v.1.0
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WNu

DYNASET

PARTNER OF YOUR MACHINE



INSTALLATION MANUAL

Installation Valves

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1. GENERAL

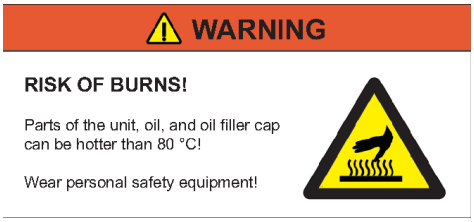
1.1 SAFETY

WARNING

Operator and maintenance personnel must act in compliance with the laws, regulations and recommendations issued by the local electricity and work safety authorities.



The pressure in hydraulic circuits is considerably high. Therefore, the condition of your equipment must under constant observation. All couplings, valves and hoses must be tight and clean. Leaks in the hydraulic system must be repaired immediately to avoid injuries caused by high pressure and oil blowouts.



WARNING

Before beginning any maintenance, repair or disassembly to the hydraulic system and DYNASET product, ensure that the hydraulic system is stopped and depressurized. Make sure that the system can not start accidentally.

NOTE!

When you do any maintenance to the hydraulic system, keep the components clean. This ensures safe, reliable and long-life operation of your equipment.

When you work with the hydraulic system, wear appropriate protective clothing, safety goggles, gloves, ear protection.

1.2 HYDRAULIC FLUIDS

A wide range of standard hydraulic fluids can be used with the DYNASET hydraulic
é. Depending on the operating temperature, the following mineral hydraulic oils are recommended:

Mineral hydraulic oil	Operation temperature up to
ISO VG 32S	60°C (140°F)
ISO VG 46S	70°C (158°F)
ISO VG 68S	80°C (176°F)

WARNING

Recommended oil viscosity is between 10 and 35 cSt when operating at normal operating temperature.

Synthetic and bio-oils can also be used if their viscosity characteristics and lubricating efficiency are similar to mineral oils. Automatic transmission fluids and even engine oils can be used, provided that they are allowed to be used in hydraulic system of your base machine.

For the hydraulic fluid change interval, obey the base machine's maintenance instructions.

To use special hydraulic fluids with DYNASET equipment, contact the nearest DYNASET representative for more information.

2. ADD-ON VALVES

2.1 GENERAL

DYNASET Add-on valves are valve blocks that are easy to install on Dynaset product. They are installed straight on the product.

Add-on valves simplify installation of Dynaset products. Many times certain valves, like pressure limiters or flow reduction valves, are required for safe installation. Now the valve is easy to install straight on the Dynaset product's hydraulic motor.

Add-on valves need fewer hoses. This means space savings, reduced risk of leaks and breakdowns and also reduced need for service.

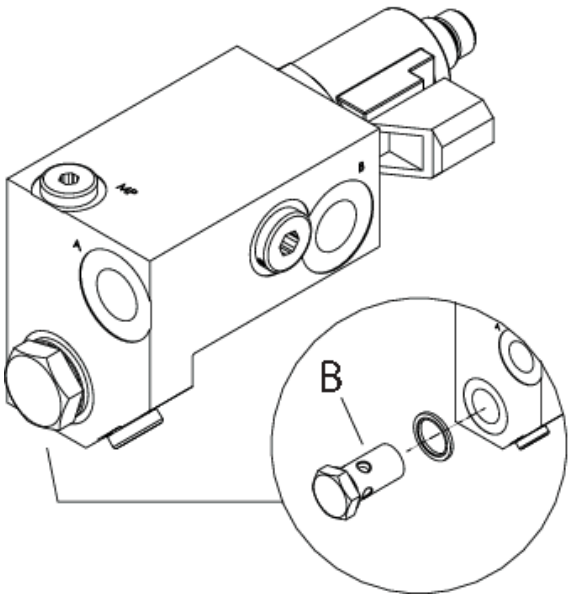
2.2 TECHNICAL SPECIFICATIONS

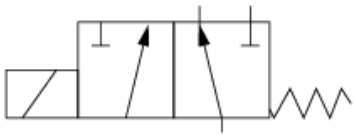
Currently there are two types of Add-On valves types available, pressure relief and directional valves with different options and configurations.

Add-On Valves are available for following Dynaset products and models.

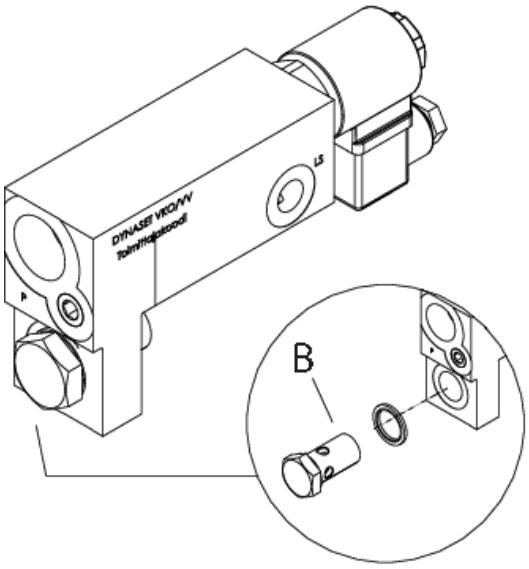
- **HG Hydraulic Generators IP23 50Hz**
  - HG3,5S-E230SE23-15-VF
  - HG5S-E230SE23-21-VF
  - HG6,5E-E400SS23-34-VF
  - HG10E-E400SS23-49-VF
  - HG12F-E400SS23-54-VF
- **HG Hydraulic Generators IP54 50Hz**
  - HG4,1W-E230SE54-25-VF
  - HG6,6W-E400ST54-34-VF
  - HG10,1W-E400ST54-49-VF
  - HG12,1W-E400ST54-54-VF
- **HG Hydraulic Generators IP23 60Hz**
  - HG3,7S-U120ST23-18-U
  - HG6E-U120PZ23-30-U
  - HG8E-U240PZ23-40-U
  - HG14F-U240PZ23-58-U
- **HG Hydraulic Generators DC**
  - HG1kW-14VDC23-12-K
  - HG2kW-28VDC23-24-K
- **HWG Hydraulic Welding Generators**
  - HWG 180/6 kVA-34-VF
  - HWG 220/6 kVA-49-VF
  - HWG 300/10 kVA-54-VF
- **HMG PRO Hydraulic Magnet Generators**
  - HMG PRO 3kW-220VDC-21
  - HMG PRO 6kW-220VDC-34
  - HMG PRO 10kW-220VDC-49

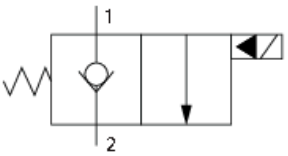
2.2.1 FLOW LIMITER VALVES



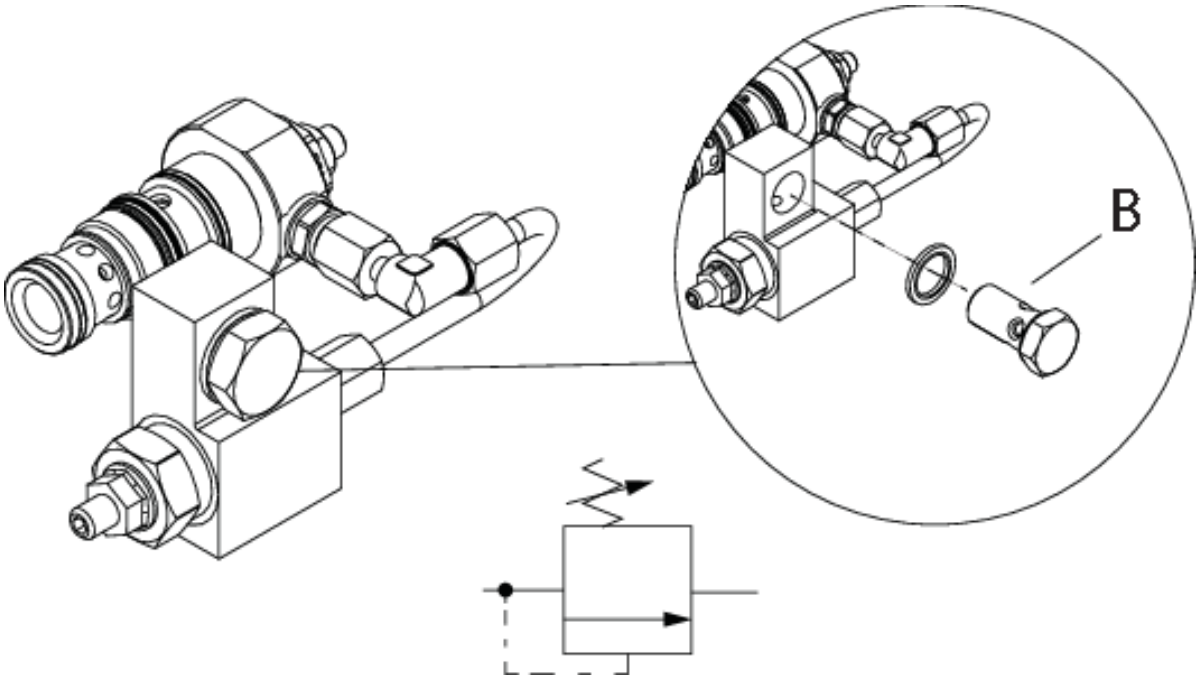


TECHNICAL SPECIFICATIONS		SV50-3/2-D3007-12/24V
Function		3 WAY SOLENOID VALVE
Pressure max.	**bar (psi)**	210 (3'046) Δ 4 (58)
Flow max.	**l/min (gpm)**	50 (13.21)
Solenoid voltage	**VDC**	12 / 24
Connection screw B torque	**Nm (ft-lbs)**	102 (75.3)





TECHNICAL SPECIFICATIONS		SV70-2/2-D3007-12V/24V
Function		2 WAY SOLENOID VALVE WITH INTEGRATED FLOW CONTROL
Pressure max.	**bar (psi)**	300 (4'351)
Flow max.	**l/min (gpm)**	70 (18.49) Δ 15 (218)
Solenoid voltage	**VDC**	12 / 24
Connection screw B torque	**Nm (ft-lbs)**	102 (75.3)



TECHNICAL SPECIFICATIONS		PR-D3007
Function		PRESSURE RELIEF VALVE FOR D3007
Pressure max.	**bar (psi)**	250 (3'626)
Connection screw B torque	**Nm (ft-lbs)**	47 (34.7)

2.3 INSTALLATION

First check the availability and fit to a Dynaset product you are planning to install the add-on valve.

Currently add-on valves area available for following Dynaset products and models:

Product	Model
HG Hydraulic Generators	HG3.5 - HG19

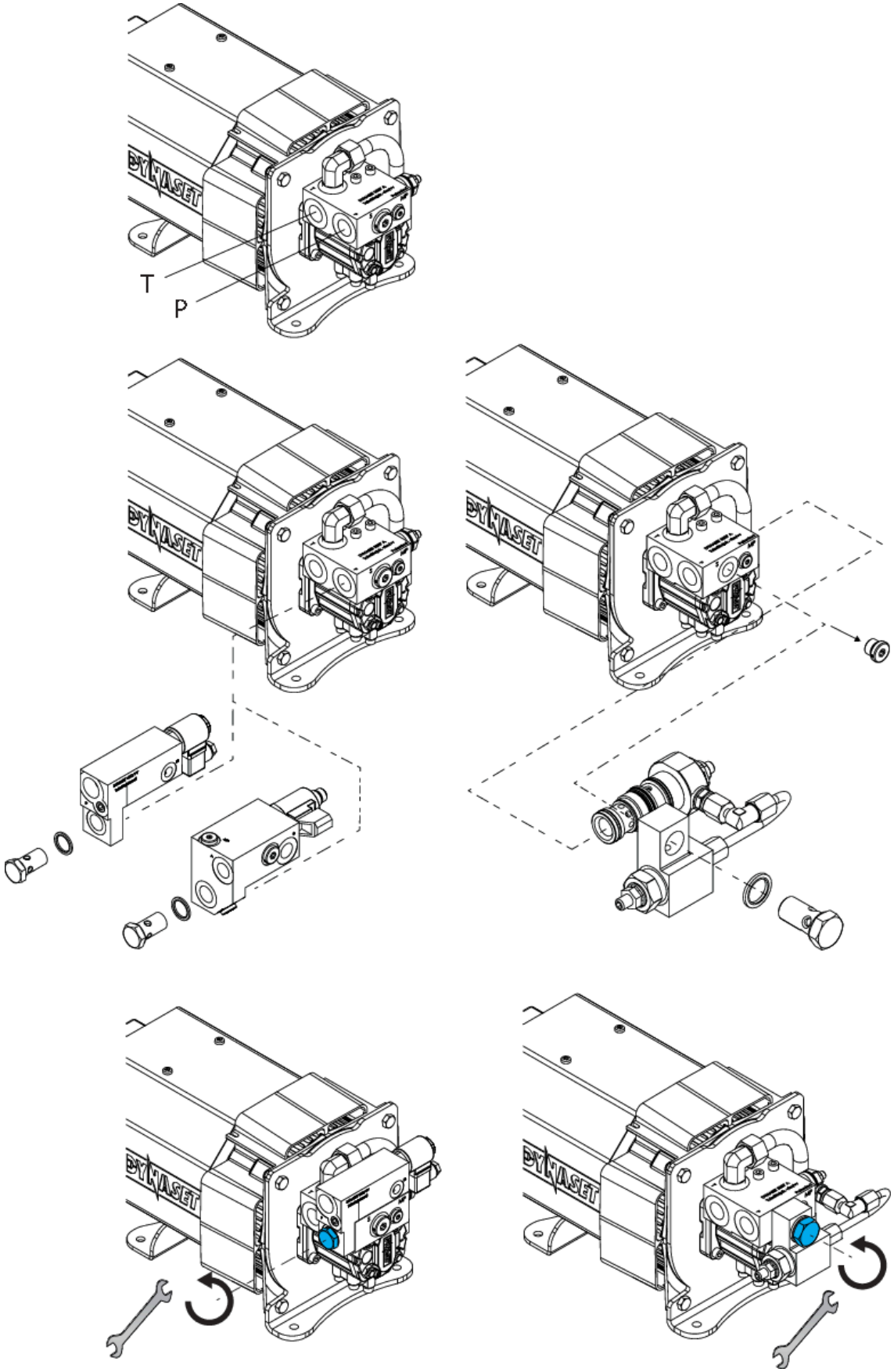
2.3.1 INSTALLATION ON A HG HYDRAULIC GENERATOR

If you install the add-on valves on a HG Hydraulic Generator that has already been installed on a hydraulic system, contact Dynaset or Dynaset dealer to ensure proper changes and suitability before installation.

To install HG Hydraulic generator on a new system with Add-on valves:

1. Make sure that the base machine's hydraulic system is turned off.
2. Find the right hydraulic ports P and T on the hydraulic motor when you install the flow limiter valves. If the installation is to the FLC-valve, locate the ports to connect the pressure relief valve for FLC.
3. Install the Add-on valve on the hydraulic motor. Make sure that the right ports align and all the seals are in their place.
4. Connect the Add-on valve and tighten the valves to demanded torque. You find the specific torques from technical specifications in chapter 3.
5. If needed, connect other solenoid valves and electric connections.

The add-on valve is now installed and ready to be connected to the hydraulic system of the base machine.


T
P

2.3.2 HYDRAULIC FLUIDS

Wide range of standard hydraulic fluids can be used with the DYNASET hydraulic equipment. Depending on the operating temperature, following mineral hydraulic oils are recommended:

MINERAL HYDRAULIC OIL	OPERATION TEMPERATURE UP TO
ISO VG 32S	60 °C (140 °F)
ISO VG 46S	70 °C (158 °F)
ISO VG 68S	80 °C (176 °F)

Synthetic and bio oils can also be used if their viscosity characteristics and lubricating efficiency are corresponding to the mineral oils.

Automatic transmission fluids and even engine oils can be used, provided that they are allowed to be used in the hydraulic system of your base machine.

Hydraulic fluid change interval is according to the base machine's maintenance instructions. To use special hydraulic fluid with DYNASET equipment, contact nearest DYNASET representative for advice.

2.4 SPARE PARTS

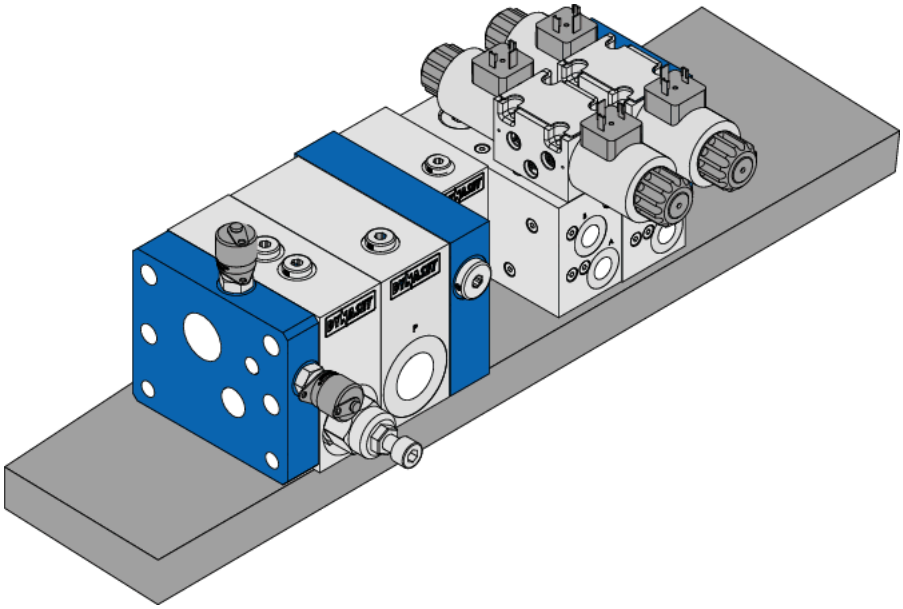
PART NO.	DESIGNATION	DETAILS
V100113106	SV70 – 2/2 - D3007 12VDC	12V valve
V100113107	SV70 – 2/2 - D3007 24VDC	24V valve
V1300476100	Pressure Relief Valve	175-350 bar - 20 lpm

3. HMV VALVES

3.1 GENERAL

DYNASET HMV modular installation valves are designed for compact and efficient hydraulic mobile applications. HMV is modular and easy to assemble from the different valve blocks. Multiple valve blocks are available; solenoid valves, pressure relief and pressure reducing valves, and also different flow control valves.

Modular construction needs fewer hoses and connections. This means space savings, reduced risk of leaks and breakdowns and also less service. Using multiple blocks user increases the cost efficiency of his hydraulic system.



3.2 INSTALLATION

3.2.1 INSTALLATION TO DIFFERENT HYDRAULIC SYSTEMS

Typical installation to following hydraulic systems is described in this chapter

- Hydraulic system with variable displacement pump
- Hydraulic system with a fixed displacement pump

If you need more information about installing the HMV valves to a different hydraulic system than listed above, contact DYNASET.

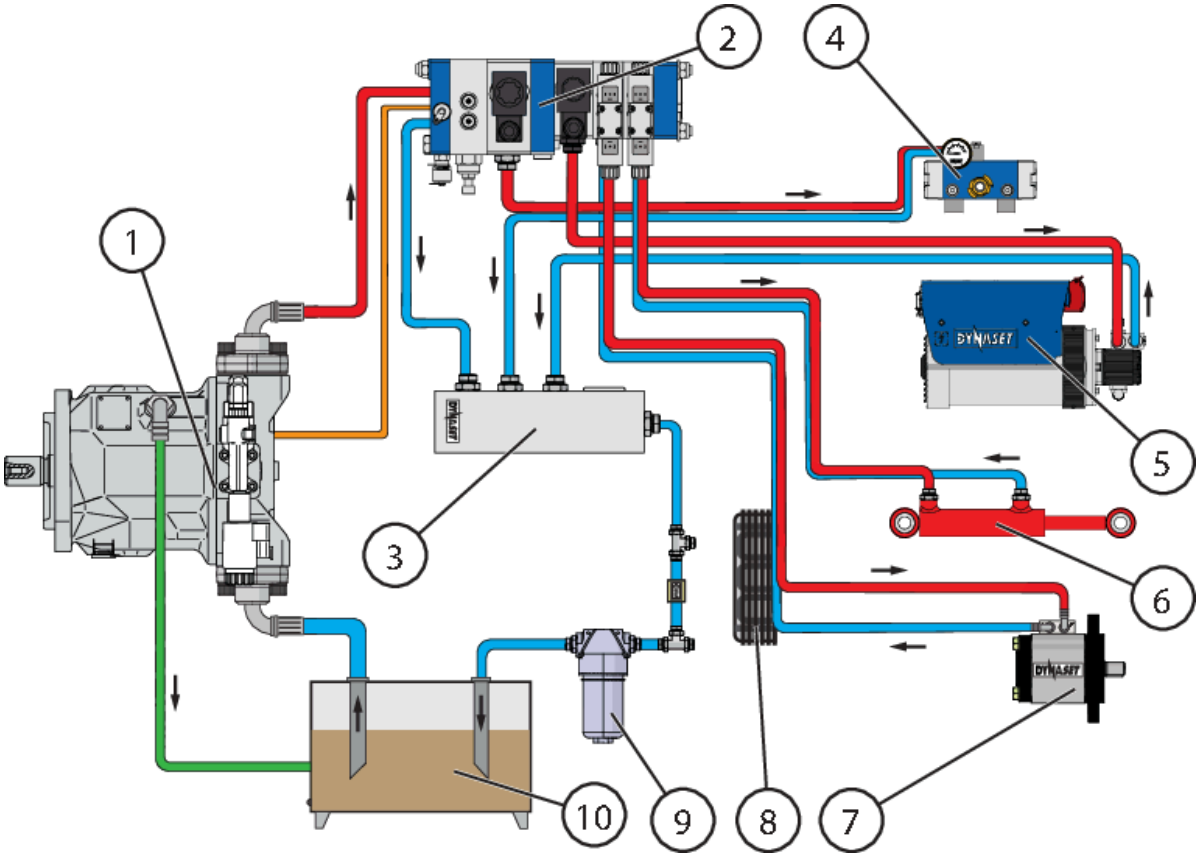
If you are unsure of the hydraulic system, contact the manufacturer of your base machine.

Next paragraphs describe the hydraulic systems in more detail.

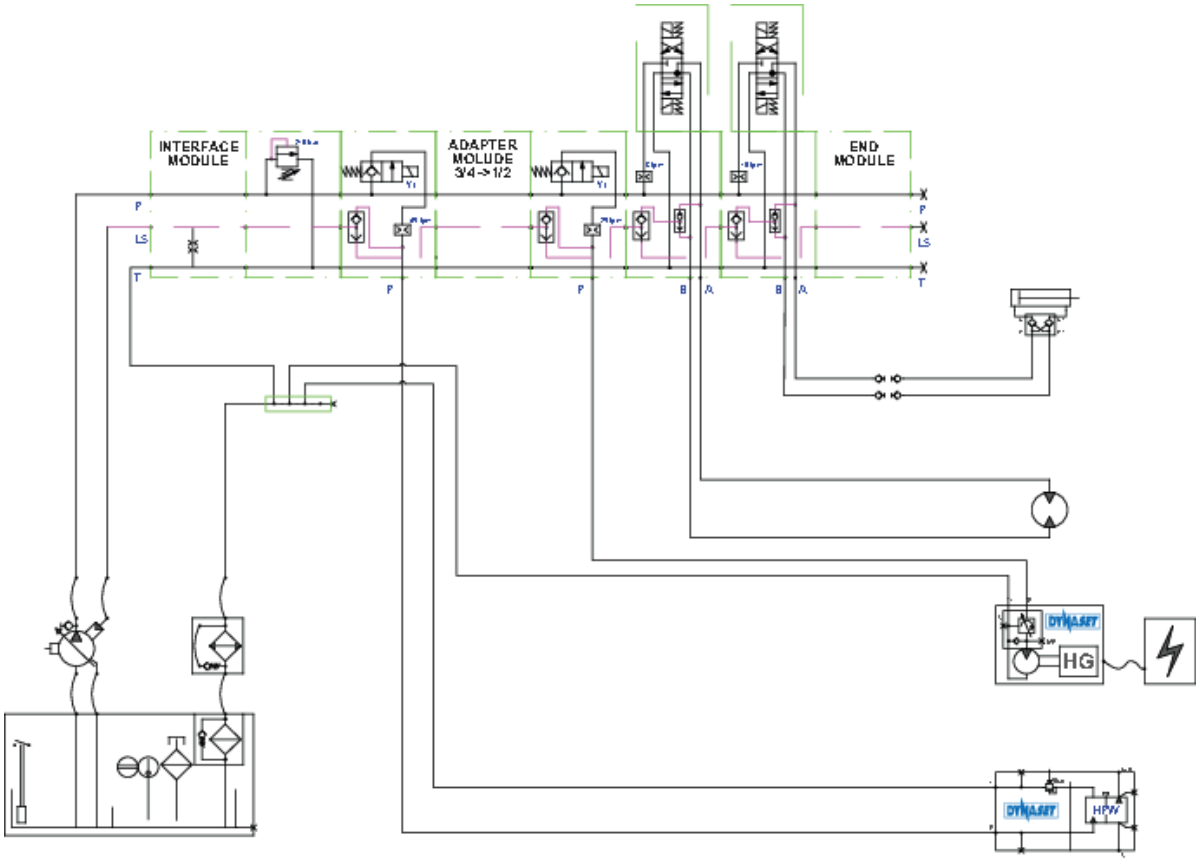
3.2.2 HYDRAULIC SYSTEM WITH LOAD SENSING VARIABLE DISPLACEMENT PUMP

Hydraulic system that has a variable-displacement pump the flow rate and output pressure adjusts automatically based on the load of the hydraulic system.

Placement of the HMV in described system:



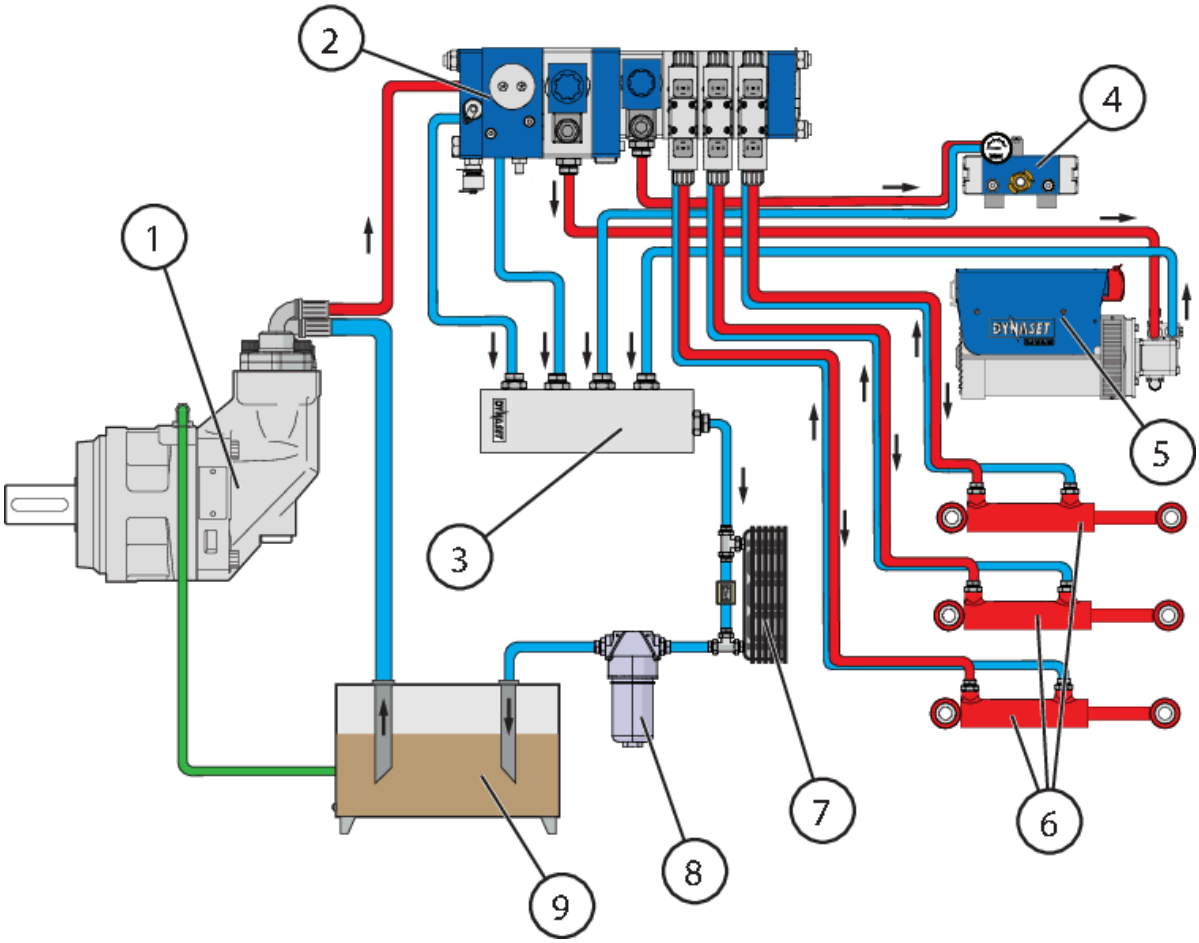
- 1. Base machine's variable displacement pump
- 2. DYNASET HMV installation valves
- 3. DYNASET PLT return block
- 4. DYNASET HPW Hydraulic high pressure water pump
- 5. DYNASET HG hydraulic generator
- 6. Hydraulic cylinder
- 7. DYNASET hydraulic equipment
- 8. Oil cooler
- 9. Oil filter
- 10. Oil tank


INTERFACE MODULE
ADAPTER MOLUDE 3/4 -> 1/2
END MODULE
P
LS
T
A
B
HG
HPW

3.2.3 HYDRAULIC SYSTEM WITH FIXED DISPLACEMENT PUMP

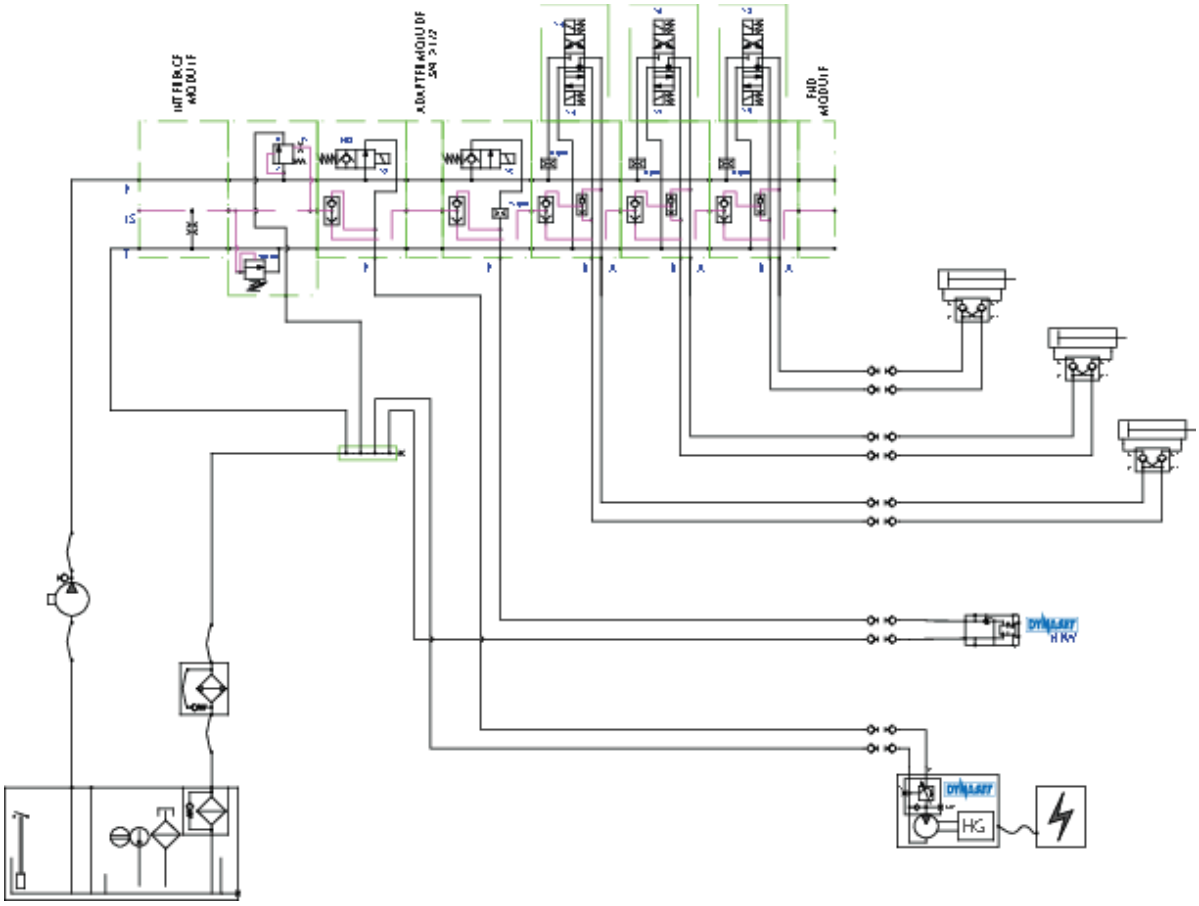
Hydraulic system that has the fixed displacement pump the oil flow from the pump is fixed. Every stroke of the hydraulic motor moves the same amount of oil. The output flow is function of the motor's rpm and pump's displacement.

Placement of the HMV in the described system:



- 1. Base machine's fixed displacement pump
- 2. DYNASET HMV installation valves
- 3. DYNASET PLT return block
- 4. DYNASET HPW Hydraulic high pressure water pump
- 5. DYNASET HG hydraulic generator
- 6. Hydraulic cylinder
- 7. Oil cooler

- 8. Oil filter
- 9. Oil tank



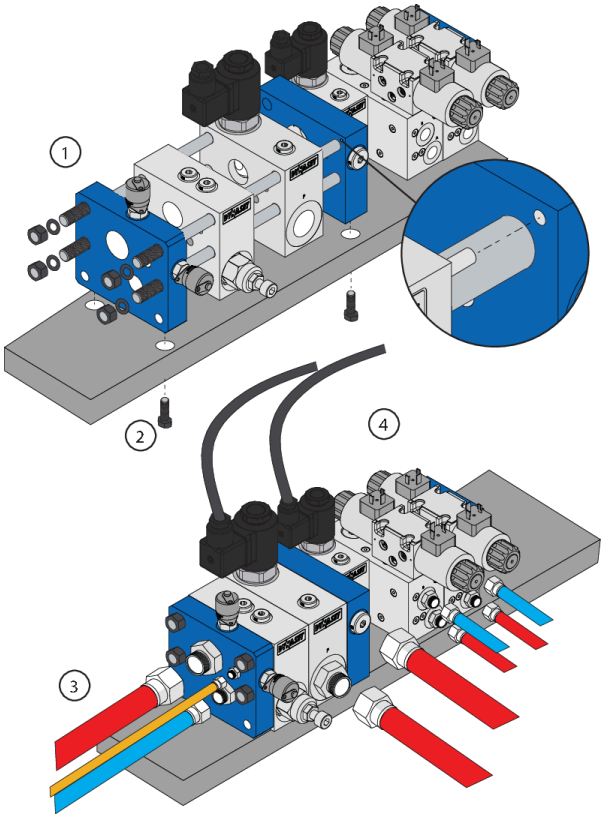
3.2.4 INSTALLATION OF THE HMV VALVES

1. Assemble the HMV valves accordingly. The guide tabs help in pre-assembling the unit. Make sure that you insert all the seals and tighten the connection bolts, thread rods and screws to the recommended torque.

2. Install the HMV to its place in the base machine. Use M10x15mm bolts.

3. Connect the Pressure (P), Tank (T) and LS-lines (if LS is required) to the HMV valves and to the PLT return block (if included).

4. Connect the control voltages to the solenoid valves (if included).



5. When you have installed the HMV valves, start the base machine's engine and turn on the hydraulic system.

6. Check all the connections and the blocks in the HMV valve assembly to ensure there are no leaks.

3.2.5 HYDRAULIC FLUIDS

Wide range of standard hydraulic fluids can be used with the DYNASET hydraulic equipment. Depending on the operating temperature, following mineral hydraulic oils are recommended:

MINERAL HYDRAULIC OIL	OPERATION TEMPERATURE UP TO
ISO VG 32S	60 °C (140 °F)
ISO VG 46S	70 °C (158 °F)
ISO VG 68S	80 °C (176 °F)

Synthetic and bio oils can also be used if their viscosity characteristics and lubricating efficiency are corresponding to the mineral oils.

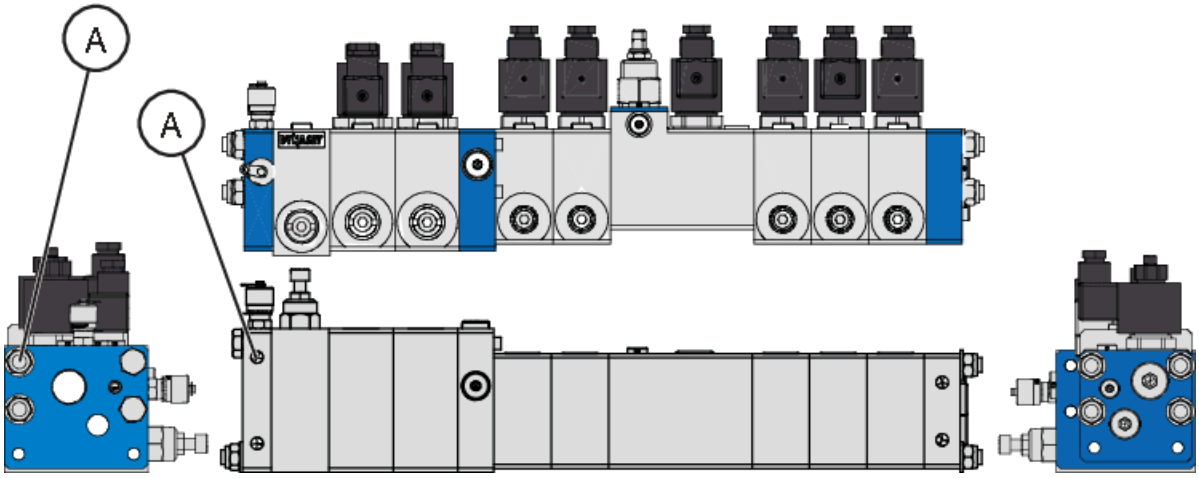
Automatic transmission fluids and even engine oils can be used, provided that they are allowed to be used in the hydraulic system of your base machine.

Hydraulic fluid change interval is according to the base machine's maintenance instructions. To use special hydraulic fluid with DYNASET equipment, please contact nearest DYNASET representative for advice.

3.3 TECHNICAL SPECIFICATIONS & SPARE PARTS

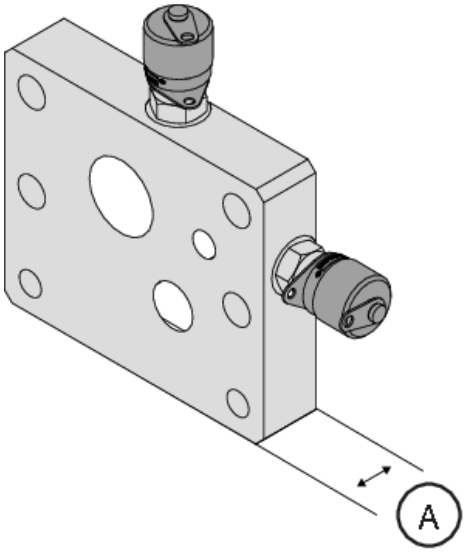
3.3.1 TECHNICAL SPECIFICATIONS

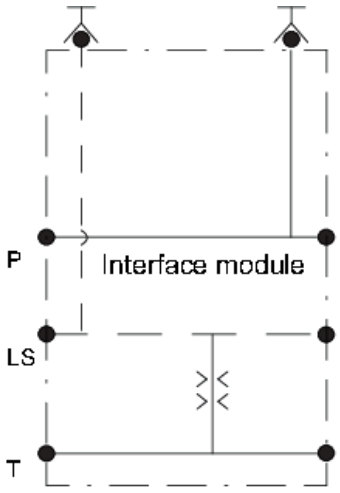
HMV modular installation valves are usually pre-assembled at Dynaset according to customer's needs. Otherwise, HMV module slices are either stacked together with standard screws or thread rods (10.9) and nuts. Recommended tightening torque for M10 bolts is 45 Nm.



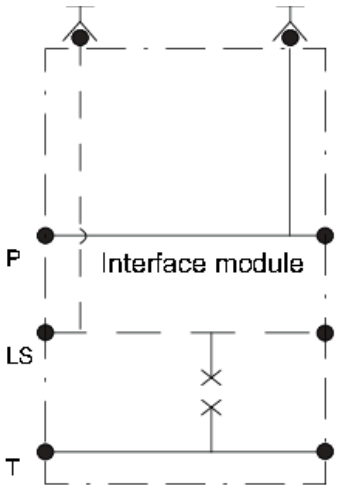
A = M10, 45 Nm

3.3.1.1 MODULES





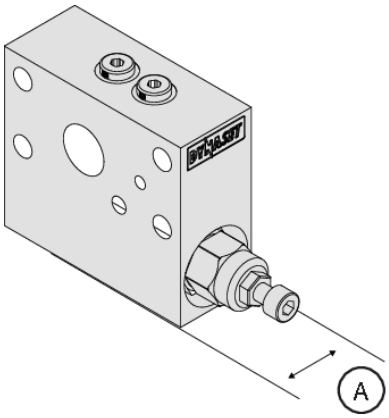
Without PC-PR valve

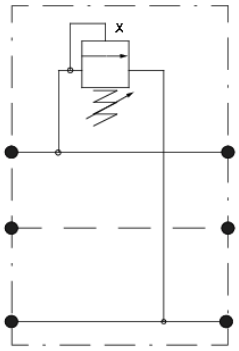


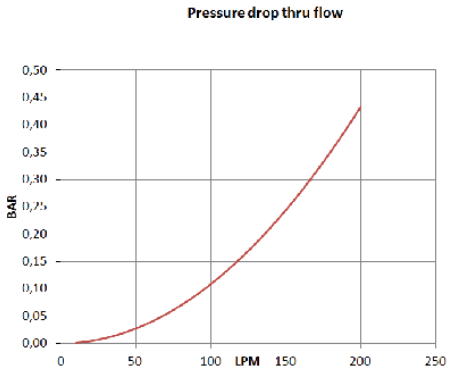
With PC-PR valve

INTERFACE MODULES

Technical Specification		HMV-3/4-INTERFACE-MODULE-ST
Measurement A	mm (in)	20 (0.8)
HYDRAULIC CONNECTIONS		
P		R3/4
T		R3/8
LS		R1/8
Measuring couplings		2x M16x2

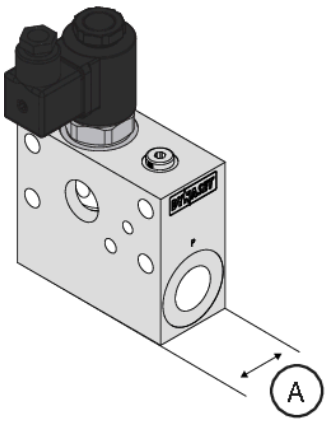


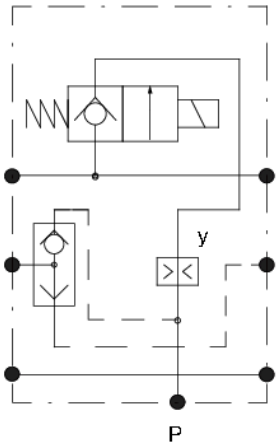


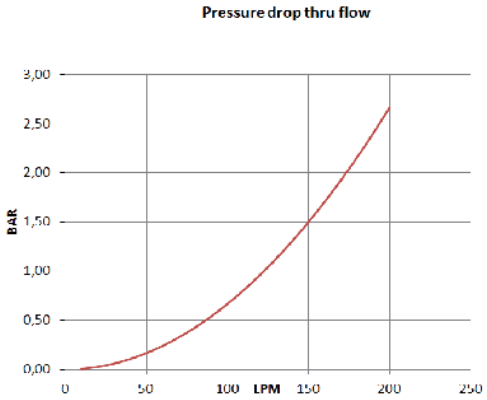


PRESSURE SHOCK RELIEF MODULE

Technical Specification	HMV-3/4-PRxx-ST
Measurement A	mm 40 (1.6) (in)
HYDRAULIC CHARACHTERISTIC	
Pressure max.	bar 315 (4'569) (psi)
Pressure drop through the block	bar 0.3 (4) (psi)
Rated flow for pressure relief	l/ 40 (10.57) min (gpr

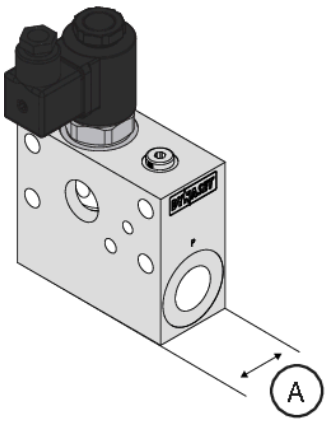


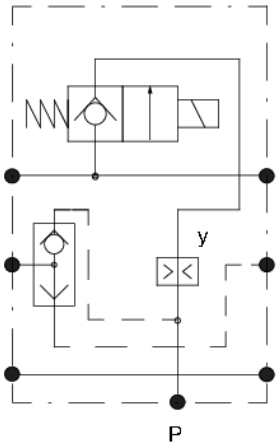


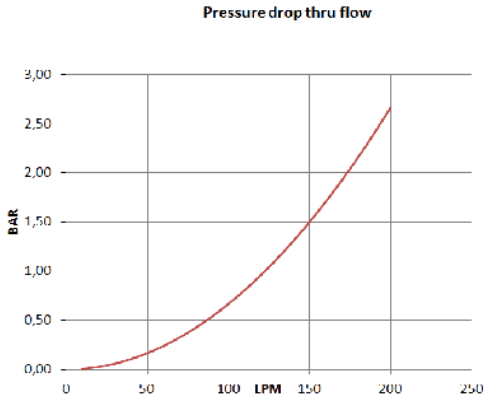


FLOW CONTROL VALVE AND 2/2 DIRECTIONAL VALVE

Technical Specification	HMV-3/4-2/2-VRxx-xxV-ST MODULE
Measurement A	mm 45 (1.8) (in)
HYDRAULIC CHARACHTERISTIC	
Pressure max.	bar 250 (3'626) (psi)
Pressure drop through the block	bar 0.3 (4) (psi)
Pressure drop through On/Off Valve	bar 4.4 (64) @ 90 (23.78) l/min (gpm) (psi) 12.2 (177) @ 150 (39.63) l/min (gpm)
Flow out	l/ 20- 86 min (gpr
Coil Voltage	VDC 12 24

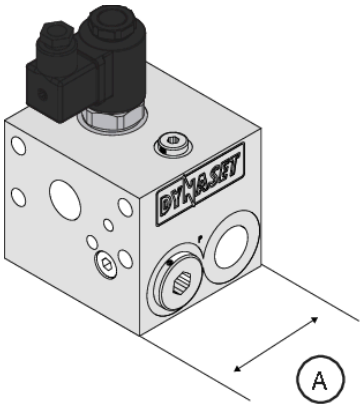


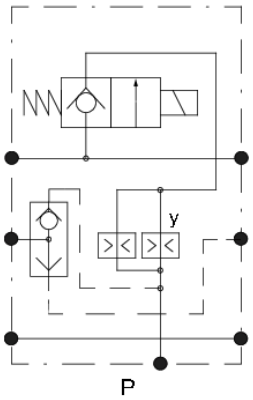


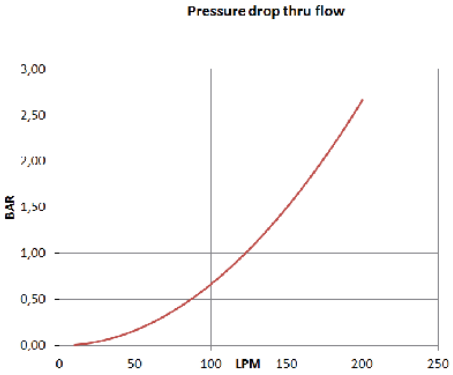


FLOW CONTROL VALVE AND 2/2 DIRECTIONAL VALVE

Technical Specification		HMV-3/4-2/2-VRxx-xxV-ST MODULE
Measurement A	mm (in)	45 (1.8)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	350 (5'076)
Pressure drop through the block	bar (psi)	0.3 (4) @ 150 (39.63) l/min (gpm)
Pressure drop through On/Off Valve	bar (psi)	4.4 (64) @ 90 (23.78) l/min (gpm) 12.2 (177) @ 150 (39.63) l/min (gpm)
Flow out	l/min (gpm)	20- 150
Coil Voltage	VDC	12 24

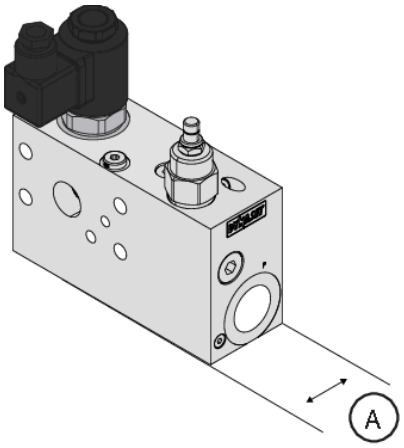


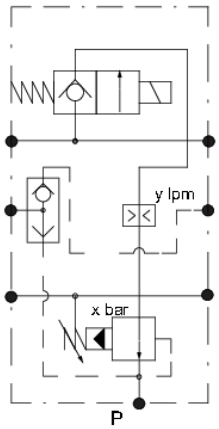


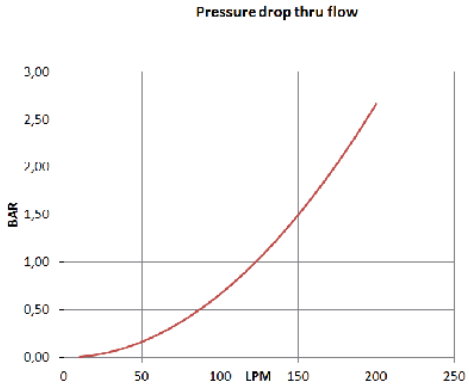


FLOW CONTROL AND PRESSURE REDUCING VALVE

Technical Specification		HMV-3/4-2/2-2x VRxx-xxV-ST
Measurement A	mm (in)	90 (3.5)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	250 (3'626)
Pressure drop through the block	bar (psi)	0.3 (4) @ 150 (39.63) l/min (gpm)
Pressure drop through On/Off Valve	bar (psi)	4.4 (64) @ 90 (23.78) l/min (gpm) 12.2 (177) @ 150 (39.63) l/min (gpm)
Flow out	l/min (gpm)	88- 150
Coil Voltage	VDC	12 24

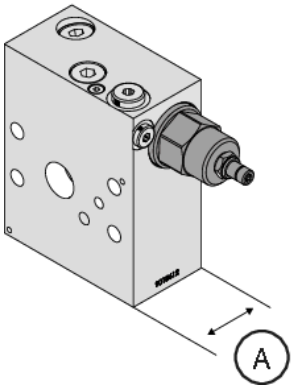


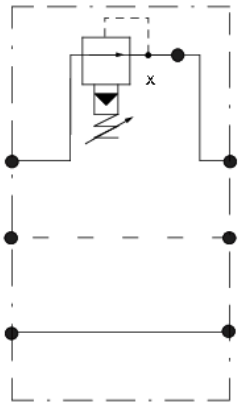


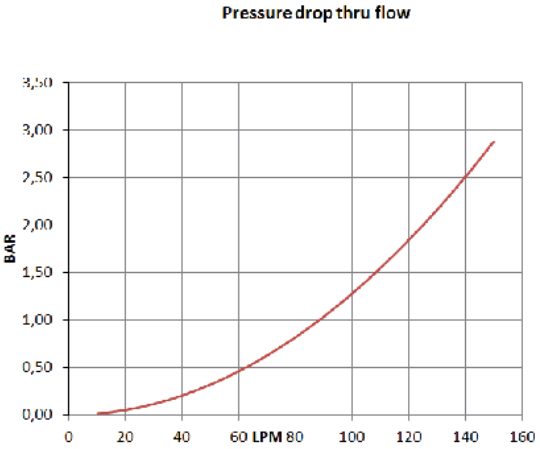


FLOW CONTROL AND PRESSURE REDUCING VALVE

Technical Specification		HMV-3/4-2/2-VRxx-PAxx-xxV-ST
Measurement A	mm (in)	60 (2.4)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	250 (3'626)
Pressure adjustment	bar (psi)	7 (102) - 210 (3'046)
Pressure drop through the block	bar (psi)	0.3 (4) @ 150 (39.63) l/min (gpm)
Pressure drop through On/Off Valve	bar (psi)	4.4 (64) @ 90 (23.78) l/min (gpm)
Pressure drop through pressure reducing valve	bar (psi)	16.4 (238) @ 90 (23.78) l/min (gpm) 12.2 (177) @ 150 (39.63) l/min (gpm)
Flow out	l/min (gpm)	20- 86
Coil Voltage	VDC	12 24

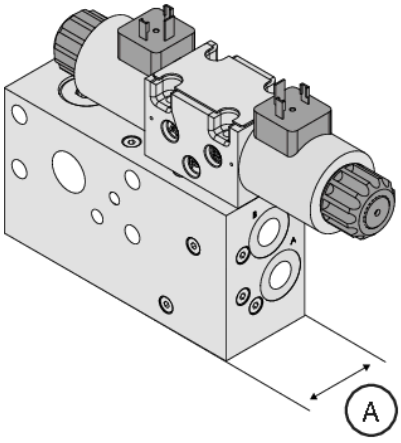


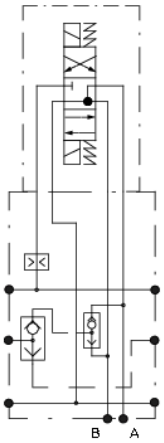


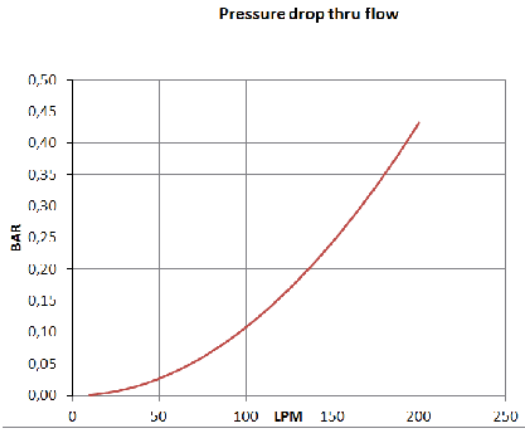


FLOW CONTROL AND PRESSURE REDUCING 2/2 DIRECTIONAL VALVE

Technical Specification		HMV-3/4-2/2-PAxx-ST
Measurement A	mm (in)	55 (2.2)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	250 (3'626)
Pressure adjustment	bar (psi)	7 (102) - 210 (3'046)
Pressure drop through the block	bar (psi)	0.3 (4) @ 150 (39.63) l/min (gpm)
Pressure drop through pressure reducer	bar (psi)	16.4 (238) @ 90 (23.78) l/min (gpm)

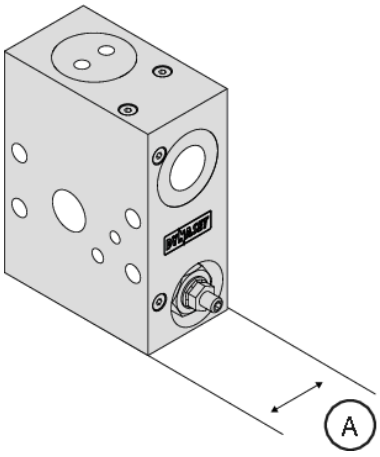


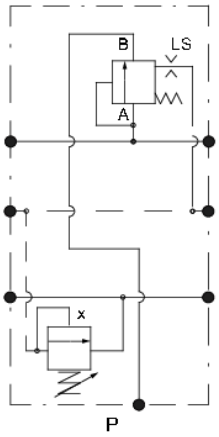


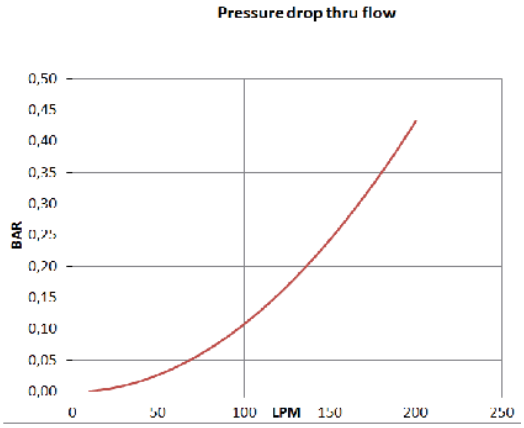


FLOW CONTROL AND 4/3 DIRECTIONAL VALVE

Technical Specification		HMV-3/4-4/3 CETOP 03 Y-VRxx-xxV-ST
Measurement A	mm (in)	55 (2.2)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	250 (3'626)
Pressure drop through the block	bar (psi)	0.3 (4) @ 150 (39.63) l/min (gpm)
Flow out with flow limiter	l/min (gpm)	8- 40
Flow out without flow limiter	l/min (gpm)	60 (15.85)
Coil Voltage	VDC	12 24
Directional valve		Different options

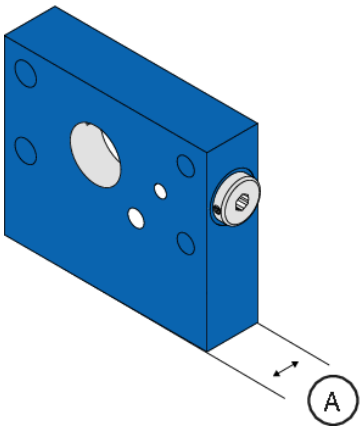


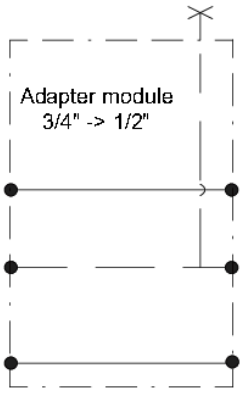


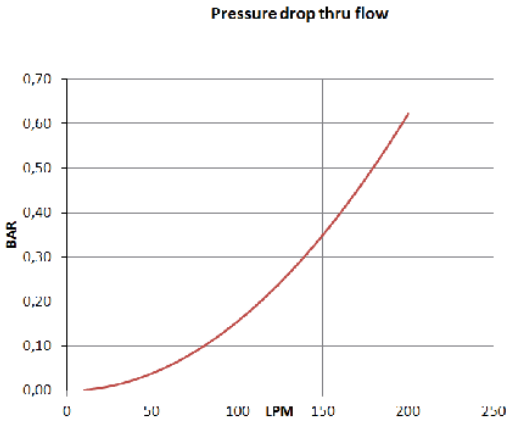


PRESSURE COMPENSATOR AND PRESSURE RELIEF VALVE

Technical Specification		HMV-3/4-PC-PR-ST
Measurement A	mm (in)	55 (2.2)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	250 (3'626)
Pressure drop through the block	bar (psi)	0.3 (4) @ 150 (39.63) l/min (gpm)
Pressure difference A - B	bar (psi)	13.5 (196)
LS Pressure control	bar (psi)	35 (508) - 350 (5'076)
Flow out	l/min (gpm)	( )

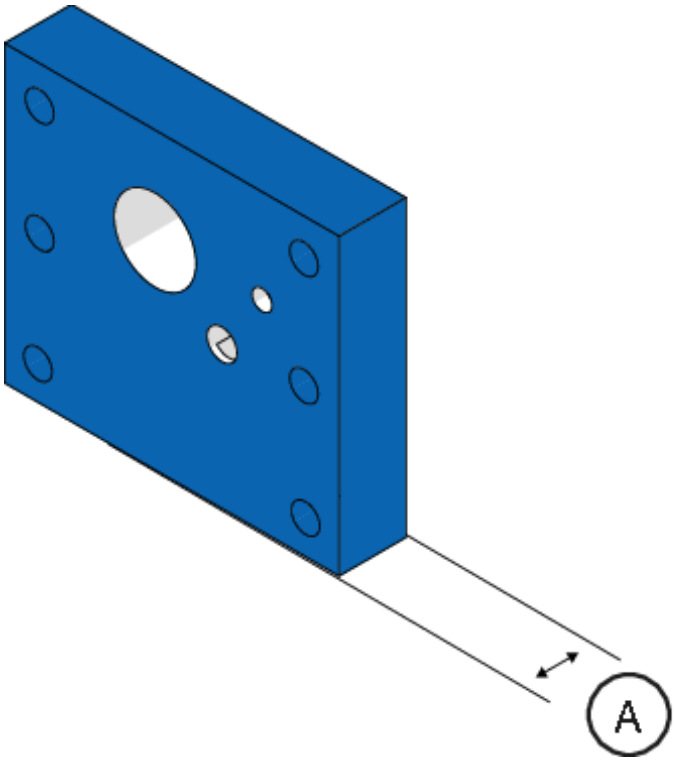


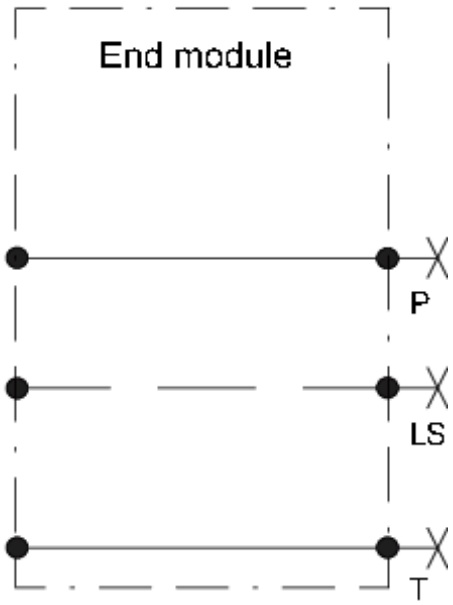




ADAPTER MODULE

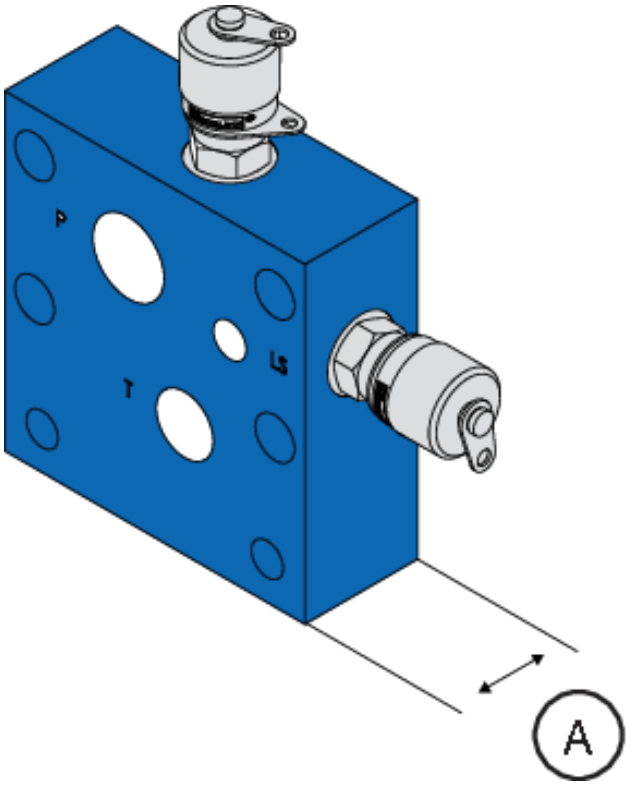
Technical Specification		HMV-3/4-1/2-ADAPTER MODULE
Measurement A	mm (in)	25 (1.0)
HYDRAULIC CONNECTIONS		
LS		R1/4
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	250 (3'626)
Pressure drop*	bar (psi)	0.35 (5) @ 150 (39.63) l/min (gpm)

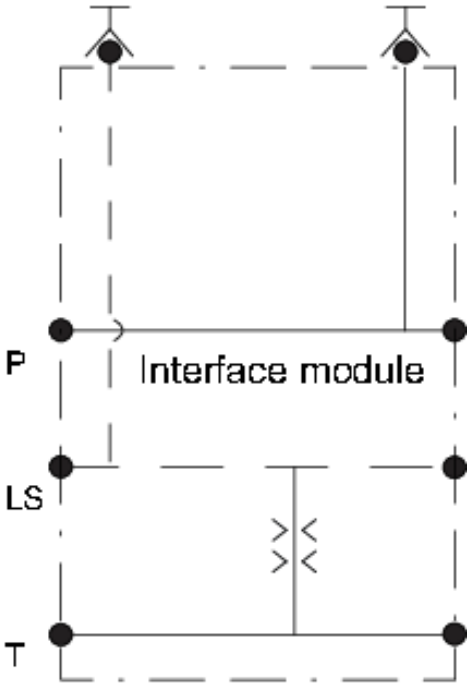




END MODULE

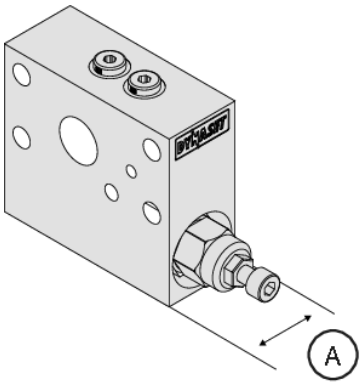
Technical Specification		HMV-3/4-END MODULE-ST
A	mm (in)	20 (0.8)
HYDRAULIC CONNECTIONS		
P		R3/4
T		R3/8
LS		R1/8

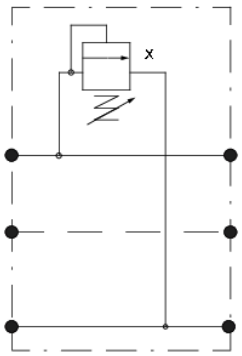


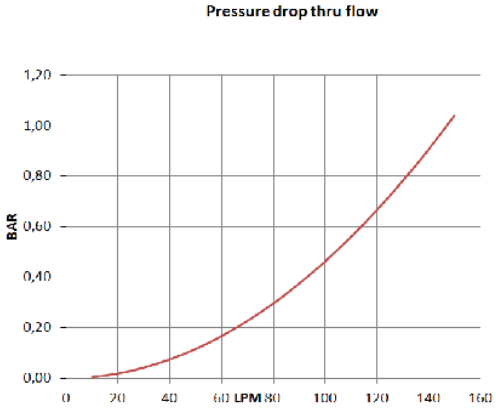


INTERFACE MODULE

Technical Specification		HMV-1/2-INTERFACE MODULE-ST
A	mm (in)	30 (1.2)
HYDRAULIC CONNECTIONS		
P		R1/2
T		R3/8
LS		R1/8
Measuring couplings		M16x2

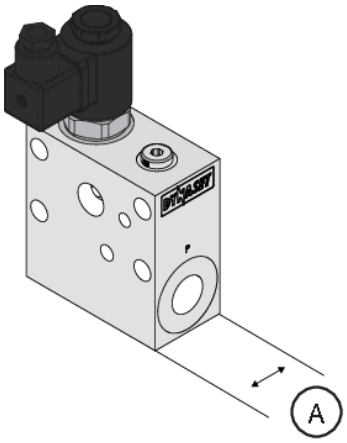


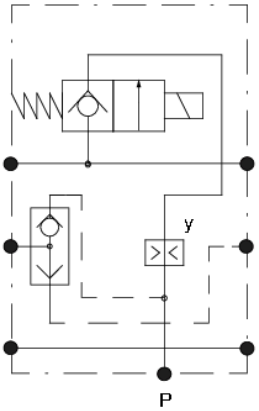


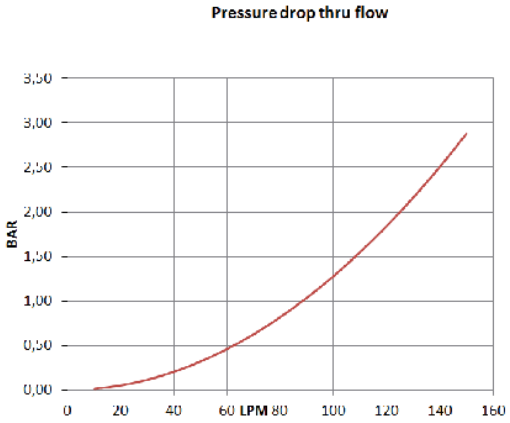


PRESSURE SHOCK RELIEF VALVE

Technical Specification		HMV-1/2-PRxx-ST
Measurement A	mm (in)	40 (1.6)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	250 (3'626)
Pressure adjustment	bar (psi)	35 (508) - 350 (5'076)
Pressure drop through the block	bar (psi)	0.3 (4) @ 70 (18.49) l/min (gpm)
Rated flow for pressure relief	l/min (gpm)	20 (5.28)

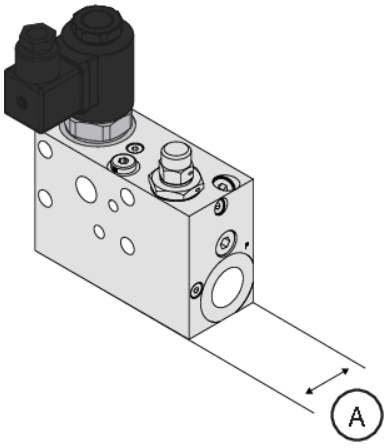


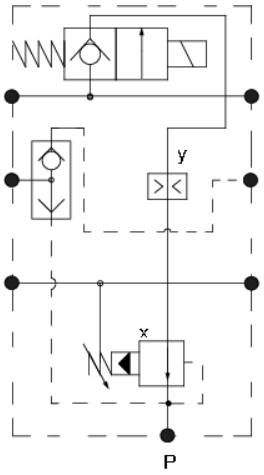


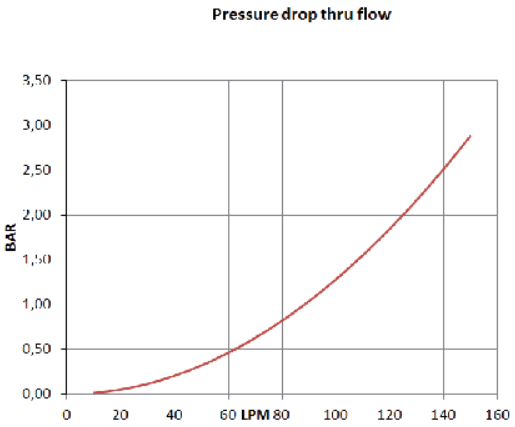


FLOW CONTROL AND 2/2 DIRECTIONAL VALVE

Technical Specification		HMV-1/2-2/2-VRxx-xxV-ST
Measurement A	mm (in)	40 (1.6)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	250 (3'626)
Pressure drop through the block	bar (psi)	0.3 (4)@ 70 (18.49) l/min (gpm)
Pressure drop through On/Off Valve	bar (psi)	9.5 (138)@ 70 (18.49) l/min (gpm)
Flow out	l/ min (gpr	8- 40
Coil Voltage	VDC	12 24

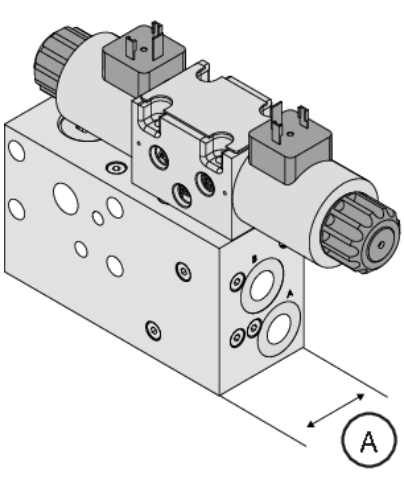


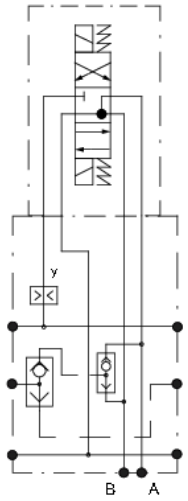


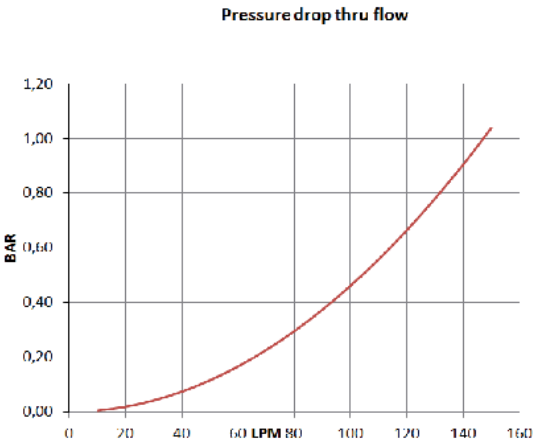


FLOW CONTROL, PRESSURE REDUCING 2/2 DIRECTIONAL VALVE

Technical Specification	HMV-1/2-2/2-VRxx-PAxx-xxV-ST
Measurement A	mm 50 (2.0) (in)
HYDRAULIC CHARACHTERISTIC	
Pressure max.	bar 250 (3'626) (psi)
Pressure adjustment	bar 70 (1'015) - 210 (3'046) (options: 30 (435) - 140 (2'031), 30 (435) - 140 (2'031)) (psi)
Pressure drop through the block	bar 0.3 (4) @ 70 (18.49) l/min (gpm) (psi)
Pressure drop through On/Off Valve	bar 9.5 (138) @ 70 (18.49) l/min (gpm) (psi)
Pressure drop through pressure reducer	bar 7 (102) @ 40 (10.57) l/min (gpm) (psi)
Flow out	l/ 8- 40 min (gpr
Coil Voltage	VDC 12 24

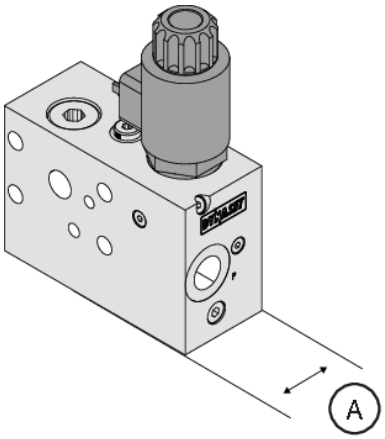


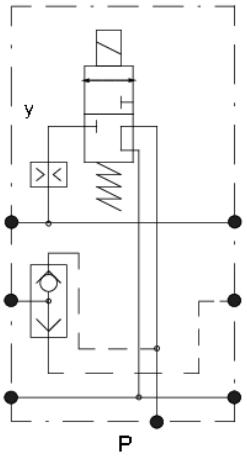


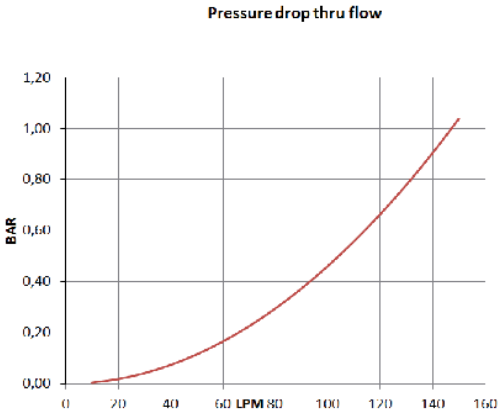


FLOW CONTROL VALVE, PRESSURE REDUCING VALVE AND 4/3 DIRECTIONAL VALVE

Technical Specification		HMV-1/2-4/3 CETOP 03 Y-VRxx-xxV-ST
Measurement A	mm (in)	55 (2.2)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	250 (3'626)
Pressure drop through the block	bar (psi)	0.3 (4) @ 70 (18.49) l/min (gpm)
Flow out with flow limiter	l/ min (gpr	8- 40
Flow out without flow limiter	l/ min (gpr	60 (15.85)
Coil Voltage	VDC	12 24
Directional valve		Different options

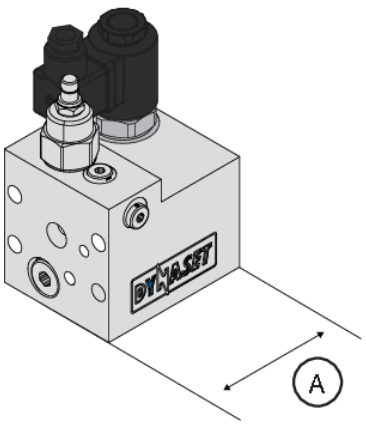


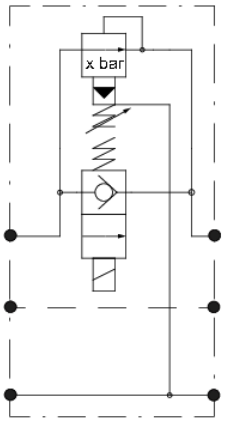


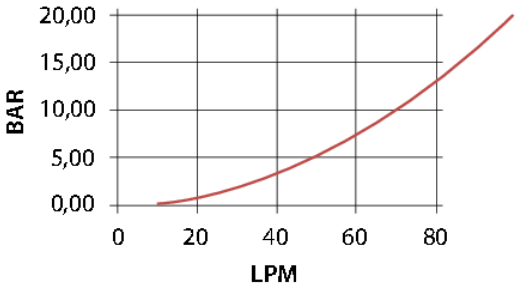


3/2 DIRECTIONAL FLOW CONTROL VALVE

Technical Specification	HMV-1/2-3/2-VRxx-xxV-ST
Measurement A	mm 55 (2.2) (in)
HYDRAULIC CHARACHTERISTIC	
Pressure max.	bar 250 (3'626) (psi)
Pressure drop through the block	bar 0.3 (4) @ 70 (18.49) l/min (gpm) (psi)
Pressure drop through directional valve	bar 7.5 (109) @ 70 (18.49) l/min (gpm) (psi)
Flow out	l/ 8- 40 min (gpr
Coil Voltage	VDC 12 24

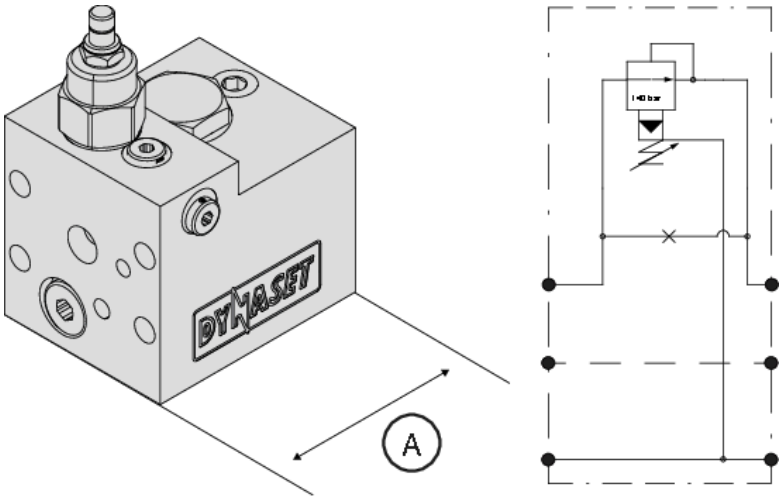


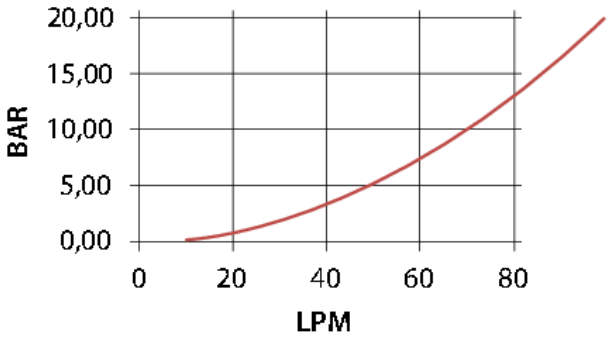




PRESSURE REDUCING 2/2 DIRECTIONAL VALVE

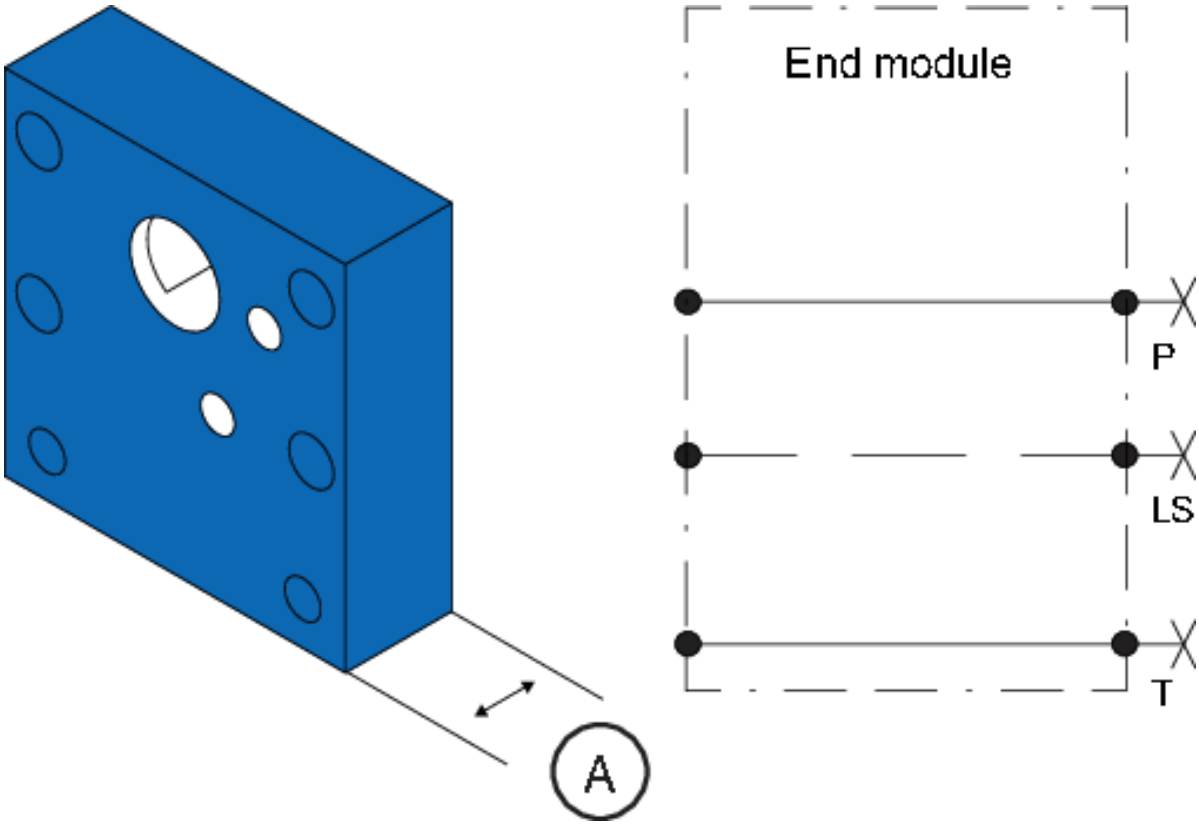
Technical Specification	HMV-1/2-3/2-VRxx-xxV-ST
Measurement A	mm 55 (2.2) (in)
HYDRAULIC CHARACHTERISTIC	
Pressure max.	bar 250 (3'626) (psi)
Pressure adjustment	bar ( ) - ( ) (psi)
Pressure drop through On/Off valve	bar 0.3 (4) - 70 (1'015) @ 70 (18.49) l/min (gpm) (psi)
Pressure drop through pressure reducer	bar ( ) @ 70 (18.49) l/min (gpm) (psi)
Coil Voltage	VDC 12 24





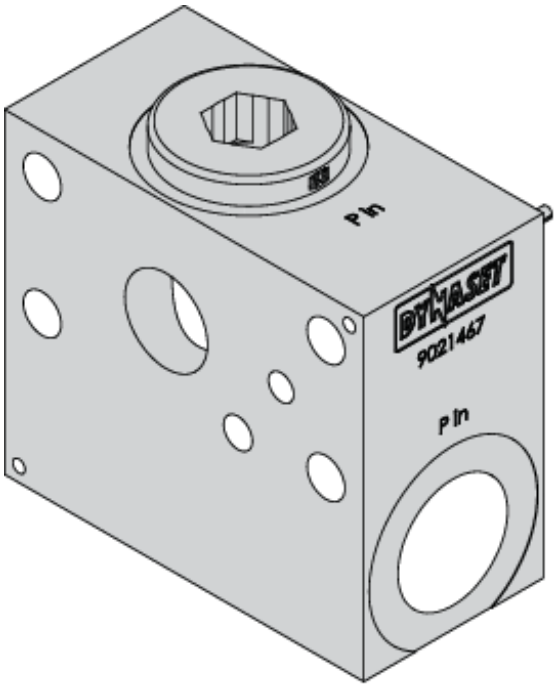
PRESSURE REDUCING VALVE

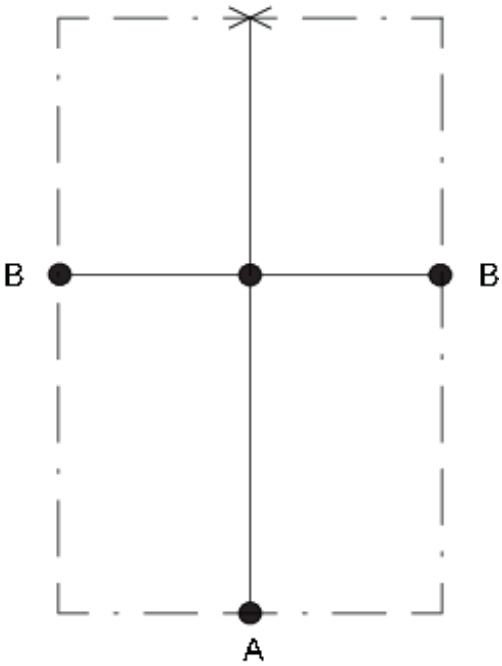
Technical Specification	HMV-1/2-PAxx-ST
Measurement A	mm 100 (3.9) (in)
HYDRAULIC CHARACHTERISTIC	
Pressure max.	bar 250 (3'626) (psi)
Pressure adjustment	bar 7 (102) - 210 (3'046) (psi)
Pressure drop through pressure reducer	bar 10 (145) @ 70 (18.49) l/min (gpm) (psi)



END MODULE

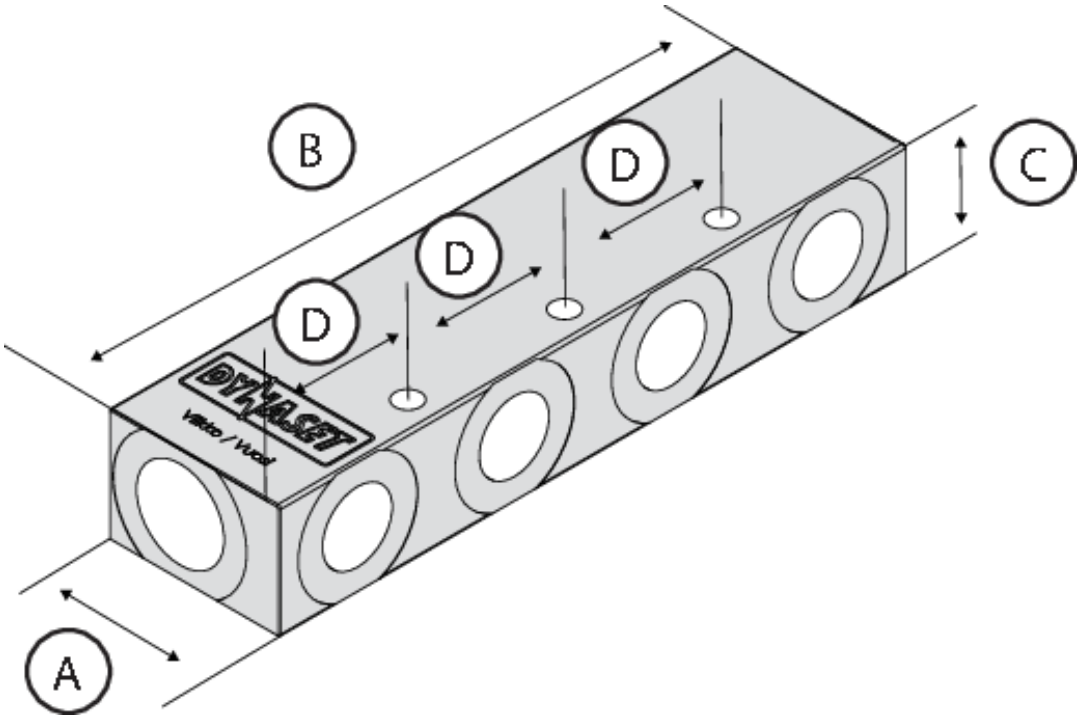
Technical Specification		HMV-1/2-END MODULE-ST
A	mm (in)	25 (1.0)
HYDRAULIC CONNECTIONS		
P		R1/2
T		R3/8
LS		R1/8





MIDDLE CONNECTION BLOCK

Technical Specification		HMV-3/4-MIDDLE CONNECTION BLOCK 2xR1-ST
A	mm (in)	50 (2.0)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	350 (5'076)
Flow max.	l/min (gpm)	( )
HYDRAULIC CONNECTIONS		
Input A		1x R1
Input B		2x R1



RETURN TERMINAL BLOCK

Technical Specification		PLT R1-3x R3/4 RETURN TERMINAL BLOCK
A	mm (in)	60 (2.4)
B	mm (in)	( )
C	mm (in)	38 (1.5)
D	mm (in)	55 (2.2)
HYDRAULIC CHARACHTERISTIC		
Pressure max.	bar (psi)	30 (435)
HYDRAULIC CONNECTIONS		
Input		3x R3/4 4 x R3/4 5x R3/4
Output		R1

Return terminal makes possible to direct all HMV module tank lines into one block guarantee reliable and centralized return piping. Optional available by request.

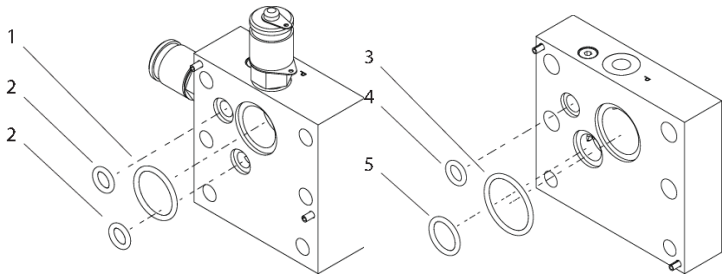
3.3.2 SPARE PARTS

PART NO.	DESIGNATION	DETAILS
V100416010*	HMV 1/2 HMV 3/4 front interface HMV 3/4	Universal Seal kit
V100416140	HMV	Quick coupler for measure-ment gauge
V100416150	HMV 3/4 - PR	Pressure relief valve
V100416155	HMV 1/2 - 12V	Valve catridge kit**
V100416160	HMV 3/4- 24V	Valve catridge kit**
V100416165	HMV 1/2 - 12V	Valve catridge kit**
V100416170	HMV 3/4 - 24V	Valve catridge kit**

* 1 Seal kit / block

** Includes connector

3.3.2.1 SEAL KIT INSTALLATION



POS.	PART NUM-BER	QTY	DESCRIPTION	DETAILS 1	DETAILS 2
	V100416010				Includes Pos. 1-5
1	*	1	O-RING	22.30 x 2.40	HMW 1/2 Front inter-face

POS.	PART NUMBER	QTY	DESCRIPTION	DETAILS 1	DETAILS 2
2	*	2	O-RING	8.30 x 2.40	HMW 1/2 Front interface
3	*	1	O-RING	27.30 x 2.40	HMW 3/4 Front interface
4	*	1	O-RING	8.30 x 2.40	HMW 3/4 Front interface
5	*	1	O-RING	15.30 x 2.40	HMW 3/4 Front interface

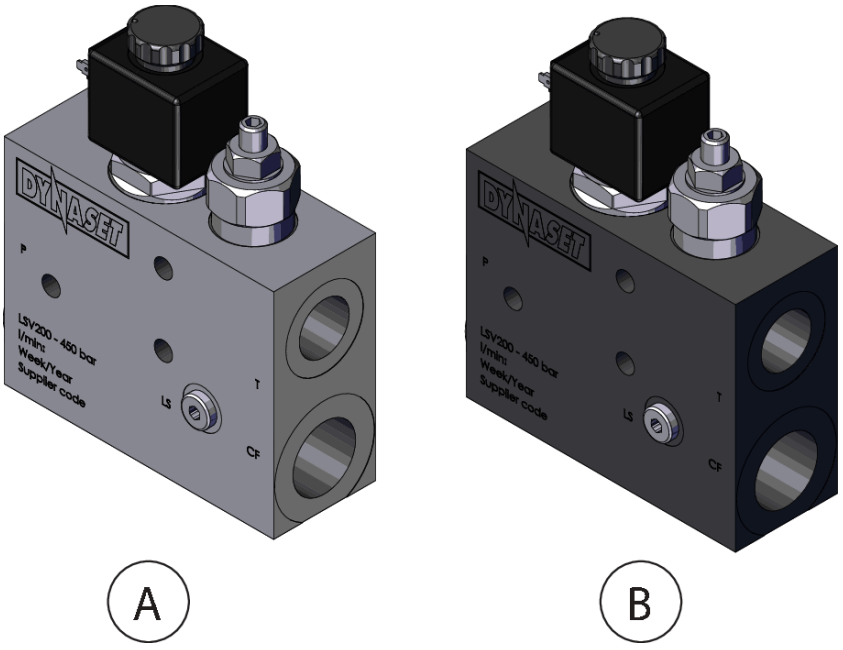
4. LSV VALVES

4.1 GENERAL

4.1.1 APPLICATIONS

DYNASET LSV load sensing valves enable easy and reliable installation of a DYNASET product to any type of hydraulic system. It lets you operate your DYNASET unit simultaneously with other hydraulic equipment that are installed into the base machine's hydraulic system. DYNASET LSV-valve ensures the prioritised and non-fluctuating hydraulic flow to your DYNASET unit. The LSV valves are designed to work together with hydraulic pumps' control.

LSV valves are available as standard version and HD version. Standard version is appliable up to 350 bar (5'076 psi) pressure applications. The HD version is designed for up to 450 bar (6'527 psi) applications. The HD models are recognizable from their black surface color.

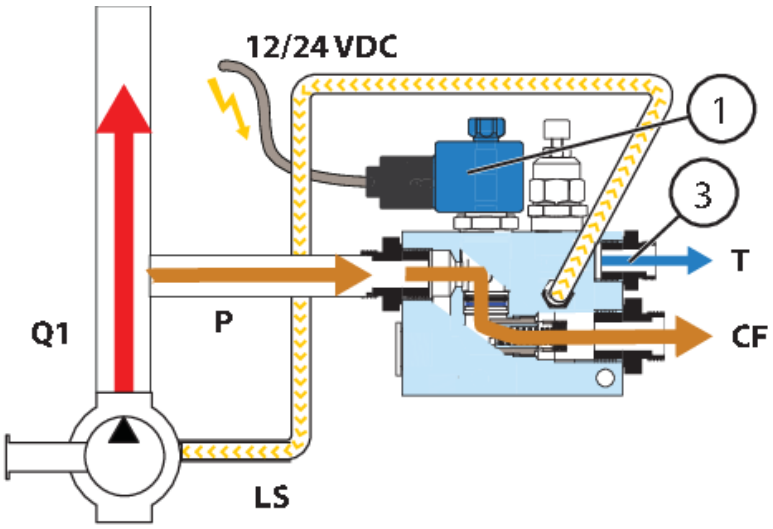


A B

A = Standard Model

B = HD Model

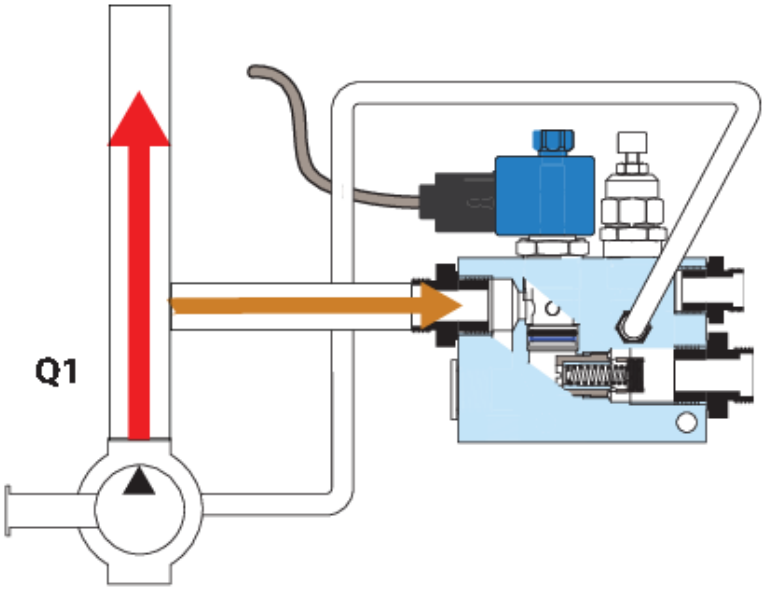
4.1.2 OPERATING PRINCIPLE



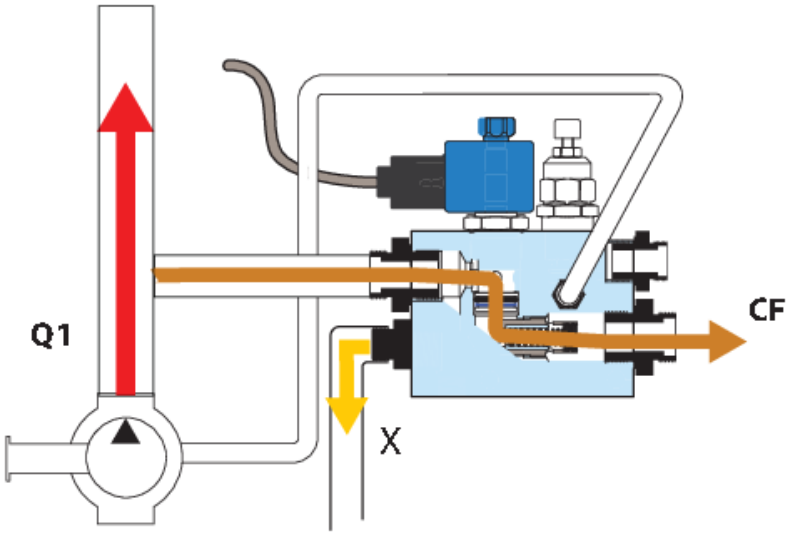
1. When the solenoid valve is open, the prioritised control flow (CF) is directed to start the appliance.

2. The CF flow is controlled and stabilized by the LS-pressure to the corrected level.

3. The Pressure relief valve opens the flow to the tank line, when the pressure increases too high. It protects the appliance from having too much pressure.



When the solenoid valve is closed, the CF flow to the appliance stops and the main flow (Q1) from the pump is not altered, and the whole hydraulic flow is available to the rest of the system.

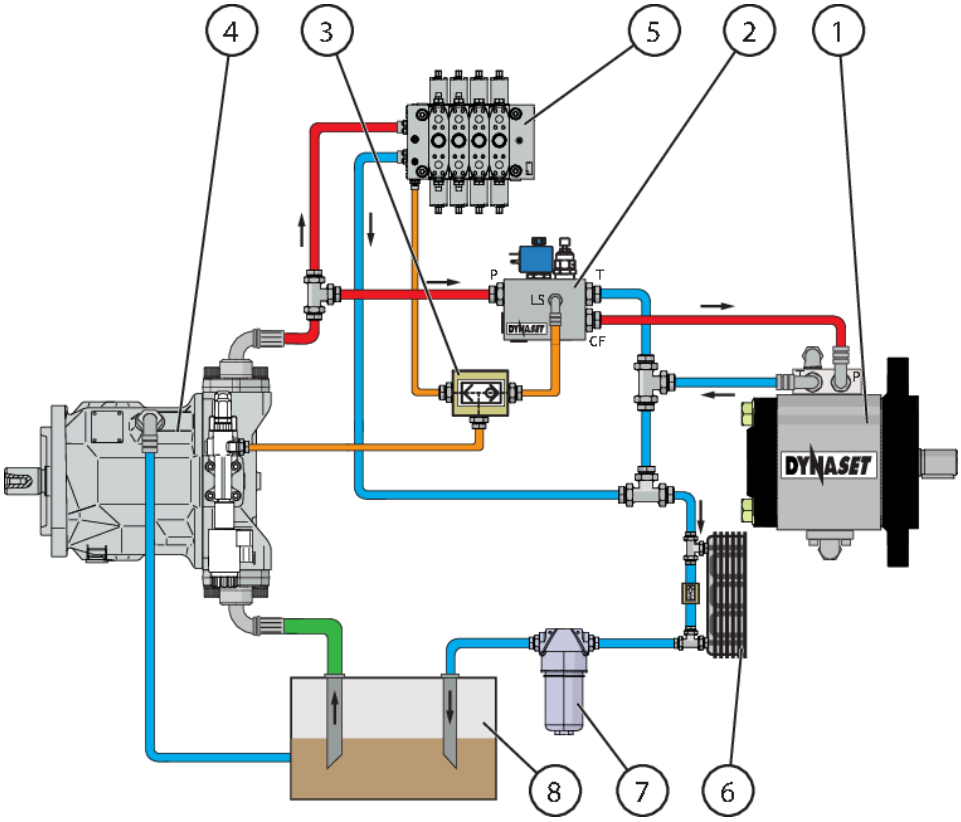


Also, additional equipment can be attached to the X port that is normally plugged. From this port the flow is controlled by the On/Off solenoid valve, not by the VR flow limiter valve. X port can be used simultaneously with the CF port.

4.2 INSTALLATION

4.2.1 BASIC INSTALLATION DIAGRAM WITH SHUTTLE VALVE IN LS-LINE

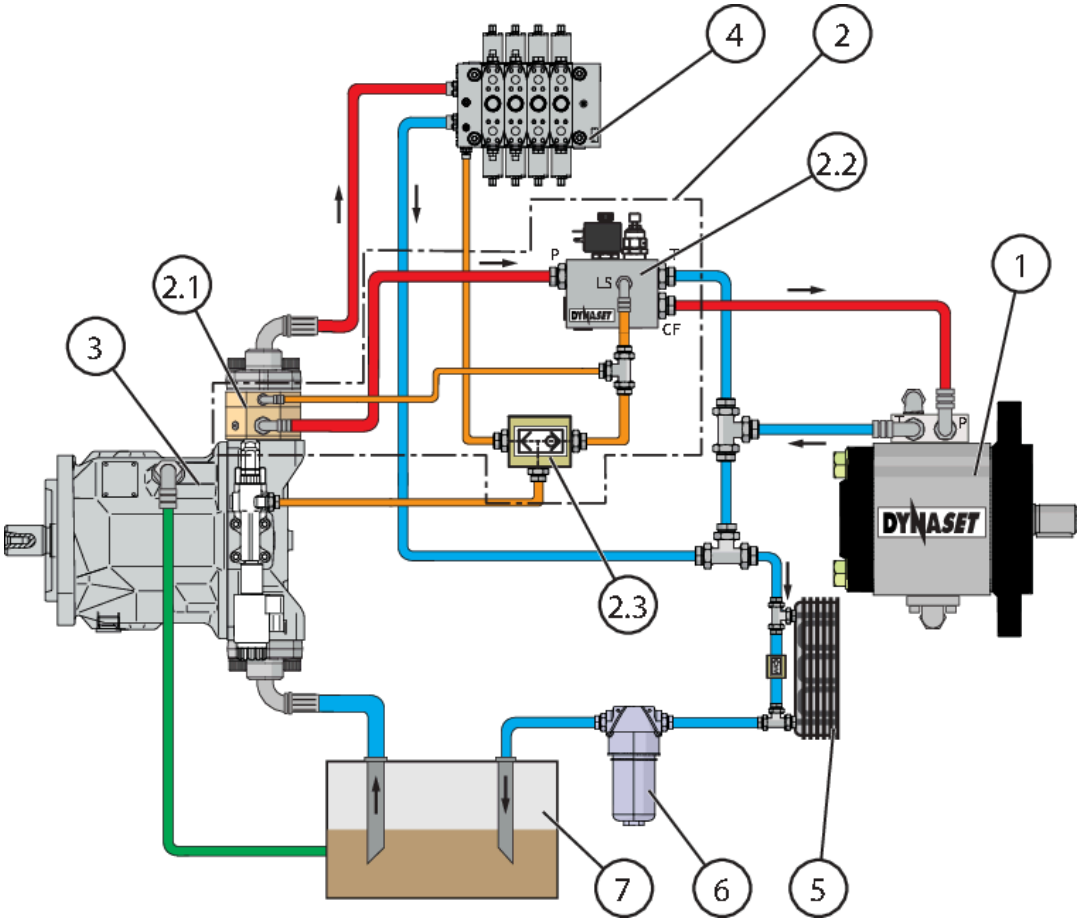
The shuttle valve is an optional accessory available by request only.



1. DYNASET hydraulic equipment
2. DYNASET LSV Load Sensing valve
3. DYNASET Shuttle valve (optional)
4. Base machine's variable displacement pump
5. Closed centre directional control valves
6. Oil cooler
7. Oil filter
8. Oil tank

4.2.2 INSTALLATION DIAGRAM TO SYSTEM WITH PARALLEL LS-CONNECTION

This installation diagram is for reference only. Take contact to DYNASET in need for more information. The shuttle valve is an optional accessory available by request only.



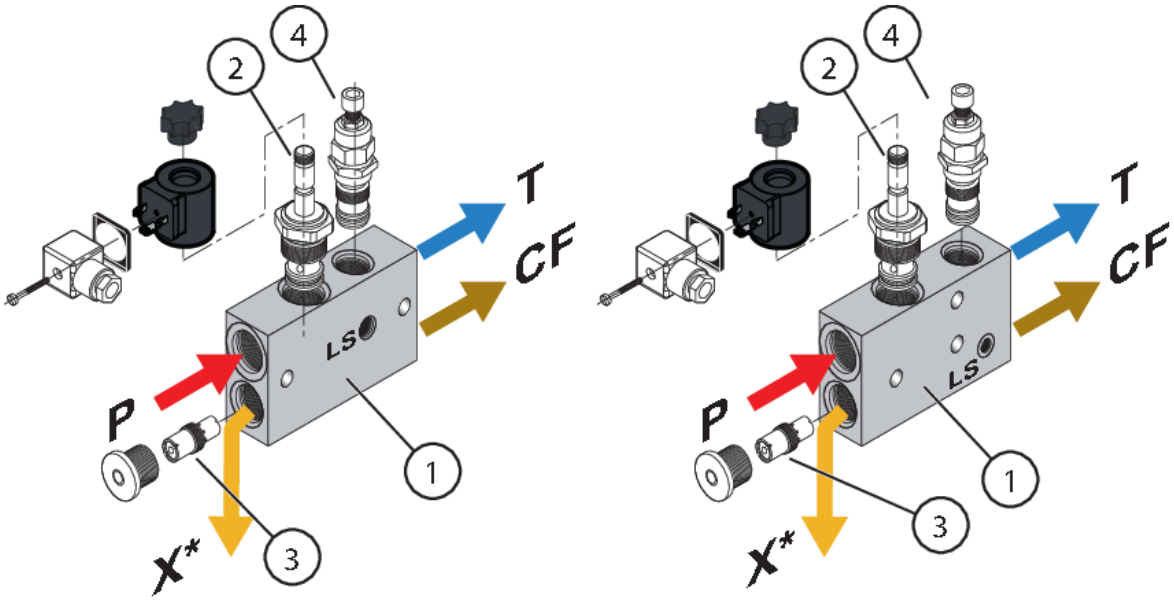
1. DYNASET hydraulic equipment
2. DYNASET Priority valve PV-SAE
2.1. DYNASET PC-SAE pressure compensator
2.2. DYNASET LSV Load Sensing valve
2.3. Shuttle valve (Optional)
3. Base machine's variable displacement pump
4. Open centre directional control valves
5. Oil cooler
6. Oil filter
7. Oil tank

4.3 TECHNICAL SPECIFICATIONS & SPARE PARTS

4.3.1 TECHNICAL SPECIFICATIONS

DYNASET LSV valve has following components

Components	
1. LSV-VALVE that includes components 2-4	3. Flow limiting valve
2. Solenoid valve 12/24V	4. Pressure relief valve

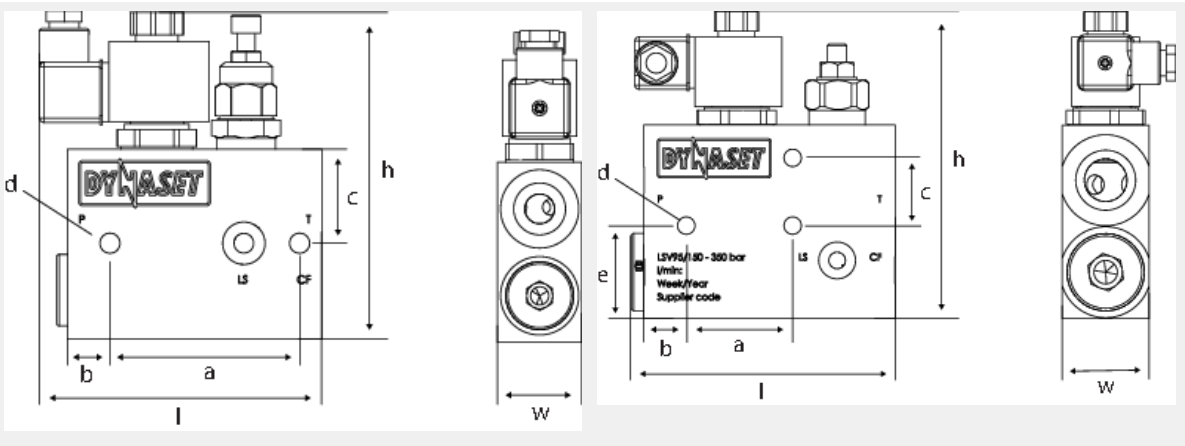


Model	Pressure p max. bar (psi)	Flow Q CF max.*l/min (gpm)	Flow range l/ min (gpm)	P	CF	LS	T	X**
LSV 40	315 (4'569)	40 (10.57)	8 (2.11) - 40 (10.57)	BSPP 3/4	BSPP 3/4	BSBB 1/8	BSPP 1/2	BSPP 3/4
LSV 60	315 (4'569)	60 (15.85)	20 (5.28) - 60 (15.85)	BSPP 3/4	BSPP 3/4	BSBB 1/8	BSPP 1/2	BSPP 3/4
LSV 95	350 (5'076)	95 (25.10)	56 (14.80) - 94 (24.83)	BSPP 1	BSPP 1	BSBB 1/8	BSPP 3/4	BSPP 1
LSV 150	350 (5'076)	150 (39.63)	90 (23.78) - 140 (36.99)	BSPP 1	BSPP 1	BSBB 1/8	BSPP 3/4	BSPP 1
LSV 90 - HD	450 (6'527)	88 (23.25)	14 (3.70) - 88 (23.25)	BSPP 3/4	BSPP 3/4	BSBB 1/8	BSPP 1/2	BSPP 3/4

Model	Pressure p max. bar (psi)	Flow Q CF max.*l/min (gpm)	Flow range l/ min (gpm)	P	CF	LS	T	X**
LSV 200 - HD	450 (6'527)	200 (52.84)	90 (23.78) - 200 (52.84)	BSPP 1	BSPP 1	BSBB 1/8	BSPP 3/4	BSPP 1

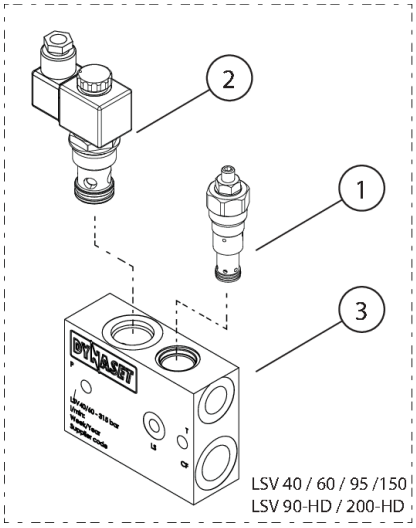
***CF value is adjusted at the factory according to the customers specifications.**

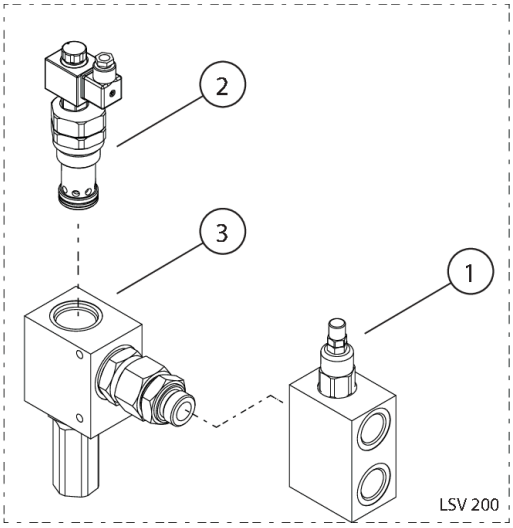
****Option. Plugged as standard.**



Model	L mm (in)	H mm (in)	W mm (in)	A mm (in)	B mm (in)	C mm (in)	D mm (in)	E mm (in)
LSV 40	127 (5.0)	146 (5.7)	40 (1.6)	85 (3.3)	19 (0.7)	42 (1.7)	9 (0.4)	( )
LSV 60	127 (5.0)	146 (5.7)	40 (1.6)	85 (3.3)	19 (0.7)	42 (1.7)	9 (0.4)	( )
LSV 95	135 (5.3)	159 (6.3)	45 (1.8)	55 (2.2)	22 (0.9)	35 (1.4)	9 (0.4)	48 (1.9)
LSV 150	135 (5.3)	159 (6.3)	45 (1.8)	55 (2.2)	22 (0.9)	35 (1.4)	9 (0.4)	48 (1.9)
LSV 90 - HD	127 (5.0)	146 (5.7)	40 (1.6)	85 (3.3)	19 (0.7)	42 (1.7)	9 (0.4)	( )
LSV 200 - HD	135 (5.3)	159 (6.3)	45 (1.8)	55 (2.2)	22 (0.9)	35 (1.4)	9 (0.4)	48 (1.9)

4.3.2 SPARE PARTS





NOTE!

HD LSV has a black valve block.

STANDARD MODELS

POS.	PART NO.	DESIGNATION	DETAILS
1	V100113101	LSV40	Pressure relief valve
1	V100113104	LSV60	Pressure relief valve
1	V100113116	LSV200	Pressure relief valve
2	V100113106	LSV40/60-12VDC	On/Off Solenoid valve
2	V100113107	LSV40/60-24VDC	On/Off Solenoid valve
2	V100113112	LSV200/12VDC	On/Off Solenoid valve
2	V100113114	LSV200/24VDC	On/Off Solenoid valve

HD MODELS

POS.	PART NO.	DESIGNATION	DETAILS
1	V100113220	LSV90HD	Pressure relief valve
1	V100113225	LSV200HD	Pressure relief valve
2	V100113200	LSV90HD-12V	On/Off Solenoid valve
2	V100113205	LSV90HD-24V	On/Off Solenoid valve
2	V100113210	LSV200HD-12V	On/Off Solenoid valve
2	V100113215	LSV200HD-24V	On/Off Solenoid valve
3	V100113230	LSV90HD - 450 bar	Valve block
3	V100113235	LSV200HD - 450 bar	Valve block

OLDER MODELS

POS.	PART NO.	DESIGNATION	DETAILS	DETAILS 2
1	V100113102	LSV95	Pressure relief valve	Aluminium frame
1	V100113103	LSV150	Pressure relief valve	Aluminium frame
1	V100113105	LSV95/150	Pressure relief valve	Steel frame
1	V100113110	LSV95/150	Pressure relief valve	
2	V100113108	LSV95/150-12VDC	On/Off Solenoid valve	
2	V100113109	LSV95/150-24VDC	On/Off Solenoid valve	
3	V100113118	LSV200	Valve block	

5. PILOT VALVES

5.1 GENERAL PILOT VALVES

5.1.1 APPLICATIONS

DYNASET Pilot valves enable easy and reliable installation of DYNASET product to any modern type of hydraulic system with electric control.

Pilot control kit is designed for pilot controlled hydraulic pumps, pilot controlled spools and other pilot controlled hydraulic devices.

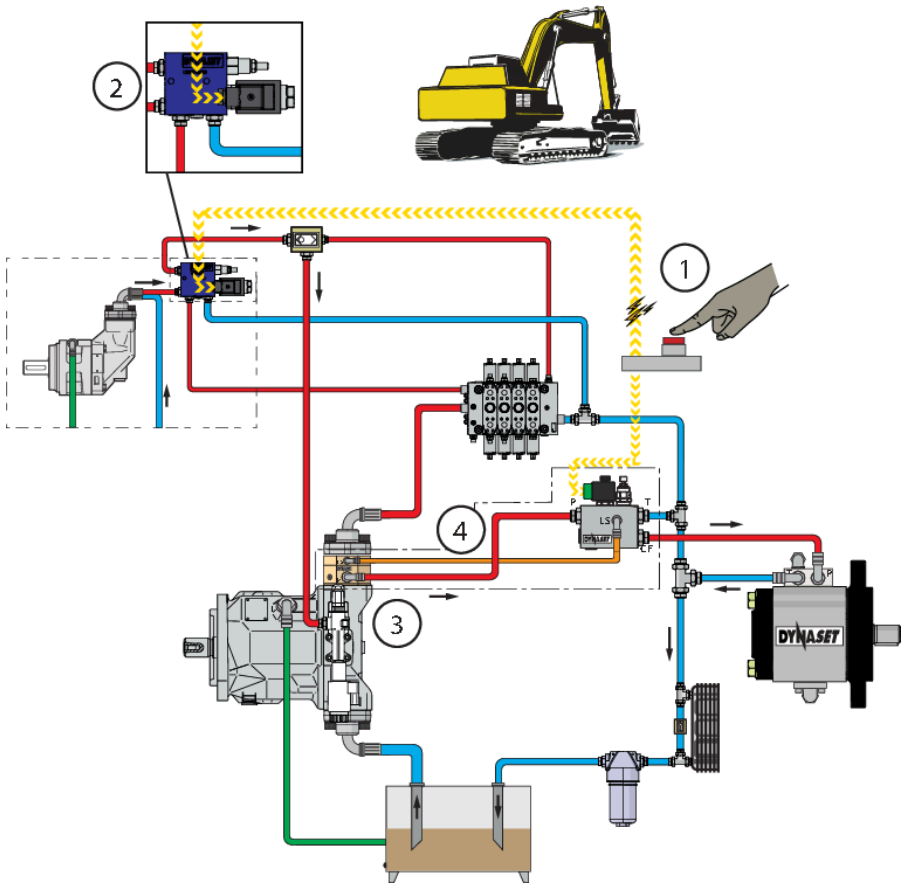
Hydraulic systems with pilot control are increasing in number and require more understanding when upgrading systems with additional hydraulic equipment.

Dynaset Pilot Control Kit is designed to fit any hydraulic pilot system for enabling installation and use of additional hydraulic equipment. It can also be used to actuate pressure switches in hydraulic system.

Pilot systems ease the hydraulic load in big hydraulic systems. The pilot system is very light and turns on the main hydraulic system. It is connected to the system controls and takes input from them. As pilot system receives input, e.g. move the right track of the excavator, it sends the signal to main hydraulic system that does the actual work. The machine works totally on the basis of pilot systems and main hydraulic systems' symbiosis.

If you want to add new hydraulic equipment to this kind of system, it must also make it controllable by the pilot system. This is when the Dynaset Pilot Control Kit is used. With it, user can install any hydraulic device to the hydraulic system and make it work properly.

5.1.2 OPERATING PRINCIPLE



1. When the operator switches on the Dynaset equipment, e.g. HG Hydraulic Generator, the Dynaset hydraulic system powers simultaneously the Pilot Control valve and the PV-SAE Priority Valve (depending on the base machines' hydraulic system) for the Dynaset Equipment.

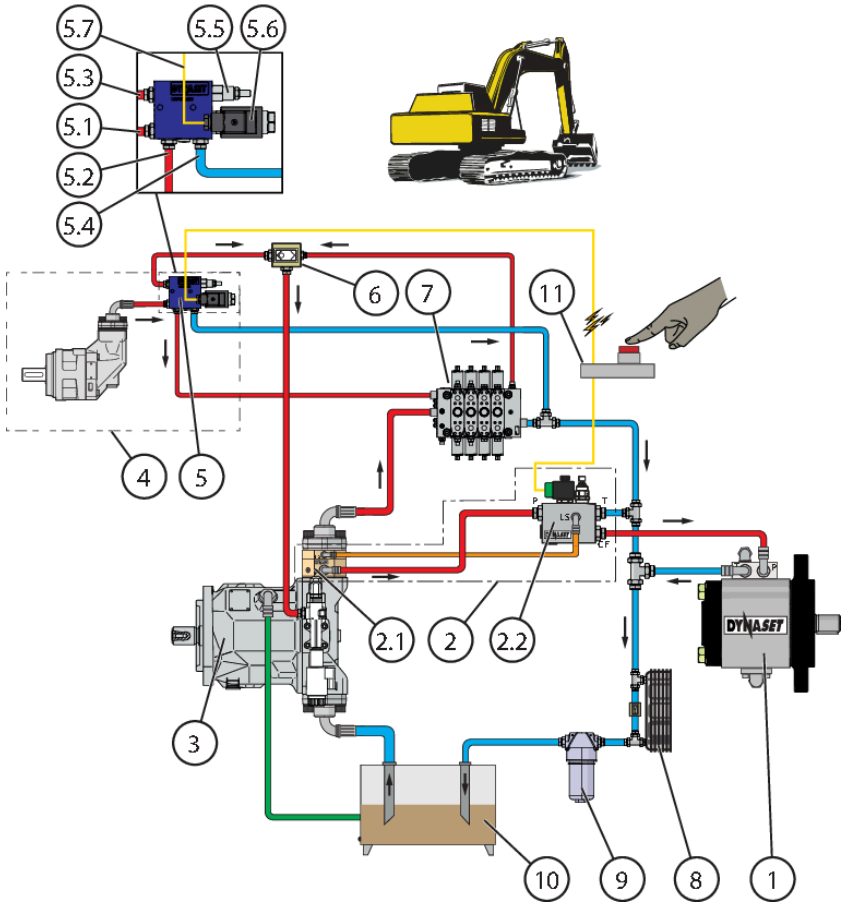
2. The Pilot Control Valve triggers the main pump to action by sending a pilot pressure to open the main hydraulic pumps' actuators. Now the pump takes commands from the operator to use the Dynaset equipment.

3. The main hydraulic pump now provides hydraulic oil flow and Dynaset PV-SAE Priority Valve guides the flow to the Dynaset equipment.

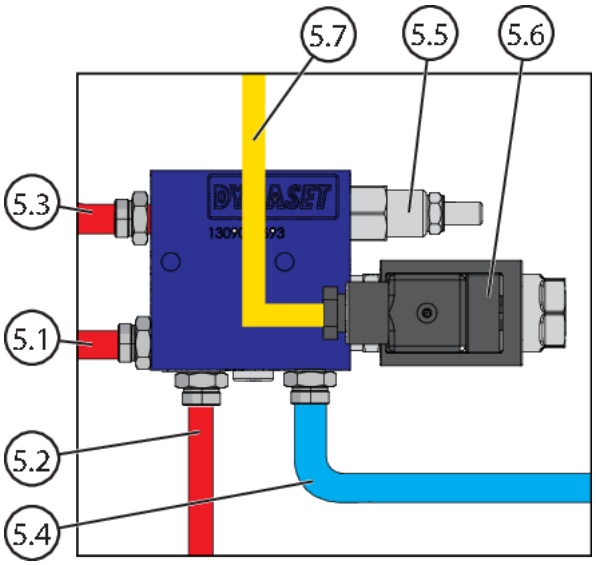
4. If the PV-SAE is needed for the system, it balances the hydraulic oil flow to the Dynaset equipment without hindering the use of other hydraulic functions of the machine, such as moving the boom.

5.2 INSTALLATION

5.2.1 SYSTEM COMPONENTS



1. DYNASET hydraulic equipment
2. DYNASET Priority valve PV-SAE
2.1 DYNASET PC-SAE pressure compensato
2.2 DYNASET LSV Load Sensing valve
3. Base machine's variable displacement pump
4. Hydraulic Pilot system
5. Dynaset Pilot Control Kit
6. Check valve
7. Open centre directional control valves
8. Oil cooler
9. Oil filter
10. Oil tank
11. Dynaset equipment ON/OFF button



DYNASET Pilot valve has the following components

5.1 P in, intake for the pilot pressure and hydraulic flow.

5.2 P in, bypass to the pilot hydraulic system, if needed. This port is plugged by default.

5.3 P out, the pilot pressure 5-55 bar regulated as the main hydraulic pump requires to be actuated.

5.4 Return line to the tank.

5.5 Pressure reducing valve.

5.6 Solenoid valve.

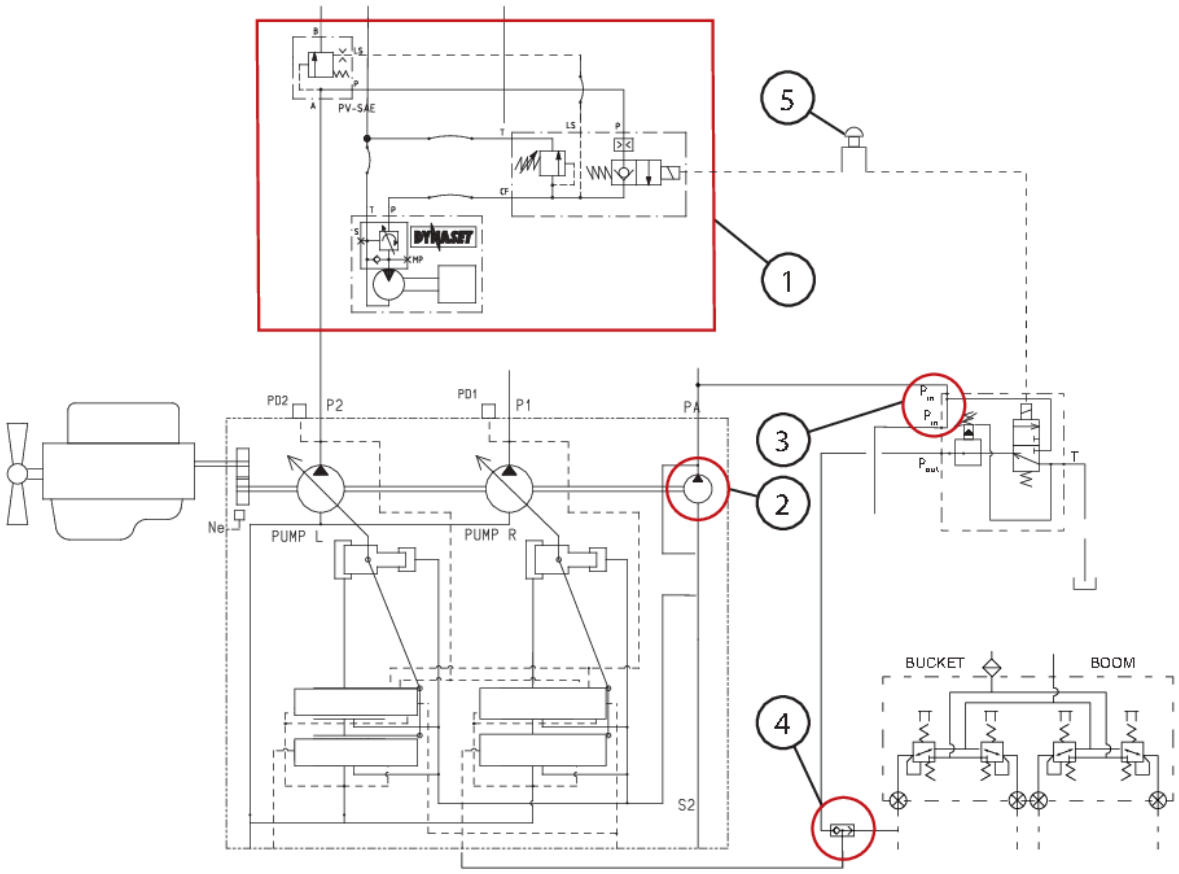
5.7 Cable wiring for operating Pilot Valve.

5.2.2 INSTALLATION

Install the system with following steps:

1. Install the PV-SAE system. Installation instructions are in PV-SAE installation manual.

2. Check the hydraulic schematic and locate the pilot systems pump.



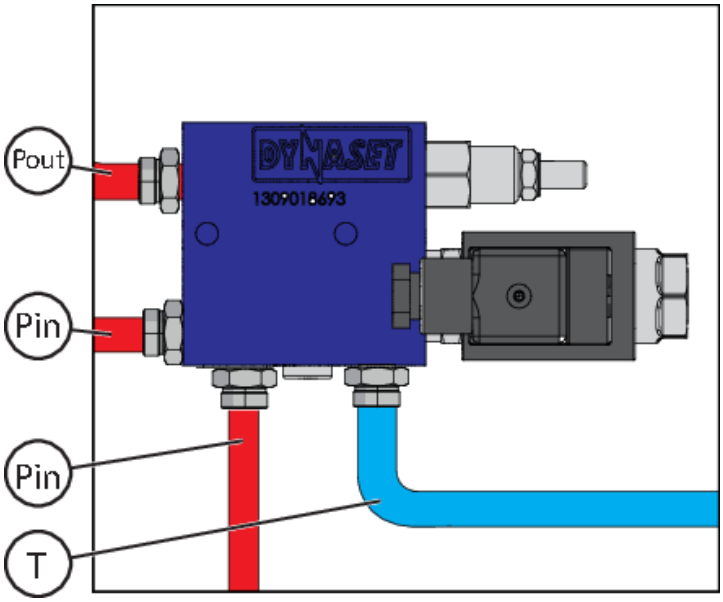
3. Make a connection to the Pilot Control Valve from the Pilot system's main pressure line. If there is no available ports in valve manifold, then make a bypass for the pilot systems main pressure line with both Pin connections.

4. Connect the Pout to the pressure switch that actuates the main hydraulic pump. Use shuttle valve to make a balancing system with the rest of the main hydraulic system.

5. Connect the electric wiring between the PV-SAE LSV modules connector and pilot valves coil.

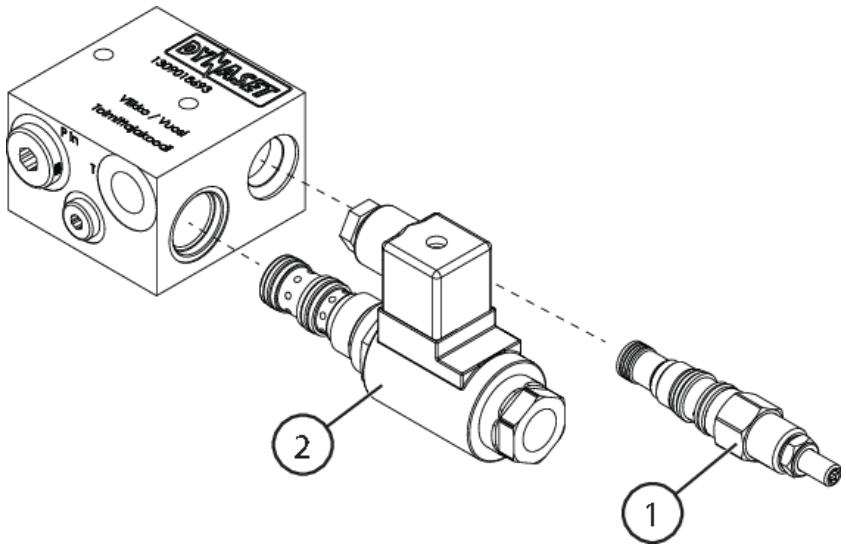
5.3 TECHNICAL SPECIFICATIONS & SPARE PARTS

5.3.1 TECHNICAL SPECIFICATIONS



Model	Pressure range bar (psi)	Flow max.l/ min (gpm)	P in	P out	T	Coil
Pilot valve-5-55	5 (73)	20 (5.28)	BSPP 3/8	BSPP 3/8	BSPP 3/8	24VDC

5.3.2 SPARE PARTS



POS.	PART NO.	DESIGNATION	DETAILS
1	V1300505050	Pressure Reducing Valve Cartridge	350/5-55 20 lpm
2	V7106881100	Valve Cartridge	3/2 - 35 lpm - 210 bar - 24 V

6. PT-FLANGES

6.1 GENERAL

DYNASET VR-PA PT-FLANGES are designed to be used when customized and fixed hydraulic flow and pressure are required.

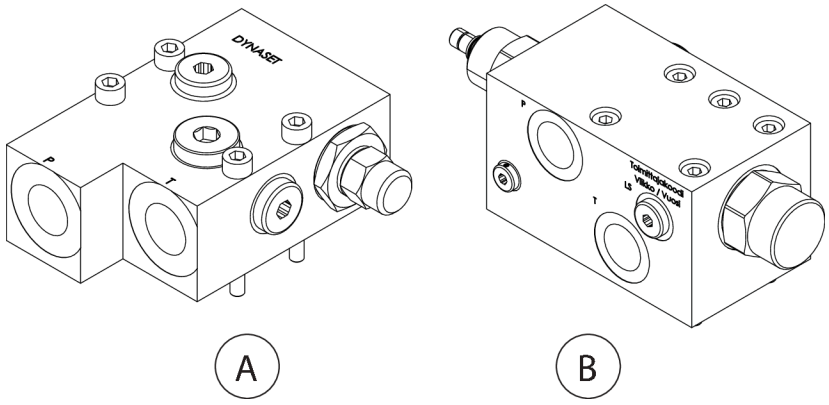
The flanges are designed to be used with DYNASET HPW High Pressure Water Pumps. The flange provides steady performance and can be tailored for specific customer requirements in various applications. Here are few application examples where VR-PA PT-Flanges are for great use:

- power washing,
- dust suppression,
- water cutting,
- hydro demolition and scaling,
- firefighting,
- drilling fluid flushing,
- water hydraulics,
- pressure testing

For example in power washing use:

DYNASET HPW250 pump equipped with PT-FLANGE R1/2-VR-PA is factory adjusted to provide specific flow and hydraulic pressure values that customer needs. The function of the flange to limit the hydraulic pressure and flow values enable to drive the HPW-pump with partial load instead of maximum flow and pressure. This feature saves significantly energy and customer's expenses, preventing excessive part wear in long term.

Product can be used in all Dynaset HPW pumps equipped with standard PT-flange. The VR-PA PT-FLANGE comes in three sizes for 3/8", 1/2" and 3/4" PT Flanges.



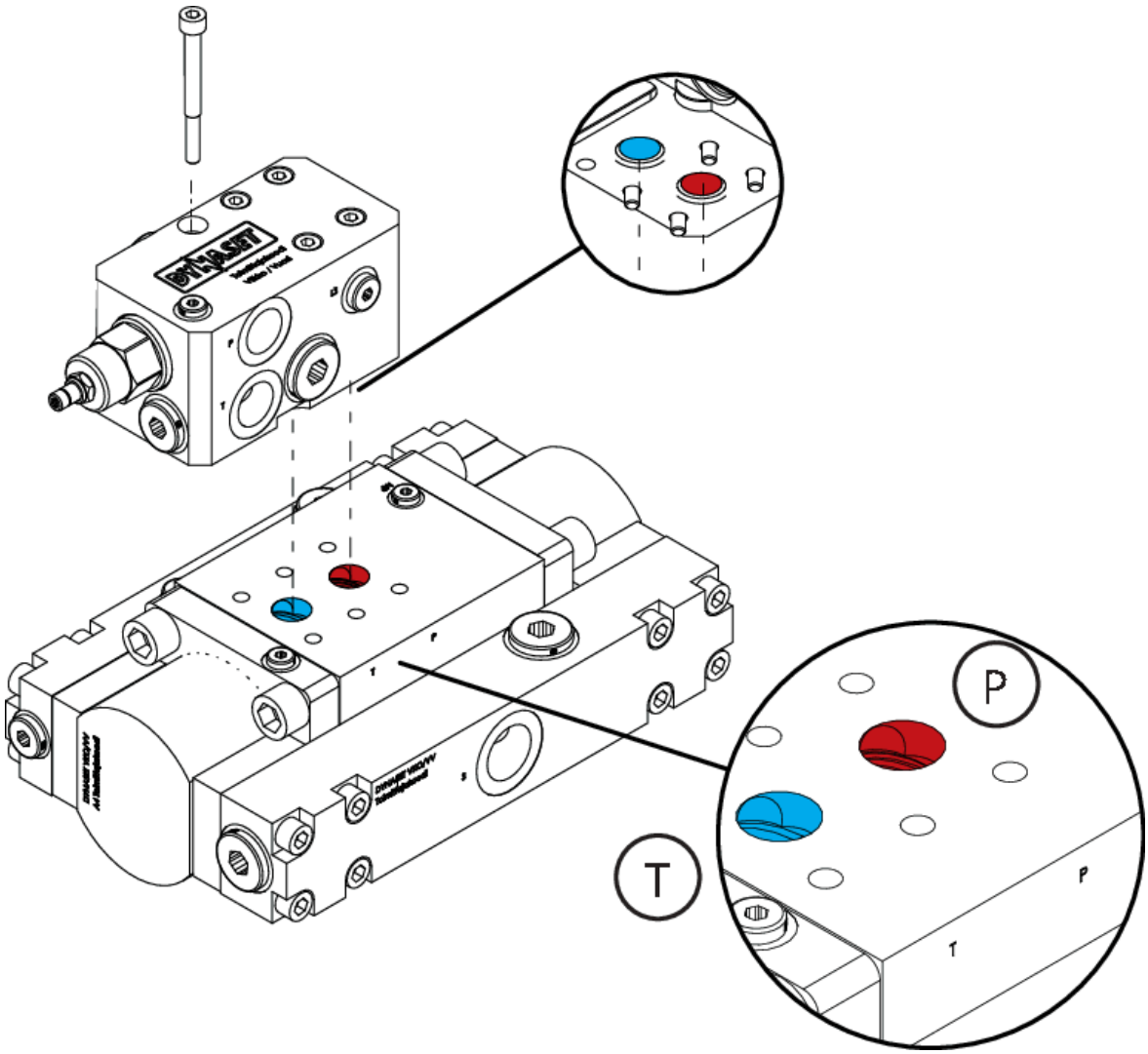
Picture 1: PT-FLANGE-VR-PA

A = 1/2" PT-Flange

B = 3/4" PT-Flange

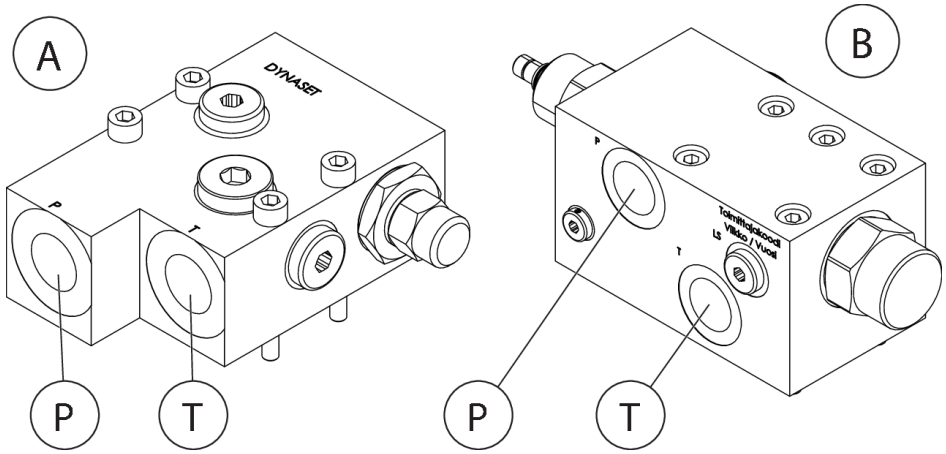
NOTE!

Make sure the installation of the PT-Flange is done to the corresponding ports, P and T, of the main pump. If flange is installed incorrectly it may damage the pump unit.



6.2 TECHNICAL SPECIFICATION

6.2.1 CONNECTIONS



A = 1/2" PT-Flange, B = 3/4" PT-Flange

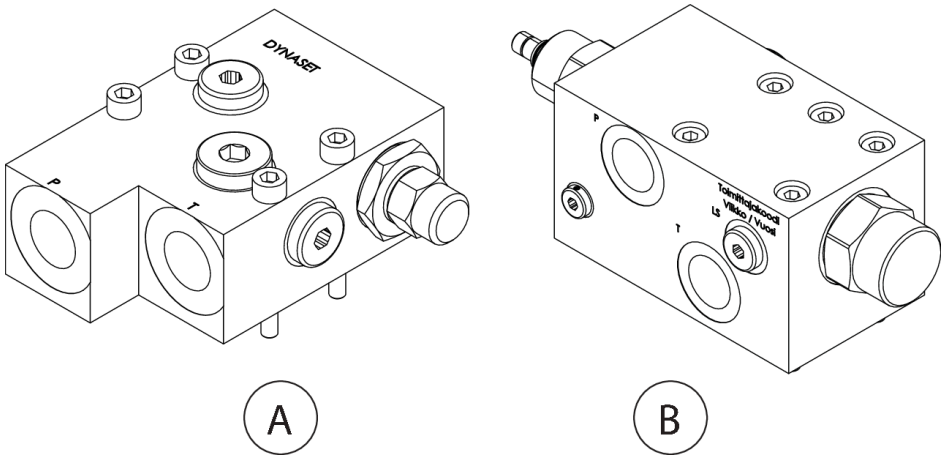
Model	Connections	
	Pressure Line, P	Return Line, T
PT-Flange-3/8-VR-PA	BSPP 3/8	BSPP 3/8
PT-Flange-1/2-VR-PA	BSPP 1/2	BSPP 1/2
PT-Flange-3/4-VR-PA	BSPP 3/4	BSPP 3/4

6.2.2 TECHNICAL SPECIFICATIONS

		PT-Flange-3/8-VR-PA	PT-Flange-1/2-VR-PA	PT-Flange-1/2-VR-PA-AIS
HYDRAULIC POWER REQUIREMENTS				
Flow max.	**l/min (gpm)**	18 (4.76)	40 (10.57)	40 (10.57)
Flow range	**l/min (gpm)**	2-18	8-40	8-40
Adjusted pressure level range	**bar (psi)**	3 (44) - 210 (3'046)	70 (1'015) - 210 (3'046)	70 (1'015) - 210 (3'046)
System pressure max.	**bar (psi)**	250 (3'626)	350 (5'076)	350 (5'076)
HYDRAULIC FLUID REQUIREMENTS				
Viscosity	**cSt**	10-200 / optimum 25-35	10-200 / optimum 25-35	10-200 / optimum 25-35
Temperature max.	**°C(°F)**	70 (158)	70 (158)	70 (158)
Filter ratio	**µm**	<25	<25	<25

		PT-Flange-3/4-VR-PA	PT-Flange-3/4-VR-PA-AIS
HYDRAULIC POWER REQUIREMENTS			
Flow max.	**l/min (gpm)**	140 (36.99)	140 (36.99)
Flow range	**l/min (gpm)**	20-140	20-140
Adjusted pressure level range	**bar (psi)**	7 (102) - 210 (3'046)	7 (102) - 210 (3'046)
System pressure max.	**bar (psi)**	350 (5'076)	350 (5'076)
HYDRAULIC FLUID REQUIREMENTS			
Viscosity	**cSt**	10-200 / optimum 25-35	10-200 / optimum 25-35
Temperature max.	**°C(°F)**	70 (158)	70 (158)
Filter ratio	**µm**	<25	<25

6.2.3 SPAREPARTS



A = 1/2" PT-Flange, B = 3/4" PT-Flange

6.2.3.1 Stock Models

PUMP MODEL	PUMP CODE	PT-FLANGE MODEL	PT-FLANGE CODE
HPW160/18-18-VR-PA	D200100200	VR-PA-3/8"	V100126290
HPW250/30-40-VR-PA	D200104650	VR-PA-1/2"	V100100538
HPW420/20-50-VR-PA	D200101300	VR-PA-1/2"	V100100538
HPW220/50-70-VR-PA	D200101550	VR-PA-3/4"	V100100766
HPW90/150-85-VR-PA	D200101860	VR-PA-3/4"	V100101472
HPW520/30-85-VR-PA	D200101745	VR-PA-3/4"	V100102183
HPW180/90-115-VR-PA	D200102050	VR-PA-3/4"	V100101570
HPW460/50-115-VR-PA	D200102145	VR-PA-3/4"	V100101465
HPW130/180-140-VR-PA	D200102390	VR-PA-3/4"	V100102383
HPW1600/15-140-VR-PA	D200102750	VR-PA-3/4"	V100101467

6.2.3.2 SUB Models

PUMP MODEL	PUMP WITH VR-PA PT-FLANGE CODE	PT-FLANGE MODEL	PT-FLANGE CODE
HPW200/30-45-VR-PA-SUB	D200101172	VR-PA-1/2"	V100100525
HPW220/50-70-VR-PA-SUB	D200101563	VR-PA-3/4"	V100101460
HPW90/150-85-VR-PA-SUB	D200101948	VR-PA-3/4"	V100101470
HPW520/30-85-VR-PA-SUB	D200101815	VR-PA-3/4"	V100102180
HPW460/50-115-VR-PA-SUB	D200102273	VR-PA-3/4"	V100101463
HPW320/75-125-VR-PA-SUB	D200104823	VR-PA-3/4"	V100101468
HPW1600/15-140-VR-PA-SUB	D200102728	VR-PA-3/4"	V100101466
HPW1000/30-140-VR-PA-SUB	D200102608	VR-PA-3/4"	V100100786

7. PV-SAE VALVES

7.1 INSTALLATION MANUAL

7.1.1 APPLICATIONS

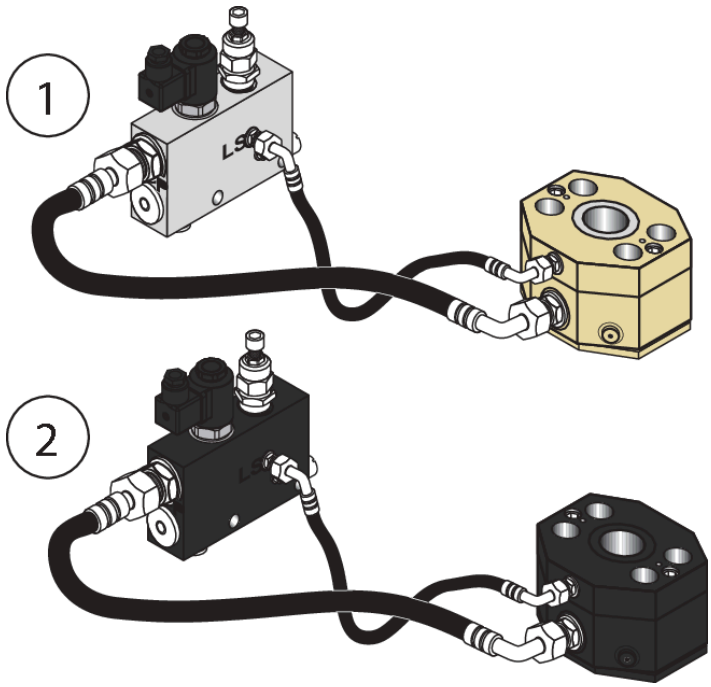
DYNASET Priority valves (PV-SAE) enable easy and reliable installation of DYNASET product to any type of hydraulic system.

DYNASET PV-SAE lets you operate your DYNASET unit simultaneously with other hydraulic equipment installed into the base machine's hydraulic system. DYNASET PV-SAE ensures the prioritised and non-fluctuating hydraulic flow to your DYNASET unit.

PV-SAE is available as standard version and HD version. Standard version is appliable up to 350 bar (5'076 psi) pressure applications. The HD version is designed for up to 450 bar (6'527 psi) applications. The PV-SAE consists of PC-SAE pressure compensator and LS-valve block. HD model can be recognized from black surface colour.

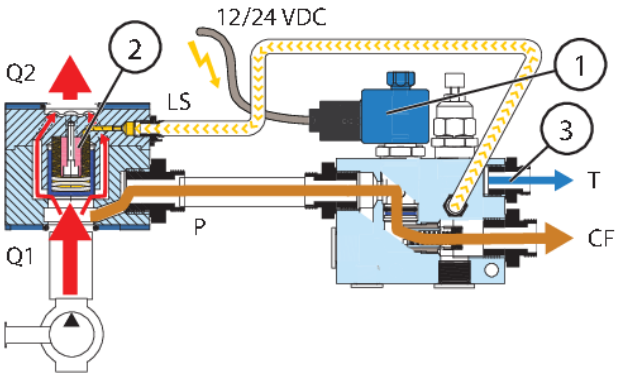
1. Regular 350 bar (5'076 psi) model

2. HD 450 bar (6'527 psi) model



Picture 2: HD

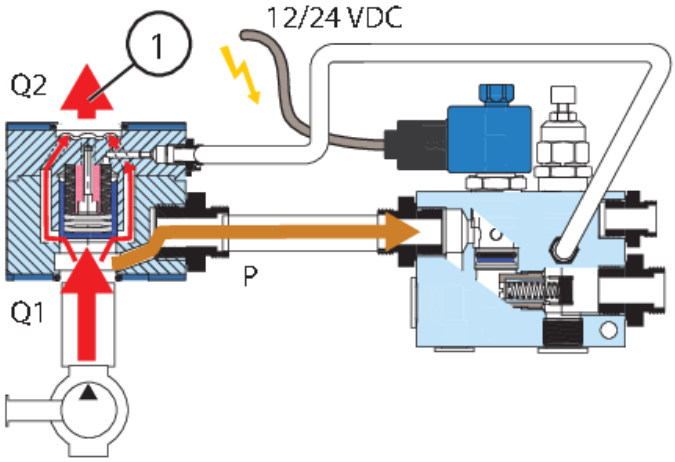
7.1.2 OPERATING PRINCIPLE



1. When the solenoid valve is open, the prioritised control flow (CF) is directed to start the appliance.

2. The CF flow is controlled and stabilized by the LS-pressure to the corrected level.

3. The Pressure relief valve opens the flow to the tank line, when the pressure increases too high. It protects the appliance from having too much pressure.



1. When the solenoid valve is closed, the CF flow to the appliance stops and the main flow (Q1) from the pump is not altered. Now the whole hydraulic flow is available for the rest of the system.

7.2 INSTALLATION

7.2.1 INSTALLATION TO DIFFERENT HYDRAULIC SYSTEMS

The PV-SAE can be installed to various hydraulic systems. Most common systems are listed below.

- Open centre hydraulic system with a Load Sensing variable displacement pump
- Closed centre hydraulic system with a Load Sensing variable displacement pump
- Hydraulic system with a fixed displacement pump

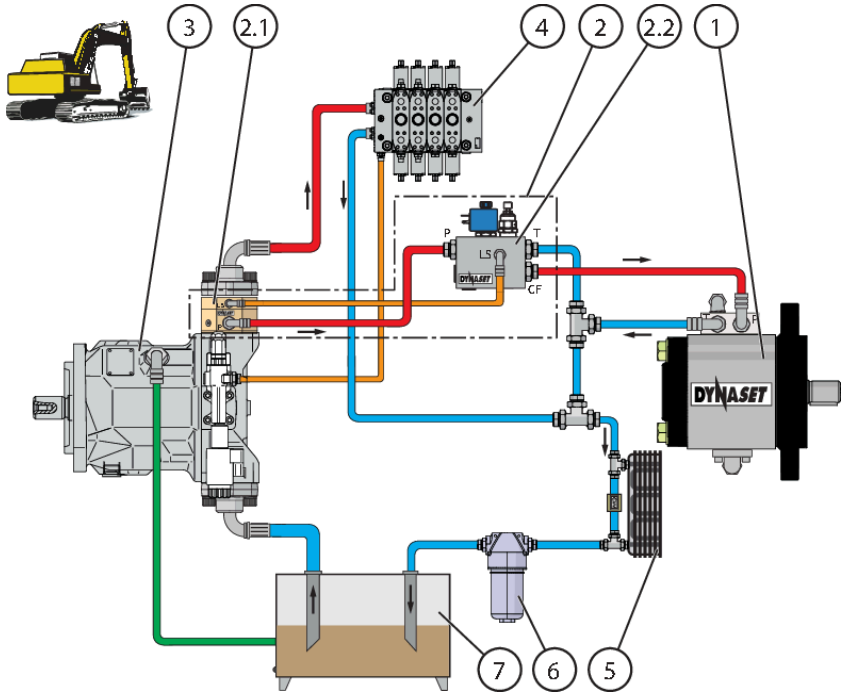
The PV-SAE can be installed to almost any hydraulic system. If you need more information about installing the PV-SAE to a different hydraulic system than listed above, contact DYNASET.

If you are unsure of the hydraulic system, contact the manufacturer of your base machine.

Next three chapters describe the most common hydraulic systems in more detail.

7.2.2 OPEN CENTRE HYDRAULIC SYSTEM WITH LOAD SENSING VARIABLE DISPLACEMENT PUMP

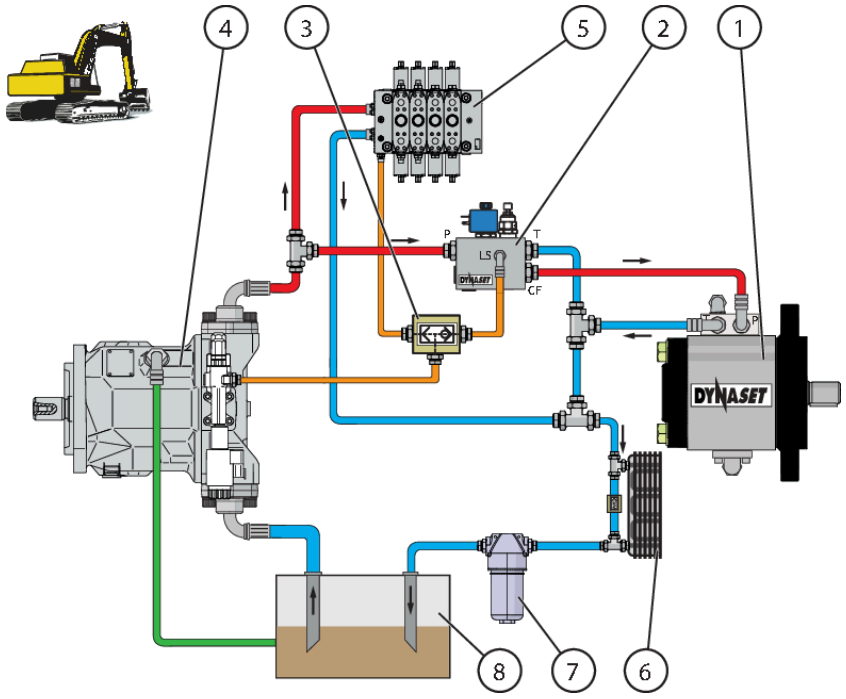
In open centre hydraulic system the flow is returned to tank through the control valve's open centre; that is, when the control valve is centered. It provides an open return path to tank and the fluid is not pumped into a high pressure. In the variable displacement pump, the flow rate and output pressure adjusts automatically based on the load of the hydraulic system. Placement of the PV-SAE in described system:



1. DYNASET hydraulic equipment
2. DYNASET Priority valve PV-SAE
2.1. DYNASET PC-SAE pressure compensator
2.2. DYNASET LSV Load Sensing valve
3. Base machine's variable displacement pump
4. Open centre directional control valves
5. Oil cooler
6. Oil filter
7. Oil tank

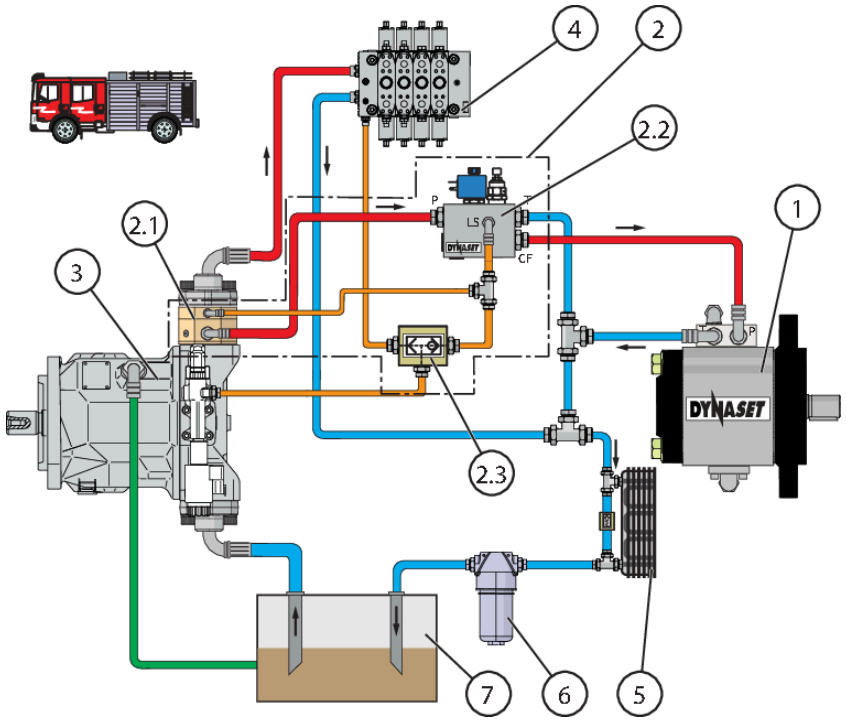
7.2.3 CLOSED CENTRE HYDRAULIC SYSTEM WITH LOAD SENSING VARIABLE DISPLACEMENT PUMP

In a closed centre hydraulic system the oil flow is stopped from the pump, when the control valve is centered. The pump can rest when the oil is not required to operate a function. In variable-displacement pump, the flow rate and output pressure adjust automatically based on the load of the hydraulic system. It is recommended to install DYNASET product to a closed centre hydraulic system of an excavator without the pressure compensator (PC-SAE), using only an LS-valve of required capacity. When installed to a closed centre hydraulic system of a modern excavator, pressure compensator may cause certain deceleration of machine's movements and functions, when the prioritised flow to the DYNASET product is on. Placement of the PV-SAE in described system:



1. DYNASET hydraulic equipment
2. DYNASET LSV Load Sensing valve
3. Shuttle Valve
4. Base machine's fixed displacement pump
5. Open centre directional control valves
6. Oil cooler
7. Oil filter
8. Oil tank

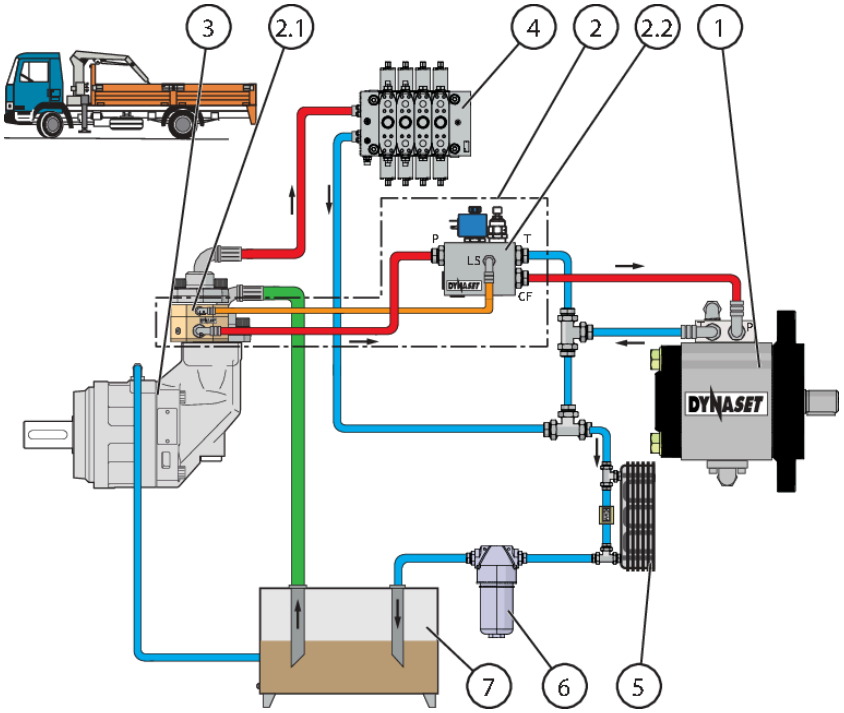
For other base machine's closed centre hydraulic systems (e.g. fire trucks) the installation of DYNASET product can be made with the complete PV-SAE valve.



1. DYNASET hydraulic equipment
2. DYNASET Priority valve PV-SAE
2.1. DYNASET PC-SAE pressure compensator
2.2. DYNASET LSV Load Sensing valve
2.3. Shutle valve
3. Base machine's variable displacement pump
4. Open centre directional control valves
5. Oil cooler
6. Oil filter
7. Oil tank

7.2.4 HYDRAULIC SYSTEM WITH FIXED DISPLACEMENT PUMP

In hydraulic system which has the fixed displacement pump, the oil flow from the pump is fixed. Every stroke of the hydraulic motor moves the same amount of oil. The output flow is function of the motor's rpm and pump's displacement. Placement of the PV-SAE in described system:

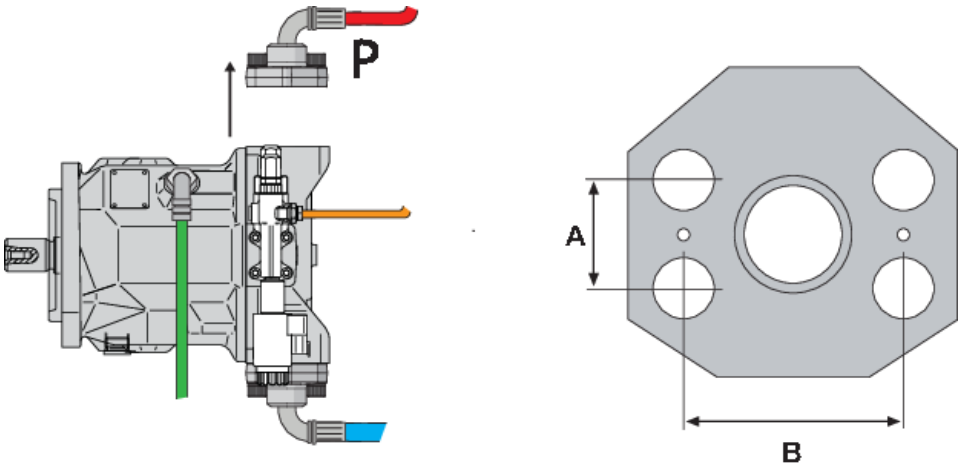


1. DYNASET hydraulic equipment
2. DYNASET Priority valve PV-SAE
2.1. DYNASET PC-SAE pressure compensator
2.2. DYNASET LSV Load Sensing valve
3. Base machine's fixed displacement pump
4. Open centre directional control valves
5. Oil cooler
6. Oil filter
7. Oil tank

7.2.5 INSTALLATION THE PV-SAE

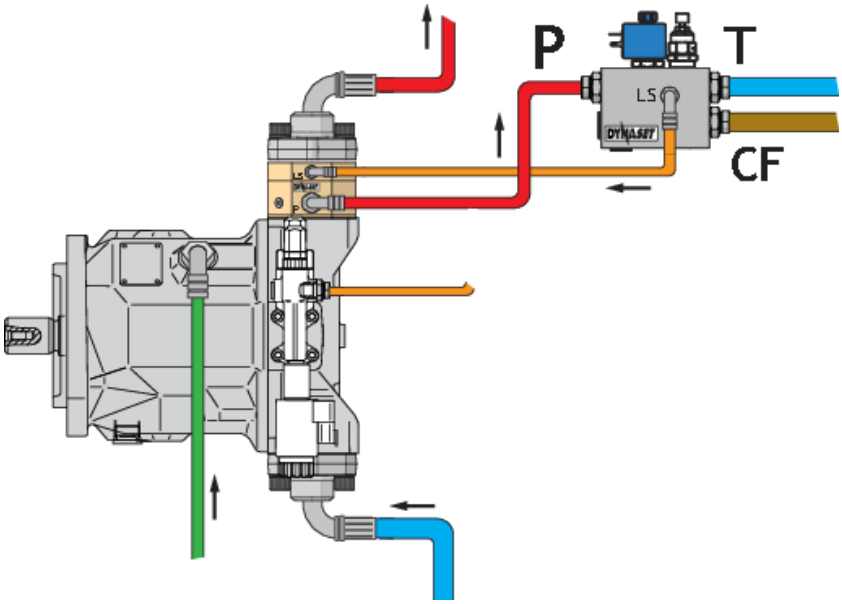
1. Detach the pressure line flange from the hydraulic pump.

2. Measure the A and B measurements and choose the correct PC-SAE flange size from the table below.



PUMP FLANGE MEASUREMENTS					PC-SAE MEASURE-MENTS
A mm (in)	B mm (in)	SAE	A mm (in)	B mm (in)	PC-SAE
22.2 (0.9)	47.6 (1.9)	3000 psi	23 (0.9)	49 (1.9)	3/4"
23.8 (0.9)	50.8 (2)	6000 psi	23 (0.9)	49 (1.9)	3/4"
26.2 (1)	52.4 (2.1)	3000 psi	27.2 (1.1)	55.6 (2.2)	1"
27.8 (1.1)	57.4 (2.3)	6000 psi	27.2 (1.1)	55.6 (2.2)	1"
30.2 (1.2)	58.7 (2.3)	3000 psi	31.5 (1.2)	63.5 (2.5)	1 1/4"
31.7 (1.2)	66.7 (2.6)	6000 psi	31.5 (1.2)	63.5 (2.5)	1 1/4"

3. When you have ensured the right size of the PC-SAE, install the PV-SAE to the hydraulic system.



4. Tighten the screws according to the picture above. Tight them in two sequence. First tight them all to the 1/2 of the needed torque value. Second time tighten them to the recommended torque value.

TORQUE NM (LB. FT)	SIZE (Metric)	SIZE (ISO)
40 (29)	M10	UNC/UNF3/8
75 (55)	M12	UNC/UNF 7/16
100 (74)	M14	UNC/UNF 1/2

5. Install the LS-valve with the instructions in the LS-valve installation guide.

NOTE!

If the pump is in a tight place and the PC-SAE can't be installed to it, the PCSAE can be installed to the pressure line with a compatible flange. A hose installation kit designed for this sort of installation is available by request for open centre systems.

7.3 TECHNICAL SPECIFICATIONS

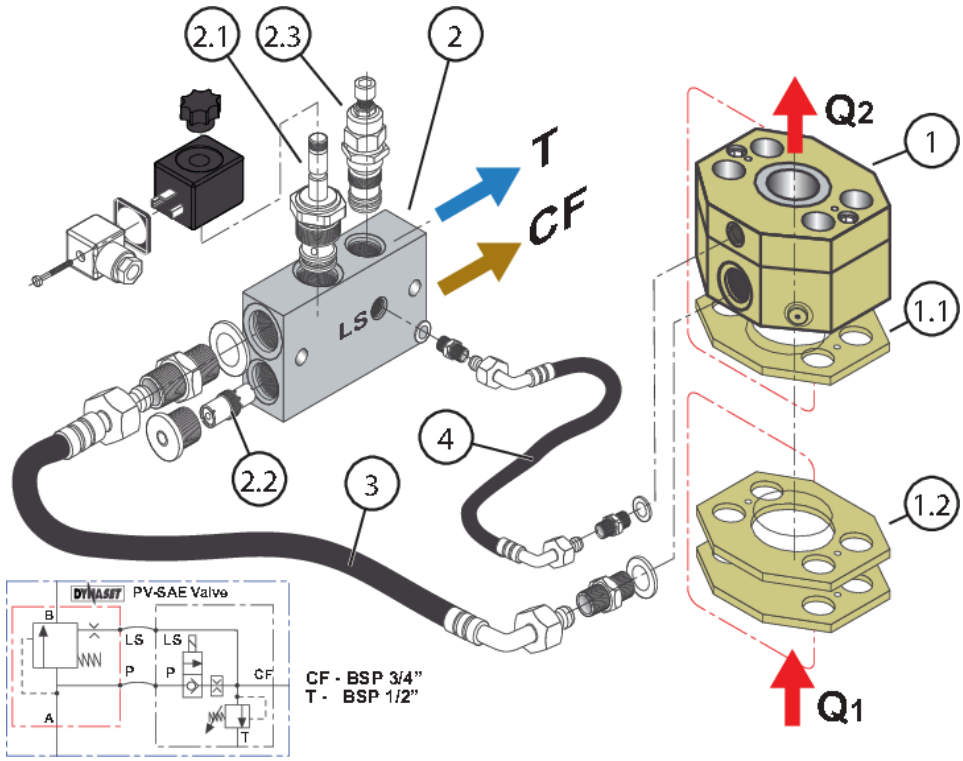
DYNASET PV-SAE has the following components

Components			
1. PC-SAE Sandwich-mounted pressure compensator with SAE-flange specification	**2.** LS-VALVE that includes following components	**3.** Pressure line hose	**4.** LS-line hose
1.1. PC-SAE includes one seal flange as standard.	**2.1.** Solenoid valve 12/24V		
1.2. Optional Height adjustment kit	**2.2.** Flow limiting valve		
	2.3. Pressure relief valve		

The PV-SAE comes in two main contructions:

- Construction I
- Construction II

7.3.1 CONSTRUCTION I

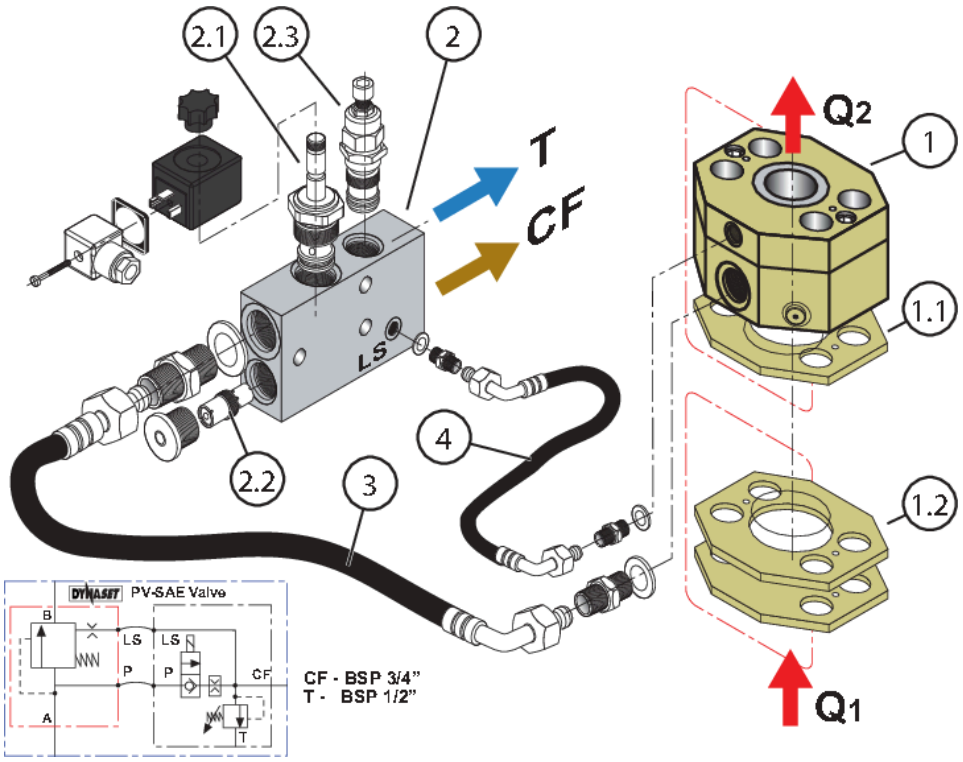


Model	PC-SAE	LSV	Pressure p max. bar (psi)	Flow Q CF max.*l/min (gpm)
PV-SAE-3/4-40-xx lpm-12/24 V	3/4	LSV 40	315 (4'569)	35 (9.25)
PV-SAE-3/4-60-xx lpm-12/24 V	3/4	LSV 60	315 (4'569)	55 (14.53)
PV-SAE-1-40-xx lpm-12/24 V	1	LSV 40	315 (4'569)	35 (9.25)
PV-SAE-1-60-xx lpm-12/24 V	1	LSV 60	315 (4'569)	55 (14.53)
PV-SAE-1-1/4-40-xx lpm-12/24 V	1 1/4	LSV 40	315 (4'569)	35 (9.25)
PV-SAE-1-1/4-60-xx lpm-12/24 V	1 1/4	LSV 60	315 (4'569)	55 (14.53)

***CF value is adjusted at the factory according to the customers specifications.**

Hoses	
Pressure Line	**Size** **Length** mm (in)
LS-Line	**Size** **Length** mm (in)

7.3.2 CONSTRUCTION II



Model	PC-SAE	LSV	Pressure p max. bar (psi)	Flow Q CF max.*l/min (gpm)
PV-SAE-3/4-95-xx lpm-12/24 V	3/4	LSV 95	350 (5'076)	85 (22.46)
PV-SAE-1-95-xx lpm-12/24 V	1	LSV 95	350 (5'076)	85 (22.46)
PV-SAE-1-1/4-xx lpm-12/24 V	1 1/4	LSV 95	350 (5'076)	85 (22.46)
PV-SAE-3/4-150-xx lpm-12/24 V	3/4	LSV 150	350 (5'076)	140 (36.99)
PV-SAE-1-150-xx lpm-12/24 V	1	LSV 150	350 (5'076)	140 (36.99)
PV-SAE-1 1/4-150-xx lpm-12/24 V	1 1/4	LSV 150	350 (5'076)	140 (36.99)

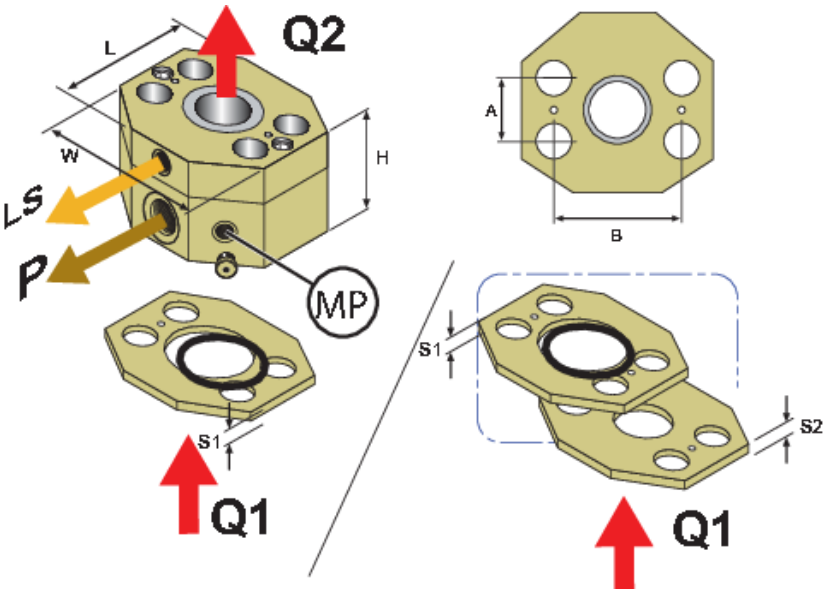
***CF value is adjusted at the factory according to the customers specifications.**

Hoses		PV-SAE-3/ 4-95-xx lpm-12/ 24 V	PV-SAE-1-95- xx lpm-12/ 24 V	PV-SAE-1-1/ 4-xx lpm-12/ 24 V	PV-SAE-3/ 4-150-xx lpm-12/ 24 V	PV-SAE-1-150- xx lpm-12/ 24 V	PV-SAE-1 1/4-150- xx lpm-12/ 24 V
Pressure Line	**Size** **Length** mm (in)	R 5/8 800 (31.5)	R 5/8 800 (31.5)	R 5/8 800 (31.5)	R 3/4 800 (31.5)	R 3/4 800 (31.5)	R 3/4 800 (31.5)
LS-Line	**Size** **Length** mm (in)	R 5/8 800 (31.5)	R 5/8 800 (31.5)	R 5/8 800 (31.5)	R 3/4 800 (31.5)	R 3/4 800 (31.5)	R 3/4 800 (31.5)

7.3.3 LS-VALVE

Measurements and detailed installation information about LS-valve are in LS-Valve installation guide provided with PV-SAE installation guide.

7.3.4 PC-SAE



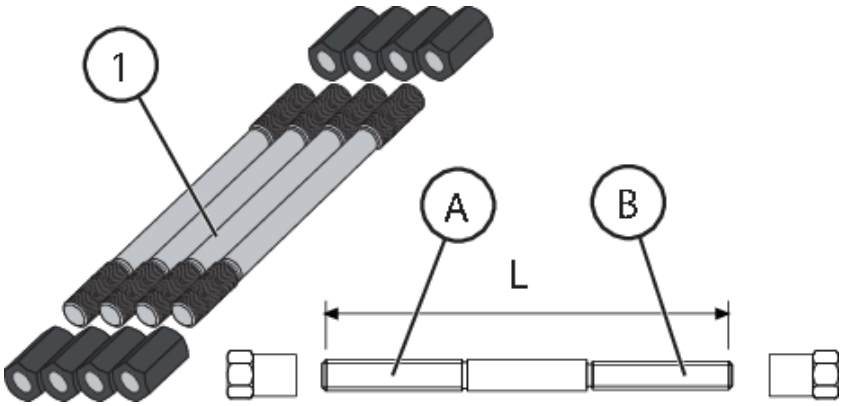
NOTE!

DYNASET PC-SAE Flange fits 3000 psi and 6000 psi hydraulic systems.

		PC-SAE-3/4	PC-SAE-1	PC-SAE-1-1/4
OUTPUT CHARACTERISTICS				
Opening pressure	**bar (psi)**	13.5 (196)	14 (203)	17.5 (254)
Pressure max.	**bar (psi)**	350 (5'076)	350 (5'076)	350 (5'076)
Flow max.	**Q1 - Q2 l/min (gpm)**	200 (52.84)	350 (92.47)	450 (118.89)
Flow max.	**Q1 - P l/min (gpm)**	70 (18.49)	100 (26.42)	145 (38.31)
Pressure drop at max. flow	**Q1 - Q2 bar (psi)**	2.9 (42)	2.8 (41)	3 (44)
Pressure drop at max. flow	**Q1 - P bar (psi)**	3 (44)	3 (44)	3.5 (51)
SAE-flange 3000-6000 psi		SAE 3/4	SAE 1	SAE 1 1/4
MEASUREMENTS				
A	**mm (in)**	23 (0.9)	27.2 (1.1)	31.5 (1.2)
B	**mm (in)**	49 (1.9)	55.6 (2.2)	63.5 (2.5)
W	**mm (in)**	67.5 (2.7)	82 (3.2)	95 (3.7)
H	**mm (in)**	63 (2.5)	65 (2.6)	72 (2.8)
P		BSPP 3/4	BSPP 3/4	BSPP 3/4
LS		BSPP 1/8	BSPP 1/8	BSPP 1/8
MP		BSPP 1/4	BSPP 1/4	BSPP 1/4

7.4 SPARE PARTS

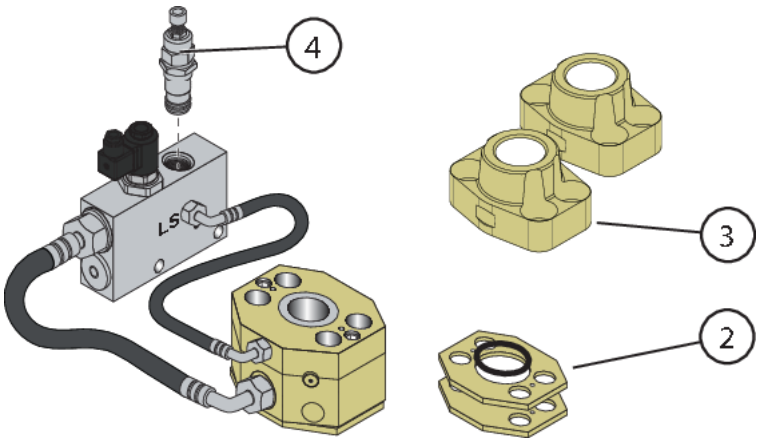
7.4.1 SCREW SET MEASUREMENTS



	A = METRIC THREAD	B = IMPERIAL THREAD	L
Torque Nm(lb. ft)	Size	Size	mm (in)
40 (29)	M10	UNC/UNF 3/8	170 (6.69)
40 (29)	M10	UNC/UNF 3/8	180 (7.09)
75 (55)	M12	UNC/UNF 7/16	170 (6.69)
100 (74)	M14	UNC/UNF 1/2	190 (7.48)

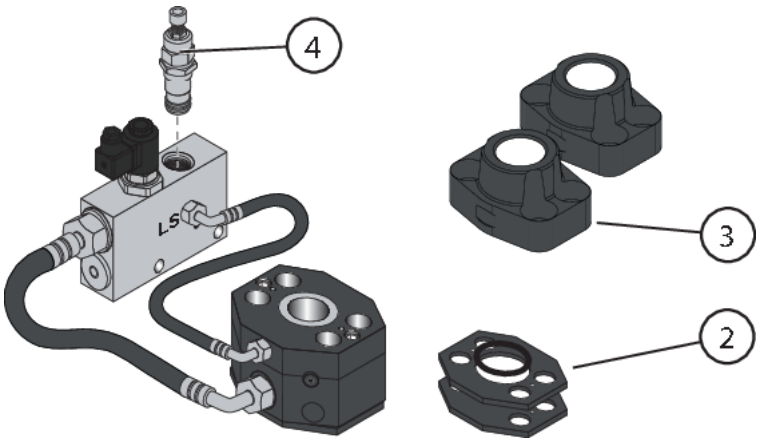
Spare part codes in following tables

7.4.2 PV-SAE SPARE PARTS



POS.	PART NO.	DESIGNATION	DETAILS
1	V100105590 V100105600 V100105610	PV-SAE 3/4" PV-SAE 1" PV-SAE1 1/4"	Screw set
2	V100410510 V100413510 V100415510	PV-SAE 3/4" PV-SAE 1" PV-SAE1 1/4"	Height adjustment
3	V100415505 V100413500 V100415500	PV-SAE 3/4" PV-SAE 1" PV-SAE1 1/4"	Hose installation kit*
4	V100113101 V100113104 V100113102 V100113103	LSV40 LSV60 LSV95 LSV150	Pressure relief valve
	V100415600	PC-SAE (All models)	Seal kit

7.4.3 PV-SAE HD SPARE PARTS



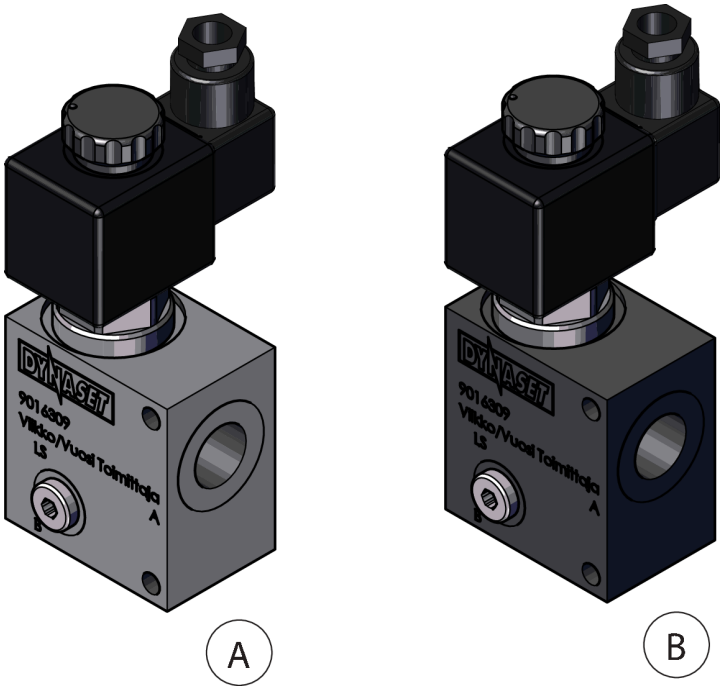
POS.	PART NO.	DESIGNATION	DETAILS
1	V100105590 V100105600 V100105610 V100105615	PV-SAE 3/4" PV-SAE 1" PV-SAE 1 1/4" PV-SAE 1 1/2"	Screw set
2	V100410515 V100413515 V100415515 V100417515	PV-SAE 3/4" PV-SAE 1" PV-SAE1 1/4" PV-SAE 1 1/2"	Height adjustment
3	V100410505 V100413505 V100415520 V100417505	PV-SAE 3/4" PV-SAE 1" PV-SAE1 1/4" PV-SAE 1 1/2"	Hose installation kit
4	V100113220 V100113225	LSV90HD LSV200HD	Pressure relief valve
	V100415605	PC-SAE All models	Seal kit

8. SV VALVES

8.1 GENERAL

SV solenoid valves enable easy and reliable start/stop control to DYNASET devices at any base machine. Operator can control base machine normally from cabin and switch hydraulic flow and pressure to DYNASET units (HG, HMG, HWG, HKL etc.). SV comes in 12 or 24 VDC models.

SV Solenoid Valves are available as standard models and HD models. Standard version is appliable up to 350 bar (5'076 psi) pressure applications. The HD version is designed for up to 450 bar (6'527 psi) applications. The HD models are recognizable from their black surface color.



A = Standard Model

B = HD Model

IDENTIFICATION KEY

Following identification key describes the SV-valves in more detail.

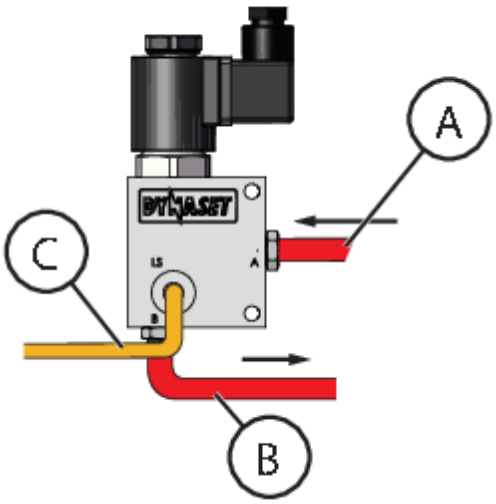
SV 70 NC - 1/2 -12V - AL - 2/2

(1) (2) (3) (4) (5) (6) (7)

1. **PRODUCT GROUP:**Describes the product group in this case the Solenoid valves, SV.
2. **FLOW MAX.:**Describes the SV's maximum flow value.
3. **OPERATION METHOD:**Describes the if the SV has NC (normally closed) or NO (normally open) working method. In NC the valve is closed until opened and the NO is vice versa.
4. **SIZE:**Describes the SV's connection size, example 1/2".
5. **OPERATING VOLTAGE:**Describes the SV's operating voltage, 12/24 V.
6. **BLOCK MATERIAL:**Describes the SV's block material.
7. **VALVE TYPE:**Informs the valve type of the SV.

8.2 INSTALLATION

Install the SV solenoid valve between the pressure source line (A) and the control line (B), to the target device line with appropriate connectors (see "Technical specifications" table) (C = LS-line).

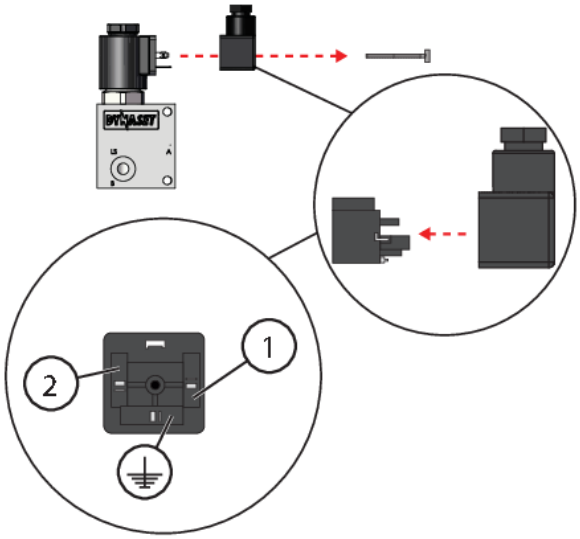


1. Connect coil connector cable to the electric switch SW (12VDC <10A / 24VDC <10A) in the cabin dashboard.

2. Take operating voltage to the SV switch from the cabin's fuse box. Use fuse >15A.

3. Remove valve connector from the cartridge coil.

4. Make sure that the SW is turned off. Open the Coil and connect the cables. Pole 1 is the + VDC and the Pole 2 is the - VDC.



5. When the SW is turned off, make sure that there is no voltage between connector pole 1 and 2 by measuring the voltage with voltage meter.

6. Turn SW switch ON and measure connector pole 1 and 2. Reading should be either ~12 VDC /~ 24 VDC depending on the electric system. If not, check the wiring.

7. Attach the valve connector to the cartridge coil.

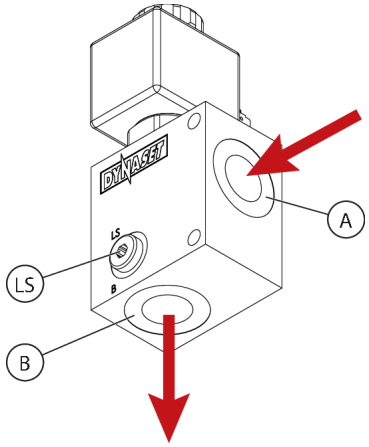
8. Start the working machine and turn SW switch ON to start the Dynaset device.

9. Check all installed hydraulic and electric connection.

10. Turn SW switch OFF to stop the Dynaset device.

8.3 TECHNICAL SPECIFICATIONS & SPARE PARTS SV

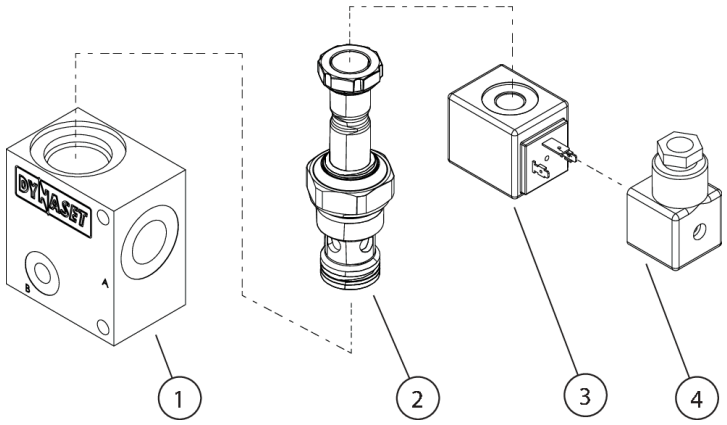
8.3.1 TECHNICAL SPECIFICATIONS



Model	Pressure p max. bar (psi)	Flow Q CF max.*l/ min (gpm)	A	B	LS
SV70NC-1/2-12VAL2/2-LS	210 (3'046)	70 (18.49)	BSPP 1/2	BSPP 1/2	BSBB 1/8
SV70NC-1/2-12VFE2/2-LS	350 (5'076)	70 (18.49)	BSPP 1/2	BSPP 1/2	BSBB 1/8
SV70NC-1/2-24VAL2/2-LS	210 (3'046)	70 (18.49)	BSPP 1/2	BSPP 1/2	BSBB 1/8
SV70NC-1/2-24VFE2/2-LS	350 (5'076)	70 (18.49)	BSPP 1/2	BSPP 1/2	BSBB 1/8
SV150NC-1-12VFE2/2-LS	350 (5'076)	150 (39.63)	BSPP 1	BSPP 1	BSBB 1/8
SV150NC-1-24VFE2/2-LS	350 (5'076)	150 (39.63)	BSPP 1	BSPP 1	BSBB 1/8
SV260NC-1-1/4-24VFE2/2-LS	350 (5'076)	260 (68.69)	BSPP 1 1/4	BSPP 1 1/4	BSBB 1/8
SV260NC-1-12VFE2/2-LS	350 (5'076)	260 (68.69)	BSPP 1 1/4	BSPP 1 1/4	BSBB 1/8
SV70NC-1/2-12VHD2/2-LS	450 (6'527)	70 (18.49)	BSPP 1/2	BSPP 1/2	BSBB 1/8
SV70NC-1/2-24VHD2/2-LS	450 (6'527)	70 (18.49)	BSPP 1/2	BSPP 1/2	BSBB 1/8
SV150NC-1-12VHD2/2-LS	450 (6'527)	150 (39.63)	BSPP 1	BSPP 1	BSBB 1/8
SV150NC-1-24VHD2/2-LS	450 (6'527)	150 (39.63)	BSPP 1	BSPP 1	BSBB 1/8

***CF value is adjusted at the factory according to the customers specifications.**

8.3.2 SPARE PARTS



STANDARD MODELS

PART NO.	DESIGNATION	DETAILS 1	DETAILS 2
V100113106	Solenoid cartridge kit	SV70 - NC -12V	Includes pos.2-4
V100113107	Solenoid cartridge kit	SV70 - NC -24V	Includes pos.2-4
V100113108	Solenoid cartridge kit	SV150 - NC -12V	Includes pos.2-4
V100113109	Solenoid cartridge kit	SV150 - NC -24V	Includes pos.2-4
V100113151	Coil	12 VDC and valve connector 3-pole	Includes pos. 3-4
V100113156	Coil	24 VDC and valve connector 3-pole	Includes pos. 3-4

HD MODELS

PART NO.	DESIGNATION	DETAILS 1	DETAILS 2
V100113260	Cartridge body	SV70HD - 450 bar	Includes pos.1
V100113265	Cartridge body	SV150HD - 450 bar	Includes pos.1
V100113240	Solenoid cartridge kit	SV70HD - NC 12V	Includes pos.2-4
V100113245	Solenoid cartridge kit	SV70HD - NC 24V	Includes pos.2-4
V100113250	Solenoid cartridge kit	SV150HD - NC - 12V	Includes pos.2-4
V100113255	Solenoid cartridge kit	SV150HD - NC - 24V	Includes pos.2-4
V100113151	Coil	12 VDC and valve connector 3-pole	Includes pos. 3-4
V100113156	Coil	24 VDC and valve connector 3-pole	Includes pos. 3-4

9. VR VALVES

9.1 GENERAL

9.1.1 APPLICATIONS

DYNASET VR oil flow limiter valves are designed for reliable hydraulic fluid flow control. With them you keep the flow constant and your hydraulic appliances working properly.

DYNASET VR Pressure compensated oil flow limiter provides fast control of hydraulic flow. It is designed for use in LS-hydraulic systems with several simultaneously running executors.

Outlet flow rate is independent of the pressure and viscosity. The flow rate is determined by a fixed measuring sensor. DYNASET VR Oil flow limiter is preadjusted at the factory.

The basic DYNASET VR Oil flow limiter is a flow limiting cartridge valve, which can be fitted into different control blocks or housings.

9.1.2 OPERATING PRINCIPLE

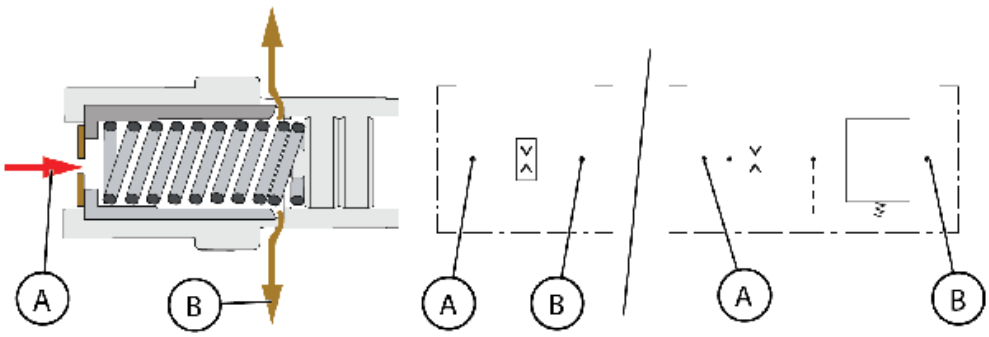
DYNASET VR are fixed orifice valves with back-up differential pressure compensator for hydraulic systems.

The oil flow sensor determines the flow adjustment range. The flow from inlet A to the outlet B in the valve is specified by a pressure drop in the oil flow sensor. The compensating spool moves into control position which corresponds to the equilibrium created between the oil flow sensor and spring force.

As the flow rate increases, the diameter of the control flow opening is reduced in accordance with increased pressure drop, until the oil flow sensor and the spring are in equilibrium again.

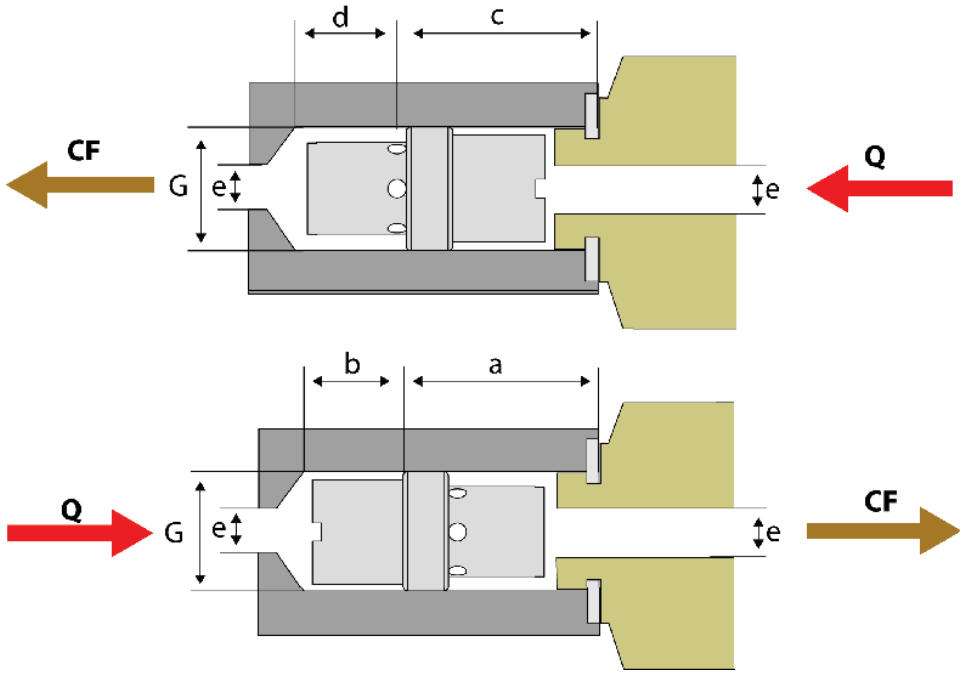
Due to the continuous adjustment of the compensating spool in accordance with the prevailing pressure drop, a constant flow is ensured.

When the flow moves from B to A the VR works as an orifice.



9.2 INSTALLATION

9.2.1 MEASUREMENTS FOR THE HOUSING



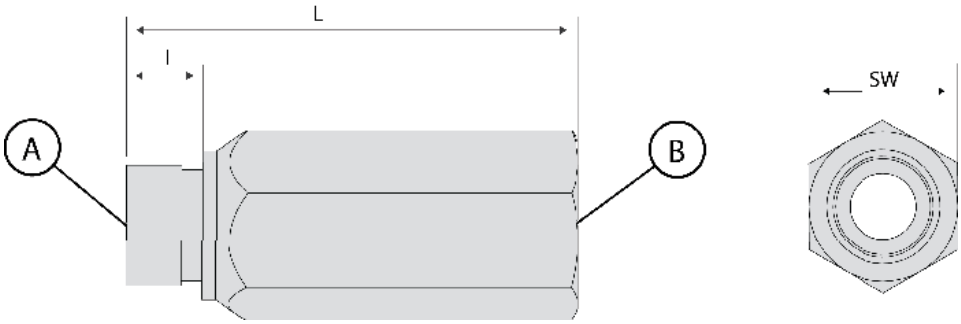
MODEL	a min*	b min*	c min*	d min*	e min*
VR1/2-PK-xx**	40 (1.58)	15 (0.59)	37 (1.46)	18 (0.71)	10 (0.40)
VR3/4-PK-xx**	51 (2.01)	24 (0.95)	51 (2.01)	24 (0.95)	12 (0.47)
VR1-PK-xxx**	51 (2.01)	26 (1.02)	51 (2.01)	26 (1.02)	17 (0.67)

**last value describes the nominal flow in l/min

*DIMENSIONS, mm(in)

Installation dimensions listed above are minimum values for pipethreads and male threads according to DIN3852.

9.2.2 STANDARD HOUSING FOR THE VR



MODEL	A*	B*	L**	l**	SW, mm(in)	Weight, g(oz)
VR1/2-PK-xx**	BSP 1/2"	BSP 1/2"	82(3.23)	14 (0.55)	27 (1.06)	200 (7.06)
VR3/4-PK-xx**	BSP 3/4"	BSP 3/4"	98(3.86)	16 (0.64)	36 (1.42)	430 (15.2)
VR1-PK-xxx**	BSP 3/4"	BSP 1"	102(4.02)	17(0.67)	41(1.61)	500(17.6)

*CONNECTIONS

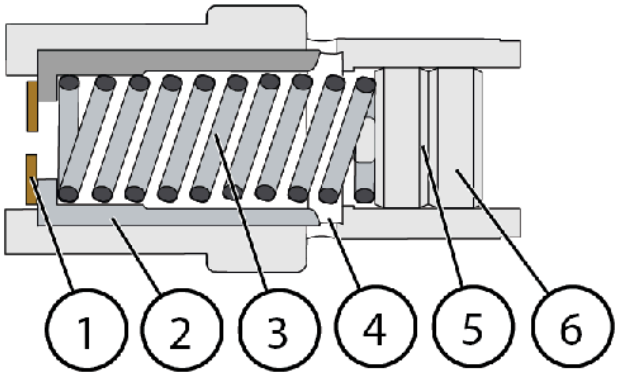
**HOUSING DIMENSIONS

***last value describes the max flow in lpm

9.2.3 INSTALLATION AND ADJUSTMENT

Install the VR valve into the control block. If the VR comes in the housing, install it into to desired place in your hydraulic system.

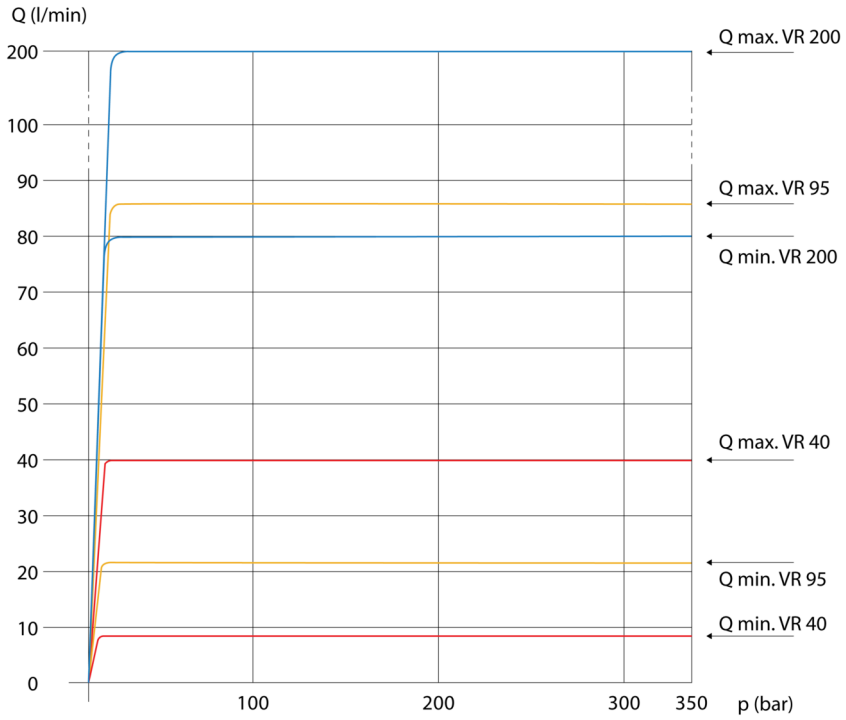
9.3 TECHNICAL SPECIFICATIONS



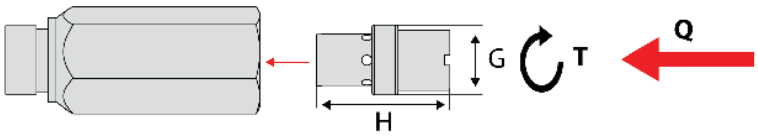
DYNASET VR valve has the following components

1. Oil flow sensor
2. Control spool
3. Spring
4. Control opening
5. Adjustment screw
6. Locking nut

FLOW RATE (Q) DEPENDENCY ON PRESSURE



MEASUREMENTS FOR THE VR VALVE



Model	Pressure p max. bar (psi)	Flow Q CF max.*l/ min (gpm)	H, mm(in)	Torque, Nm (ft-lbs)	G	Weight, g(oz)
VR1/2-PK-xx	350 (5'076)	40 (10.57)	82 (3.2)	8 (5.9) - 12 (8.9)	BSPP 1/2	37(1.31)
VR3/4-PK-xx	350 (5'076)	88 (23.25)	98 (3.9)	12 (8.9) - 18 (13.3)	BSPP 3/4	51(1.80)
VR1-PK-xxx	350 (5'076)	200 (52.84)	102 (4.0)	15 (11.1) - 20 (14.8)	BSPP 1	53(1.87)

***CF value is adjusted at the factory according to the customers specifications.**

10. MANUFACTURER'S LIMITED WARRANTY

10.1 WARRANTY COVERAGE

All accessories manufactured by DYNASET OY are subject to the terms and conditions of this limited warranty. Products are warranted to the original purchaser to be free from defects in materials or workmanship. Exclusions from warranty are explained in item Exclusions from warranty.

10.2 BEGINNING OF WARRANTY PERIOD

Warranty period begins from the delivery date of the product. Delivery is considered to be done on the date when installation has been accomplished or purchaser has taken the product in use. Product is considered as taken in use at the date when DYNASET OY has delivered the product to purchaser, unless separately agreed otherwise by written agreement.

10.3 WARRANTY PERIOD

Warranty period is twenty-four (24) months based on maximum of 2000 hours usage during this time period. In cases where the system is provided complete with certain special components (e.g. drive unit), those components are considered as a subject to their manufacturer's warranty.

10.4 WARRANTY PROCEDURES

Immediately upon identifying a problem which purchaser believes to be a failure subject to the product's limited warranty, purchaser must contact primary to the seller of the product. Contact must be made as soon as possible, the latest thirty (30) days after the problem was identified. Seller and/or manufacturer technical staff determines the nature of the problem primarily by phone or e-mail. Purchaser commits to give necessary information and to perform routine diagnostic procedures in order to determine the nature of the problem and necessary procedures.

10.5 WARRANTY REPAIRS

If the product is found to be defective during the warranty period, DYNASET OY will, at its option, either repair the product, author it to be repaired at its authorized workshop or exchange the defective product. If the product must be repaired elsewhere than premises of DYNASET OY or authorized workshop, all costs excluded from this warranty (travelling and waiting hours, daily allowance, travelling expenses and uninstallation/ reinstallation costs) will be charged from the purchaser. If the problem is not covered by this limited warranty, DYNASET OY has the right to charge purchaser of troubleshooting and repairing.

10.6 DELIVERY TERMS OF WARRANTY REPAIR

If the product is found possible to be defective under this limited warranty, and it needs to be repaired, DYNASET OY gives Warranty Return Number (WRN). Items being returned must be shipped, at the purchaser's cost, adequately packed for shipment, to the DYNASET OY or to other location authored by DYNASET OY.

Shipment documents must contain:

- Purchaser's name and contact information
- Receipt of original purchase
- WRN code
- Problem description

10.7 WARRANTY OF REPAIRED PRODUCT

Warranty period of the product repaired under this limited warranty continues to the end of original warranty period.

10.8 EXCLUSIONS FROM WARRANTY

This warranty shall not apply to:

- Failures due to normal wear and tear, improper installation, misuse, abuse, negligence, purchaser selection of improper product to intended use, accident, improper filtration of hydraulic oil or intake water or lack of maintenance.
- Cost of maintenance, adjustments, installation or startup.
- Coating, hydraulic oil, quick couplings and interconnection hoses (internal or external to system assemblies).
- Products altered or modified in a manner not authorized by DYNASET OY in writing.
- Products which have been repaired during warranty period by others than DYNASET OY or its authorized workshop.
- Costs of any other damage or loss, whether direct, indirect, incidental, special or consequential, arising out of the use of, or the inability to use, the product.
- Telephone or other communications expense.
- Product that is used in exceptional conditions, considered to cause excessive wear and tear.
- Faults caused by nature phenomenon like flood, thunder, etc.

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11. PRODUCT DISPOSAL

Dispose and recycle all products and their packaging environmentally responsible way.

Do not dispose used oils, electrical components, batteries or any other hazardous waste with normal waste. They are harmful for the environment and can be recycled for re-use.

Contact your local waste recycling facility for more information about recycling hazardous waste.

NOTE!

Always act according to the waste legislation, regulations and recommendations in waste disposal and waste recycling issued by your local authorities.

DYNASET

PARTNER OF YOUR MACHINE

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info@DYNASET.com



ELECTRICITY

HG Hydraulic Generator
HGV POWER BOX Variable Hydraulic Generator System
HGV Variable Hydraulic Generator System
HWG Hydraulic Welding Generator
HGG Hydraulic Ground Power Generator



HIGH PRESSURE WATER

HPW Hydraulic High Pressure Water Pump
HPW Hydraulic Power Washer
KPL High Pressure Street Washing Unit
KPL-WEED Weed Killing Unit
SCU Surface Cleaning Unit
HPW-DUST High Pressure Dust Suppression System
PPL High Pressure Pipe Cleaning Unit
HPW-FIRE High Pressure Firefighting System
FP Fire Fighting Piercing Kit
HDF Hydraulic Drilling Fluid Pump
JPL High Pressure Bin Washing System
HSP Hydraulic Submersible Pump



COMPRESSED AIR

HK Hydraulic Piston Compressor
HKL Hydraulic Rotary Vane Compressor
HKR Hydraulic Screw Compressor



MAGNET POWER

HMG PRO Hydraulic Magnet Generator
MAG Lift Magnet
HMAG PRO Hydraulic Magnet



VIBRATION

HVB Hydraulic Vibration Pump
HVD Hydraulic Directional Vibra
HRC Hydraulic Reversal Cylinder



POWER BOOSTING

HPI Hydraulic Pressure Intensifier
HPI-C Hydraulic Pressure Intensifier for Cylinder



VACUUM

HCF Hydraulic Centrifugal Fan
HRVB Hydraulic Recycling Vacuum Bucket



KNOW-HOW

Hydraulic Power Take-off (PTO)
Hydraulic Power Unit Technology
HEU Hydraulic Expansion Unit
HRU Hydraulic Rescue Unis
De-Icing Technology
Installation Valves
HHK Hydraulic Grinder
HV/HVY Hydraulic Winch / Winch Unit

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