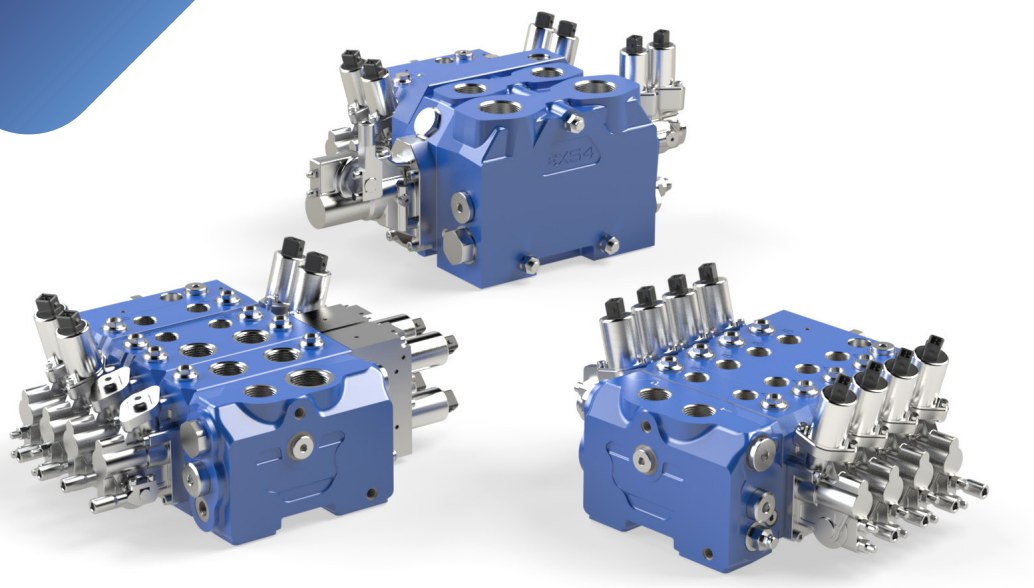
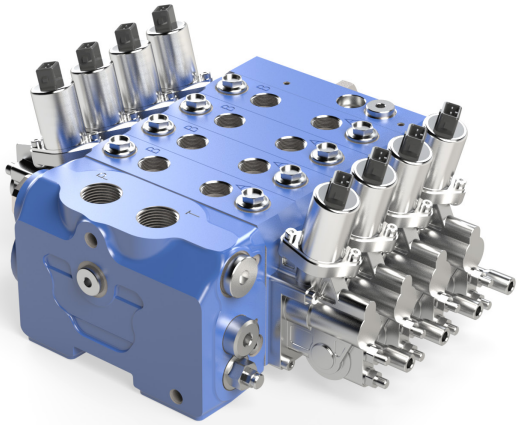
CROSS HYDRAULICS

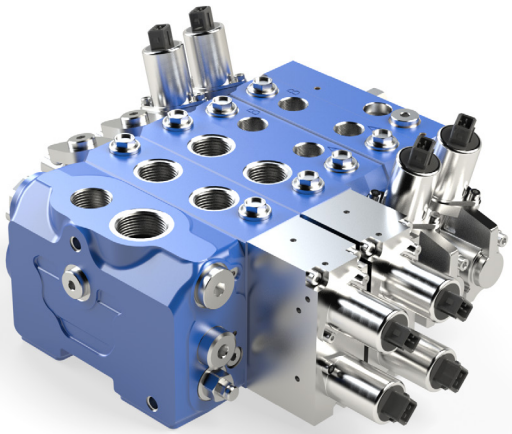


# EX38/EX38HF PRODUCT MANUAL

## Flow Sharing Valve

# EX38/EX38HF LS FLOW SHARING VALVE





## 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 | | | |
|---|---|---|---|
| | EX38 Pre-Comp | EX38 Post-Comp | EX38 HF Post-Comp |
| A&B Service Ports Nominal Flow@14bar stand-by pressure: | 65 l/min | 100 l/min | 130 l/min |
| Pump Flow | 150 l/min max. | | 200 l/min max. |
| Working Pressure: | 350bar max. | | |
| 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: | 10 | | |

## What is load-sensing?

**Load-sensing provides the right amount of hydraulic power when that power is needed. Load-sensing works by sensing the load-induced pressure downstream at the actuator and communicating to the upstream orifice to increase or decrease pressure, which in turn optimises the pressure drop across the spool for maximum efficiency and minimises energy loss.**

**Typical load – sense choices**

**Pre – Compensation:**

**When the pump is saturated, pre-compensation routes upstream oil (from the pump) to a primary, priority function (lowest induced pressure-load) so control remains dependably intact. Other functions may experience a ceasing of function or loss of control (higher induced pressure-load).**

**Post – Compensation:**

**When the pump is saturated, post compensation reduces downstream pressure (from the pump) to all the functions in the system. The result can be a slowing or reduced speed of performance, but no loss in function.**

**The EX38 Load Sense sectional mobile valve can be configured with both pre- and post-compensation, which allows flow-sharing and priority flow function.**

## 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 EX38 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.**

# Pre & Post compensation feature

**One of the unique feature of EX38 valve is that you can insert a pre-compensated section in a post compensated valve bank.**

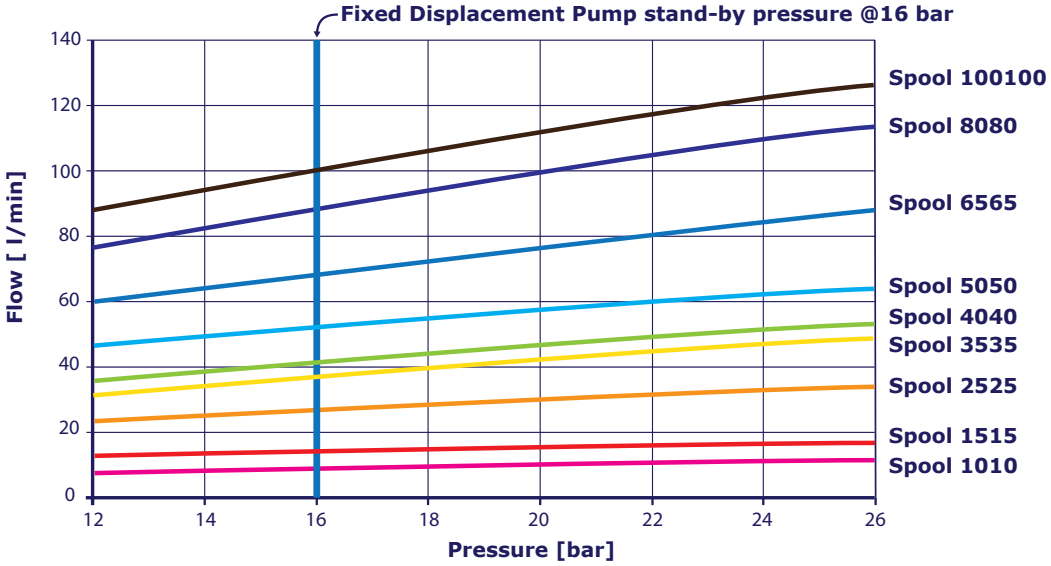
**As soon you start to saturate the pump the pre-compensated function starts to get priority over the post-compensated section even if the pre-compensated function is running at a higher load.**

**This is particularly appreciated when the function needs a constant speed independently by the load and the simultaneous activation of other functions even in pump saturation condition.**

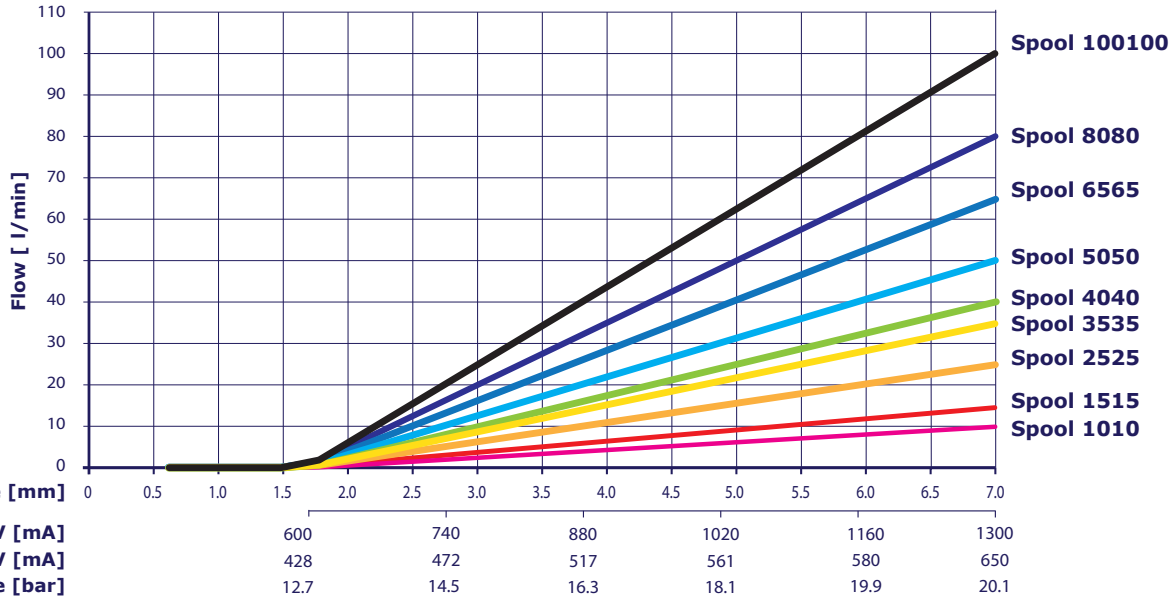
**This is the advantage having the pre-compensated section that you can mix with other post-compensated sections and gives you priority to that particular function.**
**In such as mixed pre & post compensated valve bank you get the advantage of flow sharing for all the post - compensated functions and priority sharing for all the pre-compensated functions.**

# EX38 - Work Port Flow Rate

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



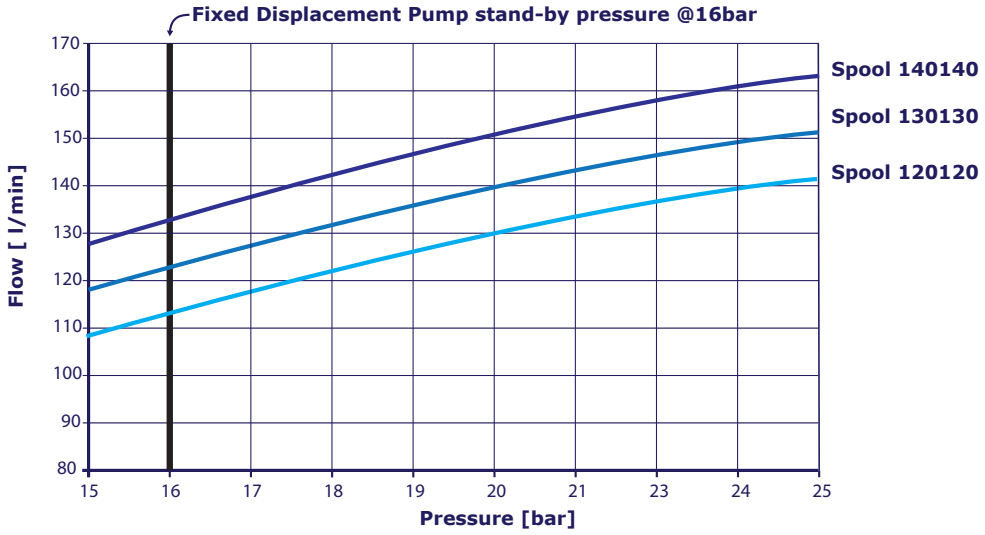

**Flow (l/min) on Ports A&B as function of Spool Stroke (mm), Control Current (mA), Pilot Pressure (Bar)**



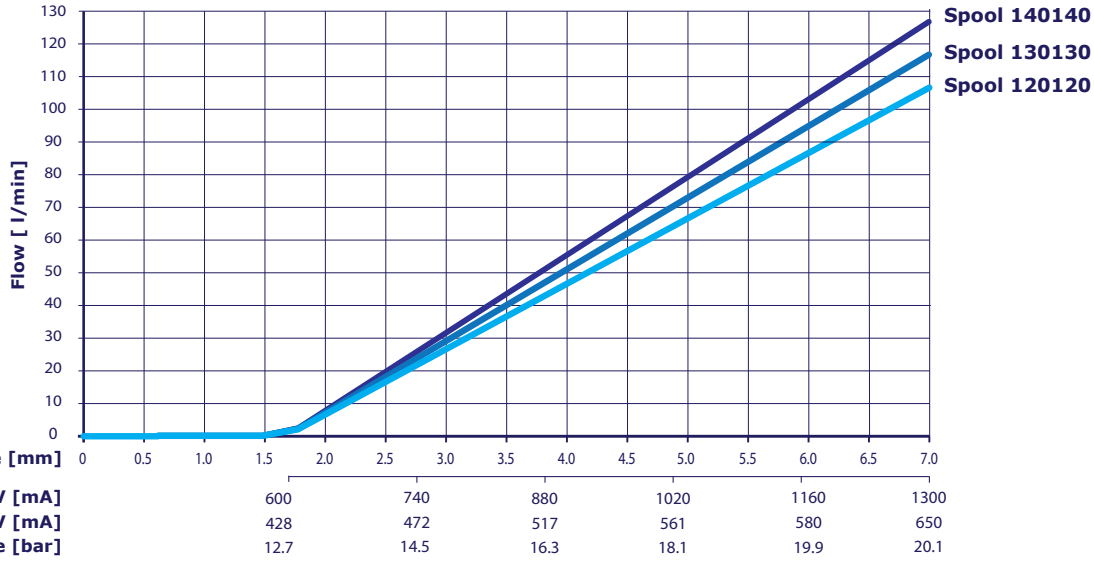

| Spool Stroke [mm] | 0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 7.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Current @ 12V [mA] | | | | | 600 | | 740 | | 880 | | 1020 | | 1160 | | 1300 |
| Current @ 24V [mA] | | | | | 428 | | 472 | | 517 | | 561 | | 580 | | 650 |
| Pilot Pressure [bar] | | | | | 12.7 | | 14.5 | | 16.3 | | 18.1 | | 19.9 | | 20.1 |

# EX38HF High Flow - Work Port Flow Rate

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




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

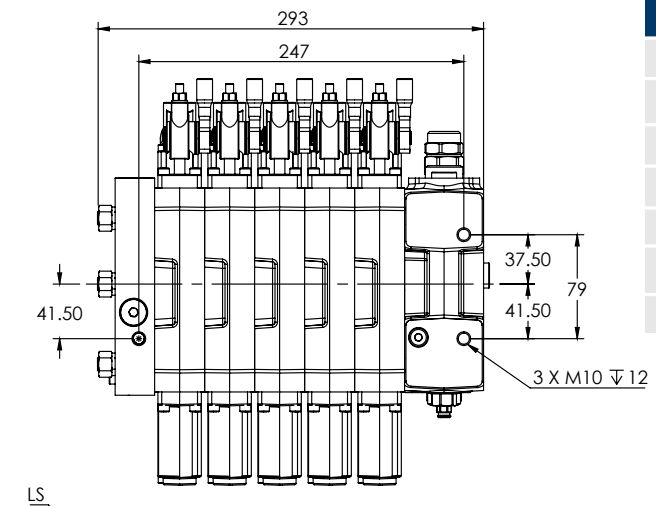


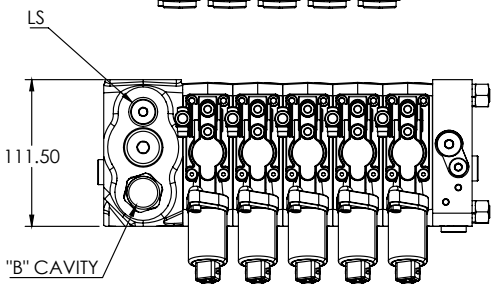

| Spool Stroke [mm] | 0 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 7.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Current @ 12V [mA] | | | | 600 | | 740 | | 880 | | 1020 | | 1160 | | 1300 | |
| Current @ 24V [mA] | | | | 428 | | 472 | | 517 | | 561 | | 580 | | 650 | |
| Pilot Pressure [bar] | | | | 12.7 | | 14.5 | | 16.3 | | 18.1 | | 19.9 | | 20.1 | |

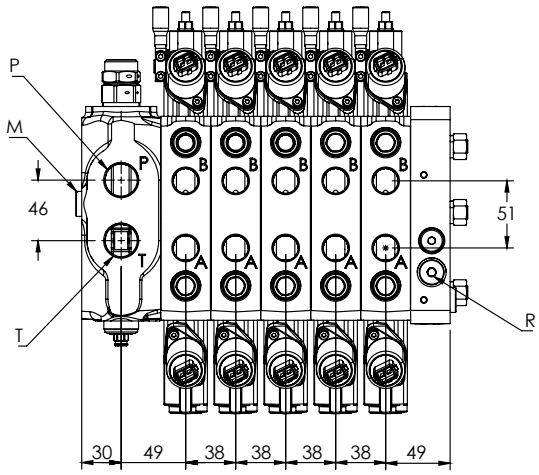
# EX38 Valve Port Connections

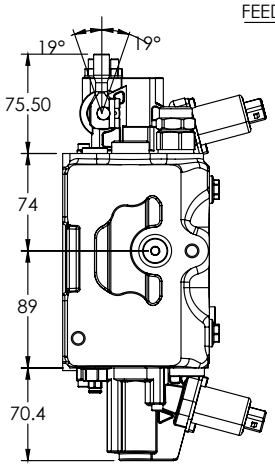
## Connections/ports:

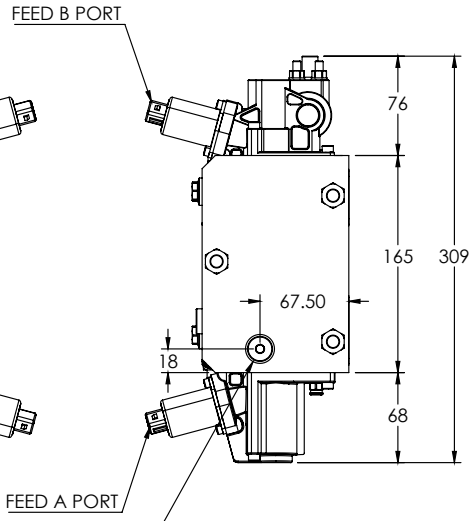
| Port: | Description: | Size BSPP: | Position: |
|---|---|---|---|
| P | Pump Inlet Port | 3/4" | Top |
| T | Tank Outlet Port | 3/4" | Top |
| A/B | Work Ports | 1/2" | Top |
| LS | Load Sense Ports | 1/4" | Rear |
| T1 | Drain Ports | 1/4" | Front/Side |
| M | Pressure Gauge Port | 1/4" | Front |
| R | Pilot Pressure Port | 1/4" | Front |

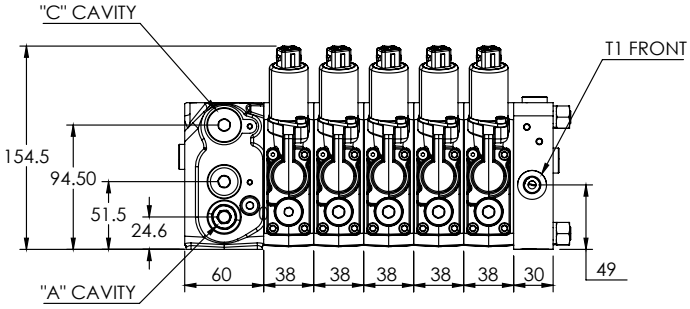


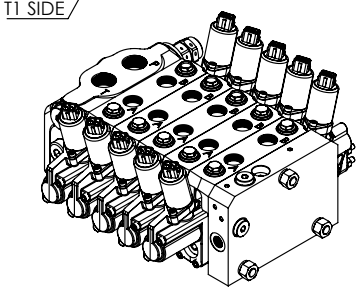



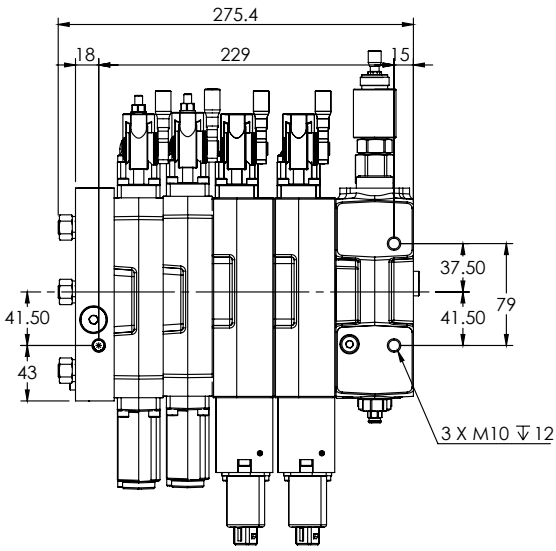



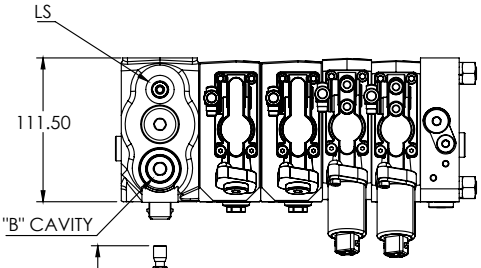



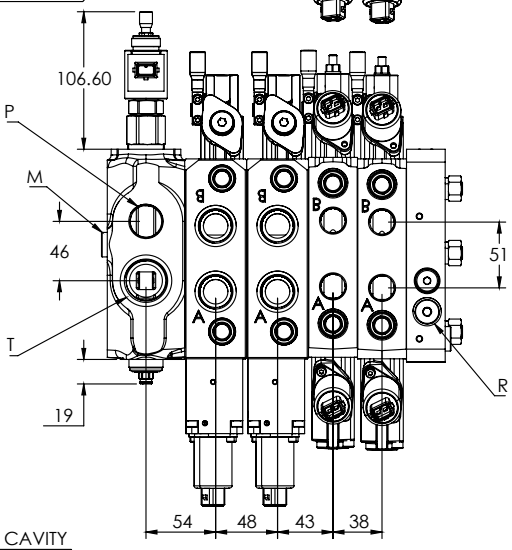
# EX38HF Valve Port Connections

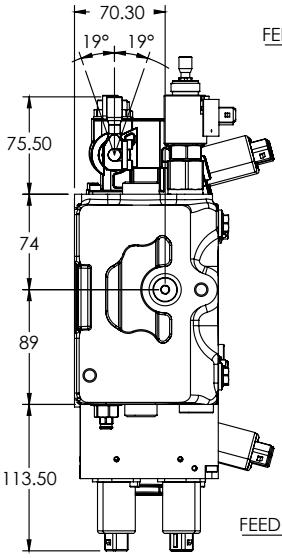
## Connections/ports:

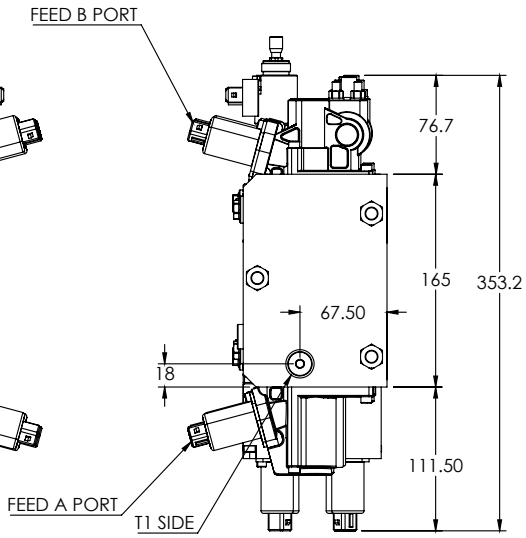
| Port: | Description: | Size BSPP: | Position: |
|---|---|---|---|
| P | Pump Inlet Port | 3/4" | Top |
| T | Tank Outlet Port | 1" | Top |
| A/B | Work Ports | 3/4" | Top |
| LS | Load Sense Ports | 1/4" | Rear |
| T1 | Drain Ports | 1/4" | Top/Side |
| M | Pressure Gauge Port | 1/4" | Front |
| R | Pilot Pressure Port | 1/4" | Front |

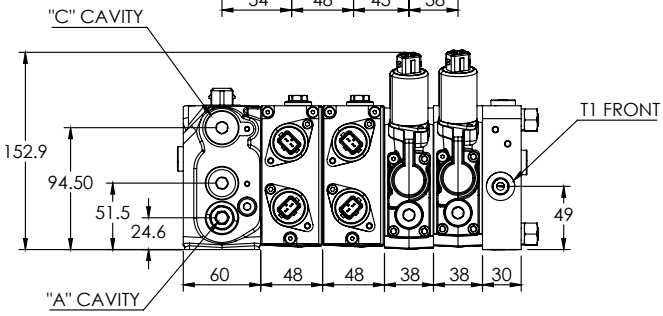


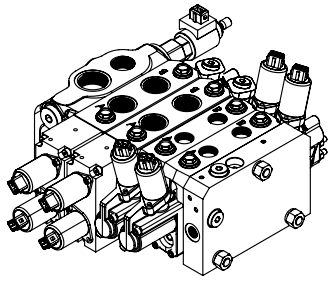



# EX38 / EX38HF Ordering Code

INLET BODY

MR V1A 250 V3B 280 V10C KV G05

**INLET BODY TYPE**

| | |
|---|---|
| KV G05 | Open centre inlet section for fixed displacement pumps (G 3/4") |
| 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 UNF) |
| JV U05 | Closed centre inlet section for variable displacement pumps (1-1/16" - 12 UNF) |

**"C" CAVITY**

| | |
|---|---|
| V10C | LS plug - on "C" cavity |
| V11C | LS electric dump valve - on "C" cavity |
| V12C | Fixed orifice LS Bleed-off cartridge - on "C" cavity |
| V13C | Pressure Compensated LS Bleed-off cartridge - on "C" cavity |

**"B" CAVITY**

| | |
|---|---|
| V3B | Full flow direct operated pressure relief valve - on "B" cavity |
| V4B | Full flow relief plug - on "B" cavity |
| V7B | Full flow eletric dump valve - on "B" cavity |

**"A" CAVITY**

| | |
|---|---|
| V1A | LS pressure relief valve - on "A" cavity |
| V2A | LS relief plug - on "A" cavity |

**INLET SIDE**

| | |
|---|---|
| ML | Valve with left inlet section |
| MR | Valve with right inlet section |

# EX38 / EX38 HF Ordering Code

WORKING SECTION

W001C 5050 HP04L FP04 B24AJ RC1 G04 03TF PA 220 03TF PB 220

**A/B PORT AUXILIARY VALVES**

| | |
|---|---|
| 02TFPA | Anti-cavitation valve (port A) |
| 02TFPB | Anti-cavitation valve (port B) |
| 03TF PA | Fixed pressure setting combined port relief valve (port A) |
| 03TF PB | Fixed pressure setting combined port relief valve (port B) |
| 03ADJ PA | Adjustable pressure setting combined port relief valve (port A) |
| 03ADJ PB | Adjustable pressure setting combined port relief valve (port B) |
| 05TF PA | Aux valve cavity plug (port A) |
| 05TF PB | Aux valve cavity plug (port B) |

**SECTION TYPE**

| | |
|---|---|
| RC1 G04 | Post Compensated section with auxiliary valve (1/2" BSP) |
| RC1 G05 | High Flow Post-Compensated section with auxiliary valve (3/4" BSP) |
| RL1 G04 | Pre Compensated section with auxiliary valve (1/2" BSP) |
| RCD1 G04 | Post Compensated section with Local LS Relief Valve (1/2" BSP) |
| RCS1 G04 | Post Compensated section with External Pilot LS Relief Valve (1/2" BSP) |
| RLD1 G04 | Pre Compensated section with Local LS Relief Valve (1/2" BSP) |
| RLS1 G04 | Pre Compensated section with External Pilot LS Relief Valve (1/2" BSP) |

**COIL TYPE**

| | |
|---|---|
| B12AJ | Proportional pressure reducing solenoid valve 12V DC (AMP junior timer) |
| B24AJ | Proportional pressure reducing solenoid valve 24V DC (AMP junior timer) |

**SPOOL RETURN ACTUATION (SIDE B)**

| | |
|---|---|
| F001A | Spring centered to neutral |
| F145 | Friction detent hold in position |
| F022A | Proportional pneumatic control (Port BSP: 1/8") |
| HP05L | Hydraulic pilot actuation with stroke limiter |
| FP00 | Electrohydraulic provision, cavity plugged |
| FP04 | Electrohydraulic actuation |
| FP04S | Spool position indicator for electrohydraulic actuation |
| FP06 | Electrohydraulic actuation (EX38HF) |

**SPOOL ACTUATION (SIDE A)**

| | |
|---|---|
| H001 | Lever actuation without stroke limiter |
| HP00L | Lever + Electrohydraulic provision, cavity plugged |
| HP04L | Lever + Electrohydraulic actuation with stroke limiter |
| HP05L | Hydraulic pilot actuation with stroke limiter |
| HP07L | Without lever mechanism + Electrohydraulic actuation with stroke limiter |
| HP06L | Lever + Electrohydraulic actuation (EX38HF) |

**SPOOL NOMINAL FLOW**

| POST-COMP | | PRE-COMP | | HF | |
|---|---|---|---|---|---|
| 0505 | 5 l/min | 1515 | 5 l/min | 120120 | 120 l/min |
| 1010 | 10 l/min | 2525 | 10 l/min | 130130 | 130 l/min |
| 2525 | 25 l/min | 4040 | 25 l/min | 140140 | 140 l/min |
| 3535 | 35 l/min | 6565 | 35 l/min | | |
| 4040 | 40 l/min | | | | |
| 5050 | 50 l/min | | | | |
| 6565 | 65 l/min | | | | |
| 8080 | 80 l/min | | | | |
| 100100 | 100 l/min | | | | |

**SPOOL TYPE**

| | |
|---|---|
| W001C | 3 positions double-acting cylinder spool (A, B blocked) |
| W002C | 3 positions motor spool (A, B to tank) |

END PLATE

KZ20EC

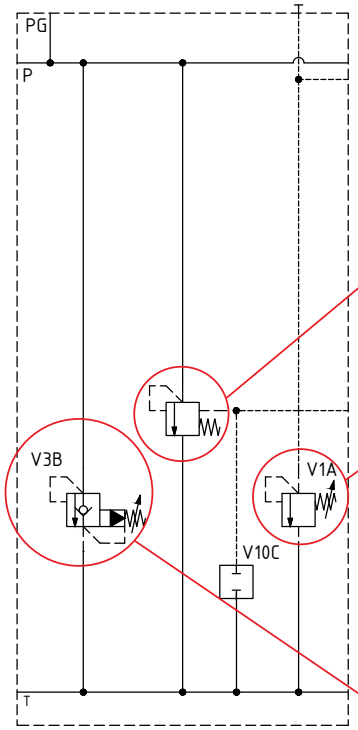
| | |
|---|---|
| KZ20EC | End plate with PRV and external drain |

## 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.

## Fixed Displacement Pumps (KV INLET)

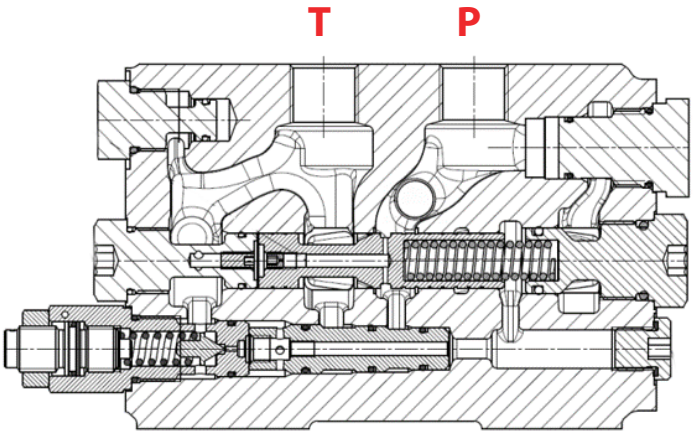
### KV INLET SECTION SCHEMATIC

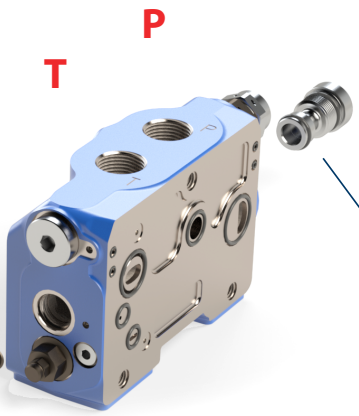



INLET COMPENSATOR & MAIN STAGE LS MAIN RELIEF VALVE

LS MAIN RELIEF VALVE

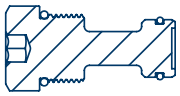
FULL FLOW MAIN RELIEF VALVE

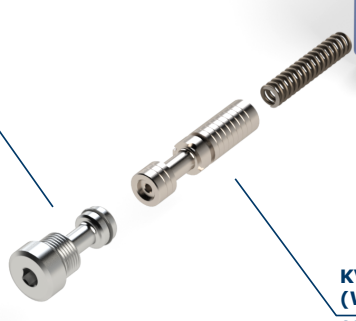


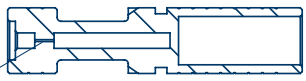

LS PORT PLUG (1/4" BSPP)
CODE: 430000017

KV COMPENSATOR CAP (NO CROSS DRILL)
CODE: 430085004





KV COMPENSATOR SPOOL (WITH 0.8MM ORIFICE)
CODE: 433085001



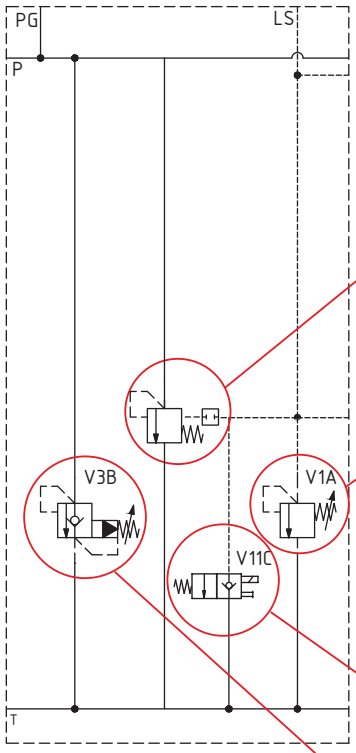
0.8MM ORIFICE

**JV -> KV Inlet Transform Kit**

**Code: 320093008**

## Variable Displacement Pumps (JV INLET)

### JV INLET SECTION SCHEMATIC

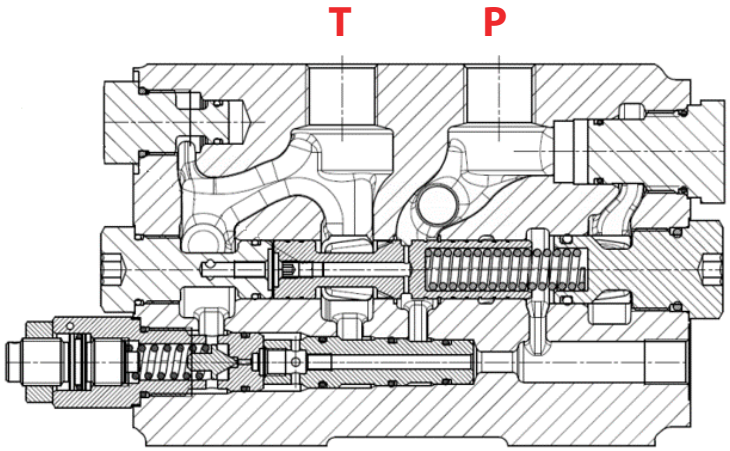


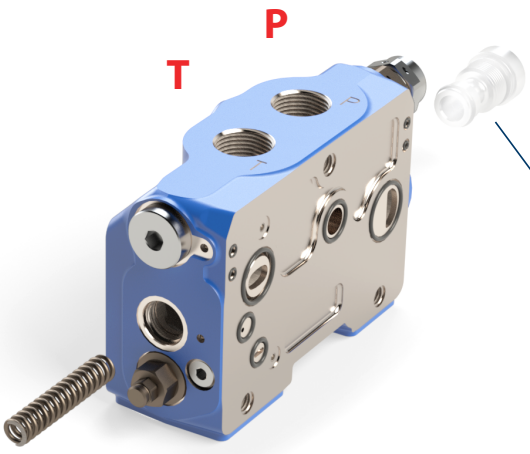

MAIN STAGE
LS MAIN RELIEF VALVE

LS
MAIN RELIEF VAL

LS SIGNAL
DUMP VALVE

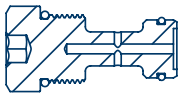
FULL FLOW
MAIN RELIEF VALVE

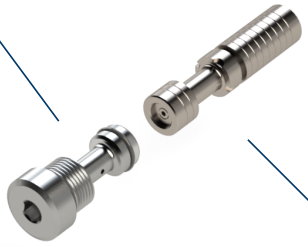


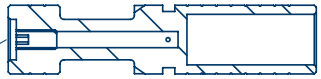

REMOVE
LS PORT PLUG
(1/4" BSPP)
CODE: 430000017

JV COMPENSATOR CAP
(WITH CROSS DRILL)
CODE: 430085012





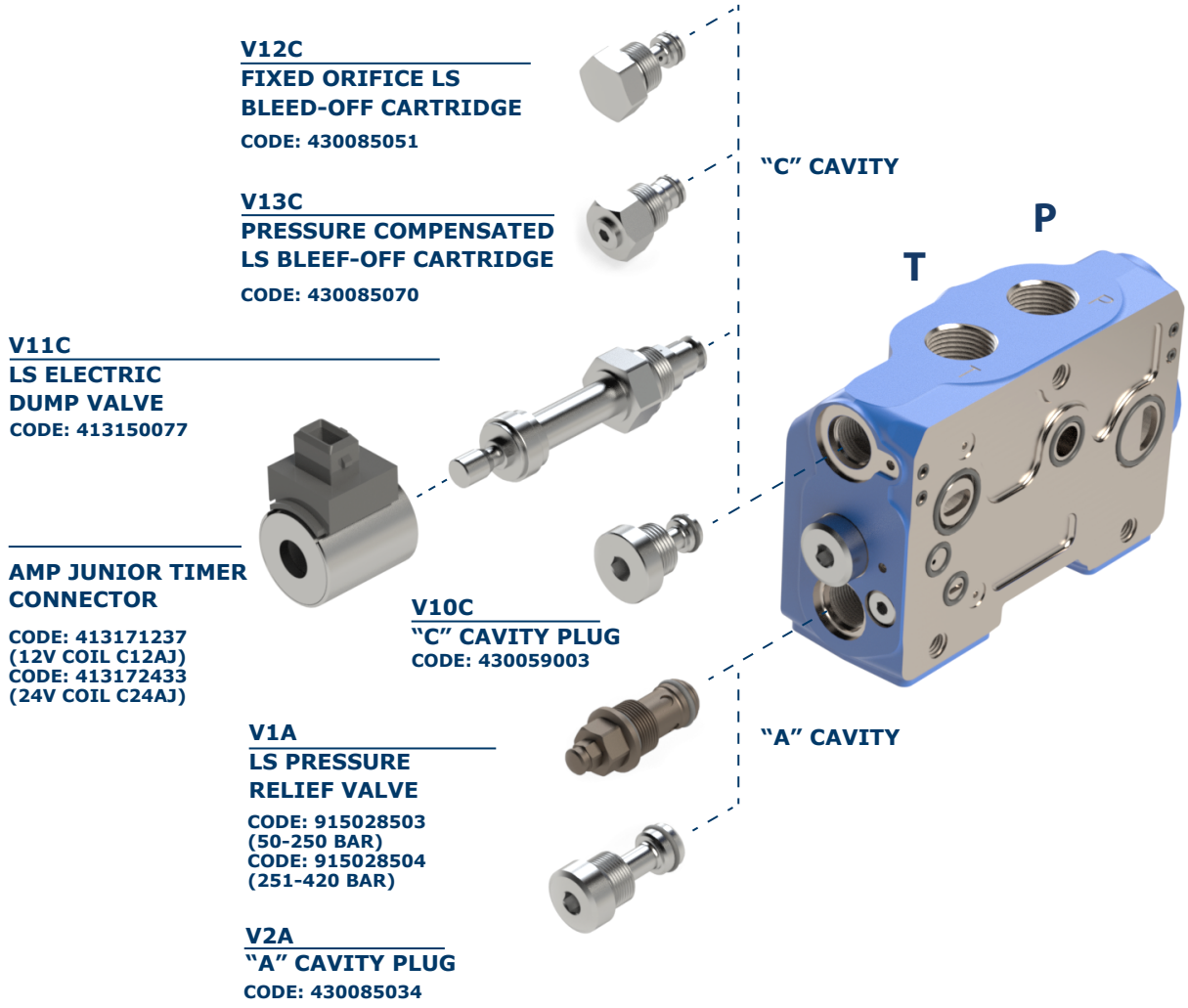
JV COMPENSATOR SPOOL
(PLUGGED)
CODE: 433085002



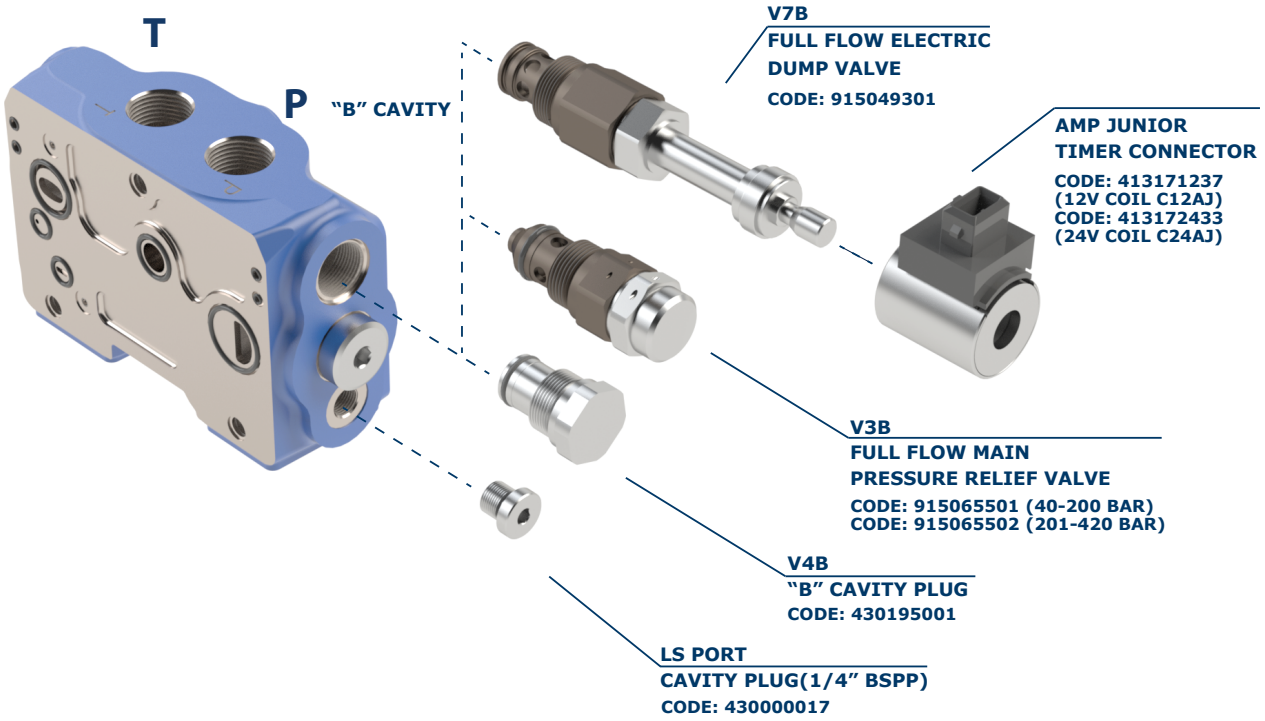
PLUGGED

**KV -> JV Inlet Transform Kit**
**Code: 320093007**

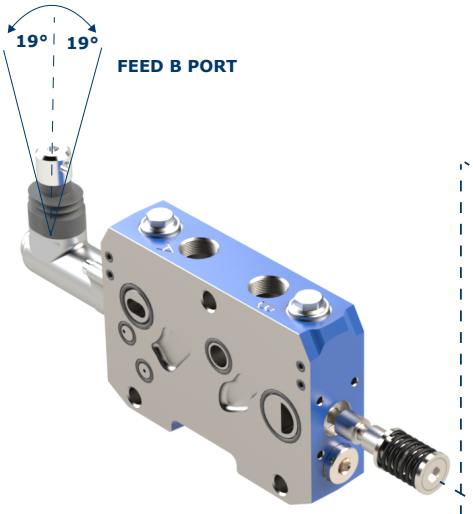
## LS Signal Flow Management (T port side)



## Pump Flow Management (P port side)



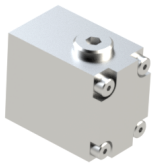
## EX38 Mechanical Lever Actuation options




**A PORT SIDE ACTUATION**

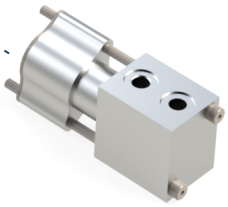
**H001**
**LEVER ACTUATION WITH-OUT STROKE LIMITER**
CODE: 320366001

**B PORT SIDE ACTUATION**



**F145**
**FRICTION DETENT HOLD IN POSITION**
CODE: 320085011

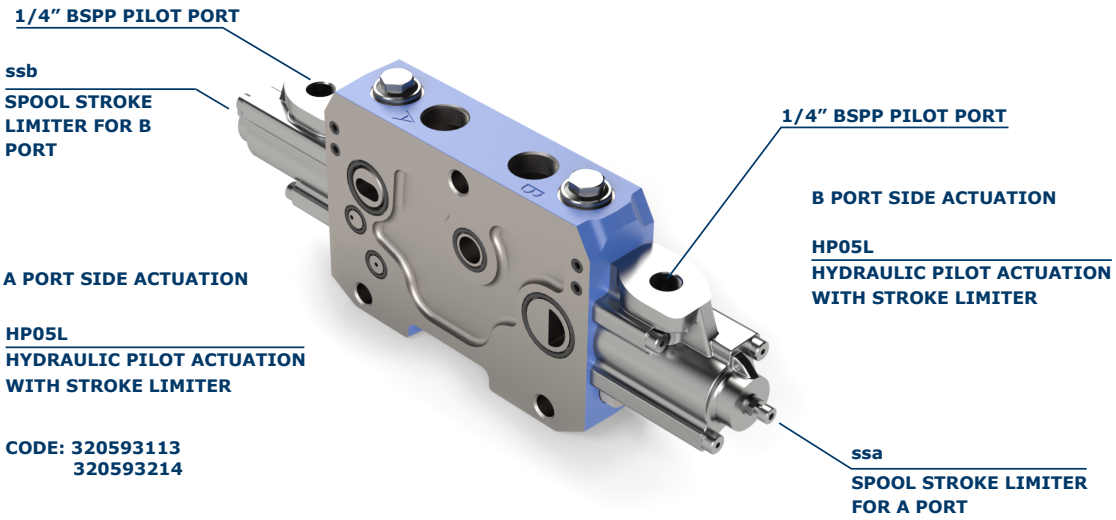
**F001A**
**SPRING CENTERED TO NEUTRAL**
CODE: 320793001



**F022A**
**PROPORTIONAL PNEUMATIC CONTROL (1/8" BSPP)**
CODE: 321293002

*Requires mechanical section body

## EX38 Hydraulic Pilot Actuation



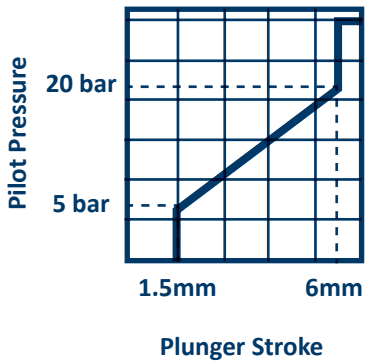

*Requires mechanical section body

| Pilot Control Pressure | 5.0 - 20.0 Bar |
|---|---|

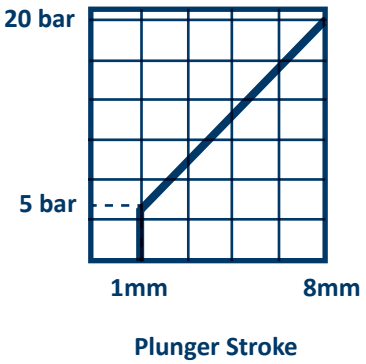
### Recommended Control Curve for HC's Remote Controls

- Control Curve with step spring type: A09
- Control Curve without step spring type: B06

**A09: Control With Step (5-20 bar)**



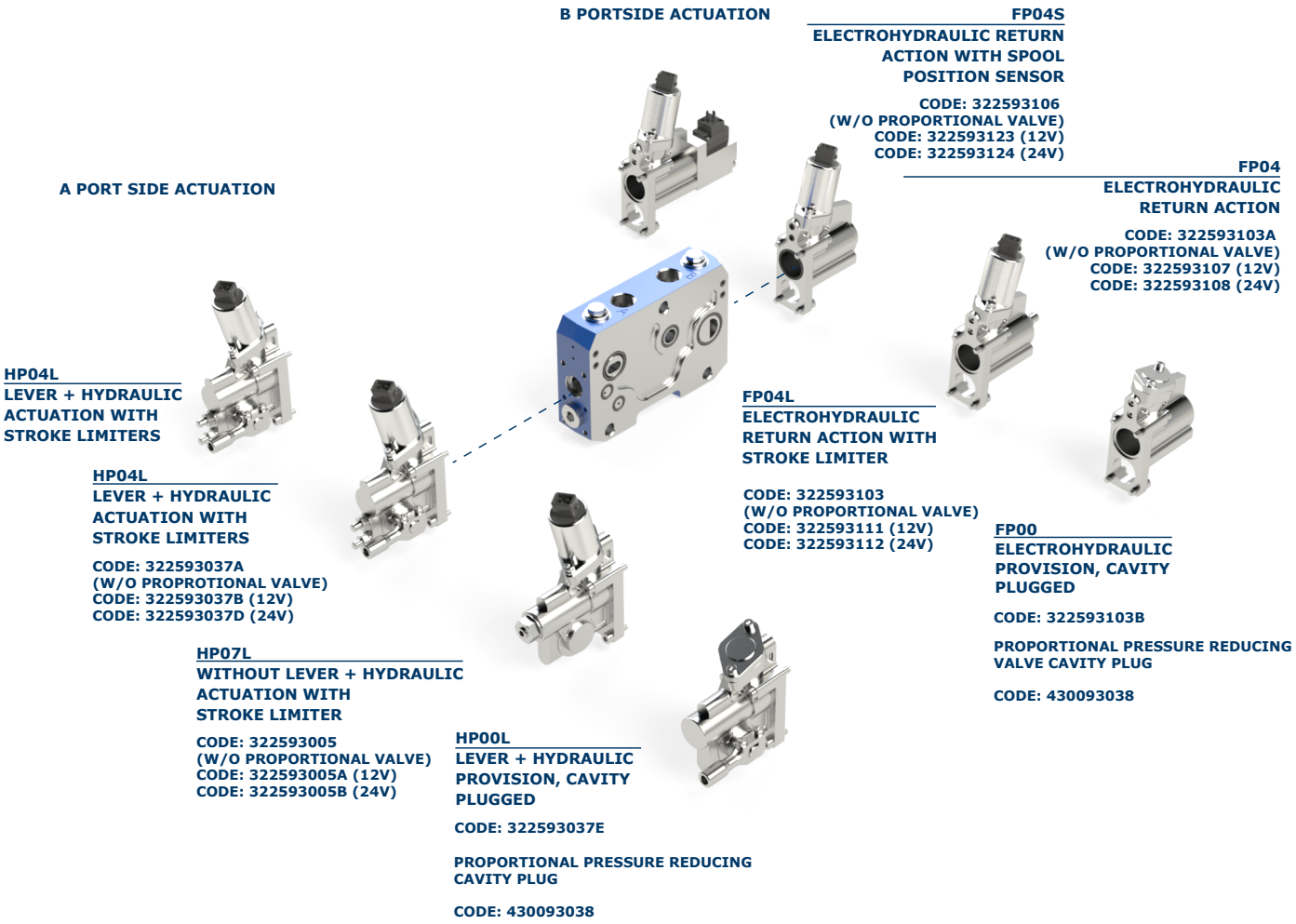

**B06: Control Without Step (5-20 bar)**



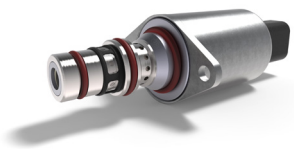

## Hydraulic Pilot Stroke Control

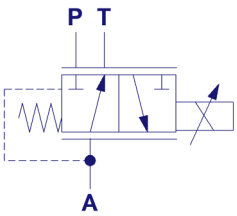
ssa - Spool Stroke limiter for A port
ssb - Spool Stroke limiter for B port

## EX38 Electrohydraulic Actuation




## Proportional Pressure Reducing Valve



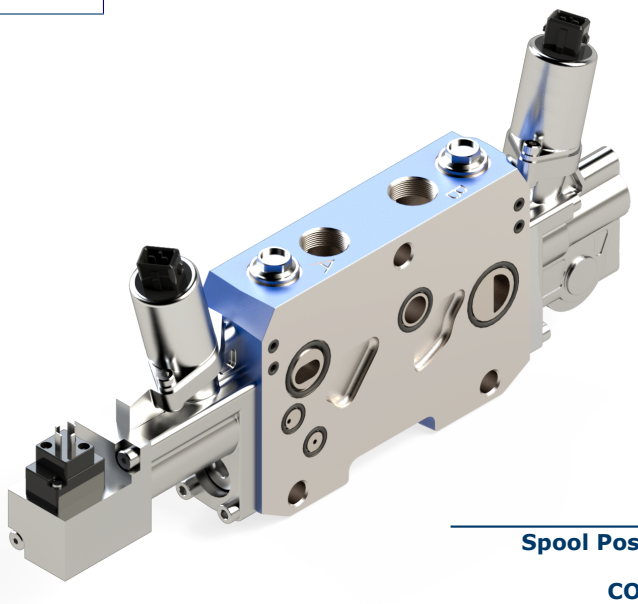


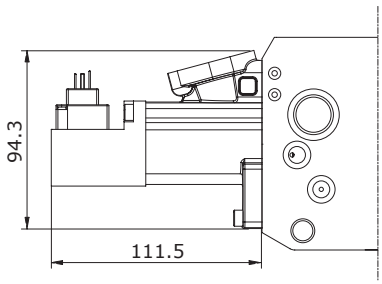

| Specifications | | |
|---|---|---|
| Order Code | B12AJ | B24AJ |
| | 430093100 | 430093101 |
| Connector Type: | AMP Junior Timer | |
| Supply Voltage: | 12V DC | 24V DC |
| Feeding reduced pressure: | 40bar max. | |
| Control Pressure Range: | 25bar | |
| Hysteresis: | < 1.0 bar | |
| Back Pressure on T1 Drain Port: | 2bar max. | |
| Proportional Pressure Reducing Valves PWM Suggested: | 70 - 90 Hz | |
| ON – OFF control current: | 2500 mA | 1150 mA |
| Proportional control current: | 500 – 1300 mA | 250 – 650 mA |
| Resistance | 4.7 Ω +- 5% | 20.8 Ω +-5% |
| Temperature Range Fluid: | -40 to 105˚C | |
| Contamination Level Min Filtration: | ISO 20/18/15 | |
| Required Absolute Filtration: | 5-15 µm | |

# EX38 Electrohydraulic Actuation - Spool Position Sensor

| Specifications | |
|---|---|
| Operating Voltage: | 6 - 30V DC |
| Max Current Consumption: | 20.5 mA |
| **Output** | |
| Output voltage spanning: | 0.5 - 4.5V DC |
| Quiescent voltage: | 2.5V DC |
| Output current: | -1 ~ +1 mA |
| Minimum output load resistance: | 4.5 kΩ |
| Overall accuracy: | +- 2.5% |
| Resolution: | 12 bit |
| Fault signalling levels: | 4.8V < Vout < 0.2V DC |
| Protections: | Short circuit protection, reverse, battery protection, thermal shutdown, overvoltage, undervoltage, load-dump |
| EM Immunity | > 60V DC /m |
| Operating temperature: | -40 / +85˚C |
| Connections: | DIN 43650-C male |
| Protection Rating | IP65 |

**ONLY AVAILABLE WITH HP04 & HP07**



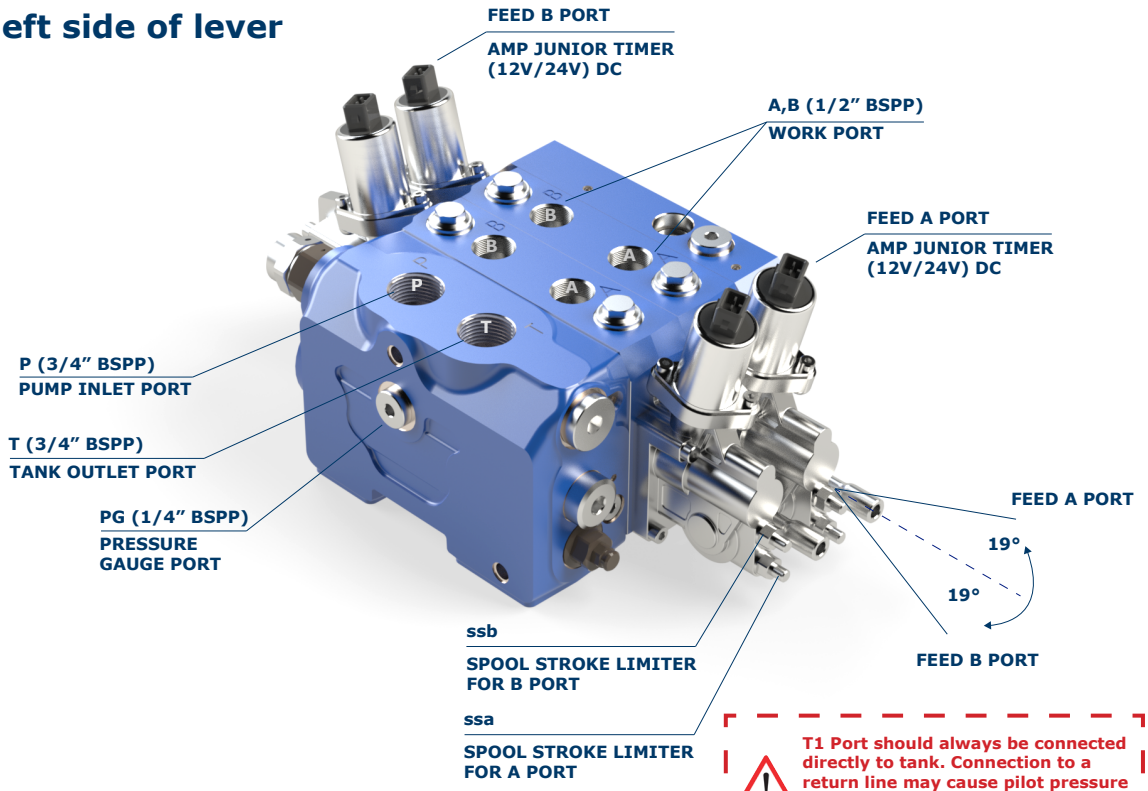



**FP04S**
**Spool Position Sensor Kit**

**CODE: 322593106**
**(W/O PROPRTIONAL VALVE)**
**CODE: 322593123 (12V)**
**CODE: 322593124 (24V)**

# EX38 Inlet Arrangement Options

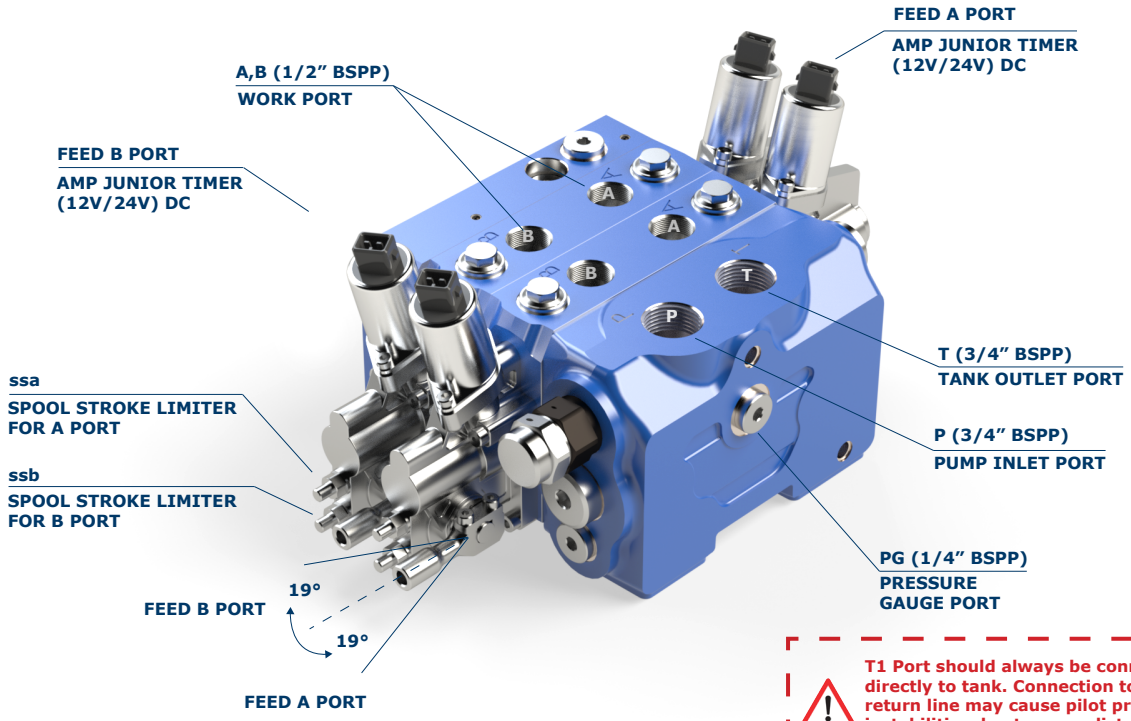
## ML - Inlet on left side of lever




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

Example assembly of standard EX38 with ML inlet
Electrohydraulic Actuation HP04L + FP04

## MR - Inlet on right side of lever




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

Example assembly of standard EX38 with MR inlet
Electrohydraulic Actuation HP04L + FP04

## EX38HF Electrohydraulic Actuation

**B PORT SIDE ACTUATION**

**HP06L**
**LEVER ACTUATION WITH STROKE LIMITER**

CODE: 322593317

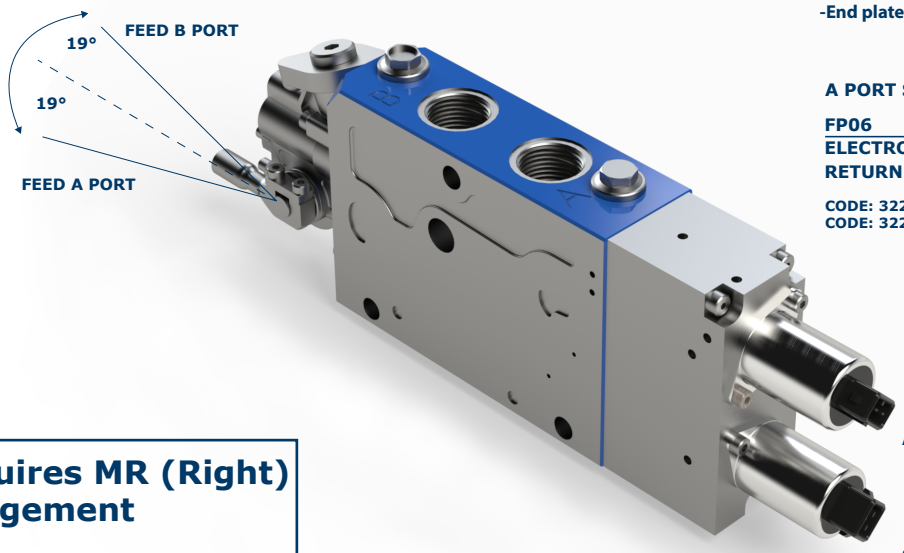
**EX38 HIGH FLOW**

-RH right inlet build required
-T, A&B ports oversized
-P&T galleries oversized
-Working section thickness 48mm
-Spool of bigger diameter
-Proportional pressure reducing valves single side
-End plate common with EX38

**A PORT SIDE ACTUATION**

**FP06**
**ELECTROHYDRAULIC RETURN ACTION**

CODE: 322593321 (12V KIT)
CODE: 322593322 (24V KIT)




**FEED A PORT**
AMP JUNIOR TIMER (12V/24V) DC

**FEED B PORT**
AMP JUNIOR TIMER (12V/24V) DC

***Requires MR (Right) arrangement**

***Local LS Relief not available**

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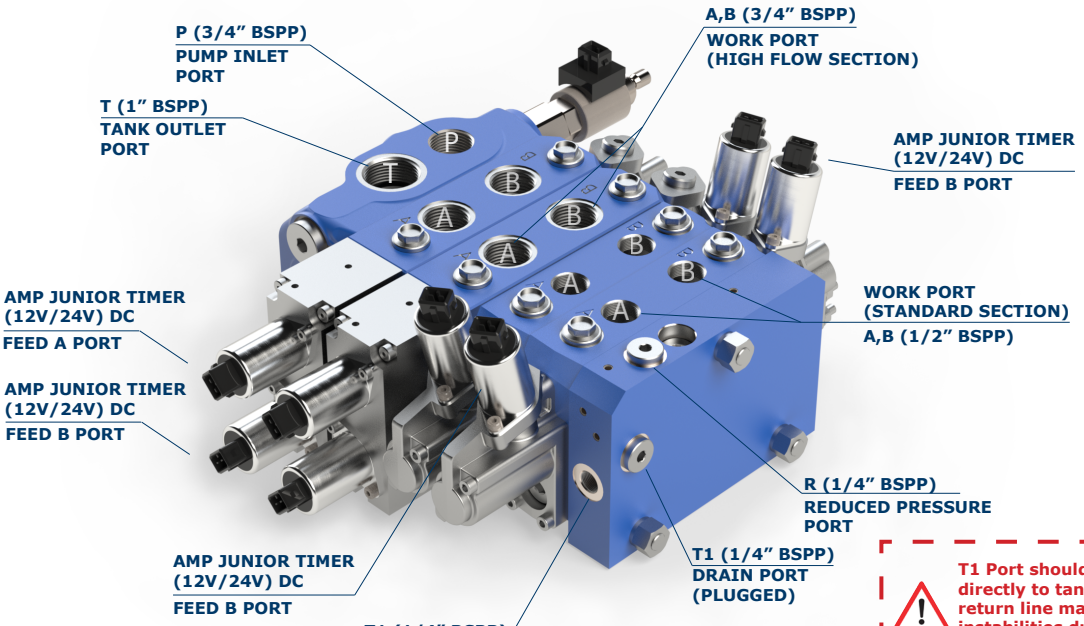
### -EX38HF sections can be stacked with EX38 Post or Pre-Compensated sections

High flow sections must be placed between the EX38HF inlet and the EX38 Standard Sections.




Example assembly of EX38HFEX38 combined assembly with electrohydraulic actuation

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

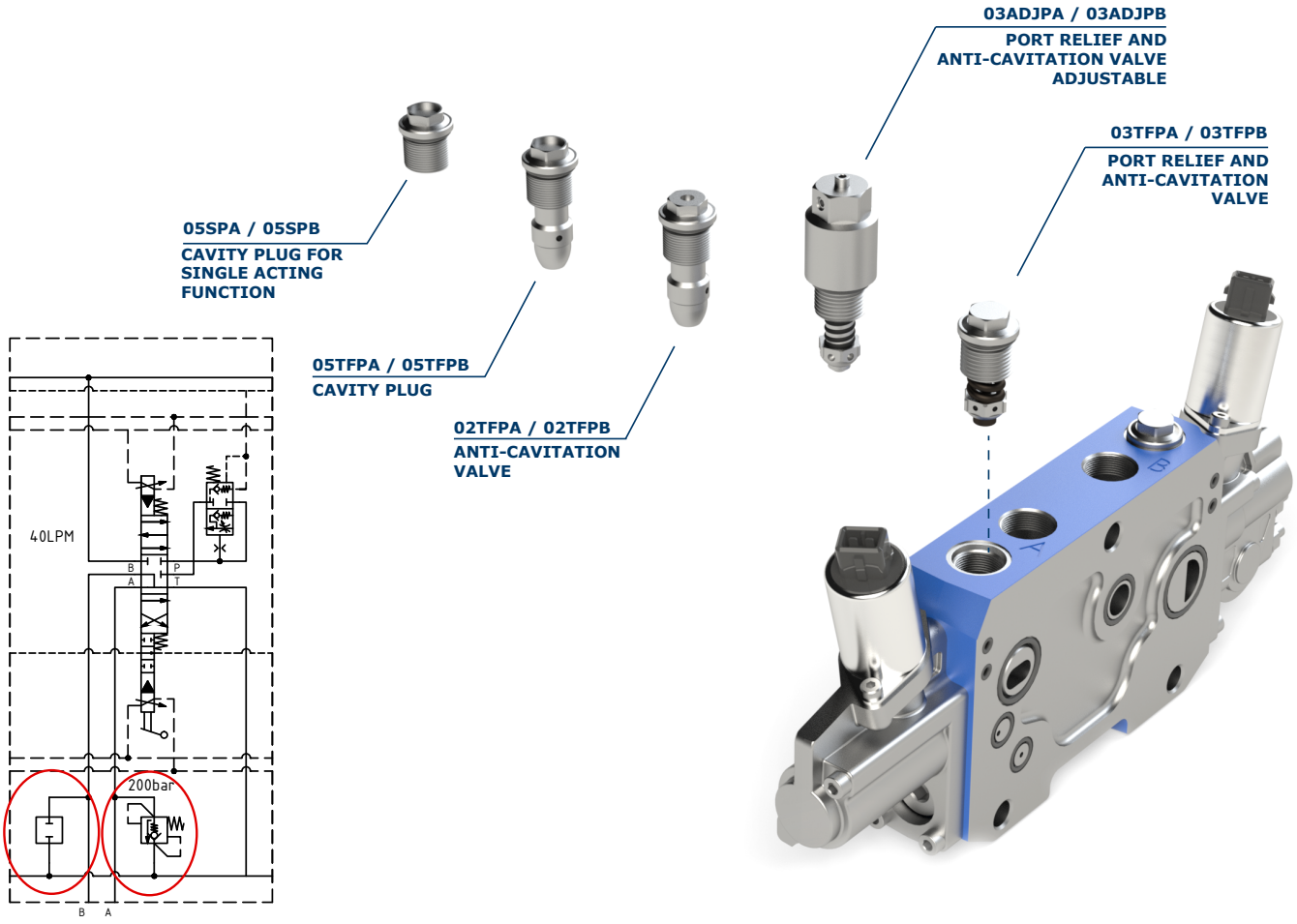
# EX38 EX38HF Features Compatibility

## EX38 / EX38HF Actuation options table:

| COMBINATION | | | SIDE B | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | EX38 | | | | | | | | EX38HF | |
| | | | F001A | F145 | F022A | FP00 | HP05L | FP04 | FP04L | FP04S | | FP06L |
| SIDE A | EX38 | H001 | ● | ● | ● | | | | | | | |
| | | HP05L | | | | | ● | | | | | |
| | | HP00L | | | | ● | | | | | | |
| | | HP04L | | | | | | ● | | ● | | |
| | | HP07L | | | | | | | ● | | | |
| | EX38HF | | | | | | | | | | | |
| | | HP06L | | | | | | | | | | ● |

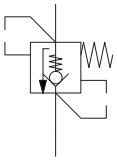
| | | SPOOL STROKE ADJ | PORT SIDE | TYPE OF BODY |
|---|---|---|---|---|
| **H001** | MANUAL LEAVER | NO | A | MECHANICAL |
| **F001A** | SPRING CENTERED TO NEAUTRAL | NO | B | MECHANICAL |
| **F145** | FRICTION HOLD IN POSITION | NO | B | MECHANICAL |
| **F022A** | AIR PILOT | NO | B | MECHANICAL |
| **HP05L** | HYDRAULIC PILOT | YES | A & B | MECHANICAL |
| **HP04L** | MANUAL LEVER + ELECTRO-HYDRAULIC | YES | A | ELECTRO-HYDRAULIC |
| **HP07L** | W/O MANUAL LEAVER + ELECTRO-HYDRAULIC | YES | A | ELECTRO-HYDRAULIC |
| **FP04** | ELECTRO-HYDRAULIC | NO | B | ELECTRO-HYDRAULIC |
| **FP04L** | ELECTRO-HYDRAULIC | YES | B | ELECTRO-HYDRAULIC |
| **FP04S** | ELECTRO-HYDRAULIC + SPOOL SENSOR | NO | B | ELECTRO-HYDRAULIC |

# EX38 EX38HF Working Section - Auxiliary Ports




### 03TF PA / 03TF PB

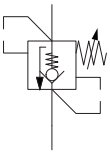
**PORT RELIEF AND ANTI-CAVITATION VALVE**



CODE: 915870100 (100 BAR)
915870150 (150 BAR)
915870200 (200 BAR)
915870120 (250 BAR)
915870150 (300 BAR)
915870350 (350 BAR)

### 03ADJ PA / 03ADJ PB

**PORT RELIEF AND ANTI-CAVITATION VALVE (ADJUSTABLE)**



CODE: 915078702 (71-130 BAR ADJ)
915078703 (131-210 BAR ADJ)

### 02TF PA / 02TF PB

**ANTI-CAVITATION VALVE**

CODE: 915089001

### 05TF PA / 05TF PB

**CAVITY PLUG**

CODE: 430490001

### 05S PA / 05S PB

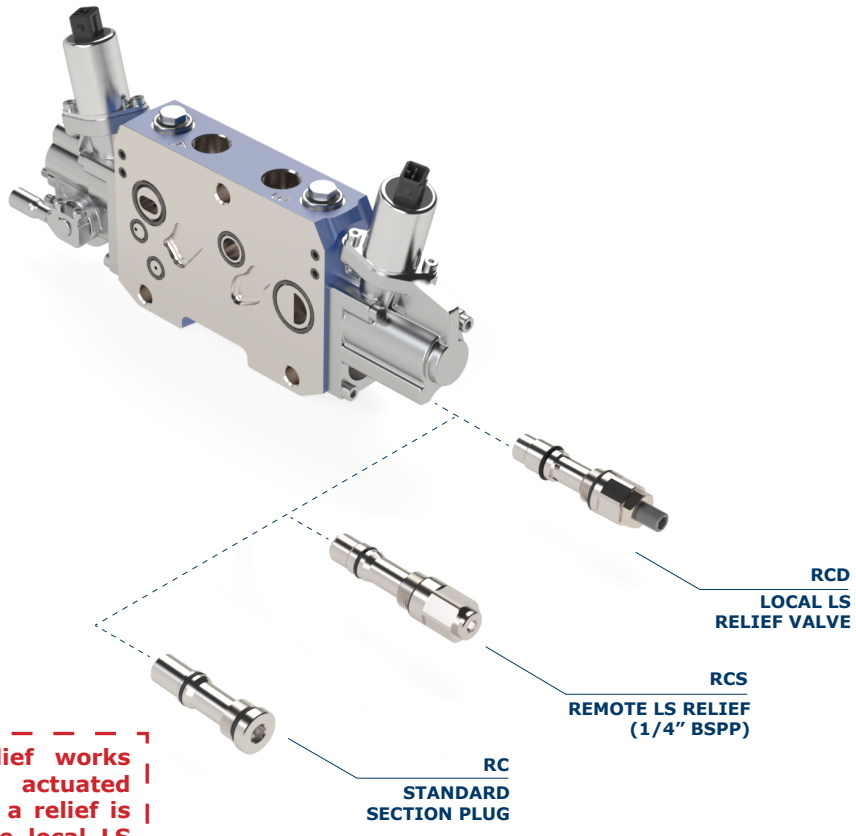
**CAVITY PLUG (BALL AND SPRING REMOVED)**

-FIT 05S PA FOR SINGLE ACTING ON B PORT
-FIT 05S PB FOR SINGLE ACTING A PORT

## A & B Ports LS Relief

**Flow sharing valve architecture does not 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.**

| | | | H001/F001A | | H001/F145<br>H001/F022A | | HP05L | | HP04L/FP04<br>HP04L/FP04S<br>HP07L/FP04L<br>HP07L/FP04S | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | MR | ML | MR | ML | MR | ML | MR | ML |
| POST COMP | STANDARD | RC1 | • | • | • | • | • | • | • | • |
| | WITH LOCAL LS RELIEF | RCD1 | • | • | | • | • | • | | • |
| | WITH EXTERNAL PILOT RELIEF | RCS1 | • | • | | • | • | • | | • |
| PRE COMP | STANDARD | RL1 | | | | | | | • | • |
| | WITH LOCAL LS RELIEF | RLD1 | | | | | | | • | |
| | WITH EXTERNAL PILOT RELIEF | RLS1 | | | | | | | • | |




***Post Compensated Electrohydraulic + Local LS Relief equires ML (Left Inlet) arrangement**

**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.**

# EX38 Working Section - Post Comp Local LS

## Post compensated working section local LS relief options:

### RC1 Cavity Plug

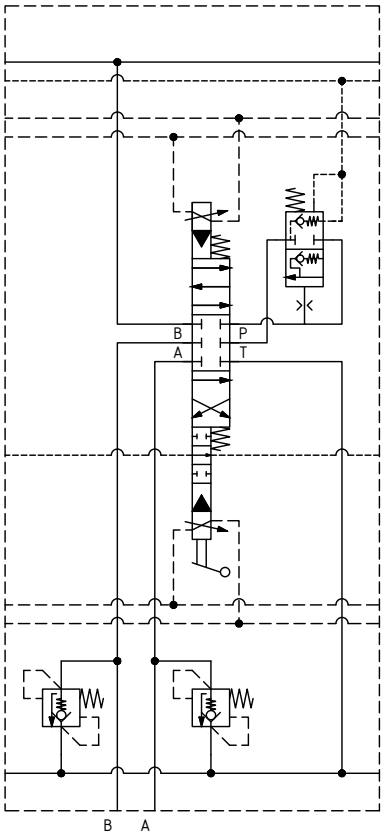
- Comes fitted as standard

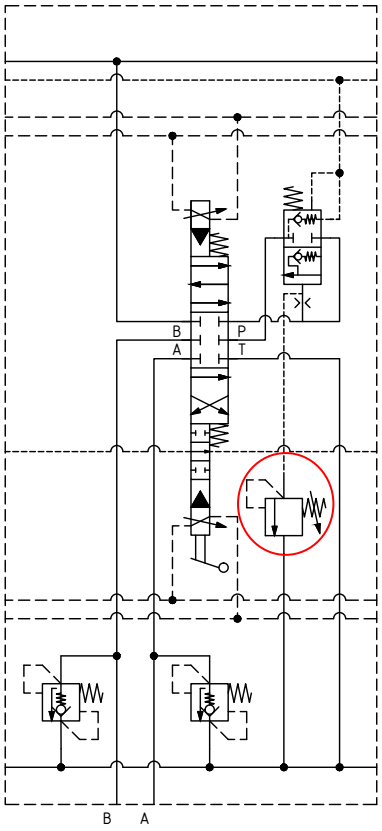
### Local LS Relief Valve

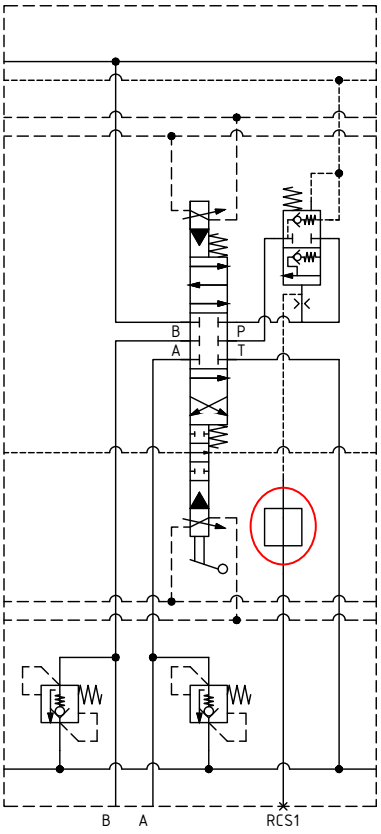
- Code 915008501 (RCD1: 30-80 Bar)
- Code 915008502 (RCD1: 81-200 Bar)
- Code 915008503 (RCD1: 201-350 Bar)

### External Pilot LS Relief Port

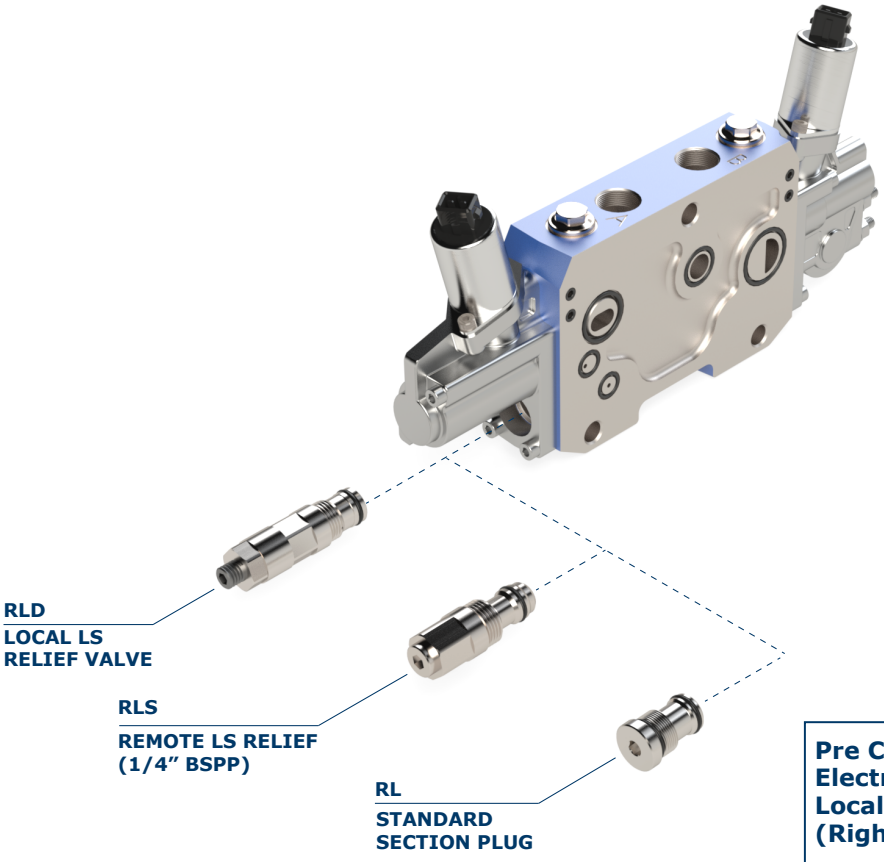
- Code 430085041 (RCS1)



# EX38 Working Section - Pre Comp Local LS




**Pre Compensated Electrohydraulic + Local LS Relief equires MR (Right Inlet) arrangement**

**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.**

# EX38 Working Section - Pre Comp Local LS

## Pre compensated working section local LS relief options:

### RC1 Cavity Plug

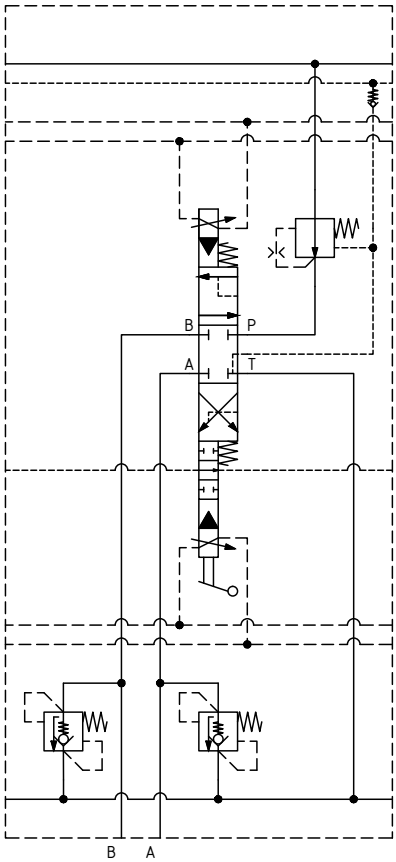
- Comes fitted as standard

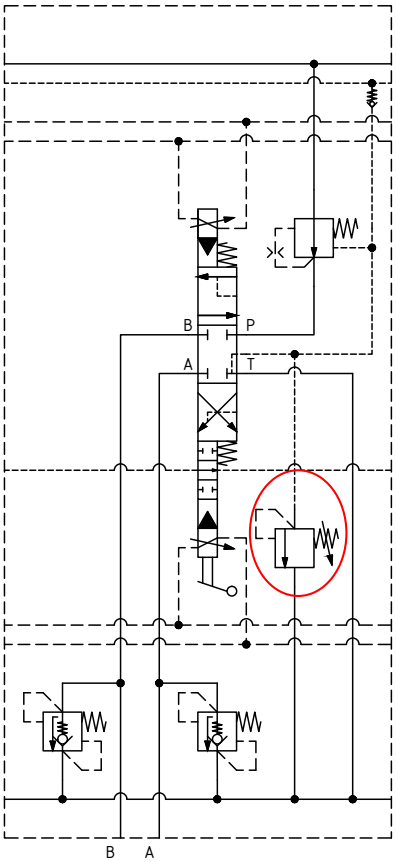
### Local LS Relief Valve

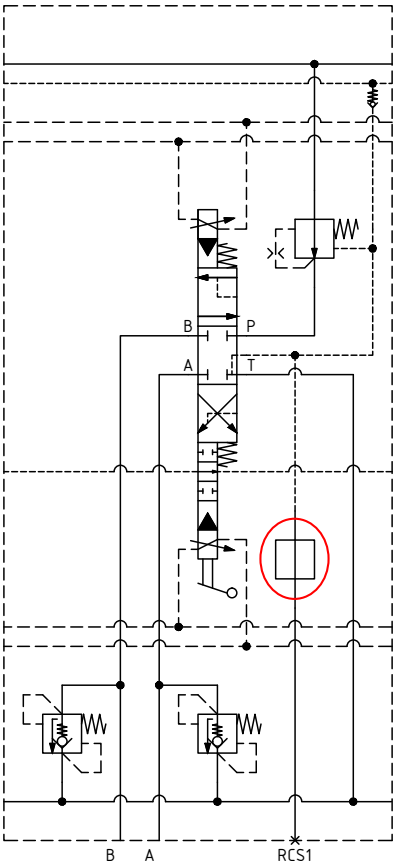
- Code 915008504 (RLD1: 50-170 Bar)
- Code 915008505 (RLD1: 181-280 Bar)

### External Pilot LS Relief Port

- Code 430085042 (RLS1)



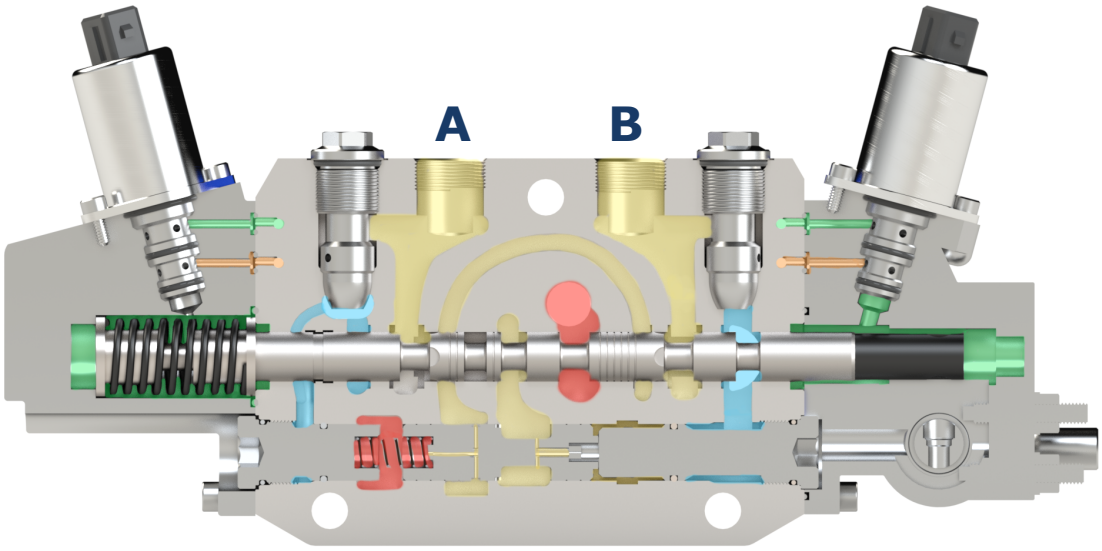



# EX38 Spools - Post Comp

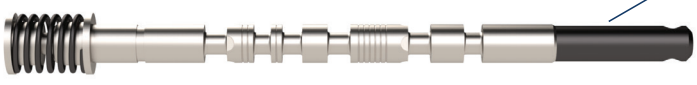
## Spool nominal flow rate comparison table

| SPOOL NOMINAL FLOW RATE (L/MIN) | EX38 POST COMP | EX38 PRE-COMP | EX38HF POST COMP |
|---|---|---|---|
| 5 | ● | | |
| 10 | ● | | |
| 15 | | ● | |
| 25 | ● | ● | |
| 35 | ● | | |
| 40 | ● | ● | |
| 50 | ● | | |
| 65 | ● | ● | |
| 80 | ● | | |
| 100 | ● | | |
| 120 | | | ● |
| 130 | | | ● |
| 140 | | | ● |

## Post Compensated Working Section

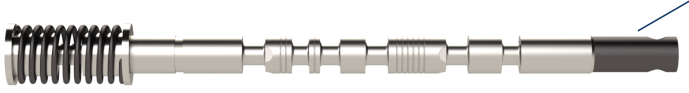



- Drain
- Pilot Pressure drain
- Working Pressure
- Pressure line
- Pilot Pressure line



MECHANICAL SPOOL ACTUATION ATTACHMENT

CODE: 422501205



ELECTRO-HYDRAULIC / HYDRAULIC PILOT SPOOL ACTUATION ATTACHMENT

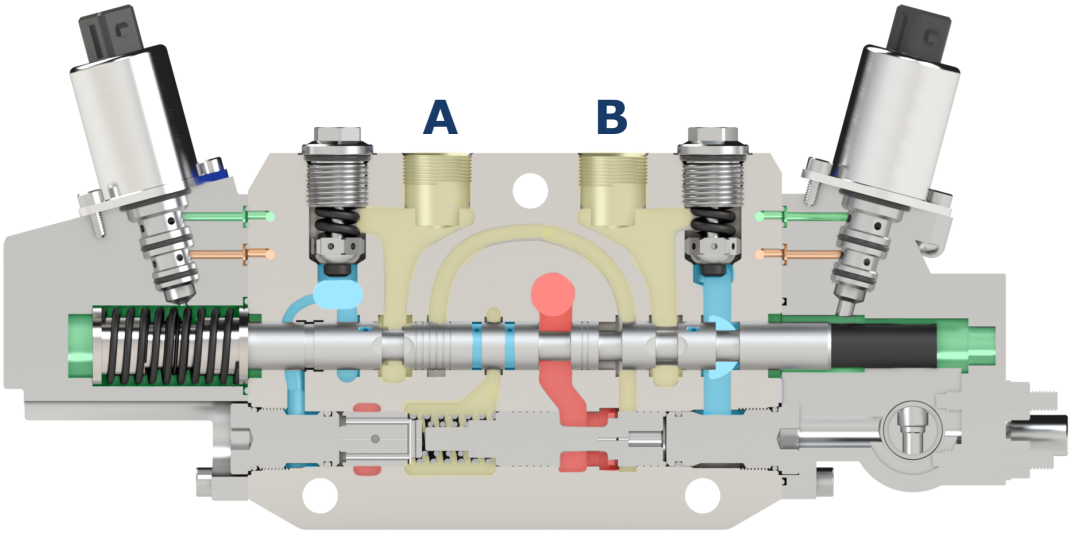
CODE: 422501217

# EX38 Spools - Post Comp

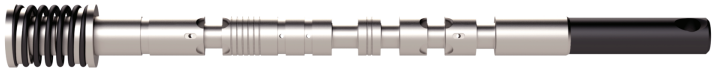
| EX38 POST COMP SPOOLS | SECTION TYPE | PART NUMBER |
|---|---|---|
| DOUBLE ACTING CYLINDER SPOOL W001C 0505 | RC1 | 421293030 |
| DOUBLE ACTING CYLINDER SPOOL W001C 1010 | RC1 | 421293035 |
| DOUBLE ACTING CYLINDER SPOOL W001C 2525 | RC1 | 421293040 |
| DOUBLE ACTING CYLINDER SPOOL W001C 3535 | RC1 | 421293015 |
| DOUBLE ACTING CYLINDER SPOOL W001C 4040 | RC1 | 421293041 |
| DOUBLE ACTING CYLINDER SPOOL W001C 5050 | RC1 | 421293010 |
| DOUBLE ACTING CYLINDER SPOOL W001C 6565 | RC1 | 421293020 |
| DOUBLE ACTING CYLINDER SPOOL W001C 8080 | RC1 | 421293013 |
| DOUBLE ACTING CYLINDER SPOOL W001C 100100 | RC1 | 421293032 |

| EX38 POST COMP SPOOLS | SECTION TYPE | PART NUMBER |
|---|---|---|
| DOUBLE ACTING MOTOR SPOOL W002C 0505 | RC1 | 421293065 |
| DOUBLE ACTING MOTOR SPOOL W002C 1010 | RC1 | 421293049 |
| DOUBLE ACTING MOTOR SPOOL W002C 2525 | RC1 | 421293043 |
| DOUBLE ACTING MOTOR SPOOL W002C 3535 | RC1 | 421293131 |
| DOUBLE ACTING MOTOR SPOOL W002C 4040 | RC1 | 421293041M |
| DOUBLE ACTING MOTOR SPOOL W002C 5050 | RC1 | 421293130 |
| DOUBLE ACTING MOTOR SPOOL W002C 6565 | RC1 | 421293039 |
| DOUBLE ACTING MOTOR SPOOL W002C 8080 | RC1 | 421293155 |
| DOUBLE ACTING MOTOR SPOOL W002C 9090 | RC1 | 421293054 |
| DOUBLE ACTING MOTOR SPOOL W002C 100100 | RC1 | 421293132 |

## Pre Compensated Working Section




Drain
Pilot Pressure drain
Working Pressure
Pressure line
Pilot Pressure line



MECHANICAL SPOOL ACTUATION ATTACHMENT

CODE: 422501205

ELECTRO-HYDRAULIC / HYDRAULIC PILOT SPOOL ACTUATION ATTACHMENT

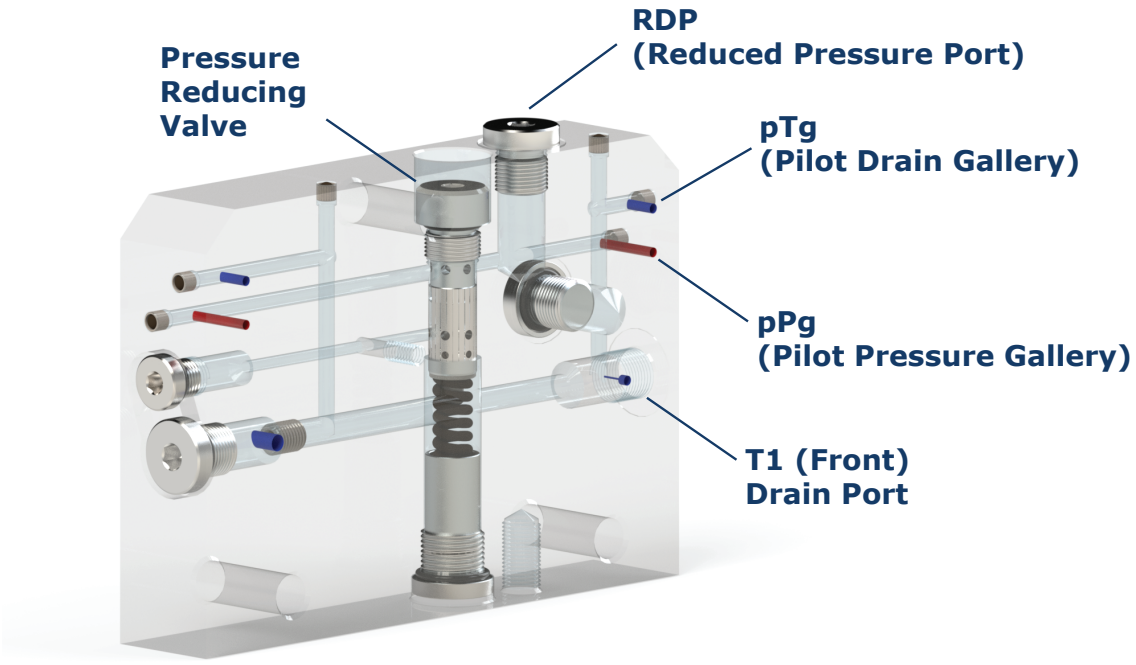
CODE: 422501217

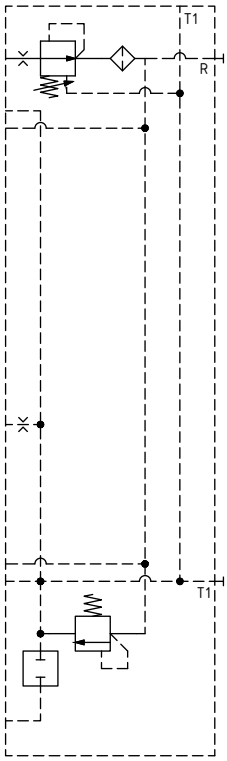
| EX38 PRE COMP SPOOLS | SECTION TYPE | PART NUMBER |
|---|---|---|
| DOUBLE ACTING CYLINDER SPOOL W001C 1515 | RL1 | 421293048 |
| DOUBLE ACTING CYLINDER SPOOL W001C 2525 | RL1 | 421293063 |
| DOUBLE ACTING CYLINDER SPOOL W001C 4040 | RL1 | 421293064 |
| DOUBLE ACTING CYLINDER SPOOL W001C 6565 | RL1 | 421293065 |
| DOUBLE ACTING MOTOR SPOOL W001C 1515 | RL1 | 421293091 |
| DOUBLE ACTING MOTOR SPOOL W001C 2525 | RL1 | 421293082 |
| DOUBLE ACTING MOTOR SPOOL W001C 4040 | RL1 | 421293081 |
| DOUBLE ACTING MOTOR SPOOL W001C 6565 | RL1 | 421293080 |

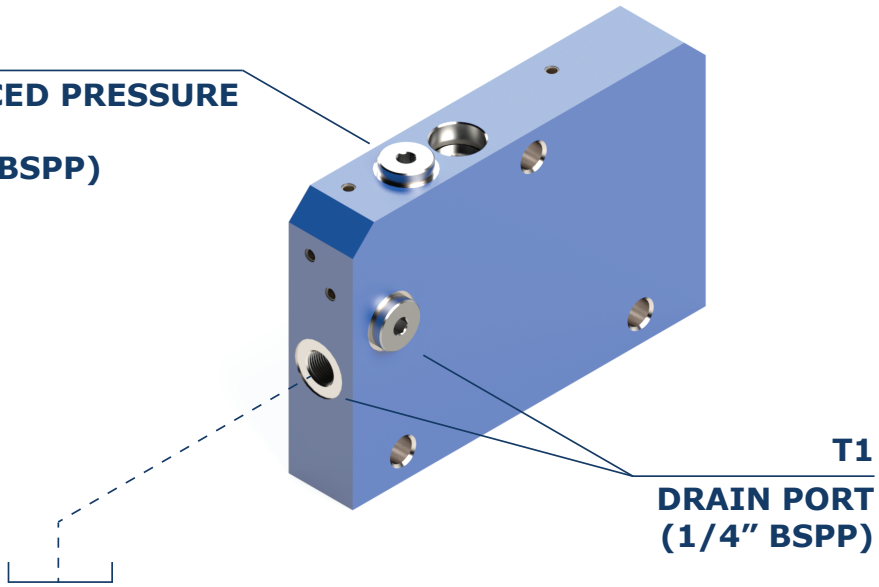
# EX38HF Spools

| EX38HF SPOOLS | SECTION TYPE | PART NUMBER |
|---|---|---|
| DOUBLE ACTING CYLINDER SPOOL W001 120120 | RCU1 | 421293115 |
| DOUBLE ACTING CYLINDER SPOOL W001 130130 | RCU1 | 421293111 |
| DOUBLE ACTING CYLINDER SPOOL W001 140140 | RCU1 | 421293138 |
| DOUBLE ACTING MOTOR SPOOL W002 120120 | RCU1 | 421293162 |
| DOUBLE ACTING MOTOR SPOOL W002 130130 | RCU1 | 421293180 |
| DOUBLE ACTING MOTOR SPOOL W002 140140 | RCU1 | 421293144 |

## KZ20EC - End plate with RDP (external drain)



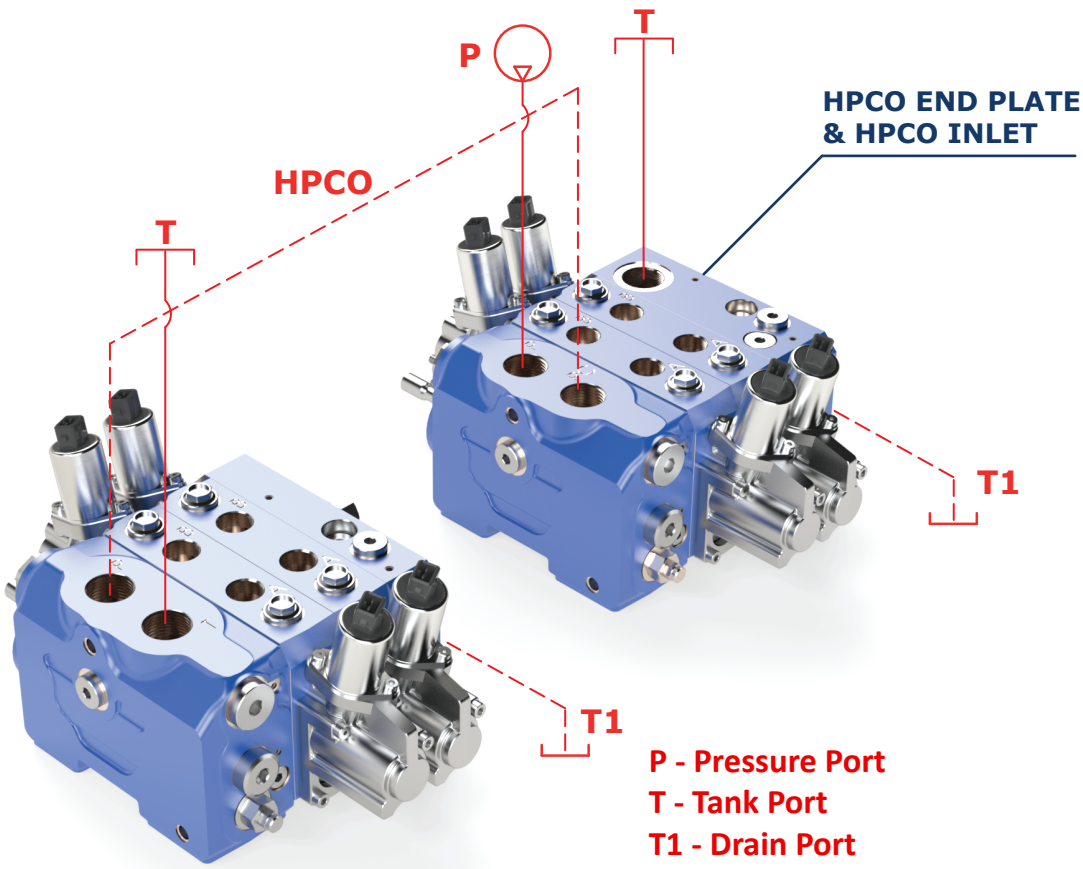

**CODE: 320093123**

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

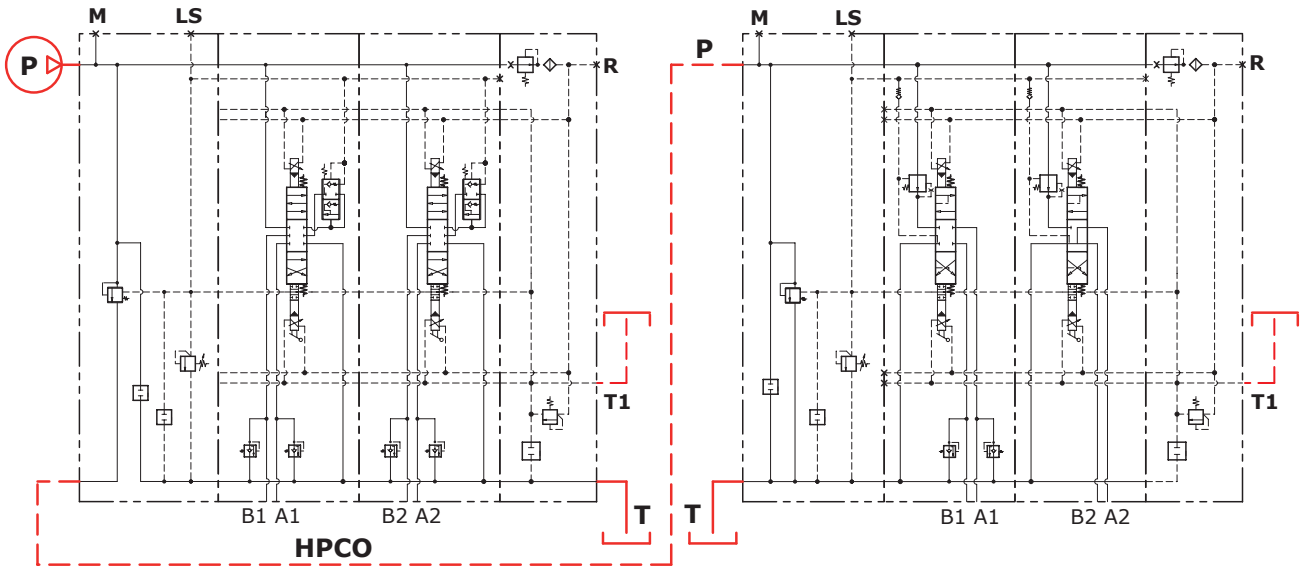
# EX38 High Pressure Carry-Over

**High Pressure Carry Over HPCO connection is available for fixed displacement pump systems. The upstream EX38 valve employs a special inlet element code 38037 and a special end plate code 38038.**

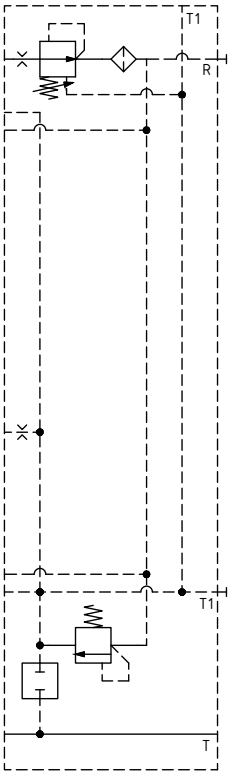
**The downstream valve can be a standard EX38 or any other kind of valve.**



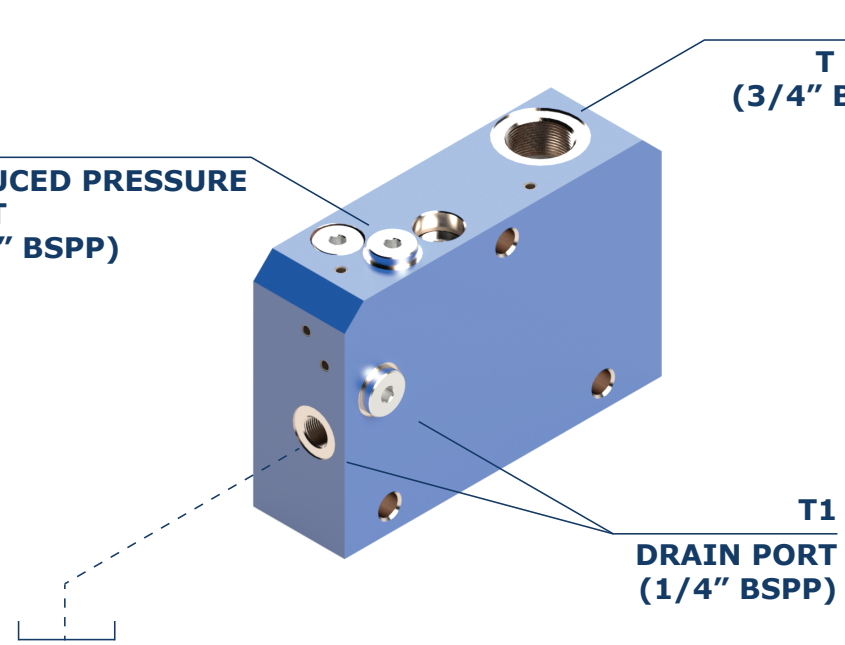

**P - Pressure Port**
**T - Tank Port**
**T1 - Drain Port**
**HPCO - High Pressure Carry Over**



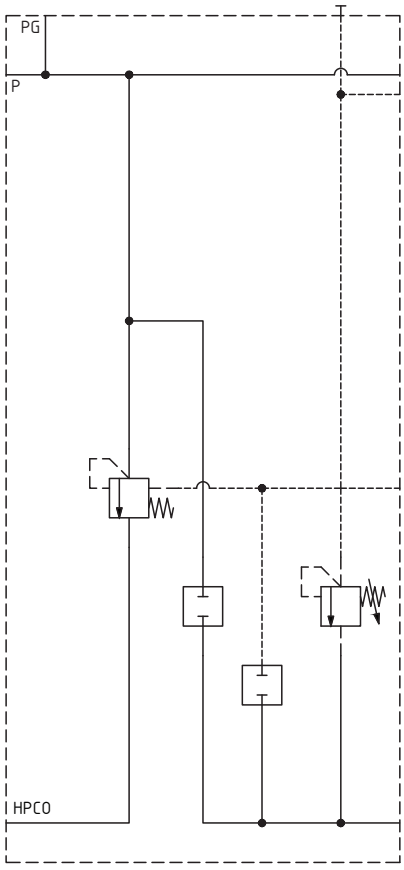
# EX38 High Pressure Carry-Over



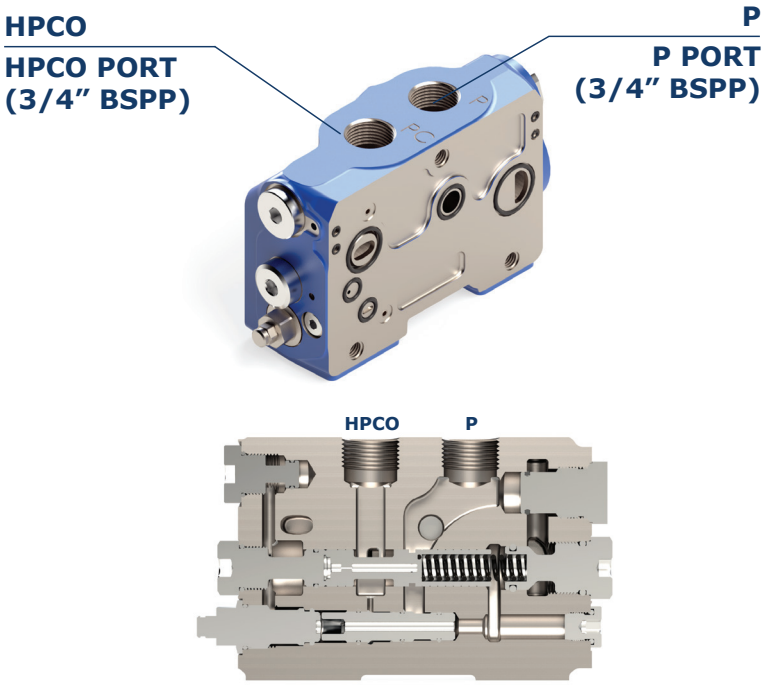

## EX38 HPCO OUTLET




**CODE: 38038**



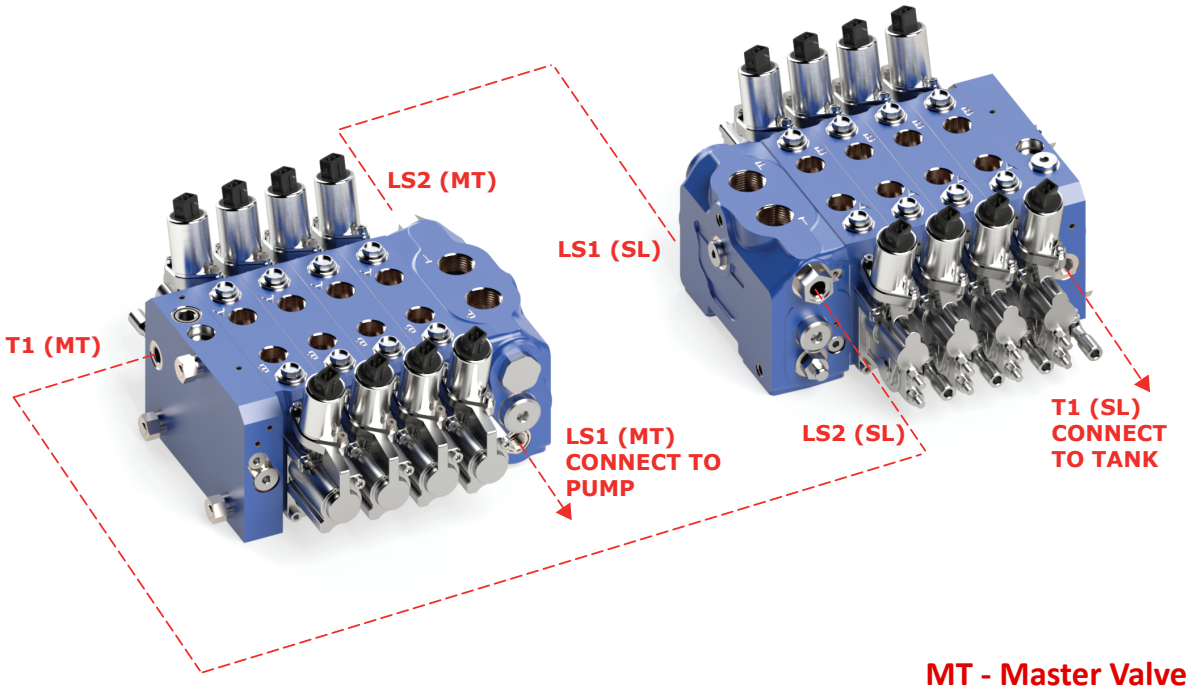

## EX38 HPCO INLET



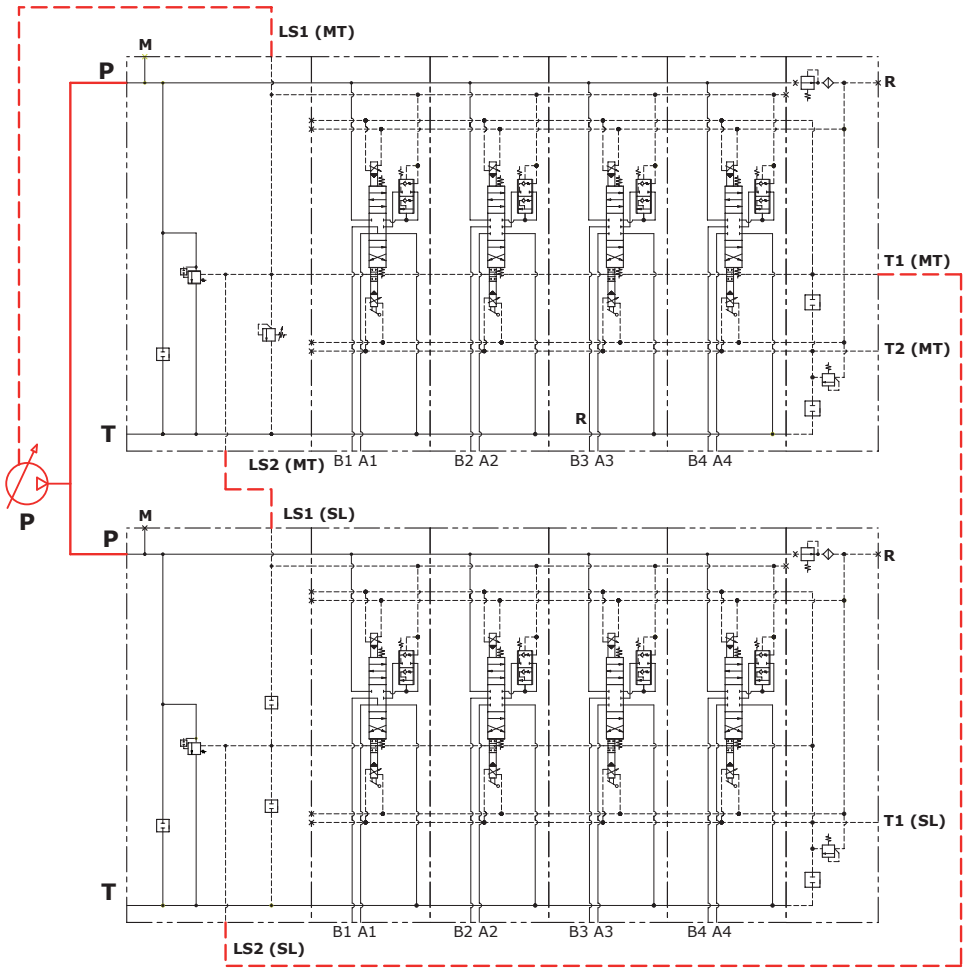
# EX38 Two valves in parallel connection

## Parallel connection - Closed Center System

**Two valves can be connected in parallel and be actuated simultaneously without affecting flow sharing function.**

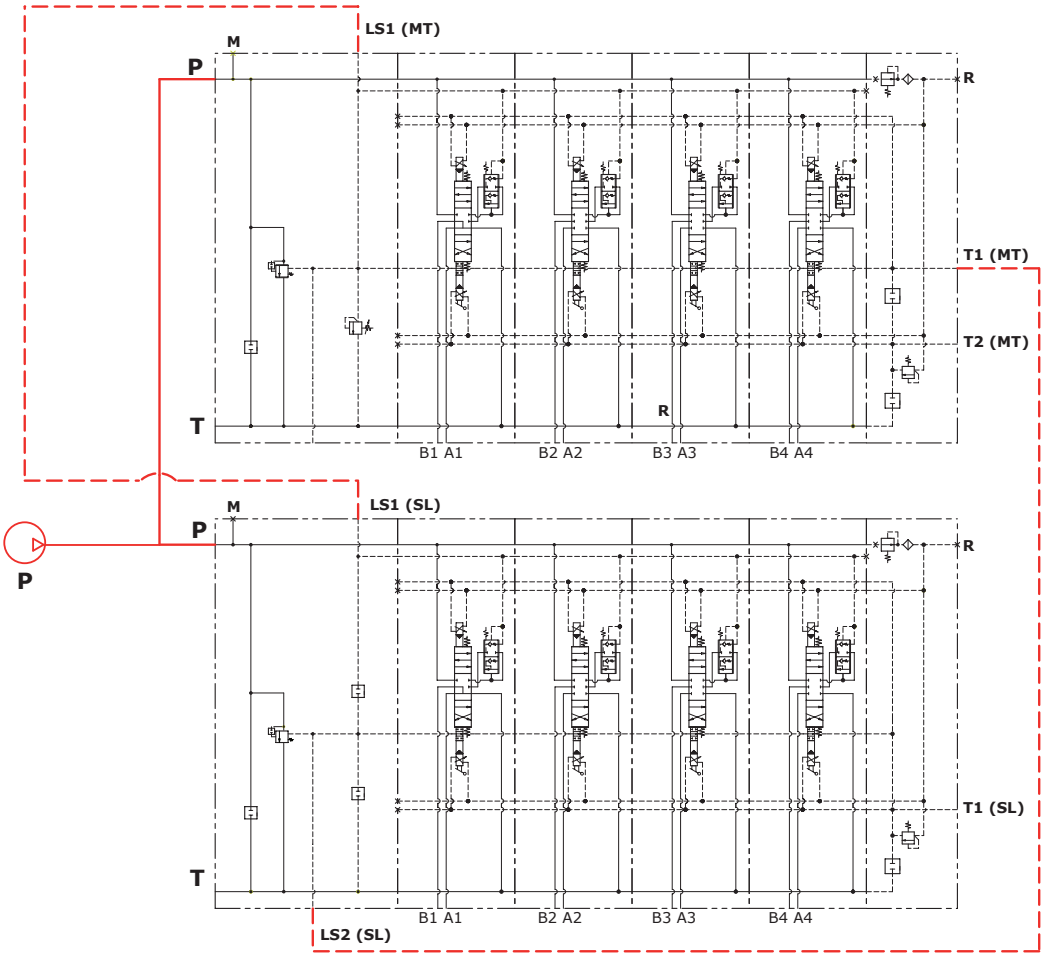



**MT - Master Valve**
**SL - Slave Valve**



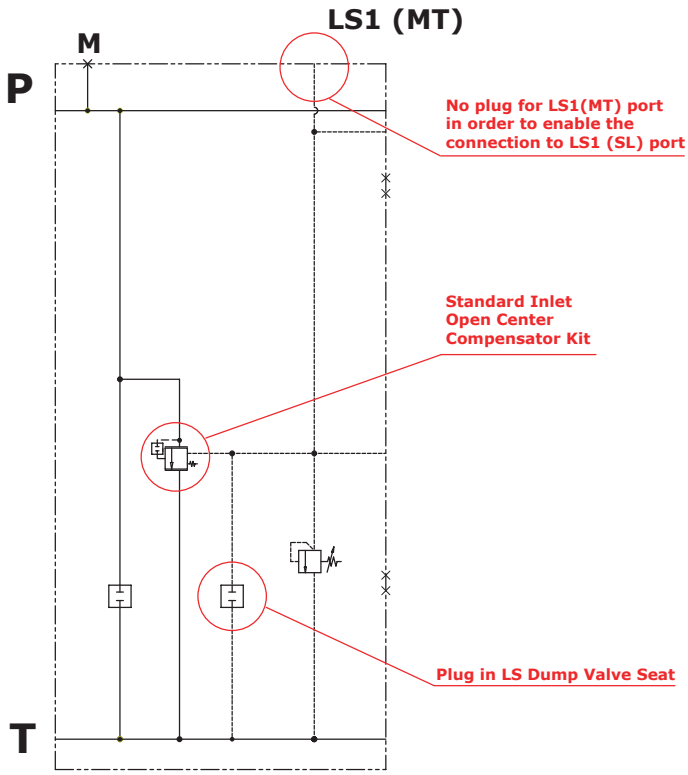
# EX38 Two valves in parallel connection

## Parallel connection - Open Center System

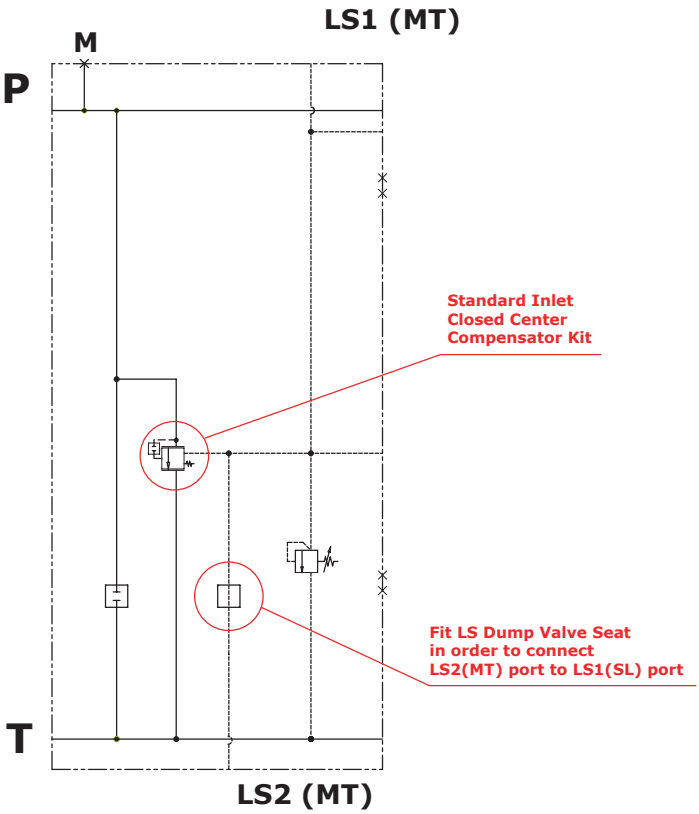


# EX38 Two valves in parallel connection

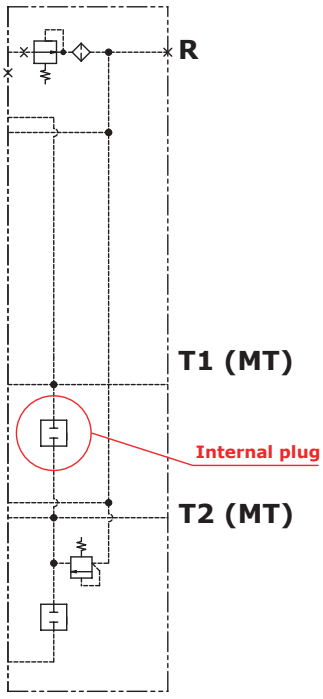
## Master Inlet for Open Center System




## Master Inlet for Closed Center System




## Master Outlet (Open/Closed)

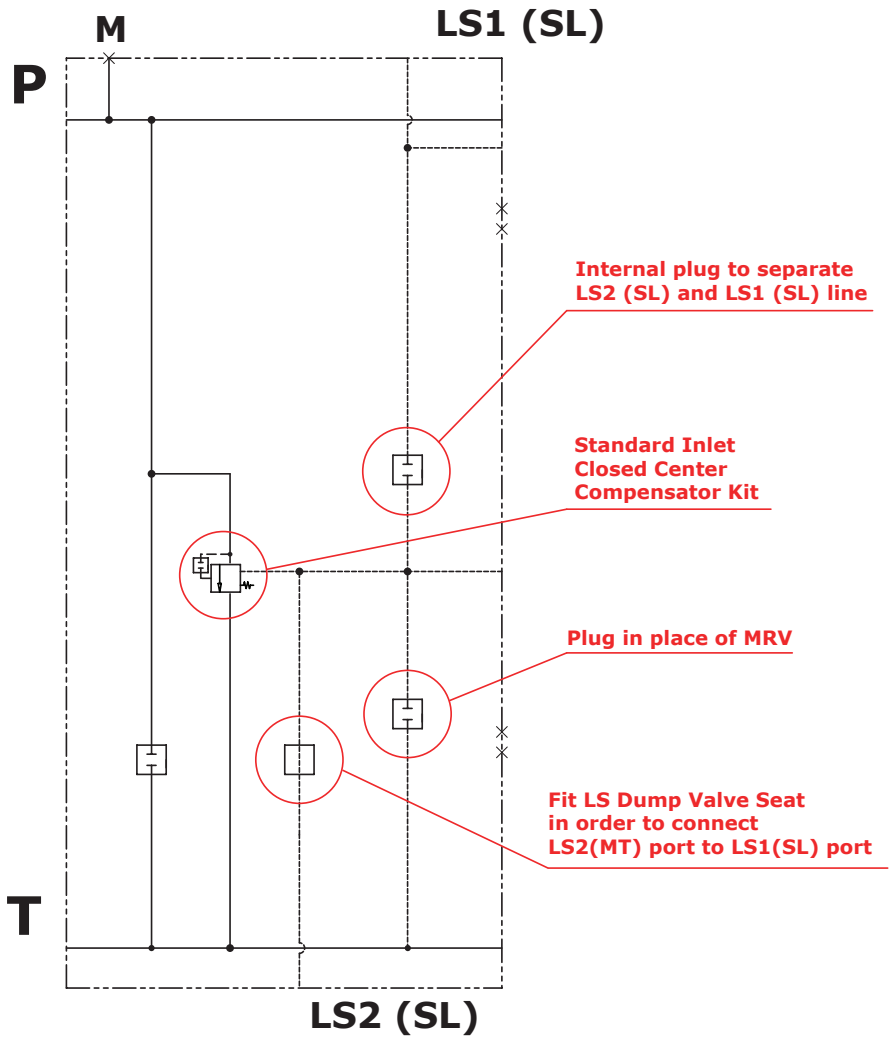



**In the end plate of the master valve an internal plug separates the proportional solenoid valves drain line from the LS line in order to protect the solenoid valves from LS pressure.**

# EX38 Two valves in parallel connection

## Slave Inlet for Open and Closed Center System

**Open and Closed center circuits employ the same slave Inlet.**
**The main relief valve MRV is not fitted since the LS pressure is limited by the Master MRV.**
**Drain LS line LS1(SL) has to be separated from the LS line LS2(LS). This separation is achieved by using a plug and consequently the LS2(SL) port is housed in the LS Dump valve seat in “C" cavity.**



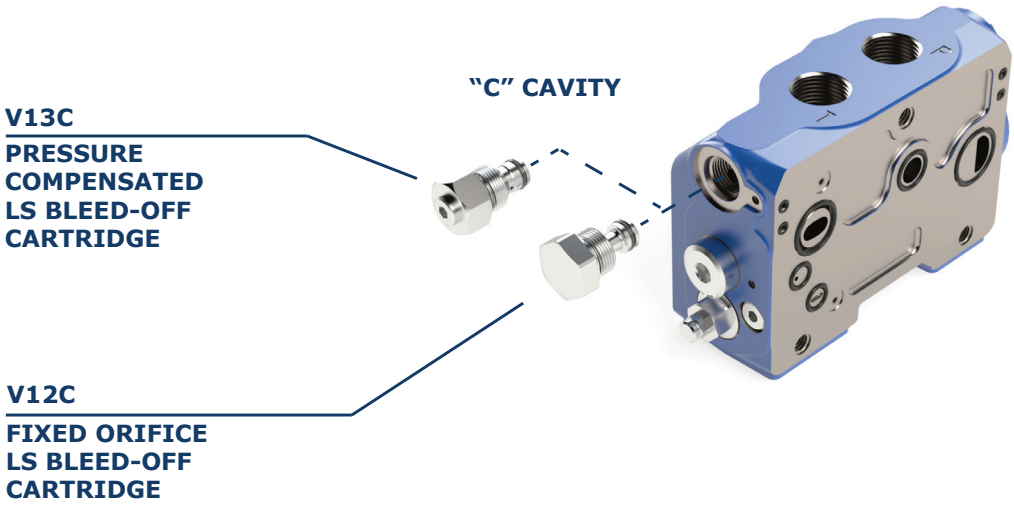
# EX38 & EX38HF - Bleed Off

## Load Sense Signal bleed-off

**In all conventional systems, a LS signal bleed-off is provided. This guarantees to have the pump flow quickly stopped any time the valve spool moves back to neutral position. Therefore, fast response time in function stopping is the main advantage of a bleed-off system.**

**On contrary, a bleed-off system is not so accurate when you want to start moving your actuator, because the first amount of oil is needed to saturate the bleed down. As a result, the actuator starts running later then the spool movement.**

**One of the unique peculiarity of EX38 is to have zero bleed-off. This improve actuator's movement and pressure compensation accuracy, as well as response time at the movement start of**
**the actuator, making the valve controllability less sensitive to operating conditions.**




**However, in some applications a more conventional approach is required.**

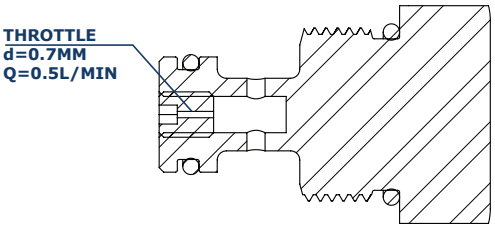
**EX38 valve can be equipped with two different bleed-off solutions:**

**1. Fix orifice bleed-off cartridge V12C code 430085051.**
**It provides a bleed of 0.5 l/min approximately, at tank pressure. By increasing the load working pressure the amount of bleed increase.**

**2. Pressure compensated bleed-off cartridge V13C code 430085070.**
**It compensates the amount of bleed by the working pressure change. The bleed flow remains constant at 0.5 l/min, and independently by working pressure change.**

***The bleed-off cartridge is fit into the C cavity, therefore when you chose this option the V11C option is not available.**

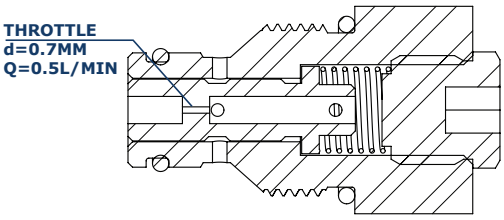
# EX38 & EX38HF - Bleed Off




## V12C

**FIXED ORIFICE**
**LS BLEED-OFF CARTRIDGE**

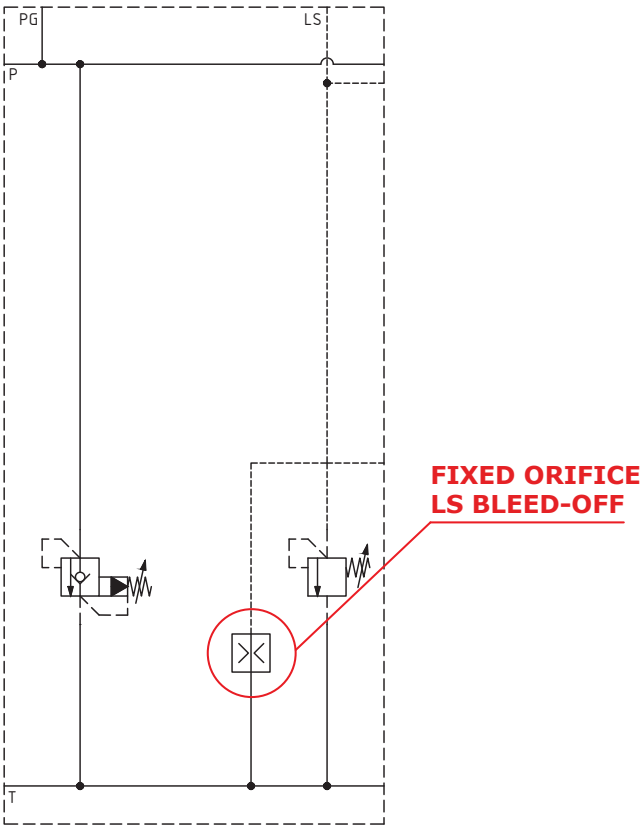
**CODE: 430085051**

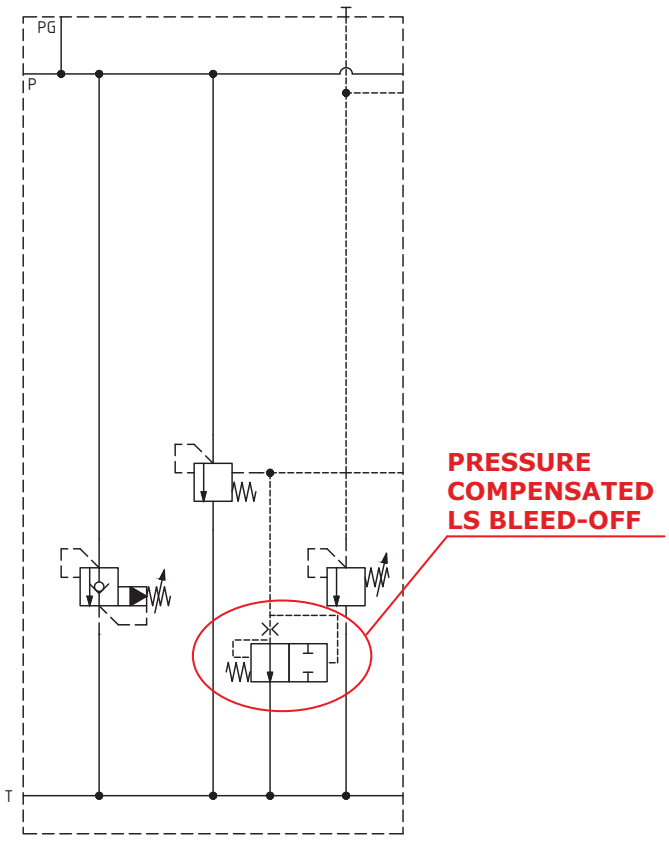



## V13C

**PRESSURE COMPENSATED**
**LS BLEED-OFF CARTRIDGE**

**CODE: 430085070**

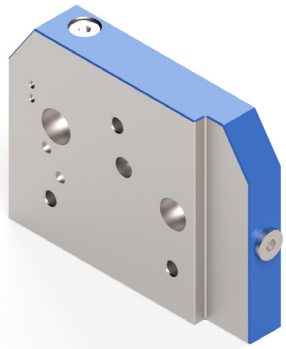


# EX54/38 Combination Valve

**The modular design of the EX Series allows the combination of the EX54 with the smaller size EX38.**

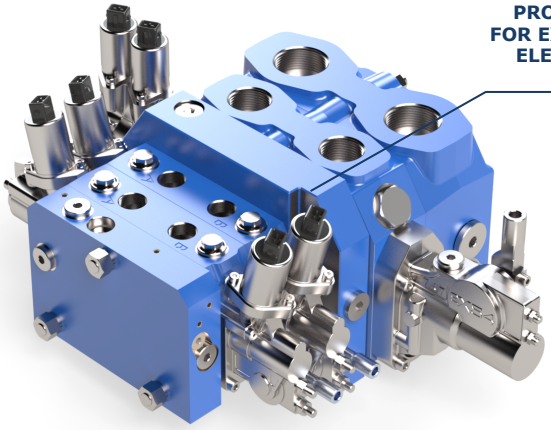
**EX54/38 interface plate**
**- code 601208644VY**



## Possible Combinations

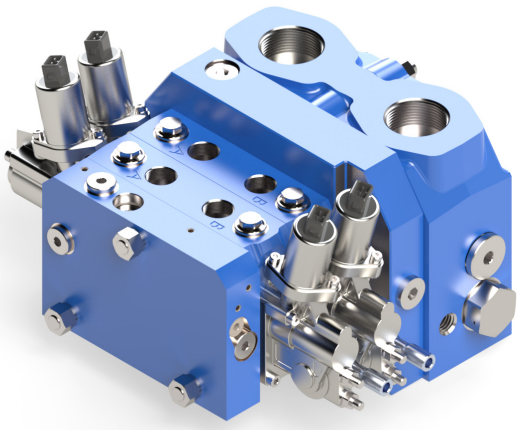
**Option 1.**

**The mid plate can be located between the EX54 and EX38 working sections, allowing EX38 low flow functions to work together with the EX54 high flow functions.**



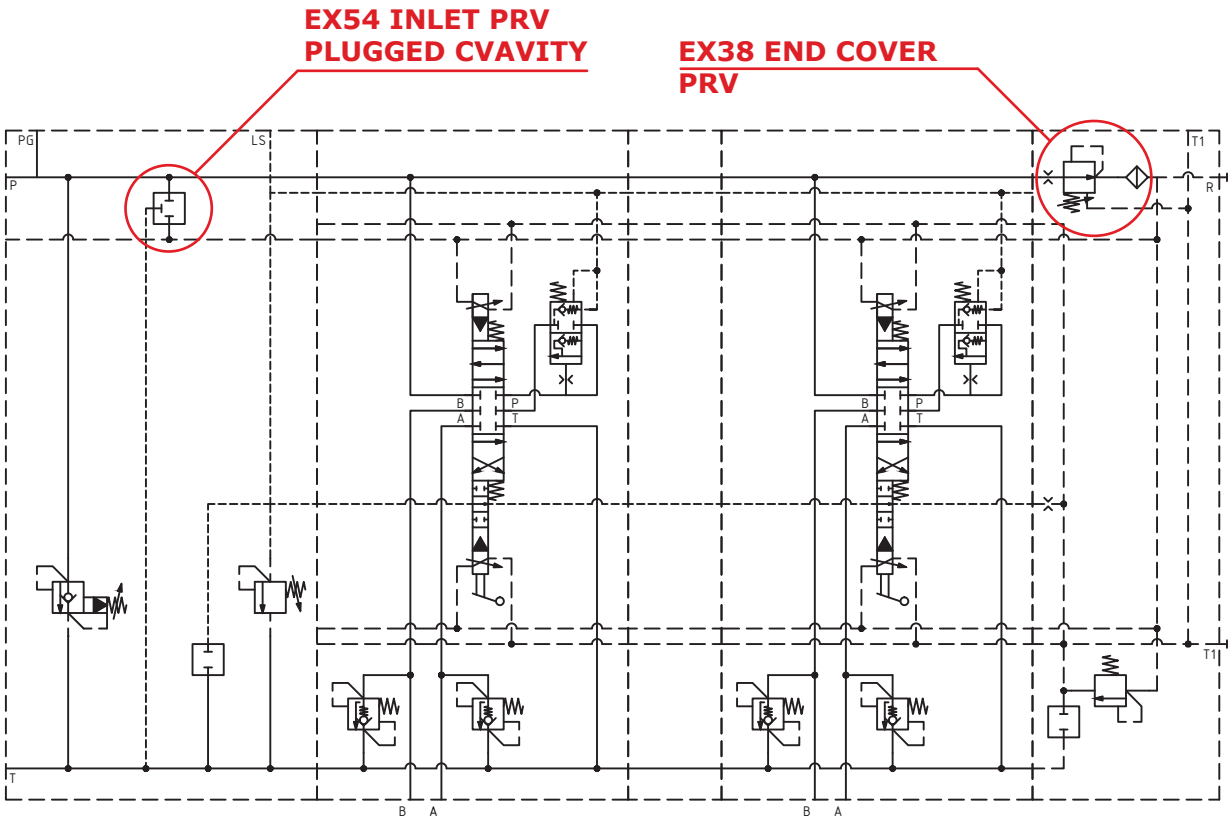

**Option 2.**

**The mid plate can be located just after the EX54 inlet module, allowing multiple EX38 working sections to operate simultaneously without incurring flow sharing.**



# EX54/38 Combination Valve

**When you combine a EX54 with an EX38 electrohydraulic proportional version, you must remember to replace the EX54 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 cover.**




# EX72/38 Combination Valve

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

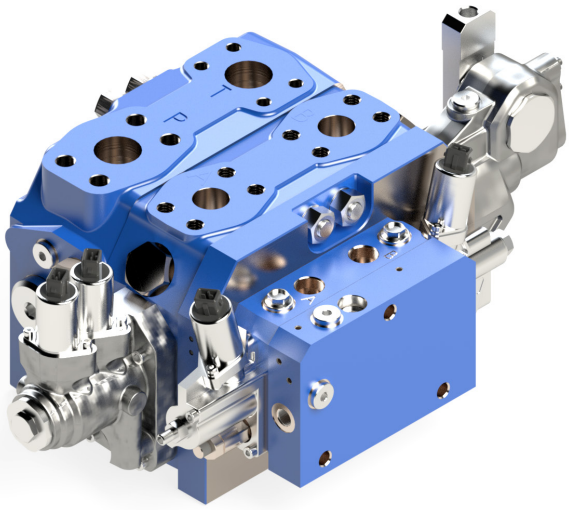
**EX72/38 interface plate**
**- code 60120494VY**

**EX38 LEVER ACTUATION SIDE CANOT BE FIT ADJACENT TO THE COMBINATION PLATE**

## Possible Combinations

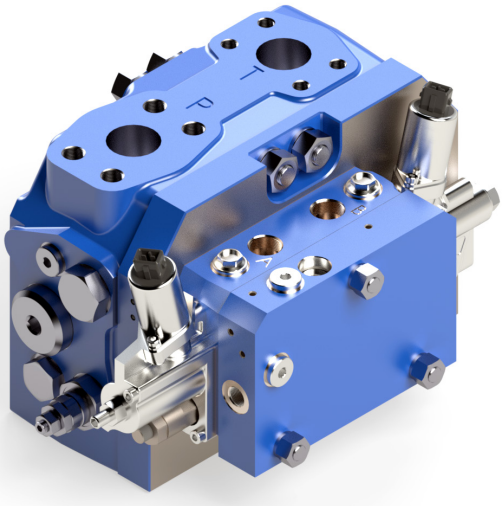
**Option 1.**

**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.**



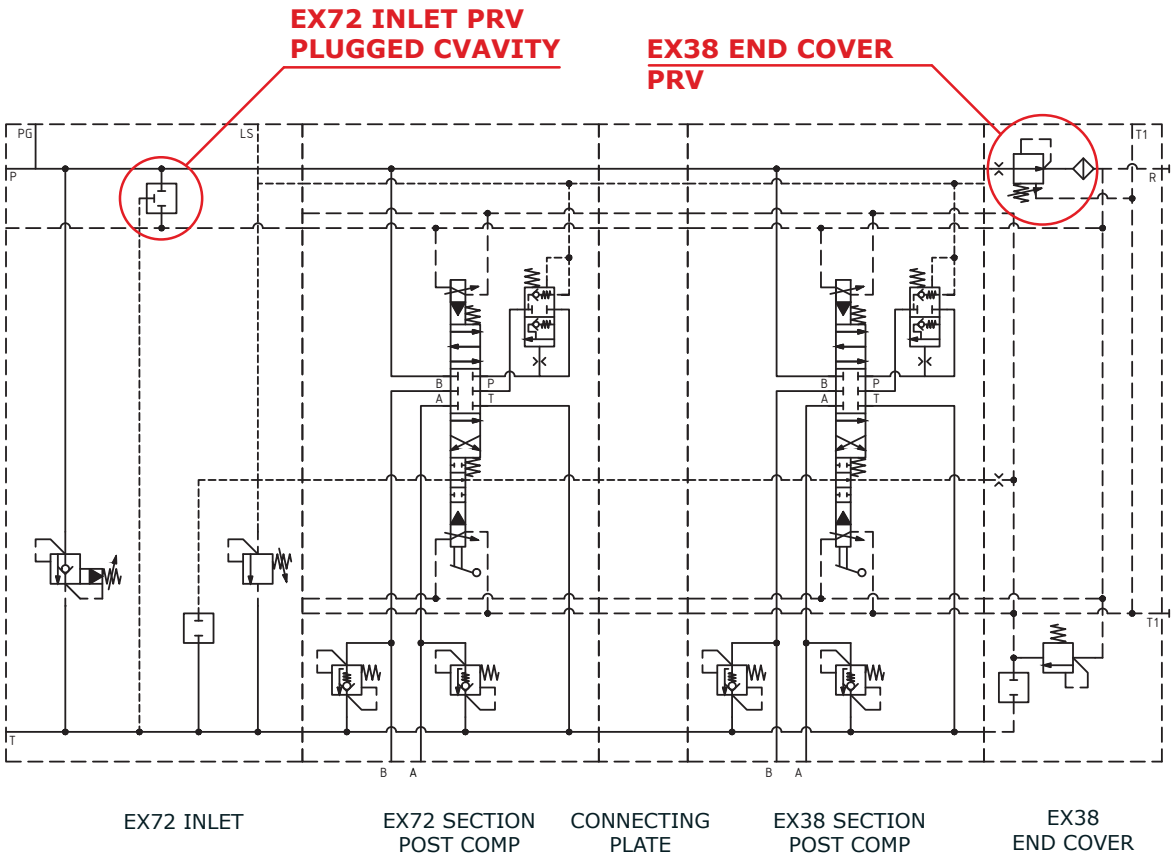
**Option 2.**

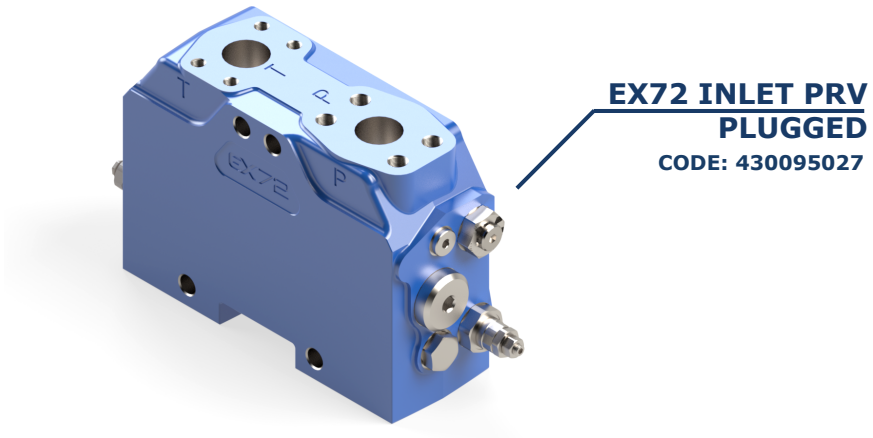
**The mid plate can be located just after the EX72 inlet module, allowing multiple EX38 working sections to operate simultaneously without incurring flow sharing.**



# EX72/38 Combination Valve

**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 cover.**



# Notes

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