary valve	**039300152**	1	RL1 U04	(UNF version) only for electrohydraulic actuation
	Pre compensated section atandard without auxiliary valve	**039300154**	1	RL2 U04	
	Pre compensated section with local LS relief valve with auxiliary valve	**039300157**	1	RLD1 U04 50/170	
		039300158	1	RLD1 U04 171/350	
	Pre compensated section with local LS relief valve without auxiliary valve	**039300161**	1	RLD2 U04 50/170	
		039300162	1	RLD2 U04 171/350	
	Pre compensated section with additional port for remoted LS relief valve with auxiliary valve	**039300164**	1	RLS1 U04	
	Pre compensated section with additional port for remoted LS relief valve without auxiliary valve	**039300166**	1	RLS2 U04	

Outlet Section (End plate)



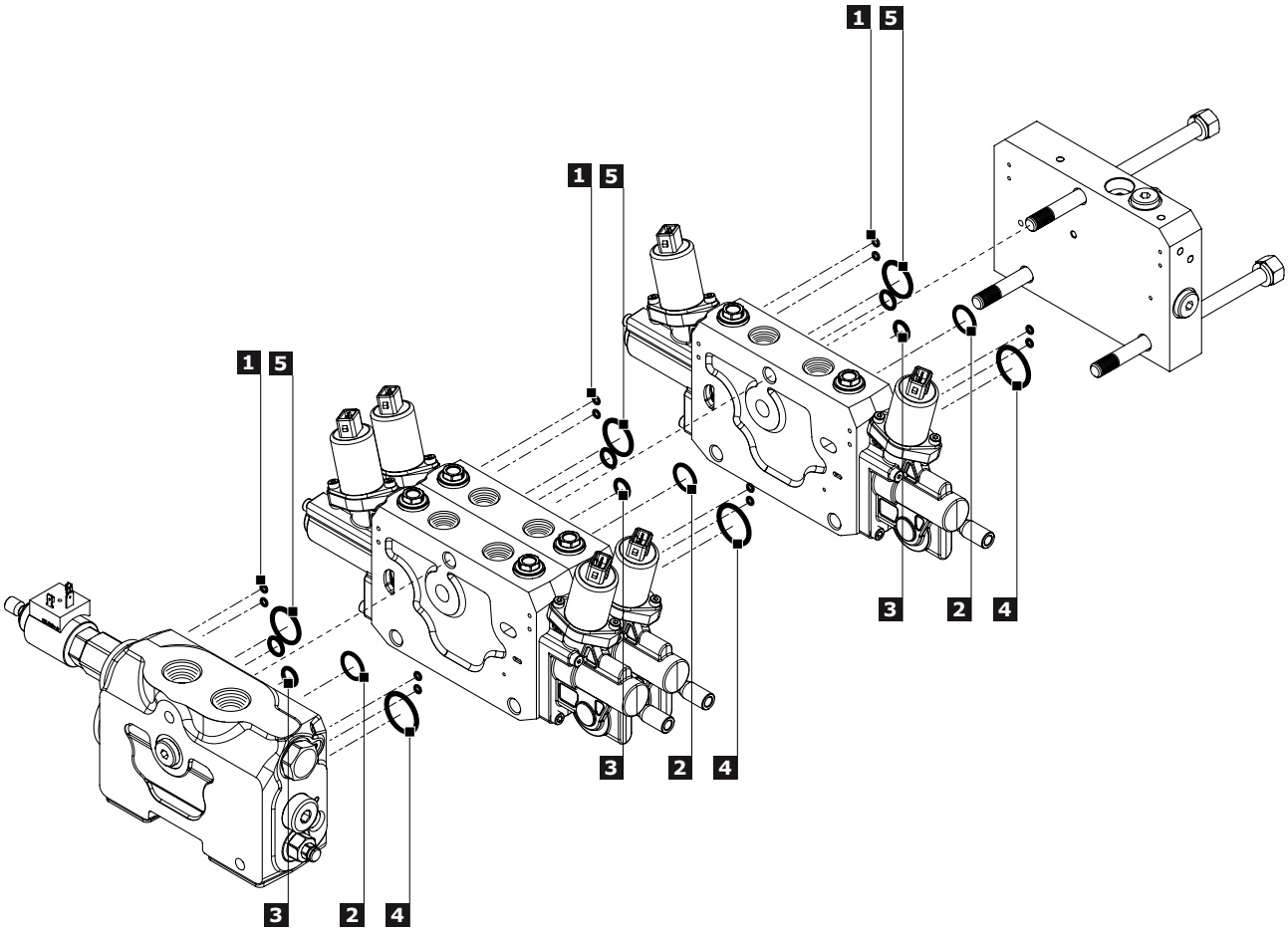
End plate for Mechanical and hydraulic actuation

Ref.	Description	Order code	Q.ty	Code	Note
1	End plate without RDP (internal drain)	**320093101**	1	KZ10I	BSP version
		320093103	1		UNF version
	End plate without RDP (external drain)	**320093102**	1	KZ10E	BSP version
		320093104	1		UNF version

End plate for electrohydraulic actuation

Ref.	Description	Order code	Q.ty	Code	Note
1	End plate with RDP (external drain)	**320093123**	1	KZ20EC	BSP version
		320093127	1		UNF version
	End plate with RDP (external-side drain)	**320093124**	1	KZ20EH	BSP version
		320093128	1		UNF version

Gasket kits



Ref.	Order Code	Description	Q.ty
1	**412020118**	O.R. 90SH 3.10 x 1,6 (N27OR050)	4
2	**412020302**	O.R. 90SH 16.36 x 2.21 (3-908)	1
3	**412020303**	O.R. 90SH 10 x 2.20 (6-532)	2
4	**412020605**	O.R. 90SH 25.07 x 2.62 (2-120)	1
5	**412020610**	O.R. 90SH 21.89 x 2.62 (2-118)	1
Complete Gasket kit: order code - 350993001			

INSTALLATION

Guidelines

- Never use the Control Valve at a pressure exceeding the rated pressure; if not, there is the possibility of brea kage 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 the 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 opera-tion 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

Fittings tightening torque (Nm)

Thread Type	Port P	Port A - B	Port T
BSP (ISO - 228)	**G 3/4**	**G 1/2**	**G 3/4**
with rubber sealing (DIN 3869)	70	60	70
with copper or steel and rubber washer	70	60	70
UN-UNF (ISO - 725)	**1”1/16 - 12 UNF**	**7/8” - 14 UNF**	**1”1/16 - 12 UNF**
with O.R.	95	90	95

INSTALLATION

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

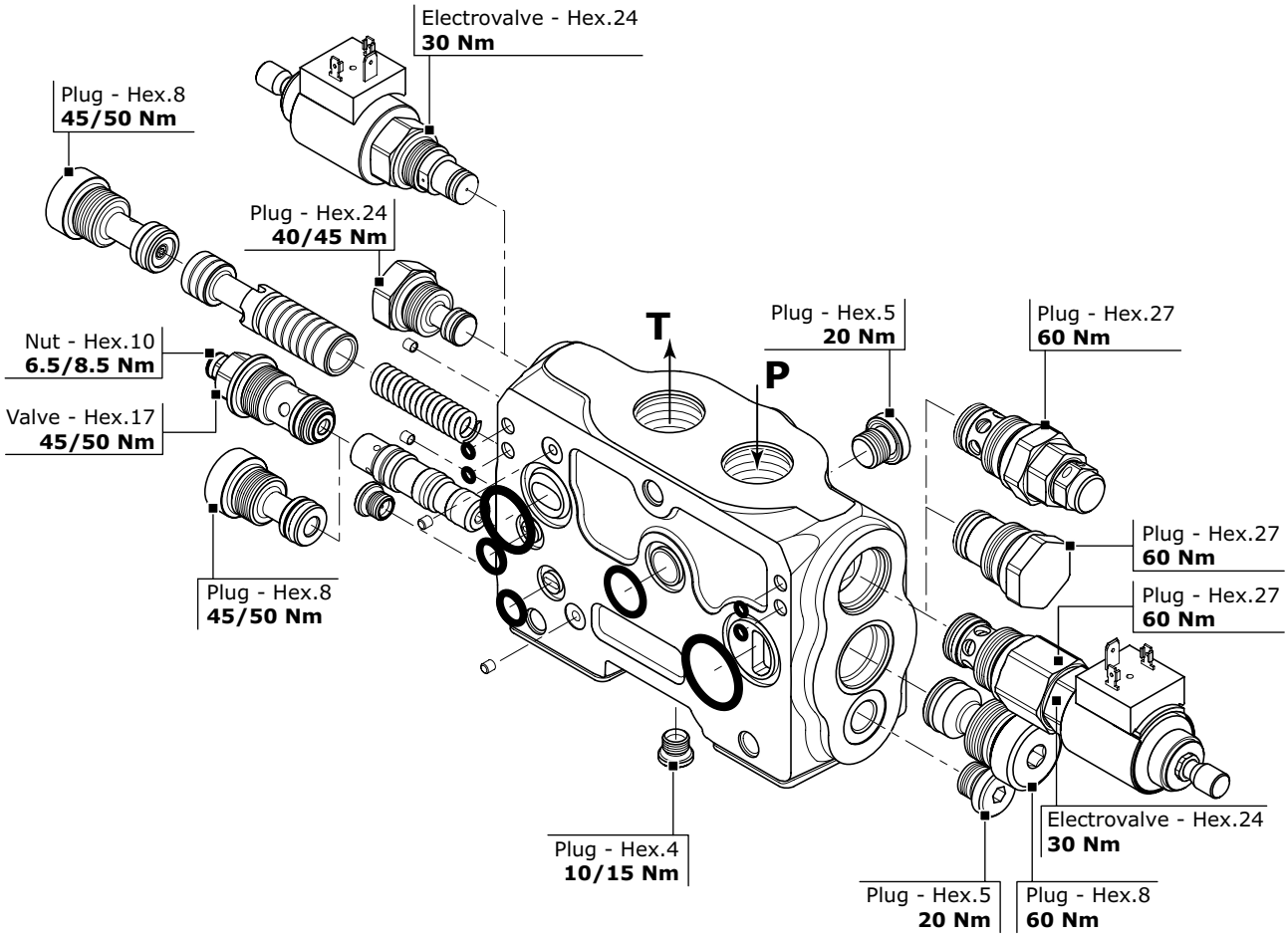
Warning

- 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.

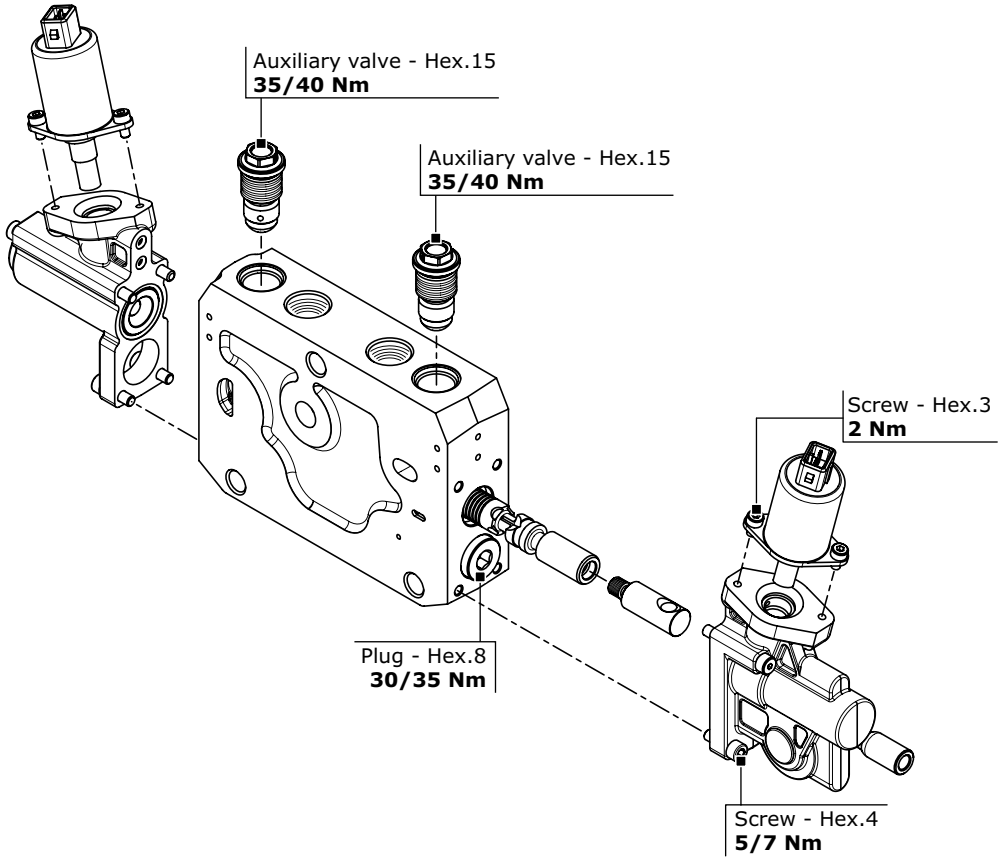
General clamping torque

The following table provides the main tightening torques of the distributor EX38; are highlighted in 3 separate drawings depicting the inlet section, the working section and the outlet section.

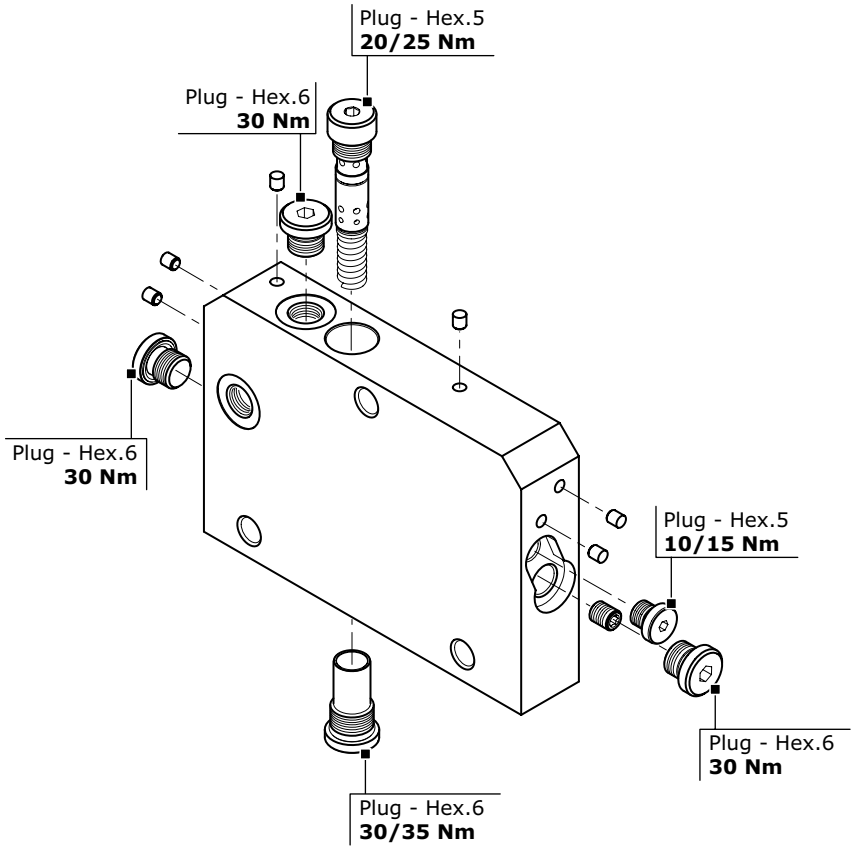
Inlet Section



Work Section



Outlet Section



Dimensions - Thread codes

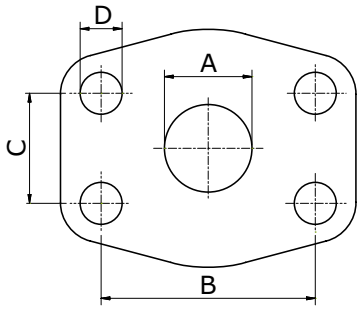
The connection ports size is indicated by an ordering code common for all Hydrocontrol products. Following table shows all available connections.

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



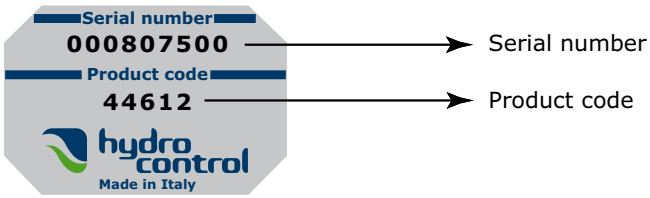
SAE / 3000 FLANGE (ISO 6162-1)												
Type	3/4" (MA)	3/4" (UNC)	1" (MA)	1" (UNC)	1"1/4 (MA)	1"1/4 (UNC)	1"1/2 (MA)	1"1/2 (UNC)	2" (MA)	2" (UNC)	3" (MA)	3" (UNC)
Code	**S03**	**S04**	**S05**	**S06**	**S07**	**S08**	**S09**	**S10**	**S11**	**S12**	**S15**	**S16**
A	19	19	25	25	32	32	38	38	51	51	76	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:

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 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.

NOTES

NOTES

Walvoil nel mondo - *Walvoil worldwide*

Sede principale, Filiali e Uffici di rappresentanza
Headquarters, Subsidiaries and Representative Offices

Walvoil S.p.A. - Sede principale - *Headquarters*
Via Adige, 13/D . 42124 Reggio Emilia . Italy
TEL. +39 0522 932411 . info@walvoil.com -
www.walvoil.com

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

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

AUSTRALASIA . *AUSTRALASIA*

Walvoil Fluid Power Australasia Pty Ltd
13 Vanessa Way . Delahey VIC 3037 . Melbourne . Australia
TEL. +61 458 918 750 . australasia@walvoil.com

BRASILE . *BRAZIL*

Interpump Hydraulics Brasil Ltda - Walvoil Division
Gilberto de Zorzi, 525 . Forqueta Caxias do Sul (RS)
TEL. +55 54 3223 2373 . infobrasil@walvoil.com

CANADA . *CANADA*

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

CINA . *CHINA*

Walvoil Fluid Power (Dongguan) Co. Ltd
1st Floor, the Third Factory Area, Sijia, Shijie Town, Dongguan City, Guangdong province, China.
TEL. +86 769 81816189-8020 . FAX. +86 769 81816589
info@walvoil.com.cn

COREA DEL SUD . *SOUTH KOREA*

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

FRANCIA . *FRANCE*

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

INDIA . *INDIA*

Walvoil Fluid Power (India) PVT. LTD.
No. 19, 2nd Cross, 2nd Main, KIADB Industrial Area, Attibele,
Anekal Taluk, Bangalore – 562107
TEL. +91 80 0614 24000 . info@walvoil.co.in

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

Walvoil Fluid Power Corp.
4111 North Garnett Tulsa, OK 74116, USA
TEL. +1 918 858 7100 . info@walvoilfluidpower.com

Walvoil Fluid Power Corp. Hydrocontrol Business Unit
1109, Technology Drive . Red Wing . MN 55066 . U.S.A.
TEL. +1 651 212 6400 . usa@hydrocontrol-inc.com

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