



Fiable Hydraulics

User Manual

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Introduction

1. Hydraulic technology is extensively used in a wide range of lifting applications in many industries. These may include: Car Parking, Truck, mining, road construction, agriculture, automotive and aerospace, just to mention a few.
2. By applying a small amount of force, a hydraulic system can develop a pressure more than 10,000 psi. This helps to lift heavy loads and perform strenuous tasks at an affordable cost

What are Hydraulic Power Units?

Hydraulic power units (sometimes referred to as a hydraulic power pack) is a self-contained system that generally includes a motor, a fluid reservoir, and a pump. It works to apply the hydraulic pressure needed to drive motors, cylinders, and other complementary parts of a given hydraulic system

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① Instructions Prior To Operating

1. Set up a filter maintenance schedule and follow it diligently.
2. Inspect filter elements that have been removed from the system for signs of failure which may indicate that the service interval should be shortened and of impending system problems.
3. Never return to the system any fluid which has leaked out.
4. Always keep the supply of fresh fluid covered tightly.
5. Use clean containers, hoses, and funnels when filling the reservoir. Use a filter cart when adding oil is highly recommended.
6. Use common sense precautions to prevent entry of dirt into components that have been temporarily removed from the circuit.
7. Make sure that all clean-out holes, filter caps, and breather cap filters on the reservoir are properly fastened.
8. Do not run the system unless all normally provided filtration devices are in place.
9. Make certain that the fluid used in the system is of a type recommended by the manufacturers of the system or components.
10. Monitor the fluid level and condition in the reservoir, topping up as required.
11. Check that pressure, flow and electric motor current are consistent with the test certificate supplied with the power unit.

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Important Safeguards and Warnings

1. The chapter safety information describes possible dangers which can appear during operation, servicing and repairing of hydraulic power pack eliminated all possible risks as good as possible.
2. All remaining risks are described in this operating and maintenance instruction and must be followed by all persons working at the hydraulic power pack absolutely.
3. In addition to this operating and maintenance instruction are to be followed all valid laws and orders, the accident prevention regulations, all order signs and hints on the hydraulic power pack.
4. Before delivery, the hydraulic power packs are functionally checked so take care for do not change any standard settings.



Warnings

Do not perform any maintenance or work on equipment unless you first perform Lock-Out Safety Precautions. All electrically powered equipment **MUST** have manually operated disconnects capable of being locked in the "OFF" position. Equipment that has been "locked out" for any reason must be restarted **ONLY** by the person who performed the "lock out" operation. These procedures **MUST** be followed to avoid personal injury, death and/or dismemberment



Hydraulic Power Pack Features

Fiable Hydraulic Power Packs feature durable pumps and motors engineered to excel in the harsh environment of a professional car parking. They deliver reliable performance day after day with minimal maintenance.

1. Oil Gauge & Oil Window
2. Temperature Gauge
3. Return Line Filter
4. Filler Breather
5. Drain Plug
6. Suction Strainer
7. System Relief
8. Manual Release
9. Pressure-Compensated Flow Control
10. Pressure Gauge
11. Gear Pump available for medium flow and medium pressure range
12. Vane Pump available for high flow and low pressure range
13. Piston Pump available for less flow and high pressure range



Installation Instructions and Start Up Procedure

The unit should be installed indoors, and preferably in a clean, dry environment with an ambient temperature of 60 to 100°F. The unit can be installed outdoors if the reservoir was provided with optional weatherproof construction, and provisions were made for extreme temperature conditions. The reservoir can be secured to the floor or base using the four mounting holes located on the reservoir legs.

1. Open any ball or gate valve (if applicable) located in the pump suction line.
2. Back the system relief valve and/or pump pressure compensator adjustment knob out, so that the pressure will be near zero during the initial start.
3. If the system has been provided with an open center directional valve, the oil during start-up will flow directly back to tank. If the system has a closed center valve, it may be necessary to loosen a fitting momentarily at the pump discharge, to bleed any air in the pump during the priming operation.
4. Jog the pump motor once, and verify that the pump is rotating in the same direction as the arrow tag on the pump case. If the direction is incorrect, reverse two (2) of the three (3) motor leads, and recheck the rotation.
5. Jog the pump/motor (3) to (6) times to prime the pump and allow the pump to run for several minutes at zero pressure. Check the piping for any leaks and correct immediately. (Leaks in fittings and tubing can be the result of vibration during shipping.)
6. Begin adjusting the relief valve to increase the pressure gradually. Note: on systems with open center directional valves, it will be necessary to actuate the valve to build pressure.
7. Continue increasing pressure until normal operating pressure is obtained, and recheck system for leaks. Lock adjustment screws in place.

Guidelines For Maintenance

- Electric Motors – Lubricate as recommended by the motor manufacturer.
- Filters – Change or clean as required or as indicated on filters supplied with visual indicators. Make sure to check indicators shortly after start-up.
- Suction Strainers – Should be cleaned after 10 hours of operation initially and every 100 hours thereafter.
- Reservoirs - Maintain oil level at all times. The oil should be checked after the first 100 hours and verify that the class of oil meets the requirements of the pump being used. Change the oil every 1000 to 2000 hours depending on the application and operation environment.

General Instructions

- Motor Rotation: Motor rotation should be as per arrow marked on motor fan cover.
If system can't generate pressure then change the wiring connection and with the help of motor "JOG" check the delivery of oil.
- Pump Noise: If pump make noise after motor starting then slightly loose the motor mounting bolts.
- Flow Control Valve / Needle Valve: This valve is used to control return speed of cylinder
Direction Of Rotation:
Clockwise: It reduces return speed
Counter-clockwise: Increases return speed of cylinder

- **Relief Valve:** It adjust and maintains system pressure
Direction Of Rotation:
 - 1) **Clockwise:** It increases system pressure
 - 2) **Counter-clockwise:** It decreases system pressure
- **Poppet Valve (If applicable) And Solenoid Valve (SV-08 / SV-10) :**
Generally we are using "NC" type of solenoid valve which is normally closed so during extraction (poppet valve coil- "energized") and solenoid valve must be "De-energized". But during retraction it is necessary that both coils must be "Energized". (Solenoid Valve Stud, Poppet Valve Stud and Banjo filter must be cleaned for cylinder extraction and retraction)

NOTE: For single acting cylinder it should have adequate weight for gravity down

Sr No.	Cylinder	Vertical	Inclined
1	Telescopic	100 KG	150
2	Bore 63mm	250 KG	300
3	Bore 80mm	350 KG	400
4	Above 80mm Bore	Min. Load 400 KG	Min. Load 500 KG

NOTE: If system having a pilot operated check valve then motor and second coil of direction control valve must be "ON" during retraction (Single and Double Acting Cylinder).

NOTE: In a stacker during extraction or retraction poppet valve must be operate electrically. During electrical shutdown or in an emergency situation (Not for testing purpose or regular use) operate poppet valve by pin provided on its back side using 4mm allen key.

NOTE: Test that the correct coil is energized by removing the nut and raising the coil slightly to feel pull and also check the LED of coil is working or not.



Procedure To Set-up Power-pack With KVS-02/ET-02, ET-05, 2B2 Lift Valve Block

All check points and standard procedure for starting a hydraulic system:-

While extracting a cylinder :-

1. **Pressure Relief Valve :-** The pressure relief valve is one of the most important types of safety valves. It is designed to control or relieve over pressure levels for optimal functionality in any system by rotating it's adjustment screw in anticlockwise or clockwise direction to decrease or increase the pressure respectively.
2. **Check valve :-** The check valve is a crucial system component for preventing back-flow. Check valves help a system maintain one-way flow and it must be fully "TIGHT" while system is on. In case if the wiring connection has been changed then first loose the check valve which removes air trapped in system and then "TIGHT" it properly.
3. **FCV And Poppet Valve Coil :-** Make sure that FCV (Flow Control Valve) is fully "TIGHT" and poppet valve coil is also "energized" while extracting cylinder.
4. **SV (solenoid coil) :-** A solenoid control valve is used by engineers to control the flow of fluid within a system autonomously and remotely, thereby eliminating the need for manual closure and opening of valves. Solenoid coil must be "De-energized" while extracting the cylinder.

While retracting a cylinder:-

1. Solenoid valve (SV) and poppet valve :- While retracting the cylinder solenoid valve (SV) and poppet valve coil should be "energized".
2. Needle Valve (NV) :- Needle valves are also known as flow control valves, used to control flow rates accurately. By rotating it's adjustment screw in anticlockwise or clockwise direction to increase or decrease the return line flow respectively. Which helps in control the speed of cylinder while retracting.

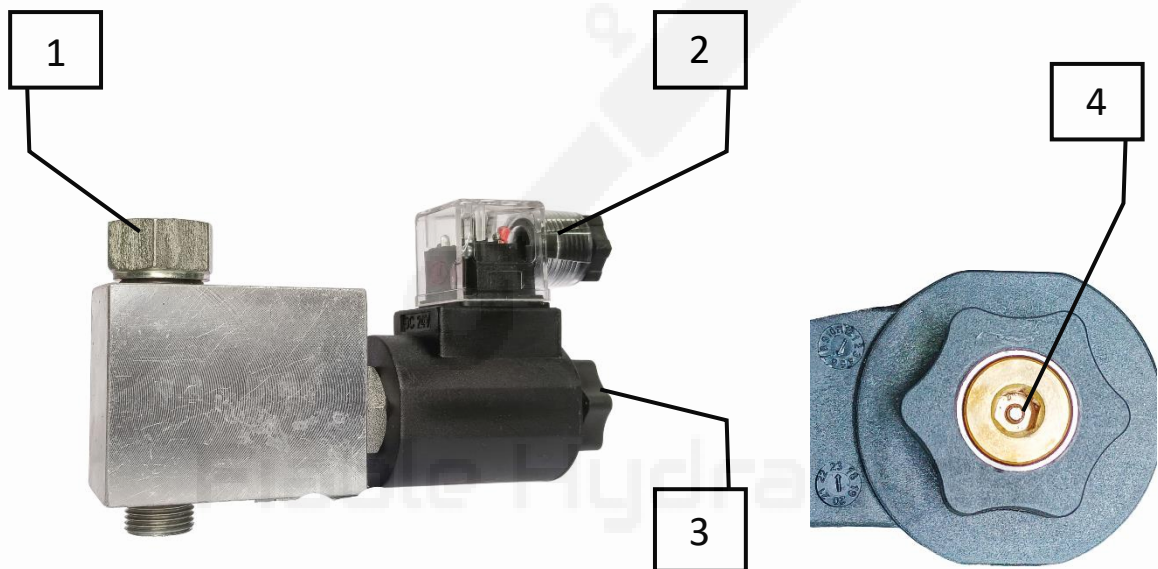
NOTE :- After following all the instructions if cylinder is not retracting then remove the SV and Poppet Valve Coil Stud and clean it properly then follow same instructions.

Test that the correct coil is energized by removing the nut and raising the coil slightly to feel pull.

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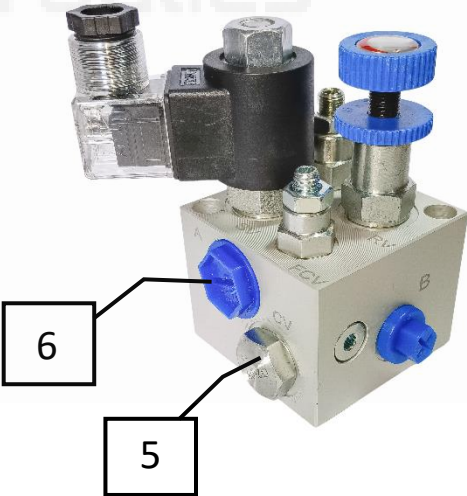
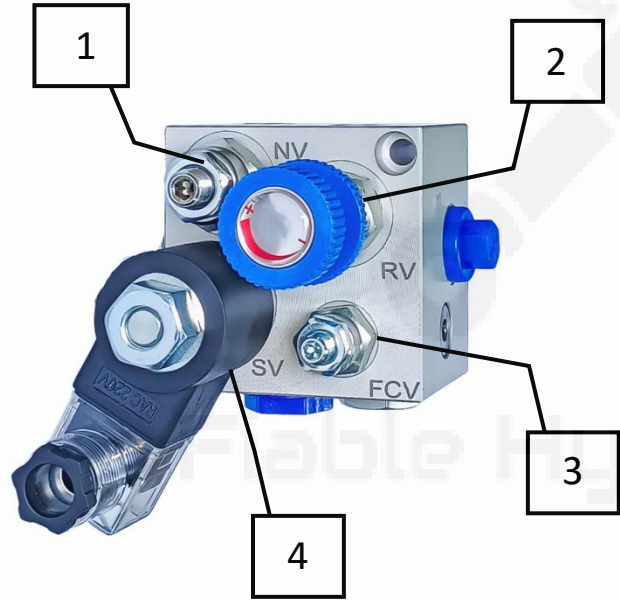
Part No.	Part Name	Function
1	Banjo	To Supply filtered oil to Cylinder and also returns to tank
2	Solenoid Coil	To control the direction of hydraulic flow
3	Solenoid Coil Stud	It having functions to open and close hydraulic flow
4	Solenoid Coil Pin	To retract cylinder manually during electrical shutdown and in emergency situation

Poppet Valve



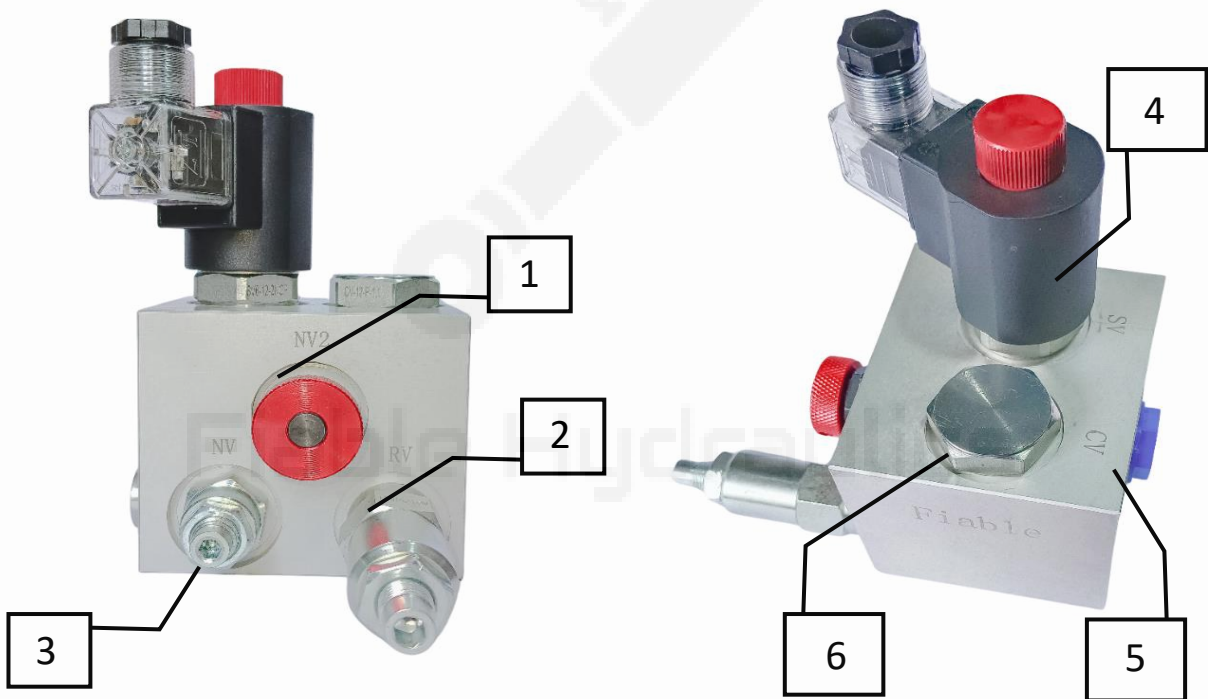
Part No.	Part Name	Function
1	Needle Valve	To control return speed of hydraulic cylinder
2	Relief Valve	To set pressure of hydraulic system
3	FCV (Manual Release)	To lower the lift when electricity is not available
4	Solenoid Valve	To control the direction of hydraulic flow
5	Check Valve	It controls one directional hydraulic flow
6	Outlet Port	1/2" BSP

ET-02/KVS-02



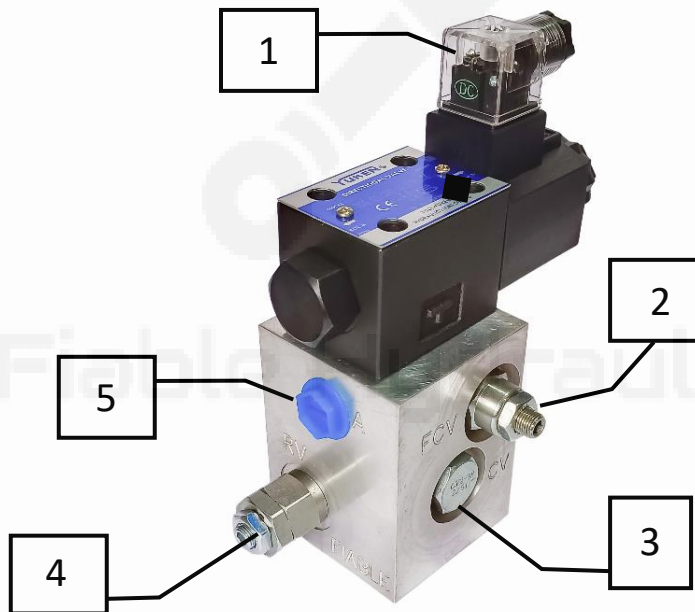
Part No.	Part Name	Function
1	NV2 (Manual Release)	To lower the lift when electricity is not available
2	Relief Valve	To set pressure of hydraulic system
3	Needle Valve	To control return speed of hydraulic cylinder
4	Solenoid Valve	To control the direction of hydraulic flow
5	Outlet Port	1/2" BSP
6	Check Valve	It controls one directional hydraulic flow

ET-05



Part No.	Part Name	Function
1	Solenoid Valve	To control the direction of hydraulic flow
2	Flow Control Valve (FCV)	To control return speed of hydraulic cylinder
3	Check Valve	It controls one directional hydraulic flow
4	Relief Valve	To set pressure of hydraulic system
5	Outlet Port	3/8" BSP

2B2



Trouble-shooting for ET-02 (KVS-02) / ET-05 / 2B2 Lift Valve Block

Extraction

Sr no.	Causes	Conditions	Trouble-shooting
1	Motor rotation	As per arrow marked on motor fan cover	Change wiring connection - jog motor and check delivery of oil
2	Rated pressure	As per application	Use pressure gauge and using pressure relief valve set required pressure
3	Manual release (FCV)	Fully tight	If loose then tight it properly
4	Poppet coil	"Energized"	If not then check electrical connection
5	Solenoid coil	"De-energized"	If not then check electrical connection
6	Air trapping	System must be free from air trapping	Remove check valve and tight it
7	Poppet and solenoid stud filter	Must be clean	If blocked by impurities then clean it
8	Leaks	No any leak from dowty washer, copper washer, hoses, connector	Change washers and tight hoses and connectors

Retraction

Sr No.	Causes	Conditions	Trouble-shooting
1	Needle valve	Normally loose	Loose it slightly and adjust return speed of cylinder
2	Poppet coil	"Energized"	If not then check electrical connection
3	Solenoid coil	"Energized"	If not then check electrical connection
4	Poppet and solenoid stud filter	Must be clean	If blocked by impurities then clean it
5	Manual lock	Unlocked	Check position of manual lock and unlock it

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Procedure To Set-up Powerpack With Multi-speed / Elevator Control Valve Block

While extracting a cylinder:-

1. Pressure Relief Valve And FRG 12 (Smooth Adjustment Rising)
:- Adjust the system pressure by loosening (anti-clockwise) or tightening (clockwise) the RV (Pressure Relief Valve) and also adjust smooth rising valve to avoid jerk when extracting cylinder.
2. Check valve :- The check valve is a crucial system component for preventing back-flow. Check valves help a system maintain one-way flow and it must be fully "TIGHT" while system is on. In case if the wiring connection has been changed then first loose the Check valve which removes air trapped in system and then tight it properly.

Manual Emergency Descent (Slow), Manual Emergency Descent (Fast) And Poppet Valve Coil (If applicable Poppet Valve) :- Make sure that both manual emergency descent are fully "TIGHT" and poppet valve coil of cylinder should be "energized" while extracting cylinder.

NOTE :- The SV (Solenoid Coil) should be "De-energized" while extracting cylinder.

While retracting a cylinder:-

NOTE:- Solenoid Valve (SV-10) is a common and should be "energized" for both slow and fast acting operations during lowering the platform with both (SV-08) coils.

Slow Acting Valve Side

Solenoid Valve (SV-08) and FCV (PC-10) : - While lowering platform make sure that Solenoid Valve Coil should be "energized" and adjust the return speed as per requirement by adjusting FCV (PC-10).

Fast Acting Valve Side

Solenoid Valve (SV-08) AND FCV (PC-10A) :- While lowering platform make sure that solenoid valve coil should be "energized" and adjust the return speed as per requirement by adjusting FCV (PC-10A).

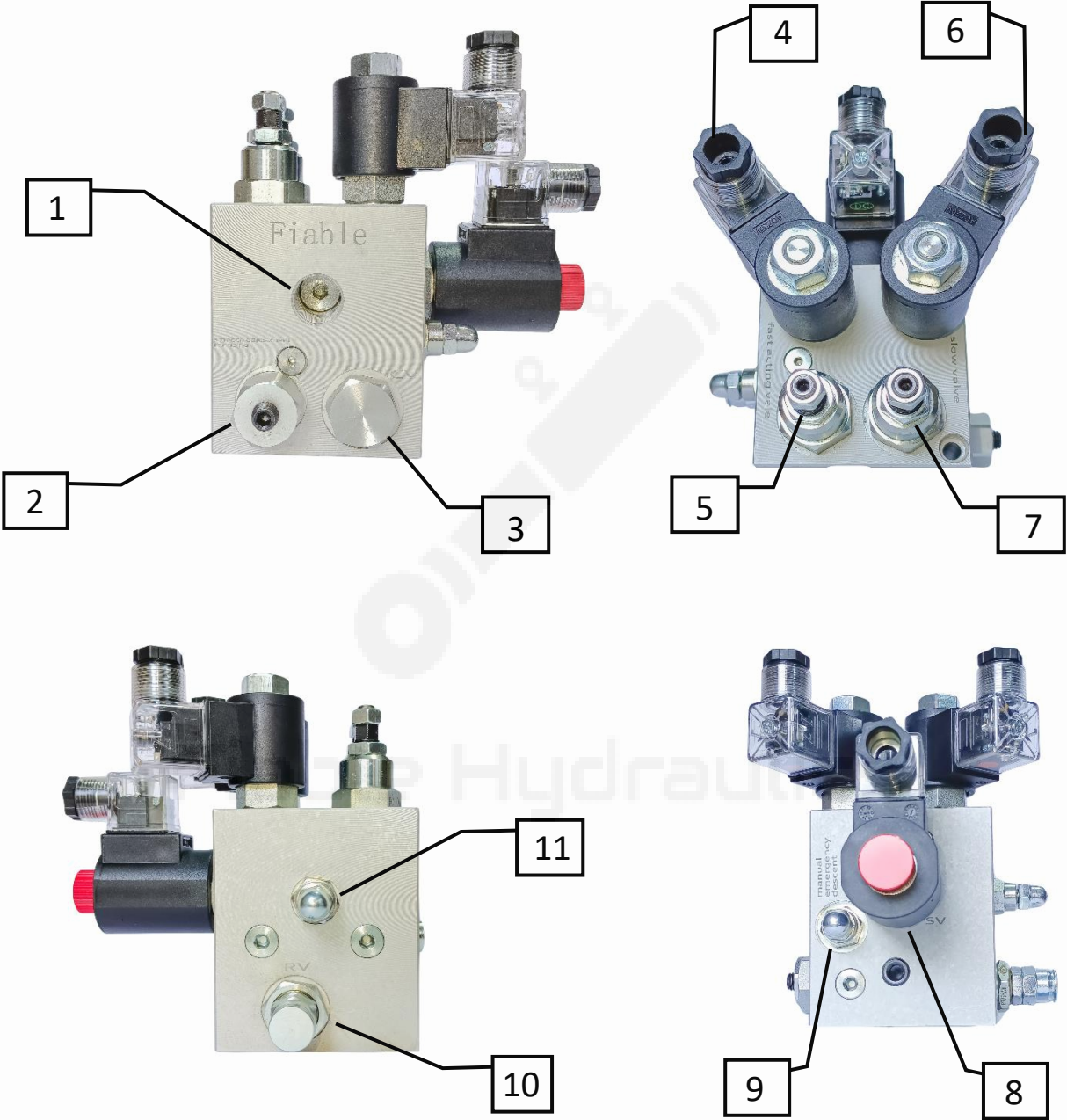
NOTE :- After following all the instructions if cylinder is not retracting then remove the SV and Poppet Valve Coil Stud and clean it properly then follow same instructions.

Test that the correct coil is energized by removing the nut and raising the coil slightly to feel pull.

Part No.	Part Name	Function
1	Outlet Port	Size – M20 X 1.5P
2	FRG 12 (Smooth Adjustment Rising)	To avoid jerk and achieve smooth rising / Lifting
3	Check Valve	It controls one directional hydraulic flow
4	Solenoid Valve (SV-08) (Fast Acting Valve)	To control the direction of hydraulic flow
5	Flow Control Valve (PC-10A) (Fast Acting Valve)	To control return speed of hydraulic cylinder
6	Solenoid Valve (SV-08) (Slow Acting Valve)	To control the direction of hydraulic flow
7	Flow Control Valve (PC-10) (Slow Acting Valve)	To control return speed of hydraulic cylinder
8	Solenoid Valve (SV-10) (Common Valve)	To control the direction of hydraulic flow
9	Manual Emergency Descent (Slow)	To lower the lift at slow speed when electricity is not available
10	Relief Valve	To set pressure of hydraulic system
11	Manual Emergency Descent (Fast)	To lower the lift at fast speed when electricity is not available

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Multi-Speed/ Elevator Control



Trouble-shooting for Multi-Speed / Elevator Control Valve Block

Extraction

Sr No.	Causes	Conditions	Trouble-shooting
1	Motor rotation	As per arrow marked on motor fan cover	Change wiring connection -jog motor and check delivery of oil
2	Rated pressure	As per application	Use pressure gauge and using pressure relief valve set required pressure
3	Both manual release	Fully tight	If loose then tight it properly
4	Jerk setting (FRG-12)	Having jerk free raising	Adjust FRG-12 and pressure relief valve properly to avoid jerk
5	Poppet coil	"Energized"	If not then check electrical connection
6	Solenoid coil (SV-10)	"De-energized"	If not then check electrical connection
7	Both solenoid coil (SV-08)	"De-energized"	If not then check electrical connection
8	Air trapping	System must be free from air trapping	Remove check valve and tight it
9	Poppet and solenoid stud filter	Must be clean	If blocked by impurities then clean it

Retraction

Sr no.	Causes	Conditions	Trouble-shooting
1	Solenoid coil (SV-10) - common	"Energized"	If not then check electrical connection
2	FCV (PC-10)- (Slow descent)	Normally loose	Loose it and adjust return speed of cylinder
3	Solenoid coil (SV-08)- (Slow descent)	"Energized"	If not then check electrical connection
4	FCV (PC-10A)- (Fast descent)	Normally loose	Loose it and adjust return speed of cylinder
5	Solenoid coil (SV-08)- (Fast descent)	"Energized"	If not then check electrical connection
6	Poppet coil	"Energized"	If not then check electrical connection
7	Poppet and solenoid stud filter	Must be clean	If blocked by impurities then clean it
8	Manual lock	Unlocked	Check position of manual lock and unlock it



Procedure To Set-up Powerpack With Zero Cushion Lift Valve Block

While extracting a cylinder:-

Main Pressure Relief Valve (0 - 315 Bar) :- Pressure-relief valve limits the ceiling pressure in a hydraulic circuit by creating an alternate path for fluid flow when preset pressure level is reached. And return excessive flow to tank.

Direction Control Solenoid Valve :- Directional control valves perform only three functions: stop fluid flow, allow fluid flow, and, change direction of fluid flow. The selection of Direction Control Valve is depend upon application of hydraulic system. While "energizing" a solenoid coil oil will be supplied to outlet port and cylinder will be extracting.

Manual Release :- Hydraulic systems sometimes have a manual release valve integrated into the design. This valve relieves built up pressure and is usually deployed when the mechanical system fails at some point and stops the pressure being relieved automatically according to the normal operation of the equipment. Manual Release must be "TIGHT" while system is under pressure for lifting load. And also we should have to operate it only during electrical shutdown or in an emergency situation.

While retracting a cylinder:-

When we operate a solenoid coil for retraction of cylinder, oil exerts a pressure on pilot operated check valve through pilot line at required pressure which is set by pressure relief valve(4 - 16 BAR).

Second Coil Of Direction Control Valve and Motor must be "ON"

Pressure Relief Valve (0 - 100 Bar) :- This pressure relief valve is used to operate pilot operated check valve. It requires pressure range of 4 - 16 bar for functioning of check valve during retraction of cylinder.

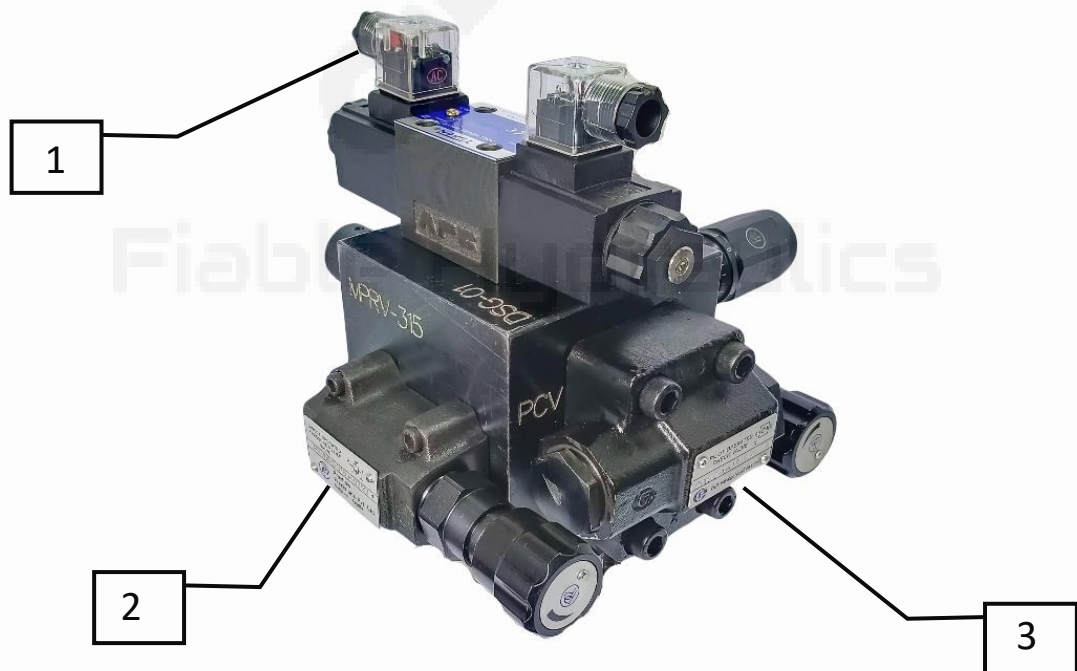
Pilot Operated Check Valve :- Pilot operated check valves work by allowing free flow from the inlet port through the outlet port. Supplying a pilot pressure to the pilot port allows flow in the opposite direction. Oil pressure on top of the poppet assembly opens the seal allowing oil to flow freely in reverse direction (tank)

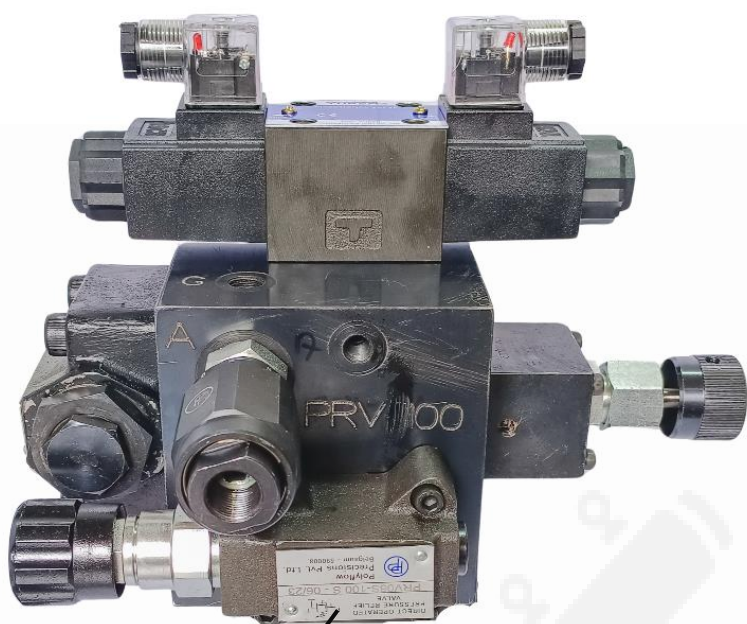
Flow Control Valve :- The purpose of a flow control valve is to regulate the flow rate in a specific portion of a hydraulic circuit. In this circuit we are using inline type FCV. During retraction we can adjust the reverse flow of oil which control the return speed of cylinder. By rotating it in clockwise or counter-clockwise direction we decrease or increase return speed of cylinder respectively.

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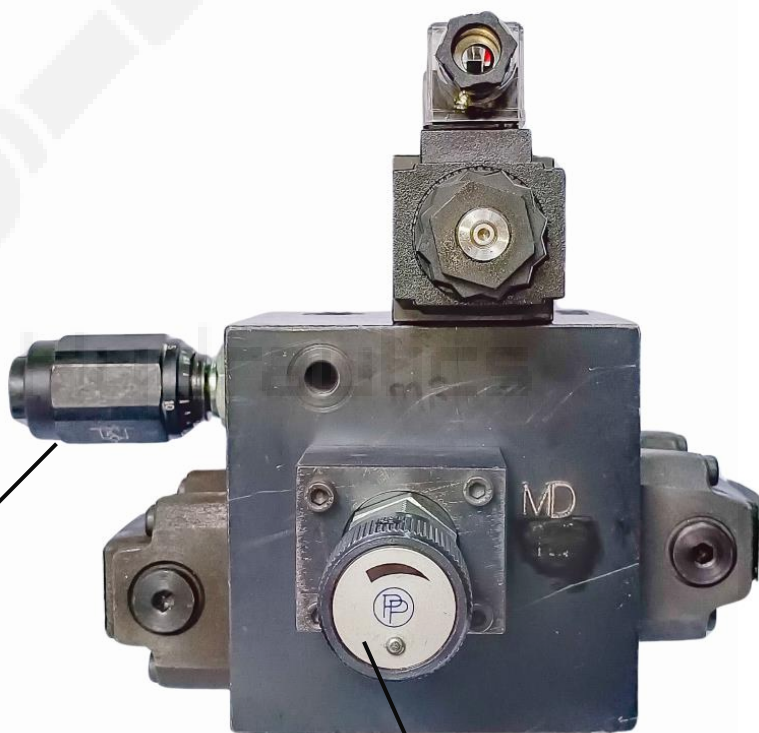
Part No.	Part Name	Function
1	Direction Control Valve	To control the direction of hydraulic flow
2	MPRV (Main Pressure Relief Valve)	To set pressure of hydraulic system
3	PCV (Pilot Operated Check Valve)	It allows to flow oil in both direction using Pilot line
4	PRV (Pressure Relief Valve)	To control pressure of pilot operated check valve
5	FCV (Flow Control Valve)	To control return speed of hydraulic cylinder
6	Manual Down/Release	To lower the lift at slow speed when electricity is not available

Zero Cushion Lift Valve Block





4



5

6

Trouble-shooting for Zero Cushion Lift Valve Block

Extraction

Sr No.	Causes	Conditions	Trouble-shooting
1	Motor rotation	As per arrow marked on motor fan cover	Change wiring connection - jog motor and check delivery of oil
2	Rated pressure (Main pressure relief) (0 – 315 bar)	As per application	Use pressure gauge and using main pressure relief valve set required pressure
3	Manual release	Fully tight	If loose then tight it properly
4	Pressure relief valve (0 – 315 bar)	Valve Orientation	As per shown in picture
5	Direction control solenoid valve	"Energized"	If not then check electrical connection
6	Poppet coil	"Energized"	If not then check electrical connection
7	Air trapping	System must be free from air trapping	Remove check valve and tight it
8	Poppet and solenoid stud filter	Must be clean	If blocked by impurities then clean it
9	Leaks	No any leak from dowty washer, copper washer, hoses, connector	Change washers and tight hoses and connectors

Retraction

Sr No.	Causes	Conditions	Trouble-shooting
1	Pressure relief valve (0 – 315 bar)	Flow must be on (4 – 16 bar)	Set required pressure to operate pilot check valve
2	Poppet coil	"Energized"	If not then check electrical connection
3	Direction control solenoid valve	"Energized"	If not then check electrical connection
4	Flow control valve	Normally loose	Loose it and adjust return speed of cylinder
5	Pilot operated check valve	Flow should be open	Adjust pressure relief valve to required pressure which opens the pilot check valve
6	Poppet and solenoid stud filter	Must be clean	If blocked by impurities then clean it
7	Manual lock	Unlocked	Check position of manual lock and unlock it

Procedure To Set-up Powerpack Without Unloading Valve (Single- station) / (Multi-station) Block

This information is applicable for DSG-3C60

While using 3C60 valve no need to use unloading valve because in neutral position "P" and "T" lines are connected.

But we should have to operate all valves at same time otherwise if any valve coil is "De-energized" then oil will directly flow from "P" to "T".

Procedure To Set-up Powerpack With Unloading Valve (Multi-station) / (Single-station) Block

This information is applicable for DSG-3C2

NOTE:- (In multi-station block we are mostly using 3C2 type direction control valve in which "P" and "T" are blocked).

If motor is continuously in running but system is not under working / pressure then we should have to take care about the SV (Unloading Valve Coil) must be "De-energized" which is "NO" normally open type and it supply oil to tank.

As per requirement if the provided power pack (Single - Station OR Multi -Station with DSG-3C2) is without unloading valve then be sure that the coil of direction control valve and motor should be "energized" at same time. Otherwise the motor will run under loading condition and it may be damage to hydraulic components.

While extracting a cylinder:-

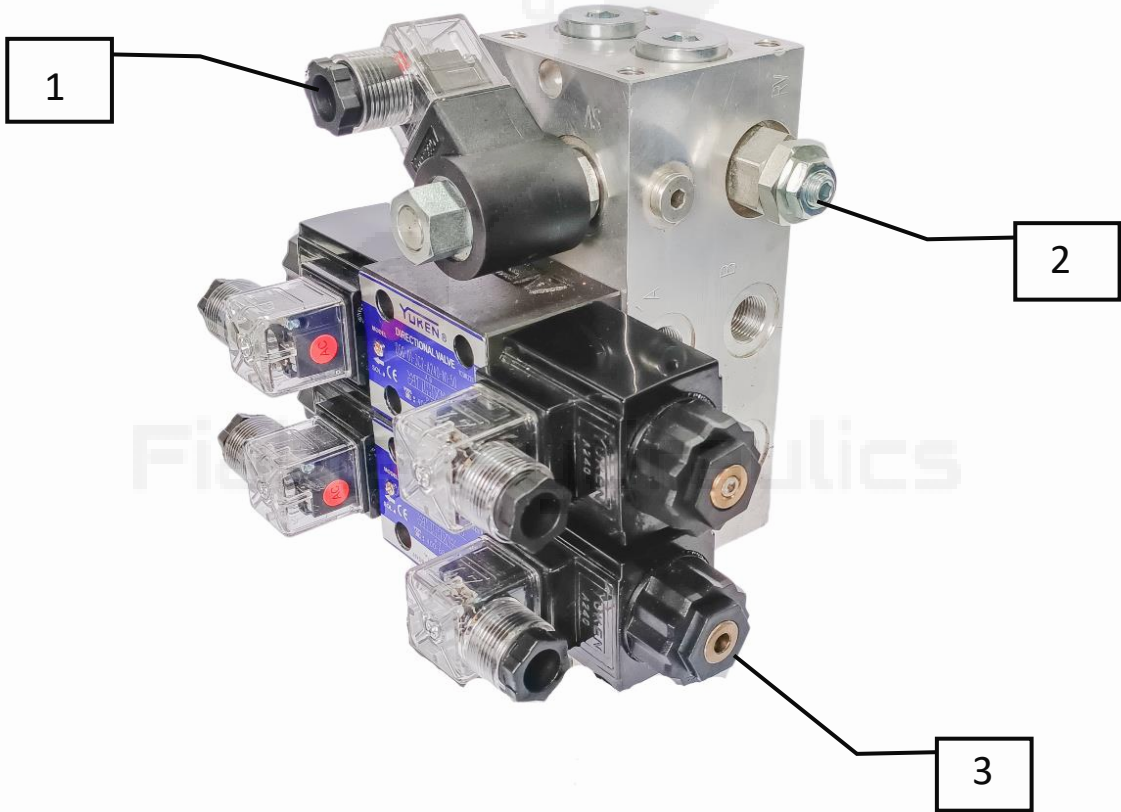
1. Adjust the required pressure by using pressure relief valve
2. While activating 1st coil of a direction control valve the SV (Unloading Valve Coil) must be "energized" otherwise system can't generate pressure because the oil will flow from "P" to "T" and return back to tank through unloading valve.

While retracting a cylinder:-

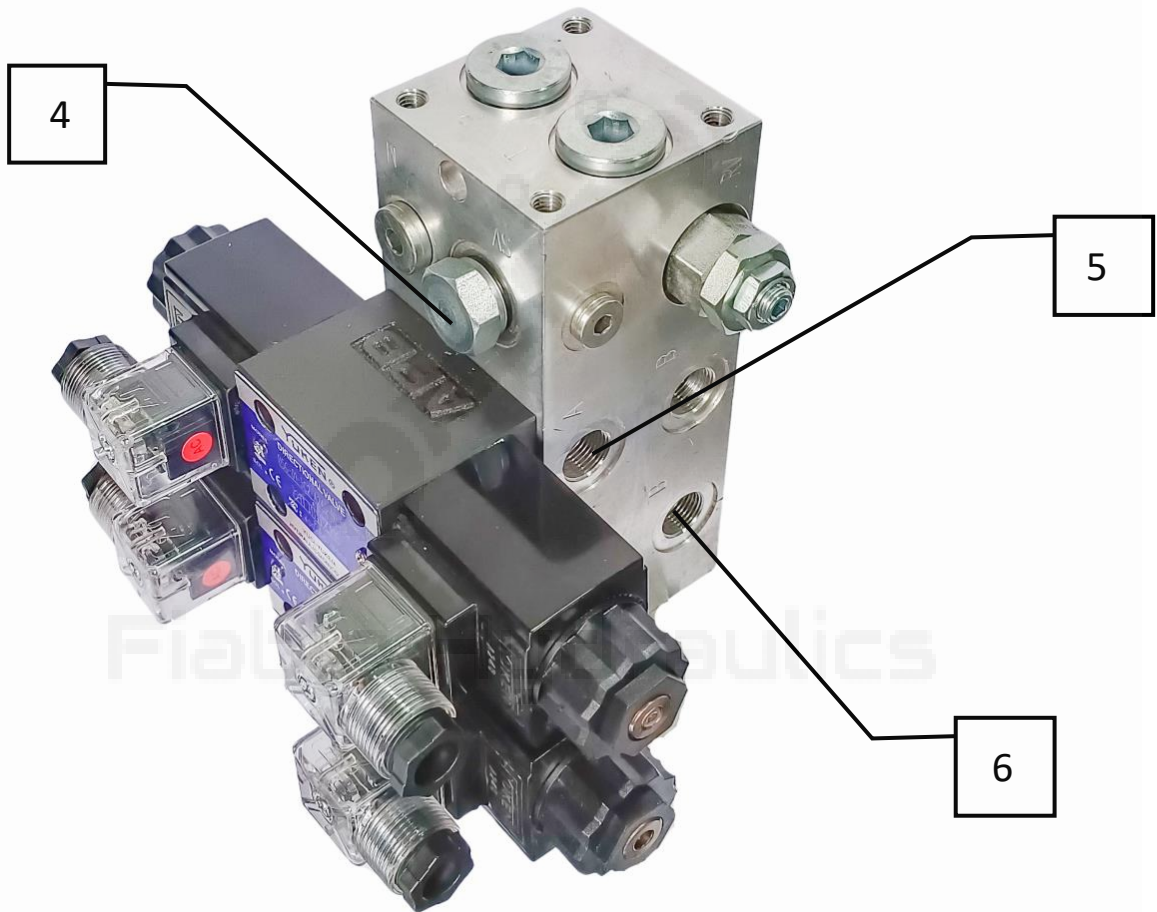
- 1) When we activate 2nd coil for retraction that time also SV (Unloading Valve Coil) must be "energized".

Part No.	Part Name	Function
1	Unloading Valve	To open and close P and T line connection as per requirement
2	Pressure Relief Valve	To set pressure of hydraulic system
3	Direction Control Valve	To control the direction of hydraulic flow

Unloading Valve



Part No.	Part Name	Function
4	Male Plug	It permanently disconnects P and T line
5	Outlet Port "A"	3/8" BSP
6	Outlet Port "B"	3/8" BSP



Procedure To Set-up Powerpack With Center Manifold

This information is applicable for Single Acting power-pack with AC and DC power supply

While extracting a cylinder:-

1. Pressure Relief Valve:- Pressure-relief valve limits the ceiling pressure in a hydraulic circuit by creating an alternate path for fluid flow when preset pressure level is reached. And return excessive flow to tank.
2. Check Valve:- The check valve is a crucial system component for preventing back-flow. Check valves help a system maintain one-way flow and it must be fully "TIGHT" while system is on.

NOTE: Solenoid Coil must be "De-energized" during extraction of cylinder.

While retracting a cylinder:-

1. SV (Solenoid Valve):-A solenoid control valve is used by engineers to control the flow of fluid within a system autonomously and remotely, thereby eliminating the need for manual closure and opening of valves. Solenoid Coil must be "energized" while retracting the cylinder.
2. Flow Control Valve:- The purpose of a flow control valve is to regulate the flow rate in a specific portion of a hydraulic circuit. During retraction we can adjust the reverse flow of oil which control the return speed of cylinder. By rotating it in clockwise or counter-clockwise direction we decrease or increase return speed of cylinder respectively.

Procedure To Set-up Powerpack With Center Manifold

This information is applicable for Double Acting power-pack with AC and DC power supply

While extracting a cylinder:-

1. Pressure Relief Valve:- Pressure-relief valve limits the ceiling pressure in a hydraulic circuit by creating an alternate path for fluid flow when preset pressure level is reached. And return excessive flow to tank.
2. Check Valve:- The check valve is a crucial system component for preventing back-flow. Check valves help a system maintain one-way flow and it must be fully "TIGHT" while system is on.

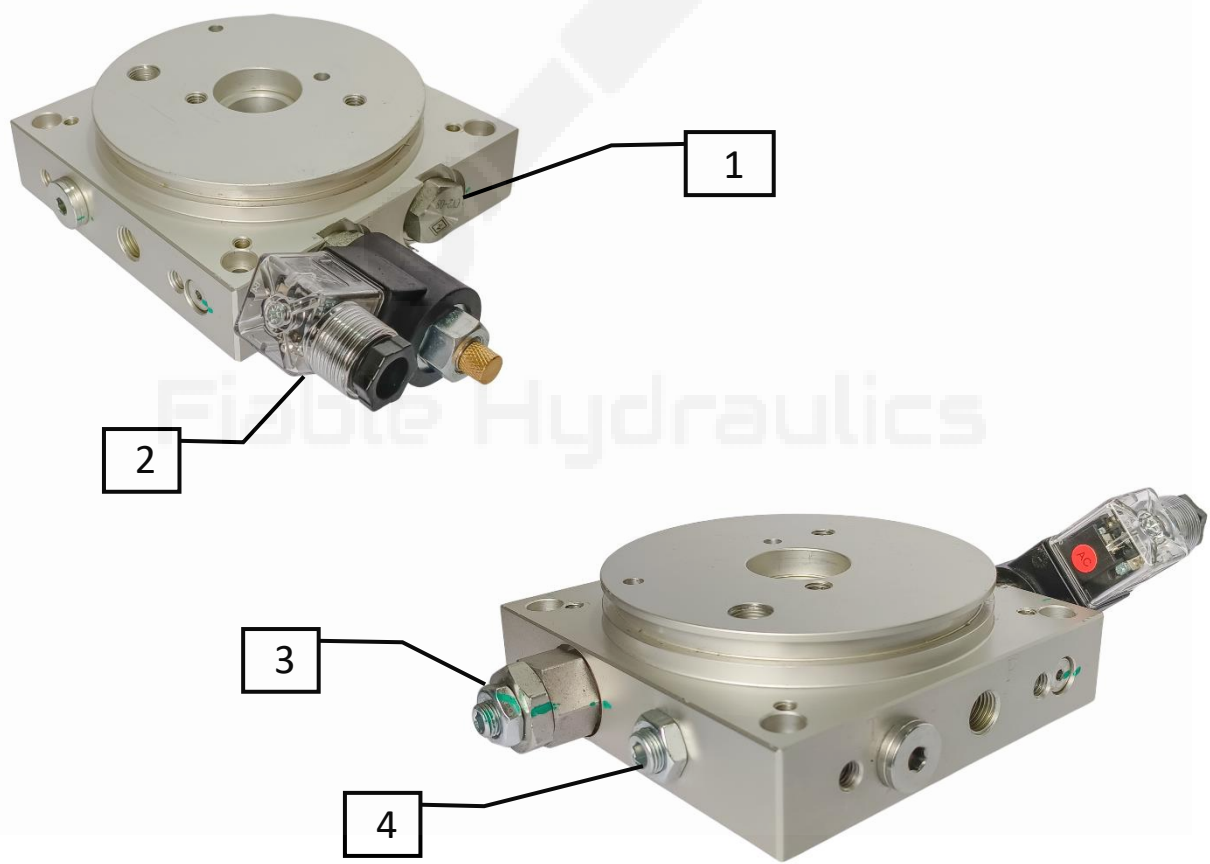
NOTE: Solenoid Coil must be "De-energized" during extraction of cylinder.

While retracting a cylinder:-

1. Direction Control Solenoid Valve :- Directional control valves perform only three functions: stop fluid flow, allow fluid flow, and, change direction of fluid flow. The selection of Direction Control Valve is depend upon application of hydraulic system. While "energizing" first solenoid coil cylinder will be extracting and retracting when "energizing" second coil.
2. Flow Control Valve:- The purpose of a flow control valve is to regulate the flow rate in a specific portion of a hydraulic circuit. During retraction we can adjust the reverse flow of oil which control the return speed of cylinder. By rotating it in clockwise or counter-clockwise direction we decrease or increase return speed of cylinder respectively.

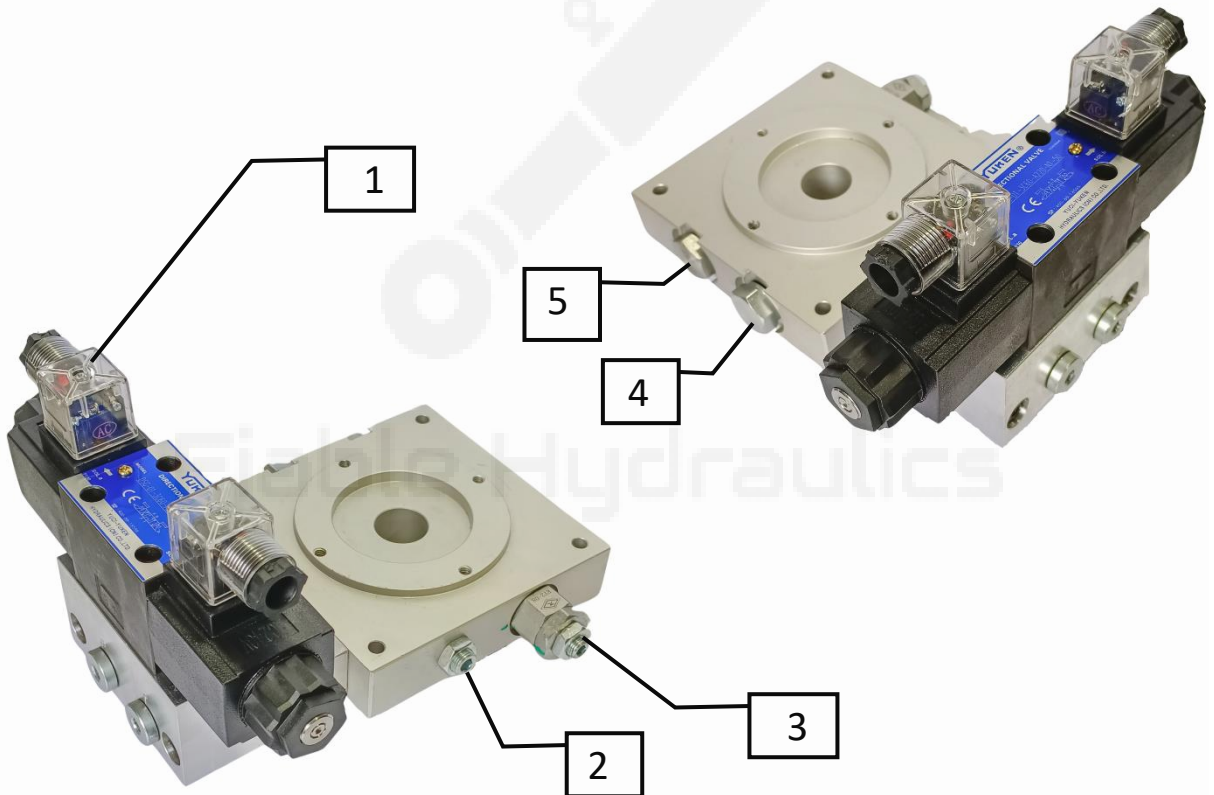
Part No.	Part Name	Function
1	Check Valve	It controls one directional hydraulic flow
2	Solenoid Valve	To control the direction of hydraulic flow
3	PRV (Pressure Relief Valve)	To control pressure of hydraulic system
4	FCV (Flow Control Valve)	To control return speed of cylinder
5	Direction Control Valve	To control the direction of hydraulic flow

Single Acting Center Manifold



Part No.	Part Name	Function
1	Direction Control Valve	To control the direction of hydraulic flow
2	FCV (Flow Control Valve)	To control return speed of cylinder
3	PRV (Pressure Relief Valve)	To control pressure of hydraulic system
4	Male Plug	It permanently disconnects P and T line
5	Check Valve	It controls one directional hydraulic flow

Double Acting Center Manifold



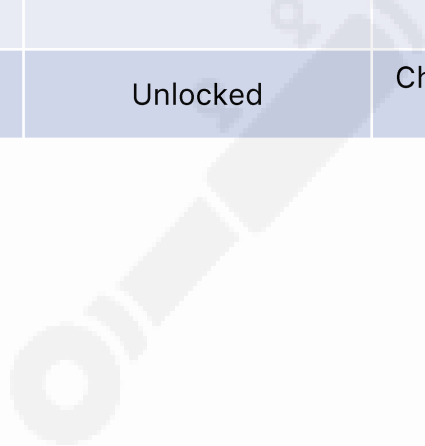
Trouble-shooting for Center Manifold Single / Double acting with AC and DC

Extraction

Sr No.	Causes	Conditions	Trouble-shooting
1	Motor Rotation	As per arrow marked on motor fan cover	Change wiring connection - jog motor and check delivery of oil
2	Rated Pressure	As per application	Use pressure gauge and using pressure relief valve set required pressure
3	Poppet Coil	"Energized"	If not then check electrical connection
4	Solenoid Coil	"De-energized"	If not then check electrical connection
5	Air Trapping	System must be free from air trapping	Remove check valve and tight it
6	Poppet And Solenoid Stud Filter	Must be clean	If blocked by impurities then clean it
7	Leaks	No any leak from dowty washer, copper washer, hoses, connector	Change washers and tight hoses and connectors

Retraction

Sr No.	Causes	Conditions	Trouble-shooting
1	Flow Control Valve	Normally loose	Loose it and adjust return speed of cylinder
2	Poppet Coil	"Energized"	If not then check electrical connection
3	Solenoid Coil	"Energized"	If not then check electrical connection
4	Poppet And Solenoid Stud Filter	Must be clean	If blocked by impurities then clean it
5	Manual Lock	Unlocked	Check position of manual lock and unlock it



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