ENERPAC
POWERFUL SOLUTIONS. GLOBAL FORCE.

OPERATING MANUAL

SFP SERIES

L14004711 rev: F 03/19

Index:

1.0 SAFETY & GENERAL INFORMATION

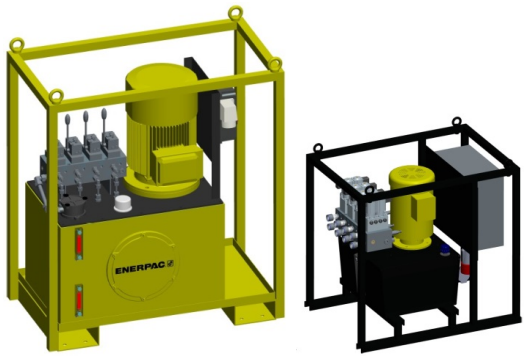
Read all instructions, warnings and cautions carefully. Follow all safety precautions to avoid personal injury or property damage during system operation. Enerpac cannot be responsible for damage or injury resulting from unsafe product use, lack of maintenance or incorrect product and/or system operation. Contact Enerpac when in doubt as to the safety precautions and operations. If you have never been trained on high-pressure hydraulic safety, consult your distribution or service center for a free Enerpac Hydraulic safety course.

Failure to comply with the following cautions and warnings could cause equipment damage and personal injury.

A **CAUTION** is used to indicate correct operating or maintenance procedures and practices to prevent damage to, or destruction of equipment or other property.

A **WARNING** indicates a potential danger that requires correct procedures or practices to avoid personal injury.

A **DANGER** is only used when your action or lack of action may cause serious injury or even death.



2.0 SAFETY PRECAUTIONS

WARNING: Stay clear of loads supported by hydraulics. A cylinder, when used as a load lifting device, should never be used as a load holding device. After the load has been raised or lowered, it must always be blocked mechanically.

WARNING: use only rigid pieces to hold loads. Carefully select steel or wood blocks that are capable of supporting the load. Never use a hydraulic cylinder as a shim or spacer in any lifting or pressing application.

WARNING: Wear proper personal protective gear when operating hydraulic equipment.

DANGER: To avoid personal injury keep hands and feet away from cylinder and workpiece during operation.

WARNING: Do not exceed equipment ratings. Never attempt to lift a load weighing more than the capacity of the cylinder. Overloading causes equipment failure and possible personal injury.

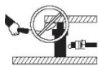
CAUTION: Do not connect a jack or cylinder to a pump with a higher pressure rating. Never set the relief valve to a higher pressure than the maximum rated pressure of the pump. Higher settings may result in equipment damage and/or personal injury.

WARNING: The system operating pressure must not exceed the pressure rating of the lowest rated component in the system. Install pressure gauges in the system to monitor operating pressure. It is your window to what is happening in the system.

CAUTION: Avoid damaging hydraulic hose. Avoid sharp bends and kinks when routing hydraulic hoses. Using a bent or kinked hose will cause severe backpressure. Sharp bends and kinks will internally damage the hose leading to premature hose failure.

IMPORTANT: Hydraulic equipment must only be serviced by a qualified hydraulic technician. For repair service, contact the Authorized ENERPAC Service Center in your area.

IMPORTANT: Do not lift hydraulic equipment by the hoses or swivel couplers. Use the carrying handle or other means of safe transport.



CAUTION: Keep hydraulic equipment away from flames and heat. Excessive heat will soften packings and seals, resulting in fluid leaks. Heat also weakens hose materials and packings. For optimum performance do not expose equipment to temperatures of 65°C [150°F] or higher. Protect hoses and cylinders from weld spatter.

DANGER: Do not handle pressurized hoses. Escaping oil under pressure can penetrate the skin, causing serious injury. If oil is injected under the skin, see a doctor immediately

WARNING: Only use hydraulic cylinders in a coupled system. Never use a cylinder with unconnected couplers. If the cylinder becomes extremely overloaded, components can fail catastrophically causing severe personal injury.

WARNING: be sure setup is stable before lifting load. Cylinders should be placed on a flat surface that can support the load. Where applicable, use a cylinder base for added stability. Do not weld or otherwise modify the cylinder to attach a base or other support.

CAUTION: Avoid situations where loads are not directly centered on the cylinder plunger. Off-center loads produce considerable strain on cylinders and plungers. In addition, the load may slip or fall, causing potentially dangerous results.

CAUTION: Distribute the load evenly across the entire saddle surface. Always use a saddle to protect the plunger.

WARNING: In case of leakage contact ENERPAC parts. Standard grade parts will break causing personal injury and property damage. ENERPAC parts are designed to fit properly and withstand high loads.

WARNING: Do not use electric pumps in an explosive atmosphere. Adhere to all local and national electrical codes. A qualified electrician must do installation and modification

WARNING: Start the pump with the valve in the neutral position to prevent accidental cylinder operation. Keep hands clear of moving parts and pressurized hoses.

WARNING: These pumps have internal factory adjusted relief valves, which must not be repaired or adjusted except by an Authorized Enerpac Service Center.

WARNING: Enerpac does not recommend the use of the SFP Series pump with multiple telescopic cylinders (such as the Enerpac RT and RLT Series). In a multi-point application, the plunger stages of each telescopic cylinder will extend and retract at slightly different speeds. The cylinders will never be exactly synchronized and uneven lifting will result.

CAUTION: To prevent damage to pump electric motor, check specifications. Use of incorrect power source will damage the motor.

CAUTION: Check motor rotation direction to prevent damage to hydraulic pump (See paragraph 4.0 installation)

3.0 SPECIFICATIONS

The split flow pump utilizes a single electric motor to drive a hydraulic pump with multiple outlets. There are different pump models depending on the number of outlets and flow. The table below provides specifications for each pump model.

PUMP MODEL Electric power: B = 110/115V-1Ph-50/60Hz J = 460V-3Ph-60Hz W = 400V-3Ph-50Hz	SFP202M	SFP213S SFP213M	SFP404S SFP404M	SFP604S SFP604M	SFP228S SFP228M	SFP242S SFP242M	SFP409S SFP409M	SFP414S SFP414M	SFP421S SFP421M	SFP613S	SFP813S
	B / W	J / W			J / W						
Reservoir size (gal) / l.	2,6 / 10	10 / 40			40 / 150						
Nr of Split flow outlets	2	2	4	6	2		4			6	8
Oil flow per outlet (in^3/min) @ 10,000 psi / l/min @ 700 bar	20 / 1,3	94/1,3	33/0,45	33/0,45	203/2,8	305/4,2	65/0,9	101/1,4	153/2,1	94/1,30	94/1,30
Motor size (Hp) / kW	1/0,75	7,5 / 5,5			10/7,5	15/11	7.5/5,5	10/7,5	15/11	15/11	20/15
Weight (lbs) / kg	190/86	529 / 240			1076/488	1160/526	1047/475	1076/488	1160/526	1213/550	1300/590

4.0 INSTALLATION

Visually inspect all components for shipping damage. Shipping damage is not covered by warranty. If shipping damage is found, notify carrier at once. The carrier is responsible for all repair and replacement costs resulting from damage in shipment.

Install or position the pump to ensure that air flow around the motor and pump is unobstructed. Keep the motor clean to ensure maximum cooling during operation.

IMPORTANT: Eliminate the presence of side load forces when using hydraulic cylinders. Side load can occur through:

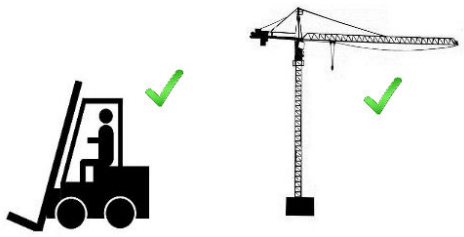
1. An eccentric load on the plunger.
2. A horizontal load on a structure.
3. A structure and/or cylinder misalignment.
4. Non synchronized lifting actions.
5. Non stable cylinder base support.

Always use a flat, hard surface as a cylinder support plate. Use a low friction material on top of the saddle. To reduce cylinder offset loading, optional CATG-swivel saddles are available. Always use grease underneath swivel saddles.

IMPORTANT: It is mandatory that the operator has a full understanding of all instructions, safety regulations, cautions and warnings, before starting to operate high force tool equipment. In case of doubt, contact Enerpac.

4.1 Transportation

The frame has two forklift truck pockets for forklift lift, and four hoisting certified eyes for lifting with cranes.



Dwg 1

4.2 Electric connections

The pump is factory equipped with a 3 phase electrical plug for the given voltage, altering the plug type should only be done by a qualified electrician, adhering to all applicable local and national codes.

The plug supplied is set as follows:

		Electric plug
Motor size KW	0,75	1Ph 115V
	5,5	3Ph + PE 400V 16A
	7,5	
	11	3Ph + PE 400V 32A
Motor size Hp	1	1Ph 115V
	7,5	3Ph + PE 480V 16A
	10	
	15	3Ph + PE 480V 32A

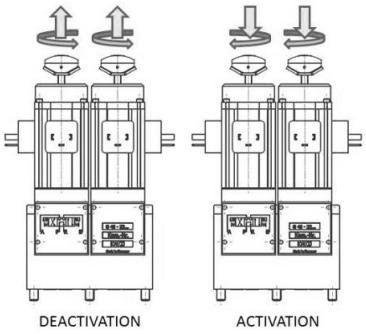
The disconnection and line circuit protection will be provided by the customer. Line circuit protection will be 115% of motor full load current at maximum pressure of application.

IMPORTANT: The pumps with reservoir of 40 l. (10 gal) require correct motor rotation. After connecting the male plug to the electric main power, start the motor and check rotation against the arrow label on the motor and correct phase if required.

4.3 Hydraulic connections

WARNING: On double-acting cylinders be certain that hoses are connected to BOTH couplers. Never attempt to pressurize a double-acting cylinder if only one hose is connected.

IMPORTANT: To decompress ports prior to connecting hoses, move the manual valve several times back and forth between the advance and retract positions with the motor switched off (manual valves). For solenoid valves turn the handle clockwise completely on every valve as shown in the picture below (make sure to unlock the locknut) and leave valves deactivated.



Dwg 2

Connect the hydraulic hoses as follows:

1. Port A to the advance side of the cylinder
2. Port B to the retract side of the cylinder (only for double acting cylinders, for single acting cylinder leave it disconnected).

Follow the next steps to correctly connect the hoses:

1. Keep cylinder connected to a hydraulic system with a fluid cleanliness level minimum of NAS 1638 Class 6.

2. Remove dust covers/rubber plugs from oil ports

3. Inspect all threads and fittings for signs of wear or damage and replace as needed.

4. Clean all threads and fittings.

5. Make hydraulic connections for double-acting cylinders using two hoses.

6. Fully hand-tighten all couplers. Loose coupler connections will block the flow of oil between the pump and the cylinder.

7. Check for leaks in system and have repaired by qualified personnel.

4.4 Oil level

Check the oil level of the pump prior to start-up, if necessary add oil by removing the plug from the top of the reservoir. The reservoir is full when the oil level reaches the top of the sight glass.

IMPORTANT: Add oil only when all system components are fully retracted, otherwise the system will contain more oil than the reservoir can hold.

5.0 OPERATION

5.1 Manual valve control

Some models have been designed to be operated with 2, 4 or 6 manual valves, one per output depending on the model type.

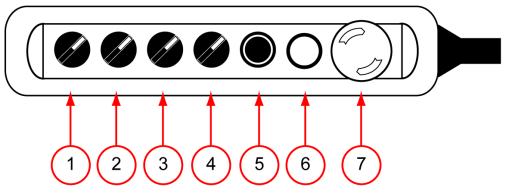
To move the cylinder, move the handle of the valve according to the desired direction. The advance or retract movement is described as labeled on the valve.

Dwg 3

5.2 Pendant Control

Some pumps (models with solenoid valves) have been designed to be operated by a remote control connected to the electric cabinet with a 5 m (15 ft) cable in the connector Nr 7 (see Dwg 5).

Through this device the operator can operate every cylinder (2, 4 or 6 cylinders depending on model). Therefore it is important to familiarize yourself with every button.



Dwg 4

1. Cylinder 4 selector: This selector controls the movement of cylinder 4

2. Cylinder 3 selector: This selector controls the movement of cylinder 3

3. Cylinder 2 selector: This selector controls the movement of cylinder 2

4. Cylinder 1 selector: This selector controls the movement of cylinder 1

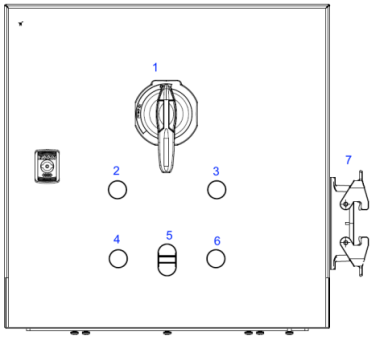
5. Retract plunger: When this button is pushed the oil flow of port A goes to the tank. Therefore in a general purpose cylinder, the plunger moves inward.

6. Advance plunger: When this button is pushed the oil flow of port A goes to the cylinder. Therefore in a general purpose cylinder, the plunger moves outward.

7. Emergency button: When this button is pushed, the pump stops the movement of all cylinders.

5.3 Electric panel description

The electric panel (models with solenoid valves) includes the controls to switch on the machine ON.



Dwg 5

1. Main electrical switch

2. Power on led

3. System Alarm Light

4. Reset Pushbutton

5. Start/Stop Motor Pushbutton

6. Decompress Pushbutton

7. Pendant Control Connector

8. Power supply connector

5.4 Turning the powerpack on

5.4.1 Pumps with manual valves

Turn the motor on using the following steps:

1. Turn the main switch (Nr 1) to the “On” position located on the electrical cabinet, ensure the Power On LED (Nr 2) activates

2. Press the motor start button (Nr 5) for 3 seconds.

After the electric motor starts use the manual valves to move the cylinders as explained in the paragraph 5.1.

5.4.2 Pumps with solenoid valves

Turn the motor on using the following steps:

1. Turn the main switch (Nr 1) to the “On” position located on the electrical cabinet, ensure the Power On LED (Nr 2) activates.

2. Deactivate the emergency stop button (Nr 7 on the pendant).

3. Press the reset button to reset the security system after the emergency button has been de-activated (Nr 4)

4. Press the motor start button for 3 seconds (Nr 5)

After the electric motor starts, use the pendant to move the cylinders as explained in paragraph 5.2.

5.5 Setting the pressure relief valves

The powerpack has been designed to set the relief valves up by the operator. The maximum pressure of the relief valve is between 10 and 700 bar (145psi and 10,000psi). For this purpose the operator needs the following tools:

1. Plain slot screwdriver (1 unit)

2. Spanner of 13 mm (1 unit)

3. Manometer 0-1000 bar (for pressures up to 700 bar) (4 units).

Manometers must be connected to the MP port (1/4” NPT), in order to read the pressure in each line.

To set the relief valve up, follow the next steps:

1. Connect the output to one cylinder

2. Loosen the hexagonal nut of the relief valve.

3. Turn the bolt with the screwdriver fully (counter clockwise) for a start reference point.

4. Turn the bolt a quarter turn (clockwise) in order to open the relief valve.

5. Press the motor start button for 3 seconds (Nr 3)

6. Extend the cylinder plunger to its full stroke. (When the plunger reaches the end of its stroke the pressure will build. Note in the manometer the maximum pressure reached).

7. Turn the bolt with the screw driver to adjust the desired pressure (counter clockwise to decrease the pressure, or clockwise to increase the pressure).

8. Tighten the nut with the spanner to lock the relief valve bolt.

5.6 Decompressing system (Relieving hydraulic pressure)

With the motor switched off:

1. Using the pendant select the cylinders to decompress.

2. Push decompress button on the electric cabinet (Nr 6)

3. Push at the same time the pendant retract or advance button (Nr 5 or 6).

The solenoid valve will direct flow to tank relieving the pressurized line.

5.7 Controlling the hydraulic flow of line A

The powerpack has a flow control valve installed on line A. By regulating this valve, the operator can control the speed of the cylinder when the flow is returning to tank in lowering operation.

5.8 Reading the pressure on the output A

The powerpack is supplied with a manometer indicating the pressure in the port A.

6.0 MAINTENANCE

6.1 Check Oil Level

Check the oil level of the pump prior to start-up. If necessary, add oil by removing the fill port cap.

NOTE: Always be sure cylinders are fully retracted before adding fluid to the reservoir.

6.2 Change Oil and Clean Reservoir

Enerpac HF oil is a crisp blue color. Frequently check oil condition for contamination by comparing pump oil to new Enerpac oil. As a general rule, completely drain and clean the reservoir every 250 hours, or more frequently if used in dirty environments.

NOTE: This procedure requires that you remove the pump from the reservoir. Work on a clean bench and dispose of used oil according to local codes.

1. Unscrew the bolts holding the cover plate to the reservoir and lift the pump unit out of the reservoir. Be careful not to damage the filter screen.

2. Pour all oil out of the reservoir.

3. Thoroughly clean the reservoir and reservoir magnet with a suitable cleaning agent.

4. Reassemble the pump and reservoir

5. Fill the reservoir with clean Enerpac hydraulic oil. The reservoir is full when oil level is in middle of the sight gauge

6.3 Changing the Filter Element

The filter element should be replaced every 250 hours, or more frequently in dirty environments. The filter manifold is equipped with a 25 psi (1,7 bar) bypass to prevent over pressure rupture if filter plugging occurs and with a small gauge that shows the pressure when the filter is dirty (see in the hydraulic diagrams num 8).

7.0 TROUBLESHOOTING GUIDE

Only qualified hydraulic technicians should service the pump or system components. A system failure may or may not be the result of a pump malfunction. To determine the cause of the problem, the complete system must be included in any diagnostic procedure.

Refer to the troubleshooting chart for a list of typical cylinder problems and possible causes. The troubleshooting chart is not all-inclusive, and should be considered only as an aid to help diagnose the most common problems. For repair service, contact your local Authorized Enerpac Service Center.