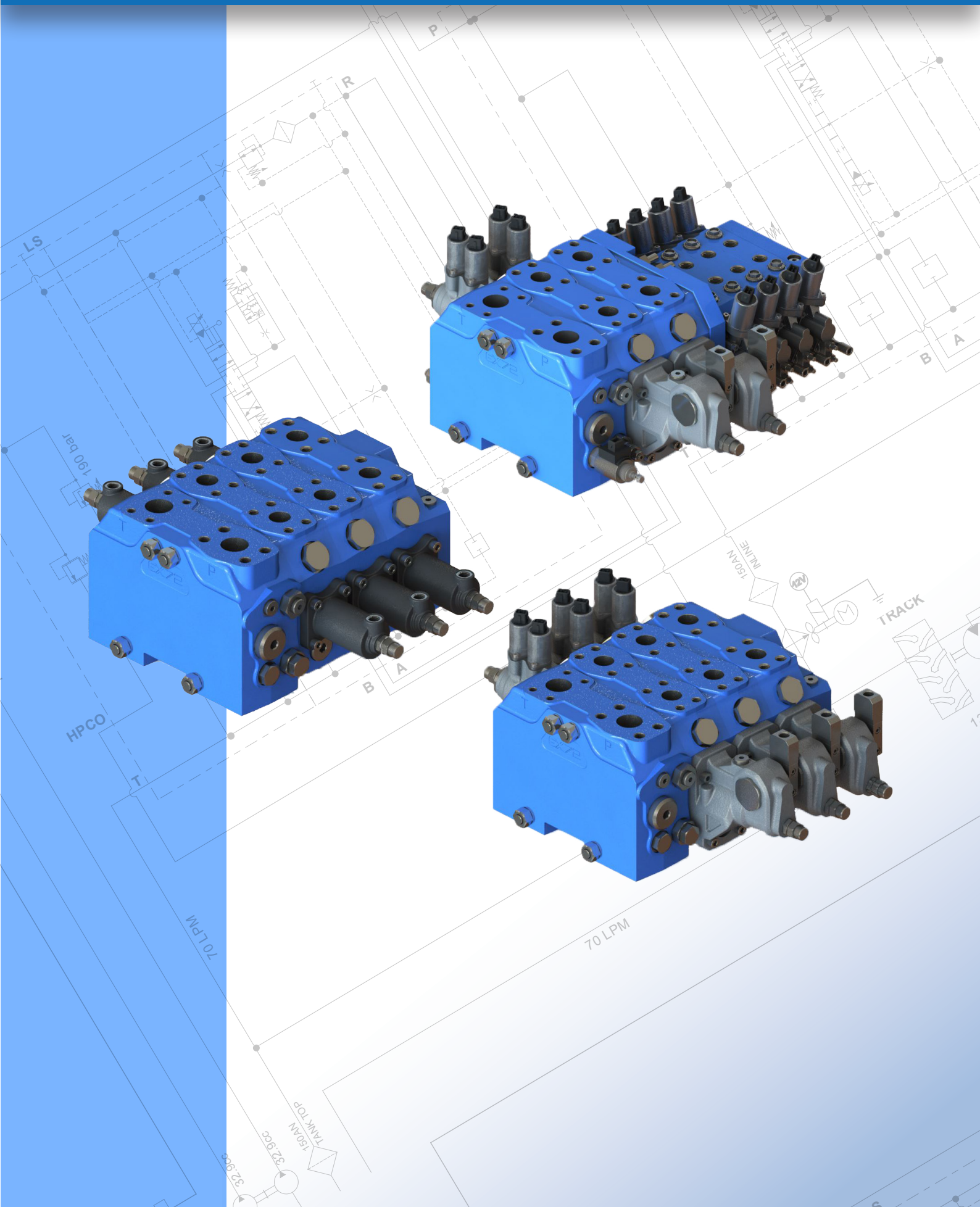
Flow Sharing Valve

EX72

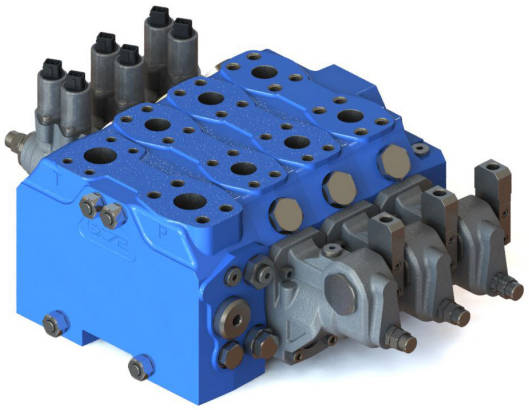
Product Manual

CROSS HYDRAULICS



EX LS FLOW SHARING VALVE

EX72 Electrohydraulic Proportional EHP



Features:

- Load independent flow control
  - Oil flow to an individual function is independent to its load pressure.
  - Oil flow to an individual function is independent to the load pressure of other functions.
- Flow sharing between working functions still occurs during pump flow saturation. This allows the operator to keep control of all functions at a reduced speed.
- Fast response in flow regulation.

Specifications:

Pump Flow: 450 l/min max.
A&B Service Ports Nominal Flow: 350 l/min @ 14bar stand-by pressure
Working Pressure: 350bar
Back Pressure on T Tank Port: 10bar max.
Back Pressure on T1 Drain Port: 2bar max.
Proportional Pressure Reducing Valves
PWM Suggested: 70 - 90 Hz
ON – OFF control current @ 12V: 2500 mA
ON – OFF control current @ 24V: 1150 mA
Proportional control current @ 12V: 500 – 1300 mA
Proportional control current @ 24V: 250 – 650 mA
Max. number of working sections: 8

EX LS FLOW SHARING VALVE

What is Flow Sharing?

Flow sharing is best suited for mobile applications where one or two actuators operate at high flow rates most of the time, but can reduce that flow appropriately when other circuits are also demanding flow.

Flow sharing is a method of pressure compensation; allowing all channels of metered fluid to take proportional allocation of flow regardless of total pump output. Flow sharing prevents fluid from taking the path of least resistance.

The EX72 Control Valve adds the benefit of Flow Sharing technology to the standard Load Sensing Valve. The EX Series patented system maintains the margin pressure as a constant pressure drop across the spool metering area. As a result, flow to the work port depends only on spool position.

In case of flow saturation, the effective pressure drop across all spools is equally reduced, thus causing a proportional flow reduction on every spool.
In case of flow saturation, the flow demand is higher than the maximum pump flow, therefore the margin pressure can be determined by the following:

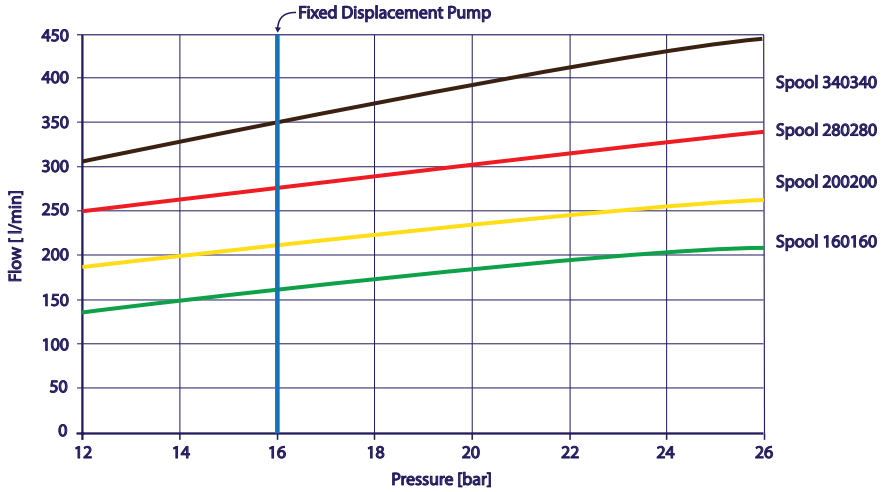
$$Q \propto A\sqrt{\Delta P / \rho}$$

$Q = flow\ to\ work\ ports$
$\Delta P = pressure\ drop\ across\ metering\ area$
$A = metering\ area$
$\rho = oil\ density$

Since all spools have the same pressure drop across the metering area, all flows are proportionally reduced.
This allows the operator to keep control of all functions, although at a lower speed.

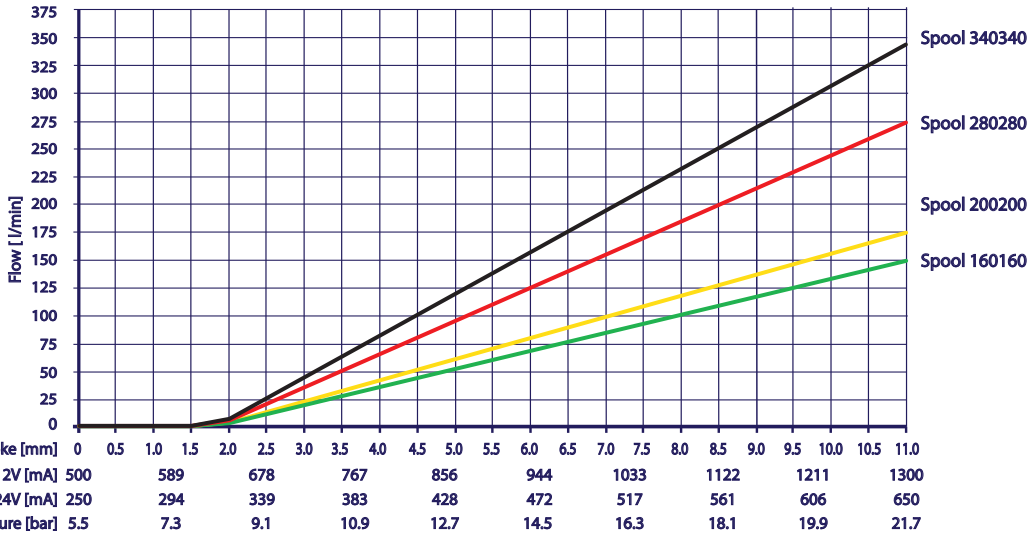
EX72 Work Port Flow Rate

A&B Work Port Spool Flow Rate as a function of Variable Displacement Pump Stand-By Pressure Setting.



With Fixed Displacement Pump A&B Work Port Flow Rate depends on the Stand-By Pressure of the Inlet Compensator, typically of 16bar.
(25bar inlet compensator standby pressure option is also available.)

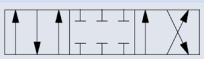
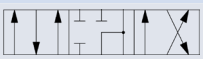
Flow (l/min) on Ports A&B as function of Spool Stroke (mm), Control Current (mA), Pilot Pressure (Bar)



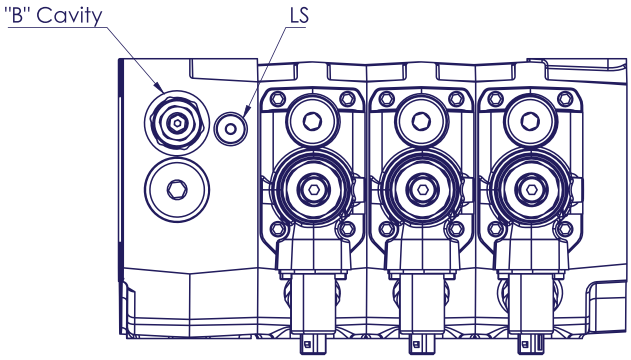
Spool Stroke [mm]	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0
Current @ 12V [mA]	500		589		678		767		856		944		1033		1122		1211		1300				
Current @ 24V [mA]	250		294		339		383		428		472		517		561		606		650				
Pilot Pressure [bar]	5.5		7.3		9.1		10.9		12.7		14.5		16.3		18.1		19.9		21.7				

Inlet Flow 450l/min @ 16 bar Stand-By Pressure

Working Section Spool Configurations

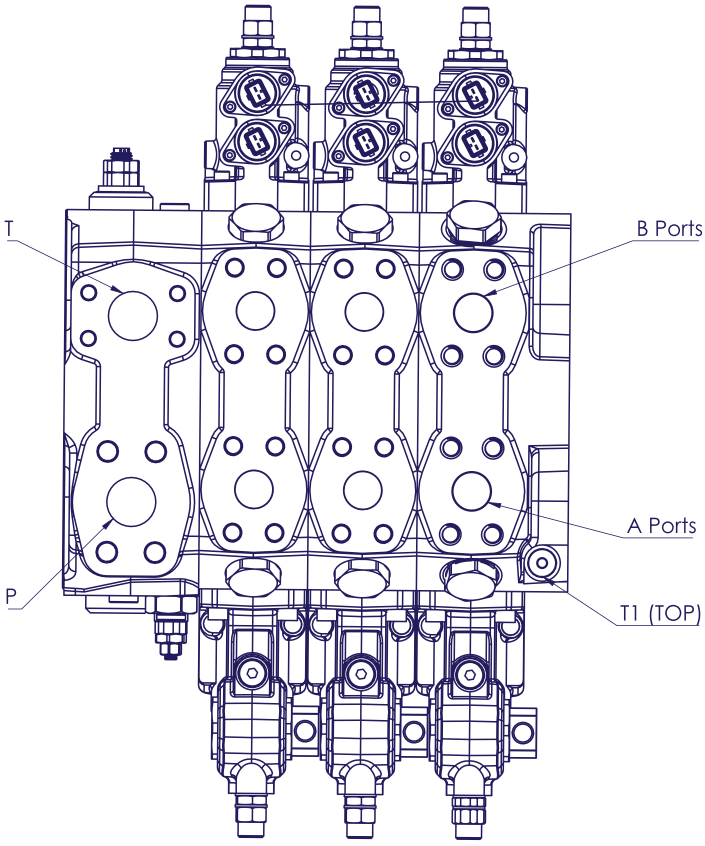
Flow A-B: (L/min)	W001C Cylidner Double Acting Spool	W002C Motor Spool
160 160	421295021	421295019
200 200	421295007	421295008
280 280	421295005	421295006
340 340	421295001	421295002
		

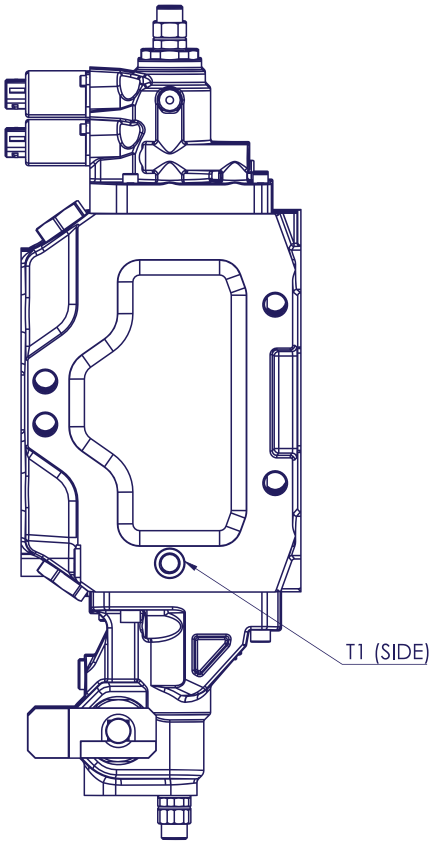
EX72 Valve Connections

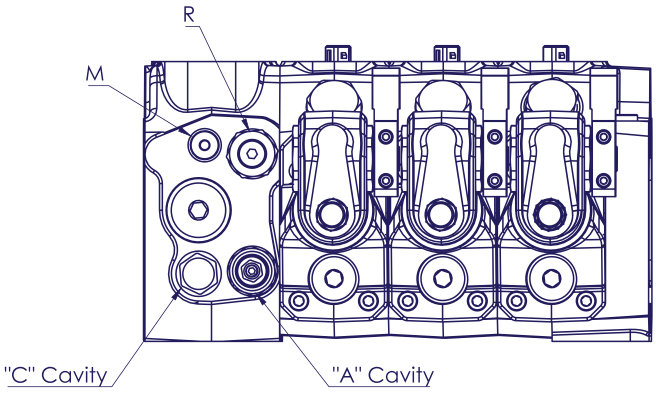


Connections/ports:

Port:	Description:	Size SAE 6000 Flange:	Position:
P	Pump Inlet Port	1-1/4" UNC	Top
T	Tank Outlet Port	1-1/4" UNC	Top
A/B	Work Ports	1" UNC	Top
LS	Load Sense Ports	9/16" UNF	Rear
T1	Drain Ports	9/16" UNF	Top/Side
M	Pressure Gauge Port	9/16" UNF	Front
R	Pilot Pressure Port	9/16" UNF	Front





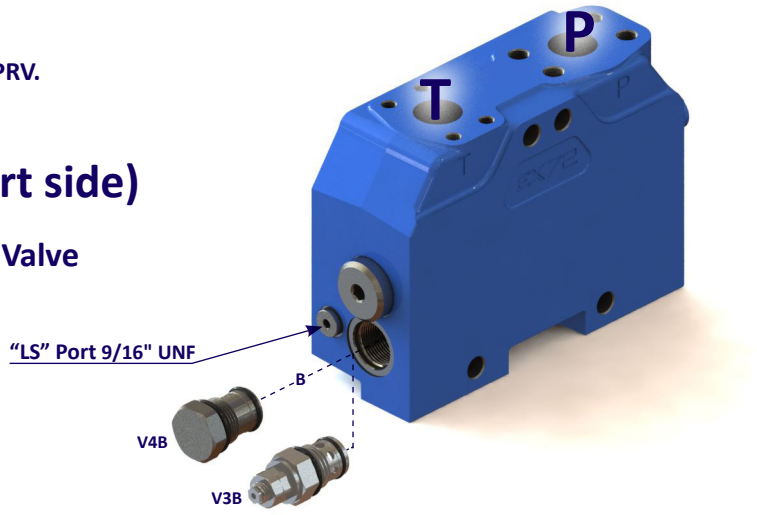


T1 Port should always be connected directly to tank. Connection to a return line may cause pilot pressure instabilities due to unpredictable back pressure.

Fixed/Variable Displacement Pumps

The inlet section comes in two seperate configurations for use with fixed displacement (open center) or variable displacement (closed center) pumps. The open and closed center inlet sections can also be configured with or without a pressure reducing valve (PRV).

JV - Variable Displacement
KV - Fixed Displacement
JVR - Variable Displcement with PRV
KVR - Fixed Displacement with PRV
- Electrohydraulic actuation requires inlet section with PRV.



Pump Flow Management (T port side)

"B" cavity – Full Flow Main Pressure Relief Valve
- Code 915078801 (V3B: 50 - 350 bar)

"B" cavity – Cavity Plug
- Code 430488001 (V4B)

LS Signal Management (P port side)

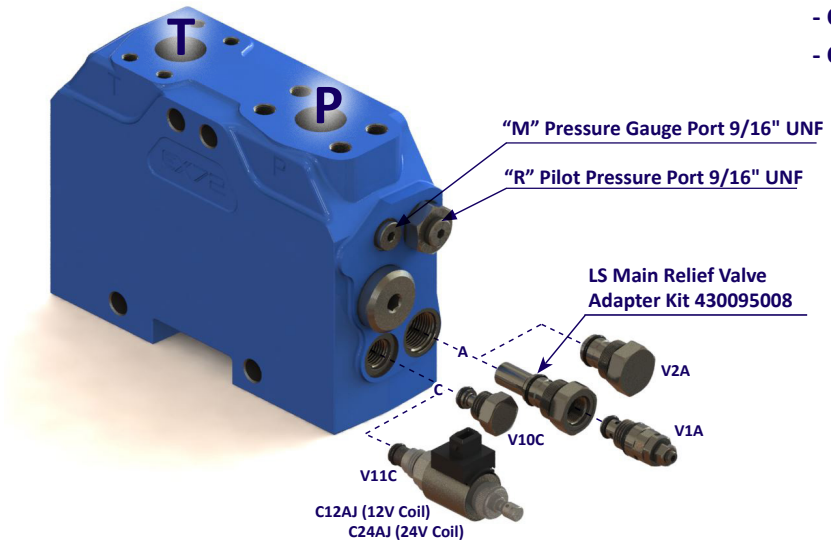
"A" cavity – LS Main Pressure Relief Valve
- Code 915029501 (V1A: 120 - 250 bar)
- Code 915029502 (V1A : 250 - 350 bar)

"A" cavity plug
- Code 430195001 (V2A)

"C" cavity plug
- Code 430059003 (V10C)

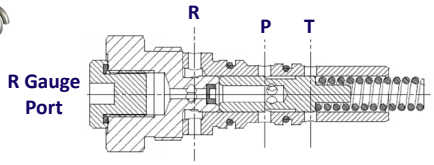
"C" cavity – LS Dump Valve Body
- Code 413150076 (V11C)

LS Dump Valve Coil Kit
- Code 4SLE001203A (C12AJ: 12V Coil)
- Code 4SLE002403A (C24AJ: 24V Coil)



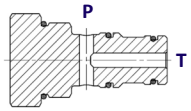
Pressure Reducing Valve (PRV) Options

The PRV is a 3 way normally open valve which is able to feed the secondary pilot line circuit with a lower presure of 35-40 bar. In cases where an external pilot supply is used, an input of 35-40 bar is required. When configuring an EX72/EX38 combination valve, the KVR/JVR alternative plug (430095027) must be used.



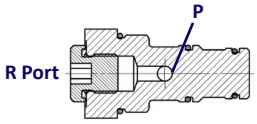
Pressure Reducer (JVR/KVR)

- Code 320095005 (Standard, R port 9/16" UNF)



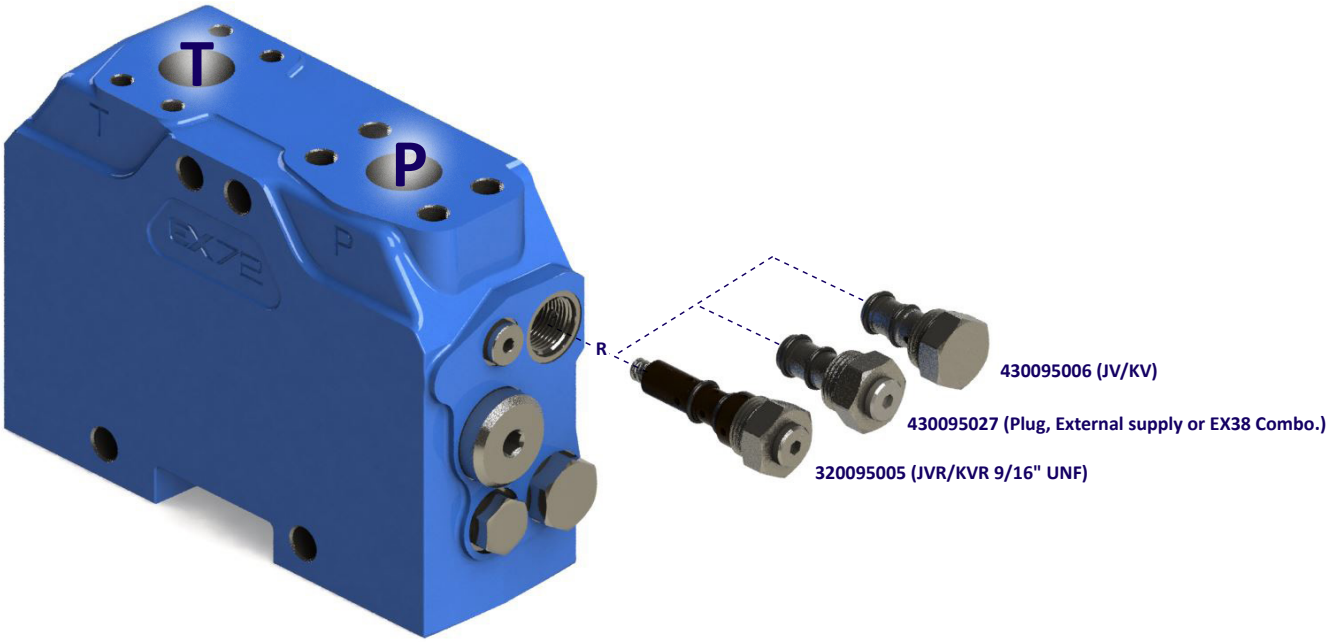
R Cavity Plug (JV/KV)

- Code 430095006

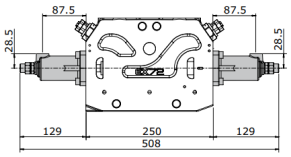
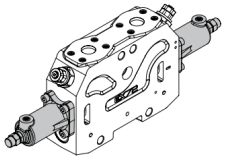


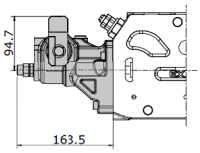
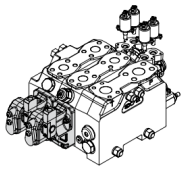
R Cavity Plug for External Pilot Supply or EX38 Combination (KVR/JVR Alt.)

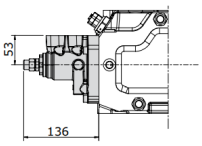
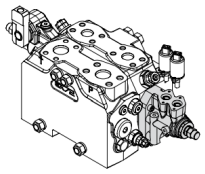
- Code 430095027 (R port 1/4" BSPP)



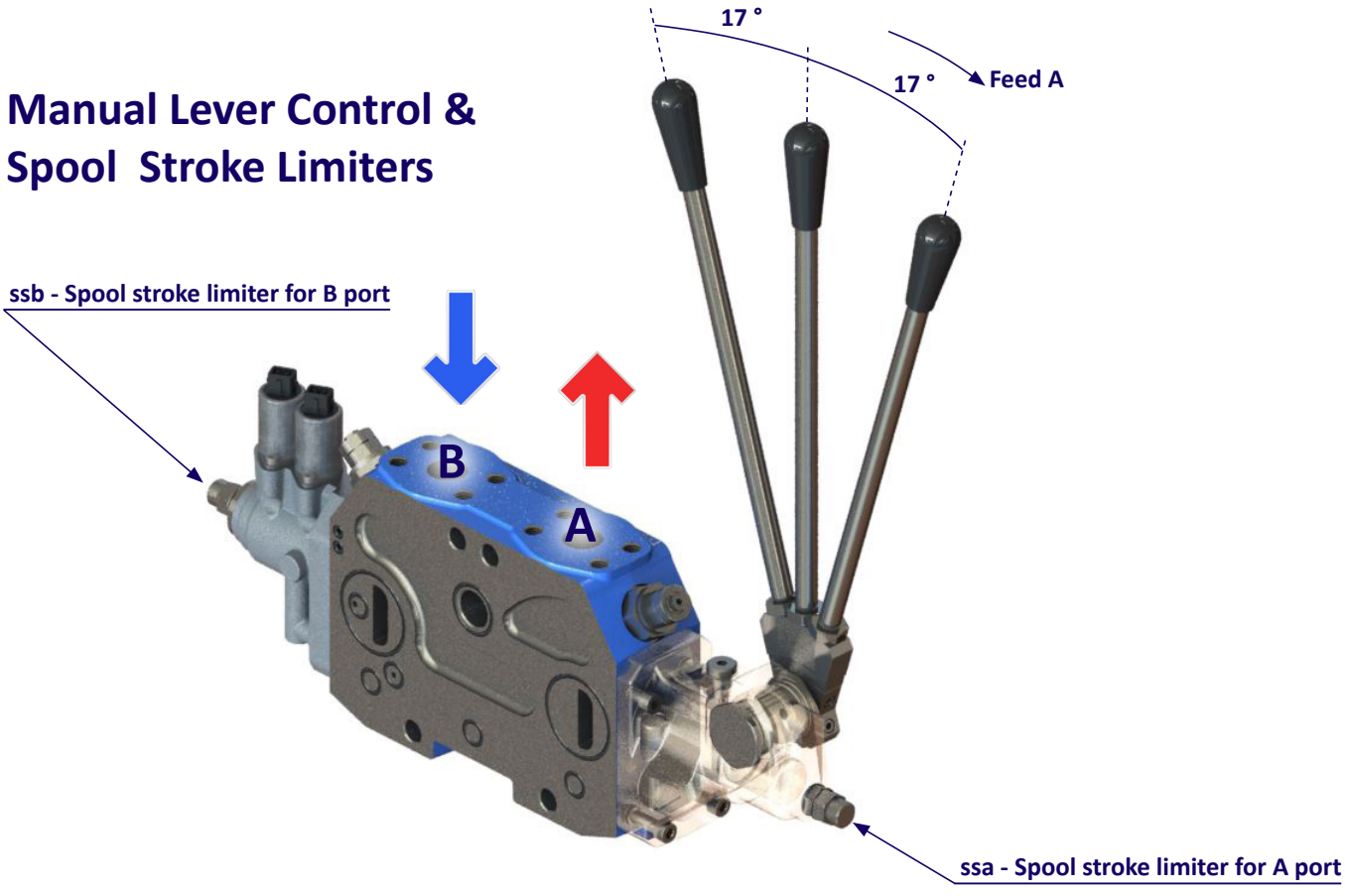
Working Section Actuation Options

COMPLETE HYDRAULIC ACTUATION			
Code	Description	Dimensions	Configuration
HP05L	**Hydraulic actuation with stroke limiter** (only with manual and hydraulic section body)		

ELECTROHYDRAULIC ACTUATION - SIDE A			
Code	Description	Dimensions	Configuration
HP04L	**Lever actuation + electrohydraulic actuation with stroke limiter**		

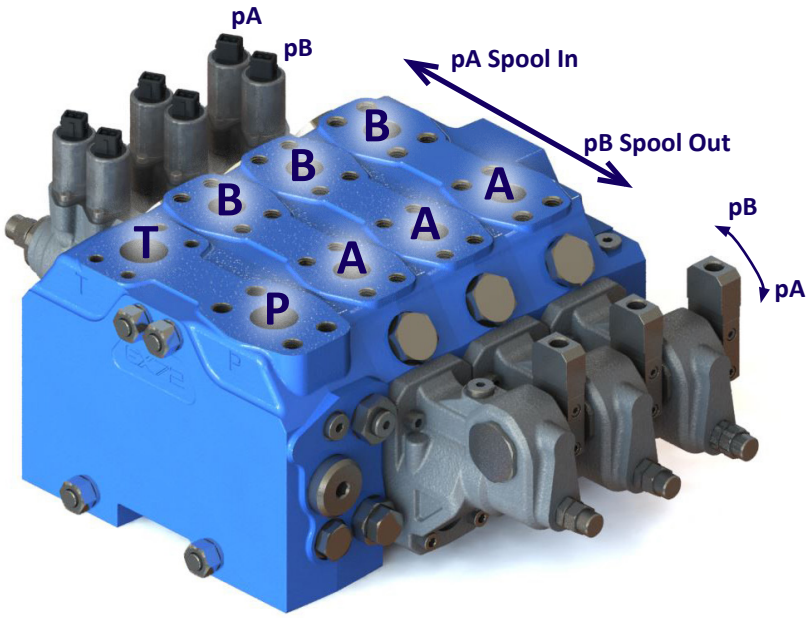
ELECTROHYDRAULIC ACTUATION - SIDE B			
Code	Description	Dimensions	Configuration
FP04L	Lever actuation + electrohydraulic actuation with stroke limiter **Only available with HP07L**		

Manual Lever Control & Spool Stroke Limiters

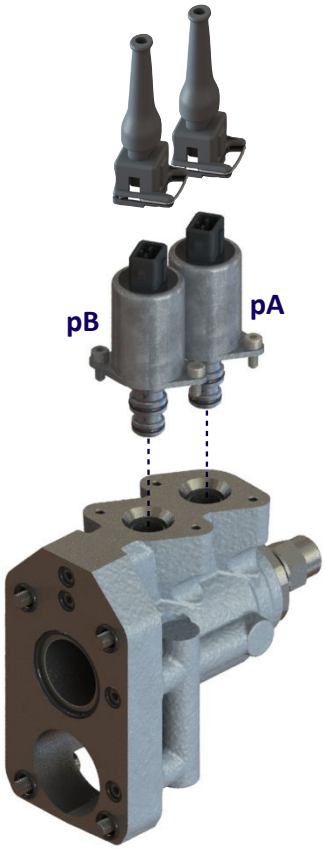


Proportional Pressure Reducing Valves PPRV

PPRV Solenoid Valve Kit
- Code 430093100 (B12AJ: 12V Kit)
- Code 430093101 (B24AJ: 24V Kit)

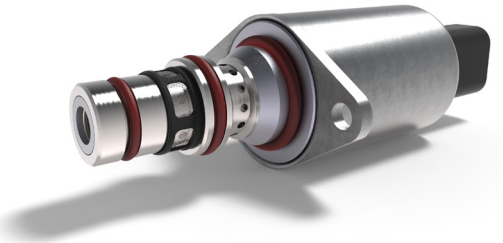


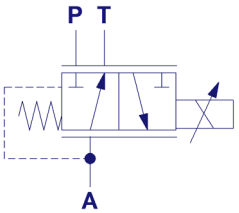
Optional Amp Junior Timer Connectors
- Code 14299 (incl. Boot)



Specifications:

Max Pressure (P): 50 bar
Control Pressure Range (A): 25 bar
Hysteresis < 1.0 bar
Contamination Level Min Filtration: ISO 20/18/15
Required Absolute Filtration: 5-15 µm
Temperature Range Fluid: -40 to 105˚C
Connector: AMP Junior Timer
Control: PWM 100Hz max.
Current (12V/24V): 1500mA/750mA
Resistance (12V/24V): 7.72 Ω +- 5% / 20.8 Ω +-5%



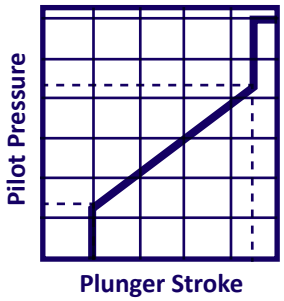


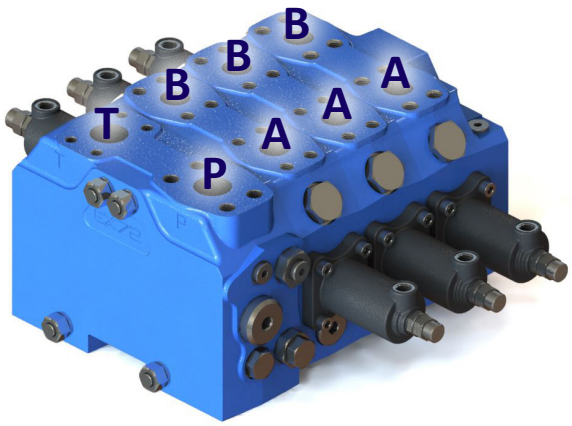
Pilot Control Pressure	5.5 - 21.7 Bar

Recommended Control Curve for HC's Remote Controls

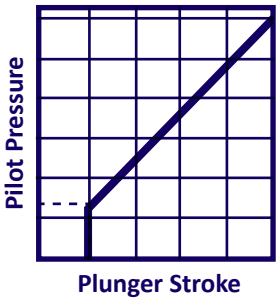
- Control Curve with step spring type: A16
- Control Curve without step spring type: B01

A16: Control With Step (6.0-22 bar)



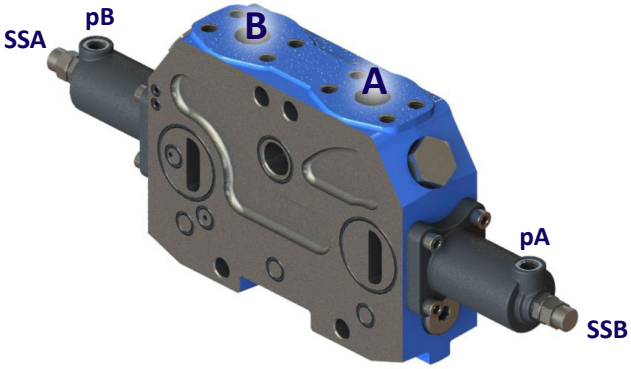


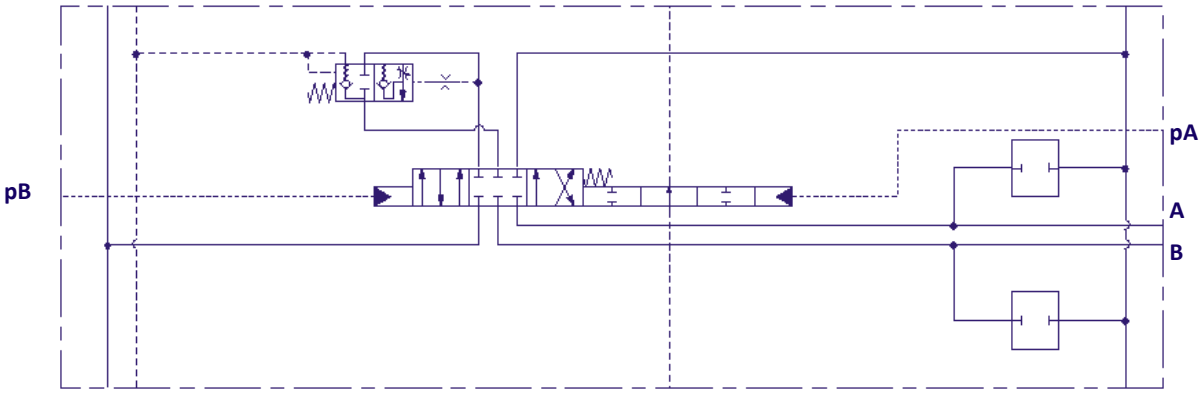
B01: Control Without Step (5-22 bar)



Hydraulic Pilot Stroke Control

SSA - Spool Stroke limiter for A port
SSB - Spool Stroke limiter for B port





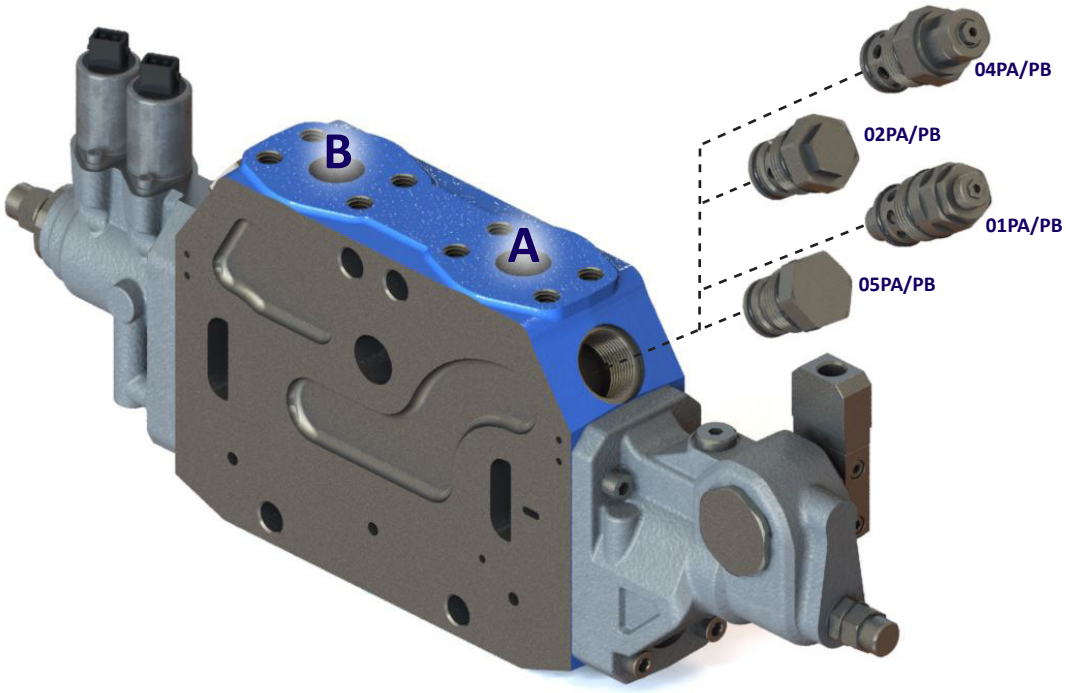
A & B Ports Auxiliary Valves

Cavity Plug
- Code 430195001 (05PA/PB)

Port Relief and Anti-Cavitation Valve 04PA/PB
- Code 915078801 (04PA/PB: 50-350 Bar)
- Code 915079501 (04PA/PB: 50-400 Bar)

Anti-Shock Valve
- Code 915068804 (01PA/PB: 60-100 Bar)
- Code 915068805 (01PA/PB: 101-160 Bar)
- Code 915068806 (01PA/PB: 161-250 Bar)

Anti-Cavitation Valve
- Code 915088801 (02PA/PB)



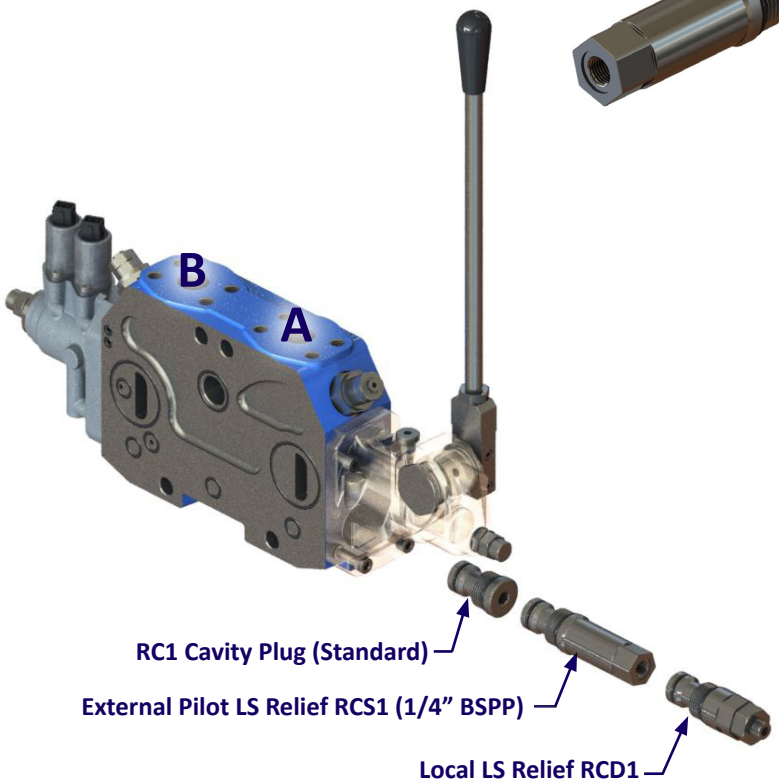
A & B Ports LS Relief

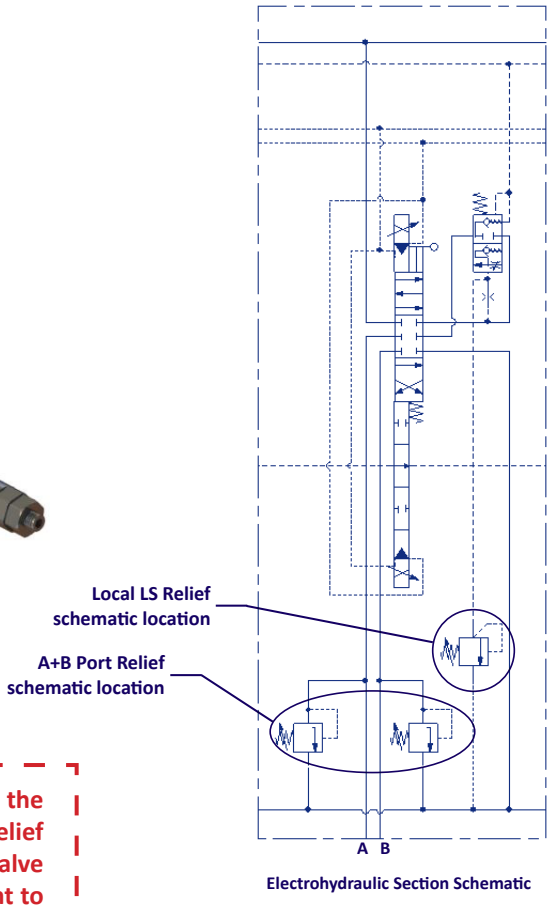
Post compensated valve architecture doesn't allow the use of individual A&B Port LS Relief Valves with different pressure settings.
The unique design of the EX Series allows a single LS Port Relief Valve that limits LS pressure on both A & B Ports with the same pressure setting.

RC1 Cavity Plug
- Comes fitted as standard
- Code 430098002 (RC1)

Local LS Relief Valve
- Code 915029506 (RCD1: 71-180 Bar)
- Code 915029503 (RCD1: 181-280 Bar)
- Code 915029504 (RCD1: 281-350 Bar)
- Code 915029505 (RCD1: 351-420 Bar)

External Pilot LS Relief Port
- Code 430098020 (RCS1)



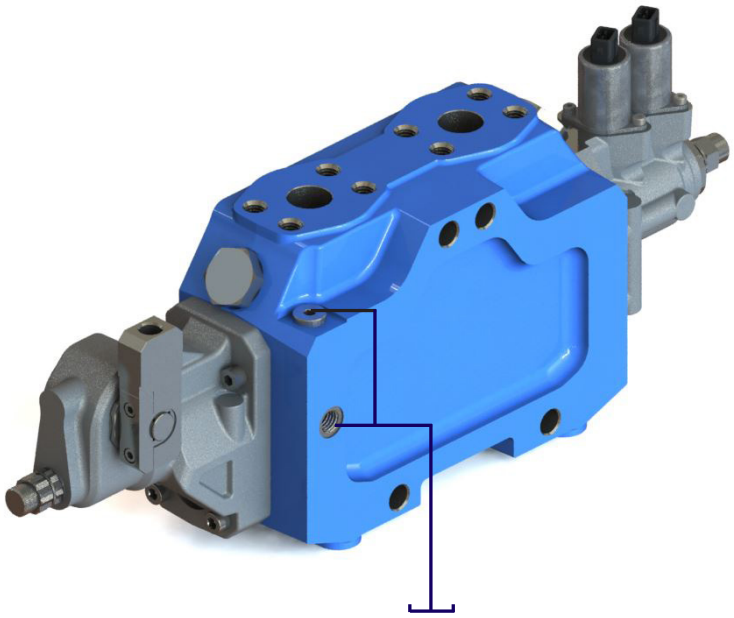


Electrohydraulic Section Schematic

The local LS pressure relief works properly if the section is actuated alone or if the section with a relief is under the highest load. The local LS Relief Valve pressure setting has to be at least 10 Bar different to the LS Main Relief Valve setting.

Combined Outlet/Working Section

The EX72 Series Valve has been designed with an integrated outlet/working section available only with the post compensated configuration. The end section body has the option of side or top LS drain ports (T1), one of which MUST be connected directly to tank. Connecting the LS drain T1 to a shared return line can cause the working sections PPRV's to malfunction due to unpredictable back pressure fluctuations.



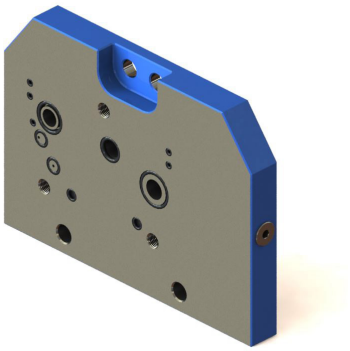
Drain Port T1 (1/4” BSPP)

Position: Top or Side.
Either “T1” drain port MUST be connected directly to tank to avoid PPRV malfunctioning.

EX72/38 Combination Valve

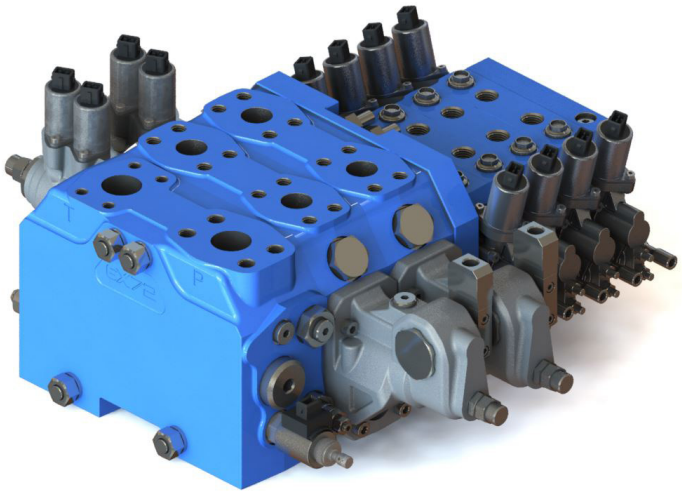
The modular design of the EX Series allows the combination of the EX72 with the smaller size EX38.

EX72/38 interface plate
- code 60120494VY

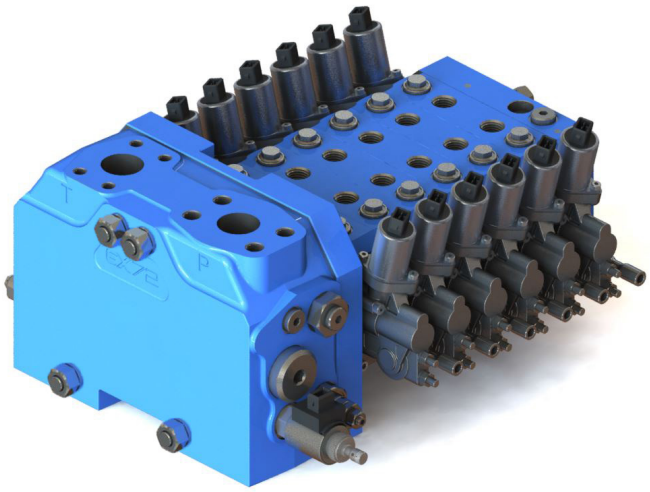


Possible Combinations

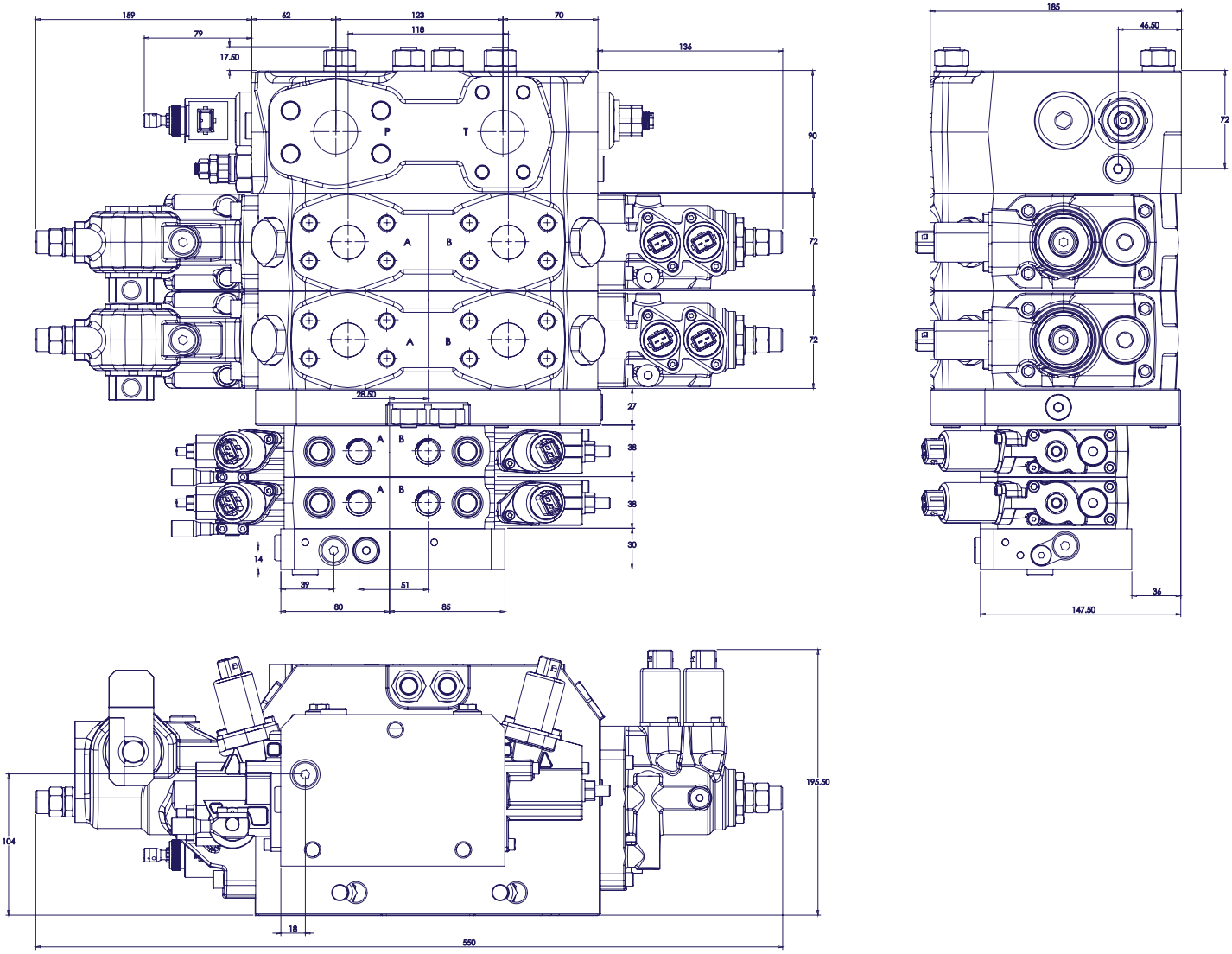
The mid plate can be located between the EX72 and EX38 working sections, allowing EX38 low flow functions to work together with the EX72 high flow functions.



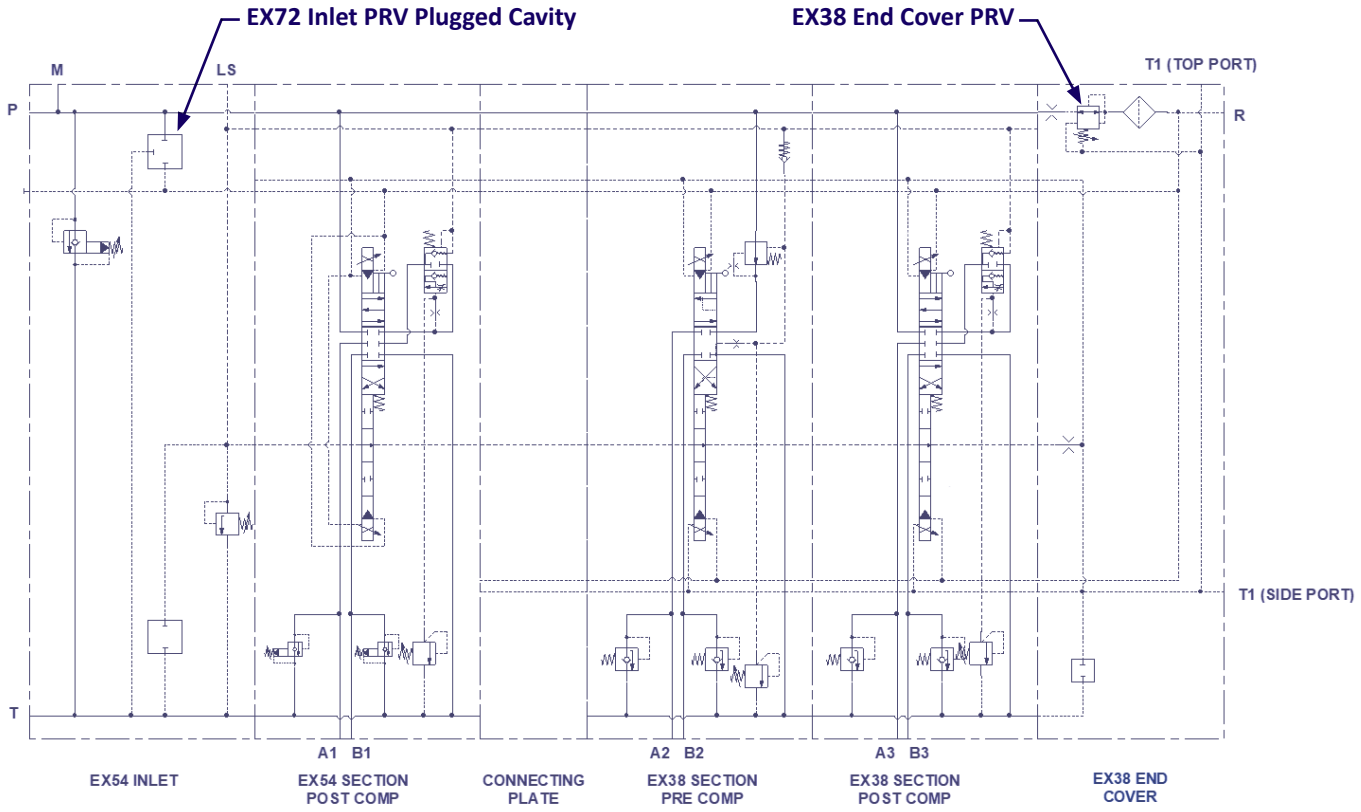
The mid plate can be located just after the EX72 inlet module, allowing multiple EX38 working sections to operate simultaneously without incurring flow sharing.

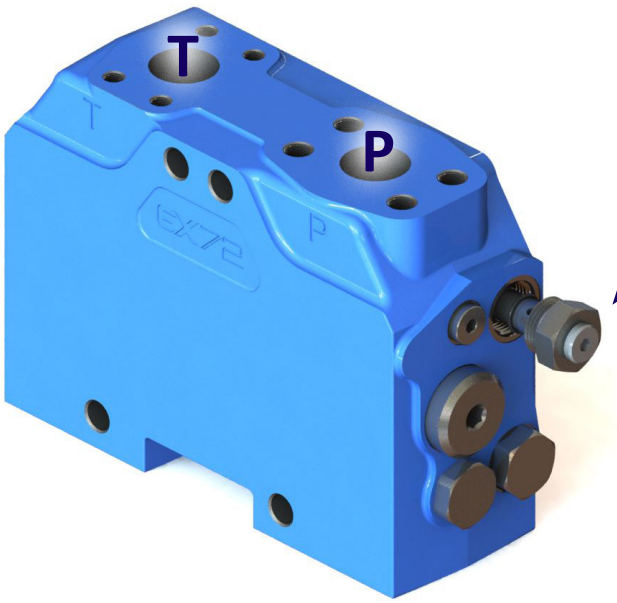


Dimensions

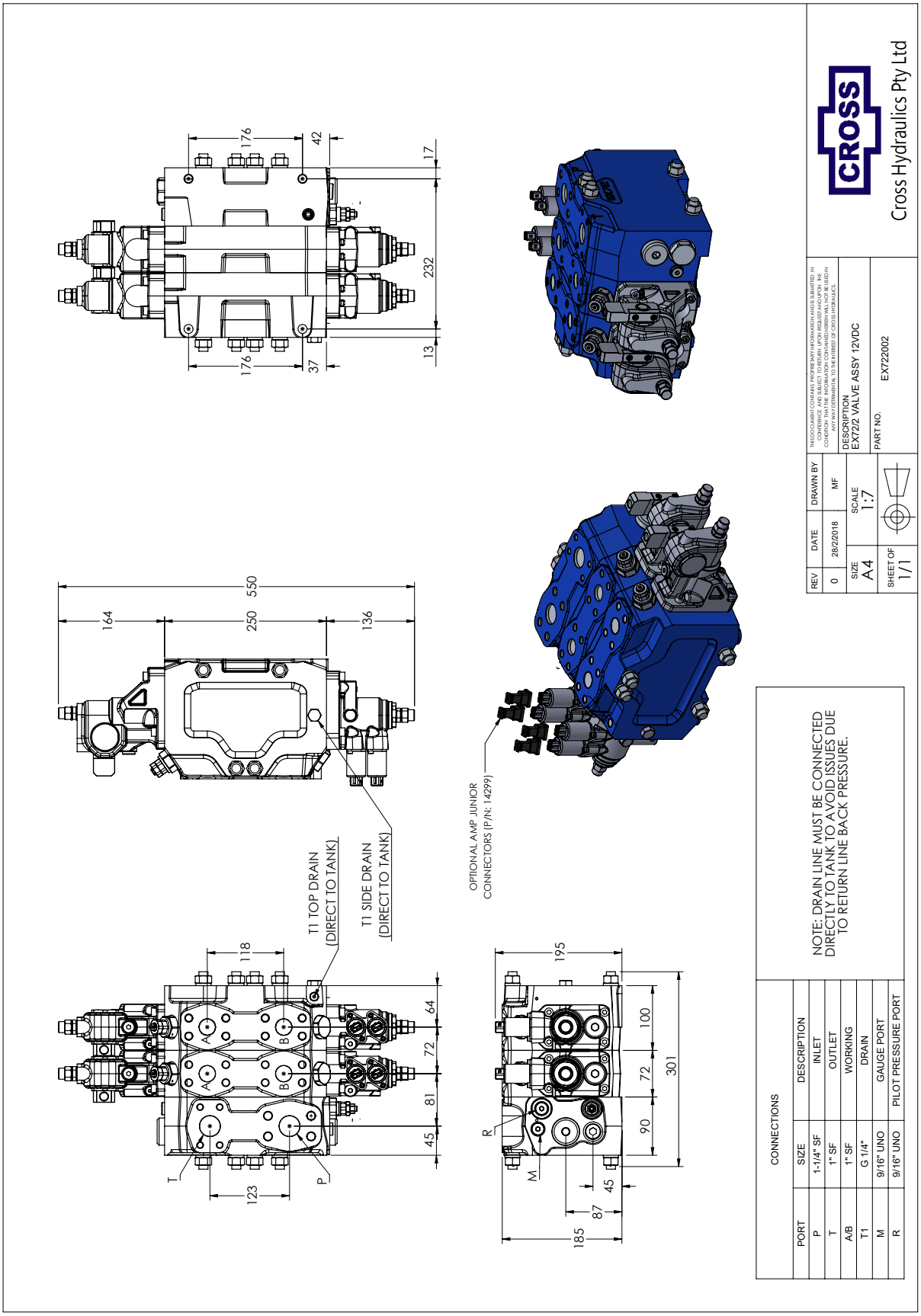

159
62
123
70
79
118
17.50
136
P
T
90
A
B
72
A
B
72
28.50
27
A
B
38
A
B
38
14
30
39
51
80
85
185
46.50
72
36
147.50
104
195.50
18
550

When you combine a EX72 with an EX38 electrohydraulic proportional version, you must remember to replace the EX72 pressure reducing valve cartridge with a cavity plug (code 430095027). This avoids any possible interference with the pressure reducing valve located in the EX38 end





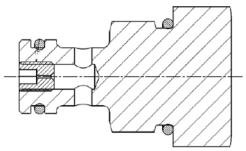
PRV Cavity Plug
Code 430095027
(with 1/4" BSPP R port plugged)


Cross Hydraulics Pty Ltd
DESCRIPTION
EX72/2 VALVE ASSY 12VDC
PART NO.
EX722002
REV
DATE
DRAWN BY
0
28/2/2018
MF
SIZE
A4
SCALE
1:7
SHEET OF
1/1
THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION AND IS SUBMITTED IN CONFIDENCE AND SUBJECT TO RETURN UPON REQUEST AND UPON THE CONDITION THAT THE INFORMATION CONTAINED HEREIN WILL NOT BE USED IN ANY MANNER DETRIMENTAL TO THE INTERESTS OF CROSS HYDRAULICS
CONNECTIONS
PORT
SIZE
DESCRIPTION
P
1-1/4" SF
INLET
T
1" SF
OUTLET
A/B
1" SF
WORKING
T1
G 1/4"
DRAIN
M
9/16" UNO
GAUGE PORT
R
9/16" UNO
PILOT PRESSURE PORT
NOTE: DRAIN LINE MUST BE CONNECTED DIRECTLY TO TANK TO AVOID ISSUES DUE TO RETURN LINE BACK PRESSURE.
OPTIONAL AMP JUNIOR CONNECTORS (P/N: 14299)
T1 TOP DRAIN (DIRECT TO TANK)
T1 SIDE DRAIN (DIRECT TO TANK)
176
42
17
232
13
37
550
164
250
136
118
64
72
81
45
123
195
100
72
90
301
87
45
185

LS Signal Bleed-Off

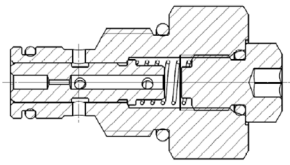
The unique design of the EX Series negates the need for an LS signal bleed-off in standard applications. As a result the EX valves are the best in their class, with improved compensation accuracy and response speed, as well as a decreased sensitivity to operating conditions.

In specific applications where an LS signal bleed-off is required, two options are available to convert the inlet module into a conventional LS bleed-off system:



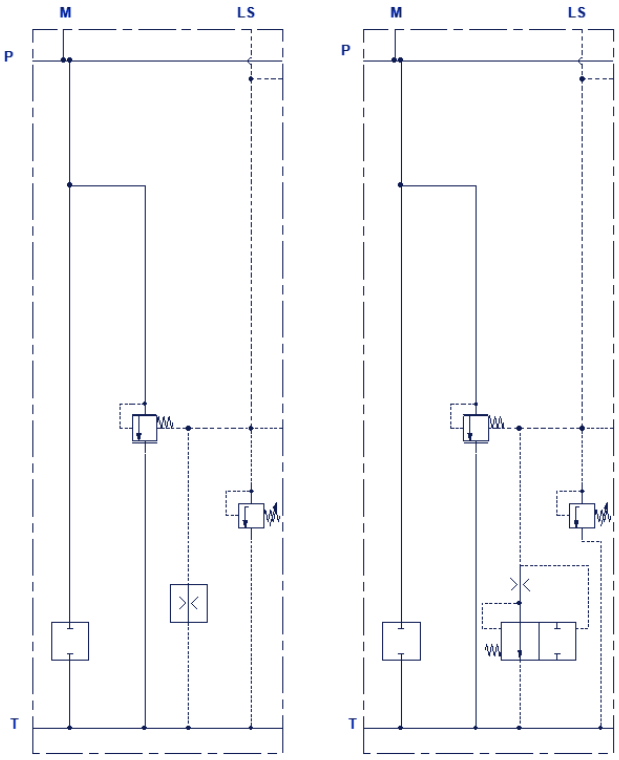
Fixed Orifice

- code 430085051 (V12C: 0.7mm Diameter)



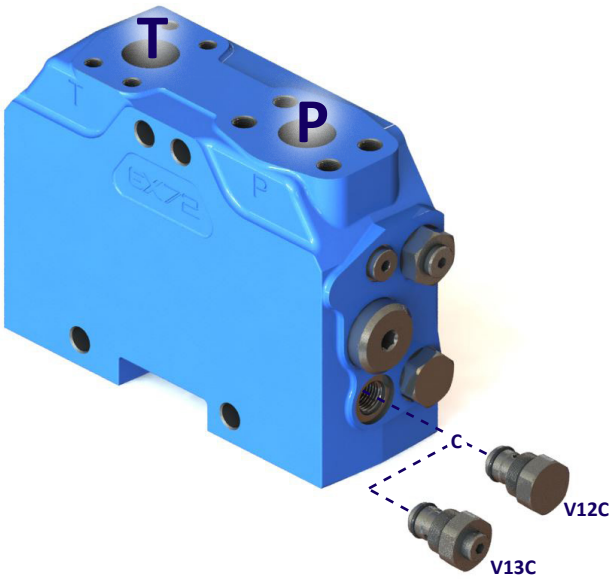
Pressure compensated

- Code 430085070 (V13C: Q = 0.5L/min)



EX72 INLET
FIXED ORIFICE
LS BLEED
(430085070)

EX72 INLET
PRESSURE COMP.
LS BLEED
(430085051)



Notes

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