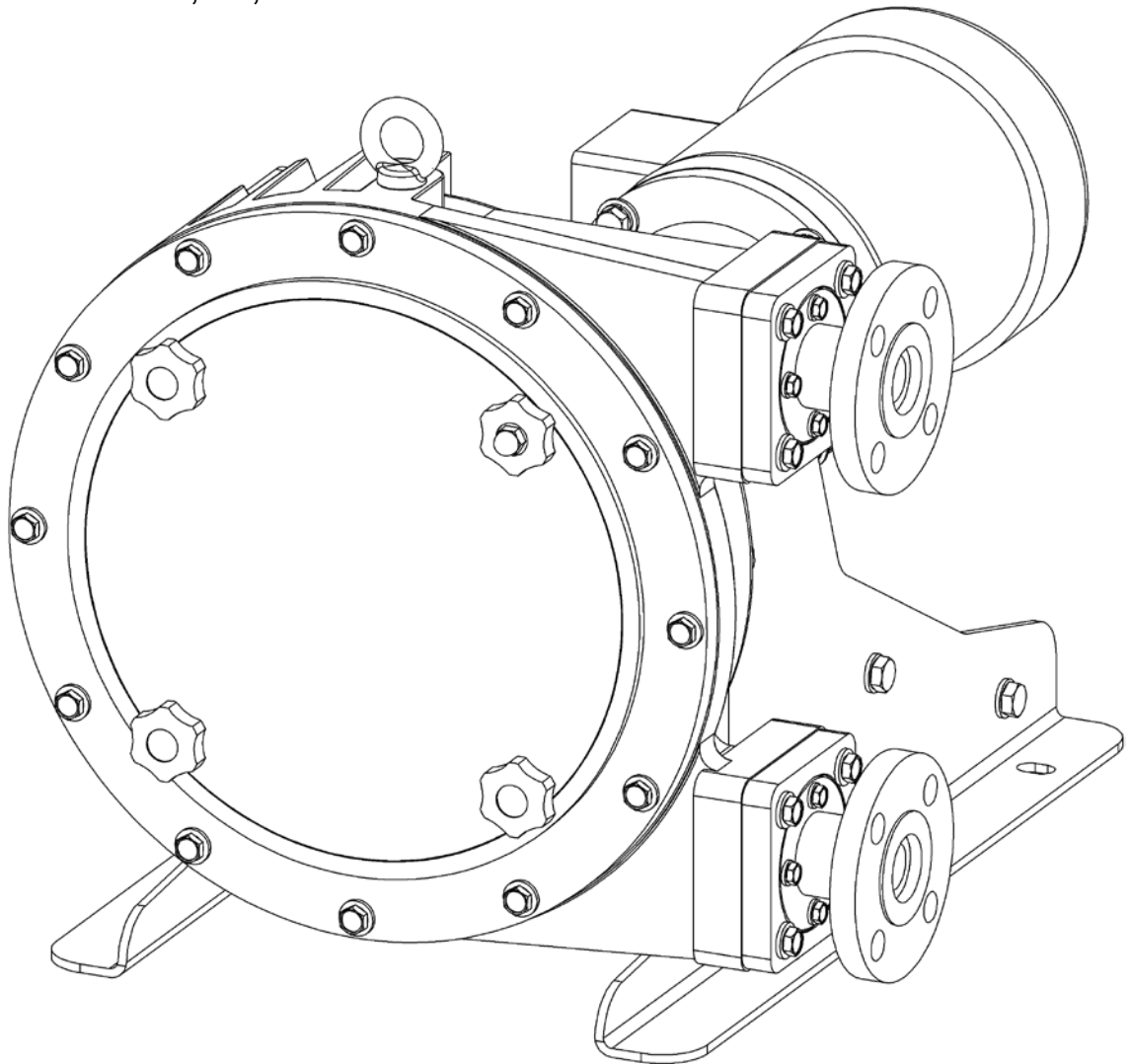


Installation, Operation & Maintenance Instruction

Models: FMP Series 30, 40, 50



Bulletin #: IOM-PFL-4502

PeriFlo[®] **FMP**
PERISTALTIC PUMP

Pulsafeeder Factory Service Policy

Should you experience a problem with your PeriFlo FMP pump, first consult the troubleshooting guide in your operation and maintenance manual. If the problem is not covered or cannot be solved, please contact your local Pulsafeeder Sales Representative or our Technical Services Department for further assistance.

Trained technicians are available to diagnose your problem and arrange a solution. Solutions may include purchase of replacement parts or returning the unit to the factory for inspection and repair. All returns require a Return Authorization number to be issued by Pulsafeeder. Warranty parts returned as defective, which test good, will be sent back freight collect. No credit will be issued on any replacement electronic parts.

Pulsafeeder's Factory Service Policy is maintained online. Please source this document at this URL:

<http://www.pulsa.com/pulsa-docs/Pulsafeeder-EPO-Limited-Warranty-Statement.pdf>

All Pulsafeeder PeriFlo manufactured products are guaranteed against defects in materials and workmanship under normal use for 12 months from the date of shipment from the factory.

Any modifications or out-of-warranty repairs will be subject to bench fees and costs associated with replacement parts.

Safety Considerations:

1. Read and understand all related instructions and documentation before attempting to install or maintain this equipment.
2. Observe all special instructions, notes, and cautions.
3. Act with care and exercise good common sense and judgment during all installation, adjustment, and maintenance procedures.
4. Ensure that all safety and work procedures and standards that are applicable to your company and facility are followed during the installation, maintenance, and operation of this equipment.

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1. Equipment Inspection

Check all equipment for completeness against the order and for any evidence of shipping damage. Shortages or damage must be reported immediately to the carrier and your authorized representative or distributor of PeriFlo pumps.

Included Items:

- PeriFlo FMP Peristaltic Pump

Optional Items:

- Motor (pre-installed at the factory)
- Leak Detection
- Controls Package
- Spare Hoses, Grease or Oil, and Shims

1.1 General Description

The PeriFlo® peristaltic pump is constructed with simple yet robust components designed to create continuous, repetitive, positive flow. Modern materials are used to meet the needs of the toughest jobs from aggressive chemicals to highly abrasive slurries.

1.2 Construction of the Pump

The diagram below highlights the four main components of the PeriFlo® FMP peristaltic pump. The outer casing (Item 1) contains the pump components and supports the hose/tube. Inside the casing, the rotor (Item 2) supports the two rollers (Items 3). As the rotor turns, the rollers compress the hose/tube (Item 4) to create suction and generate the pumping action. A change in rotor direction will result in a change in direction of the pumped fluid.

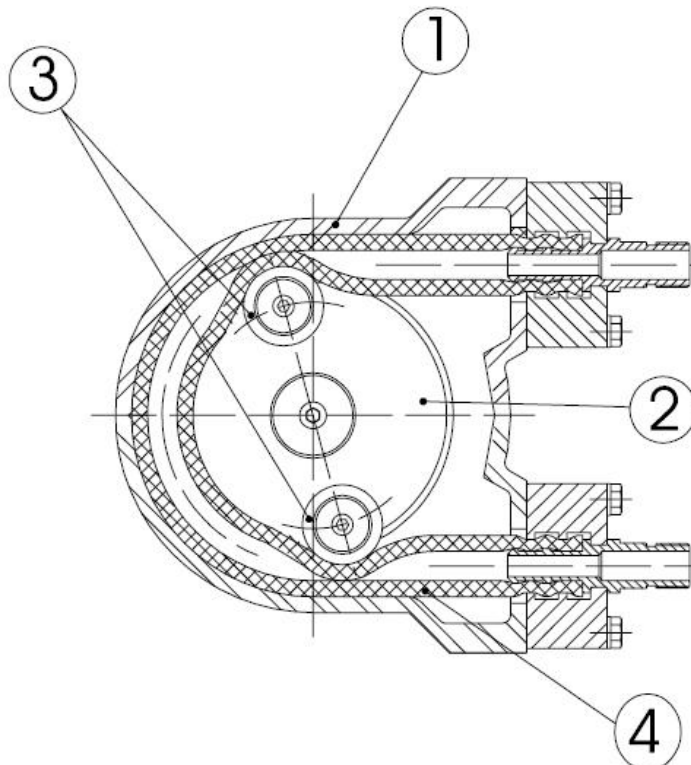


Figure 1 - Construction of Pump

Hoses are defined as the flexible element for fluid transfer comprised of natural rubber outer layers, nylon reinforcement, and an elastomer inner liner. The inner liner material is to be specified for chemical compatibility; Natural Rubber, EPDM, or Nitrile BUNA Rubber. Hoses are distinguished by their black outer layer of natural rubber and stamped with the inner liner material code.

Tubes are defined as the flexible element for fluid transfer made of extruded Norprene. Tubes are distinguished by their cream color and stamped material code. Note that tubes are only available for FMP40 models.

1.3 Storage Instructions

Short Term

Storage of a PeriFlo FMP pump for up to 6 months is considered short-term. The recommended short-term storage procedures are:

- Store the pump indoors at room temperature in a dry environment. Avoid areas open to inclement weather or excessive humidity.
- Prior to start up; inspect the pump as outlined in Section 3.0.

Long Term

Storage of a PeriFlo FMP pump for over 6 months is considered long-term. If long term storage is anticipated, the following procedures are recommended in addition to the procedures above:

- Remove the hose/tube from the pump and wipe away excess grease. Store in a protective covering, preferably UV resistant, indoors, and lay flat.
- Keep the inside of the pump, the rotor, and rollers lightly greased with Periflo lubricating grease.
- Every 12 months the motor should be connected to a power source in accordance with Local, National and Motor Manufacturer requirements and operated for a minimum of one hour. It is not necessary to have the hose/tube installed during this operation but the suction and discharge ports must be open to atmosphere when the hose/tube is present.

After 12 months storage, Pulsafeeder's warranty does not cover such items as lubricating grease, gaskets, hose/tubes (if left installed in the pump), and other items which are subject to deterioration with age. If the pump has been in storage for longer than 12 months, it is recommended that these items be replaced prior to going into service. Material and labor to recondition or replace this class of item is the purchaser's responsibility.

Hoses and Tubes

Spare hoses and tubes should be stored indoors and in their original protective covering. Always store hoses and tubes on a dry, flat surface. Never rest objects on top of hoses/tubes.

2. Installation

2.1 Location

When selecting an installation site or designing a chemical feed system, plan for operation and routine maintenance. Provide 3.25FT (1M) of space around the pump for this purpose.

PeriFlo FMP pumps are designed to operate in an environment where the pump is protected from direct sunlight, and precipitation (i.e., under shelter). The ambient temperature must be between 32° F (0° C) and 104° F (40° C). If necessary, add environmental controls.

The pump must be rigidly bolted to a solid and flat foundation to minimize vibration and prevent loosening of the connections. The pump must be level within 5°.

2.2 Motor

The PeriFlo FMP is typically shipped with the motor pre-installed. It must be wired in accordance with Local and National requirements by a qualified electrician. Please refer to the motor nameplate for further manufacturer specific information.

If the PeriFlo FMP was purchased less motor, please refer to section 4.4 for further instructions.

2.3 Piping System

Attention to piping detail will assure an easy startup and long life of your FMP. Please follow these guidelines:

General

- Select piping component materials that are compatible with the fluid type, intended flow rate and pressure, and will not collapse due to internal vacuum.
- It is highly recommended to use a flexible connection between the rigid piping and the pump. This reduces vibration in the piping as well as aids in hose/tube replacement (see Section 4.1.1).
- Pipes should be sized to be equal or slightly larger than the hose/tube diameter. It is recommended to use larger diameter equipment for viscous fluids.
- If making a threaded joint to the connections, use a sealing compound chemically compatible to the process fluid or sealing tape.

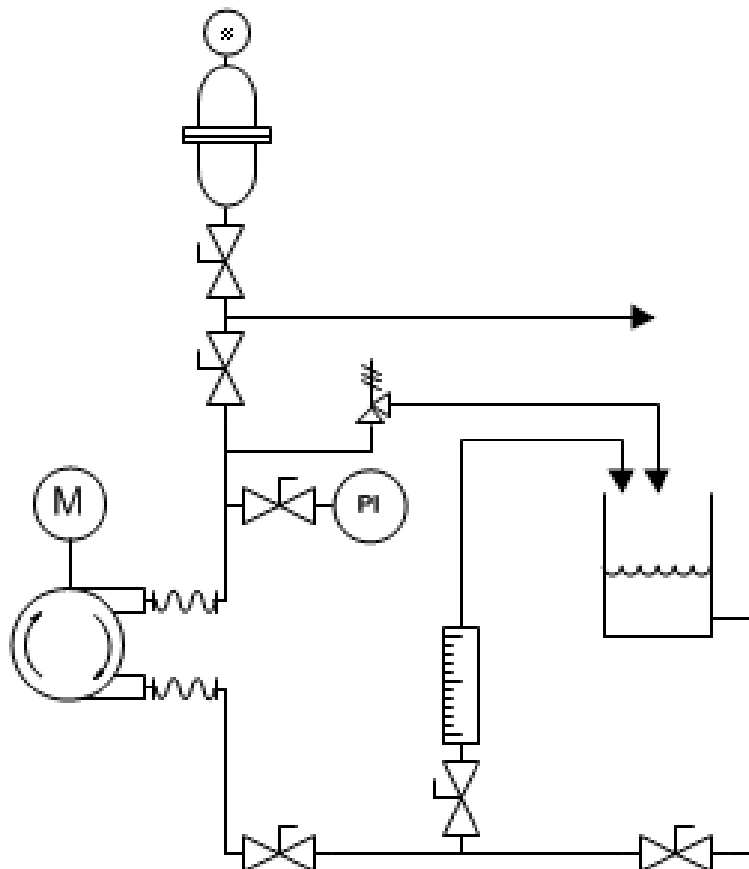



Figure 2- Pump P&ID

Piping System Recommendations

- Both new and existing piping should be cleaned, preferably by flushing with a clean liquid compatible with process fluid, connection and hose/tube materials. Piping should be blown out with air prior to connection to the pump.

 **NOTE** - Debris from manufacturing the piping system (e.g., PVC shavings, TFE Tape, dirt, etc.) can be unknowingly assembled inside the pipe. When fluid is introduced this material can be transferred to the pump and damage the hose/tube.

- Piping weight must not be supported by connections or other portions of the pump, as the resulting stresses can cause them to break. When temperature variations are expected, provide for thermal expansion and contraction of piping components so that force and/or moments are controlled within the allowable range.

Suction Piping


Location: Successful installations place the pump the shortest distance away from the process fluid supply. Minimal pipe bends and straight pipe runs are also ideal.

Isolation Valve and Unions: Isolation valves allow the system to be isolated from the process fluid to facilitate safe servicing. They also aid in the operation of calibration columns. Valves should include good visible indications of open/closed condition. Unions assist with installation and maintenance. Valves that integrate union fittings are ideal.

Calibration Column (Optional): Used to calibrate pump performance. Include an isolation valve in the suction line and vent line back to the supply tank to facilitate safe operation.

Discharge Piping

Location: Figure 2 depicts the typical discharge piping connections and equipment for a successful installation. Minimal pipe bends and straight pipe runs are ideal.

 **IMPORTANT:** DO NOT Install an elbow directly into the discharge connection threaded fitting as it will create excessive back pressure that can lead to premature hose/tube failure.

Pressure Relief Valve: Install a Pressure Relief Valve as close to the pump as possible. Using the leg of a T fitting for this purpose is acceptable (with the normal discharge taking the straight path and the relief flow taking the leg). The relief pressure must be to 10-15% over the system operating pressure but must not exceed the maximum rated discharge pressure of the pump. As a positive displacement pump, the FMP pump will continue to build pressure if the fluid pathway is stopped or blocked potentially resulting in hose/tube failure or “blowout.”

 **NOTE:** Failure to install and properly set a Pressure Relief Valve can lead to premature hose/tube failure that will not be covered under warranty.

Pulsation Dampener: Peristaltic pumps do create a pulse of fluid during operation. Installation of an adequately sized Pulsation Dampener will smooth the associated flow/pressure variation to the downstream process.

2.4 Discharge Pressure Requirements

The specified discharge pressure experienced by the pump is a critical variable in peristaltic pump performance. Each FMP pump is factory set to match the specified discharge pressure in order to fully compress the hose/tube, preventing “back flow.” Accurately specifying the discharge pressure helps find the balance of compression and back pressure to achieve accurate flow and optimize hose/tube life.

Hose Maximum Discharge Pressure: 115psi (8 bar)

Tube Maximum Discharge Pressure: 30psi (2 bar)

In the event that the discharge pressure conditions change or the pump requires a change in shimming to achieve specified flow see Section 4.3.

3. Equipment Startup

3.1 Fastener Inspection

All pump fasteners should be checked prior to pump operation and occasionally during use. This would include front cover knobs and hardware, motor mounting bolts, base mounting bolts, and the hardware that secures the pump to its foundation.

The front cover knobs should be hand tight with the acorn nut secured with a wrench. Motor mounting bolts and base mounting hardware should be torqued to the following:

Motor Bolt Torque	
Motor Size	Torque (IN-LB / N-M)
56C	96 / 10.8
143TC	96 / 10.8
182TC - 184 TC	216 / 24.4

3.2 Pump Inspection

The PeriFlo FMP pump should be checked prior to pump operation and occasionally during use.

- **Hose/Tube:** Ensure that the hose/tube is properly aligned and completely supported by the roller.
- **Lubrication:** Check that the entire outside surface of the hose/tube, surface of the rollers, and inside diameter of the pump casing that supports the hose/tube is coated with PeriFlo lubricating grease. The specially formulated grease can be obtained from Pulsafeeder PeriFlo or from an authorized distributor. See Section 4.0 for maintenance guidelines.

3.3 Preliminary Checks

- Verify the supply voltage is suitable for the motor.
- Verify the optional pump control components are connected to the control panel and test that they function correctly.
- Verify all gauges, valves, and instrumentation are sized and adjusted appropriately for the application.
- Verify that the predicted working conditions, such as flow, pressure, temperature and motor power, correspond to the application.

3.4 Calibration

3.4.1 Description

Peristaltic pumps should be calibrated to accurately correlate rotor speed to measured flow rates. The pump output is linear with respect to the rotor speed.

The theoretical output flow rate is based on the volume inside the hose/tube and the speed of the rotor. Pumps are rated for a certain flow at a specified speed with a correlating pressure. Whenever possible, calibration should be performed under actual process conditions (i.e., the same or a similar process liquid at system operating pressure).

To construct a calibration chart, measure the flow rate at three or more speed settings (e.g., 25%, 50%, 75%, and 100%), plot these values on linear graph paper, and draw a best-fit line through the points. For stable system conditions, this line will predict settings to attain required outputs.



Note - All users are encouraged to test the flow rate of their pump once installed in their system, to ensure best accuracy and reliable operation.

3.4.2 Calibration Procedure

1. Adjust the suction piping to supply the pump from the calibration column. The calibration column should be sized and filled accordingly to complete a timed draw down.



Use appropriate precautions if handling process fluid. Ensure that any other fluid used for priming is compatible with the product that will be pumped.

2. Run the pump in the FORWARD direction at full motor speed. Verify fluid flow and pressure is accurately adjusted for the application.



Verify the direction of rotation of the pump. As it is reversible, the pump could generate excessive pressure and compromise the safety of the installation. The circulation of the fluid should be in the same direction as the turning direction of the pump as seen through the front cover.

3. Complete a timed draw down and record the amount of fluid pumped from the calibration column. Stop the pump and refill the calibration column. Repeat this step two more times and calculate the average maximum flow.
4. Verify the average flow meets the published flow rate as required per the application.
5. Repeat these steps at interval speed settings (example: 75%, 50%, and 25% motor speed).



Note – Verify the Discharge Pressure at each speed interval.

4. Maintenance



BEFORE PERFORMING ANY MAINTENANCE REQUIRING REMOVAL OF THE FRONT COVER OR HOSE/TUBE CONNECTIONS, BE SURE TO RELIEVE PRESSURE FROM THE PIPING SYSTEM AND, WHERE HAZARDOUS PROCESS MATERIALS ARE INVOLVED, RENDER THE PUMP SAFE TO PERSONNEL AND THE ENVIRONMENT BY CLEANING AND CHEMICALLY NEUTRALIZING AS APPROPRIATE. WEAR PROTECTIVE CLOTHING AND EQUIPMENT AS APPROPRIATE.

Accurate records from the early stages of pump operation will indicate the type and levels of required maintenance. A preventative maintenance program based on these records will minimize operational problems. The life of the hose/tube, the main wear item of a peristaltic pump, can only be estimated. Since corrosion rates and operational conditions affect functional material life, the life of a hose/tube must be considered according to its particular service conditions.

4.1 Hose/Tube Inspection, Removal, & Reinstallation



IF THE HOSE/TUBE HAS FAILED, PROCESS FLUID MAY HAVE CONTAMINATED OTHER PARTS OF THE PUMP. HANDLE WITH APPROPRIATE CARE.

PeriFlo FMP hoses and tubes do not have a specific cycle life. Periodic hose/tube inspection and replacement are recommended. Each user should perform regular inspections to determine the replacement interval that is appropriate to their system conditions.

Hose/Tube Inspection

The following wear characteristics can be attributed to normally accumulated service time, extended service in high pressure and/or high speed applications, incorrect shimming, chemical attack, accumulation of debris, lack of lubrication or contaminated lubrication. See Section 6.0 for corrective actions.

- Outer layer of the hose is peeling/shredding
- Hose/tube is flattened or set from idle roller
- Cracking/creasing parallel or perpendicular to the hose/tube
- Excessive smoothing from rollers
- Bulging
- Discoloration

4.1.1 Hose/Tube Removal & Reinstallation

1. Disconnect the power source to the drive motor. Follow local Lockout/Tagout procedures.
2. Relieve all pressure from the piping system. Close the inlet and outlet shut off valves.
3. Disconnect piping to the suction and discharge connections and drain any process liquid, following all recommended material safety precautions.



Caution – Process fluid may drain from the Piping. Take necessary precautions.

4. Remove the bolts and washers (Items 1) that fasten the press flange connection assembly (Item 2) to the pump casing on both the suction and discharge ports. Visually inspect for any damage and set aside.
5. Pull the press flange connection assemblies (Item 2) from the hose/tube and remove the closing rings and o-rings (Items 3).



If the hose/tube has NOT failed and is being replaced as part of Scheduled Preventative Maintenance (If the hose/tube has failed, proceed to step 11):

6. Reconnect the motor to power and jog the pump FORWARD to push the hose/tube out of the discharge port of the pump.



NEVER place fingers or hands into any part of the pump while the pump is running.

7. Remove the new hose/tube from its protective packaging. Completely coat the new hose/tube with a 1/16" layer of PeriFlo lubricating grease.
8. Place the hose/tube end into the suction port. Reconnect the motor to power and jog the pump FORWARD to draw the hose/tube into the pump through the suction port until the end is through the discharge port. Disconnect the power source to the motor. Follow local Lockout/Tagout procedures.
9. Install the closing rings around the both the hose/tube ends. Check that the o-ring is seated in the press flange connection assembly and press into hose/tube ends. Fasten the press plate to the pump casing.
10. Reconnect suction and discharge piping and prepare the pump for operation.

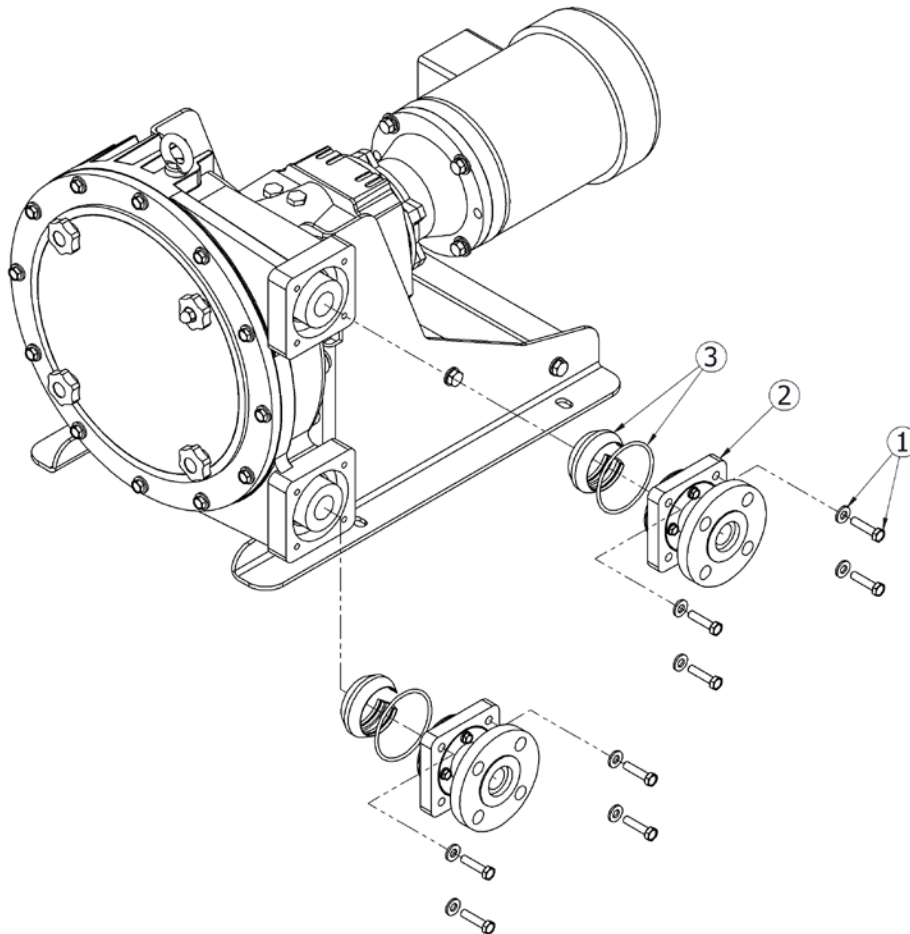


Figure 3 - Hose Change



If the hose/tube has FAILED:

11. Remove the lower drain plug on the backside of the pump to drain any process fluid (disconnect leak detection on models with leak detection option). Take necessary safety precautions.
12. After the press flange connection assemblies and closing rings have been removed, reconnect the motor to power and jog the pump FORWARD to push the hose/tube out of the discharge port of the pump. Wear personal protective equipment as appropriate.
13. Remove the front cover to access the inside of the pump, continuing to follow safety precautions as appropriate.
14. Use a clean cloth or paper towel to wipe away all the remaining grease from inside the pump casing, ports, and around the rotor and rollers. The pump casing and internal components should be free and clear of any process fluid, corrosion, or contaminants before replacing the hose/tube.
15. Check that the rollers continue to spin freely and all fasteners are tight. There should be no visible damage to the rotor, front cover, or front cover o-ring.
16. Replace the front cover and tighten the front cover bolts.
17. Remove the new hose/tube from its protective packaging. Completely coat the new hose/tube and the inside of the cleaned pump casing with a 1/16" layer of PeriFlo lubricating grease.
18. Place the hose/tube end into the suction port. Reconnect the motor to power and jog the pump FORWARD to draw the hose/tube into the pump through the suction port until the end is through the discharge port. Disconnect the power source to the motor. Follow local Lockout/Tagout procedures.
19. Install the closing rings around the both the hose/tube ends. Check that the o-ring is seated in the press flange connection assembly and press into hose/tube ends. Fasten the press plate to the pump casing.
20. Reconnect suction and discharge piping and prepare the pump for operation.

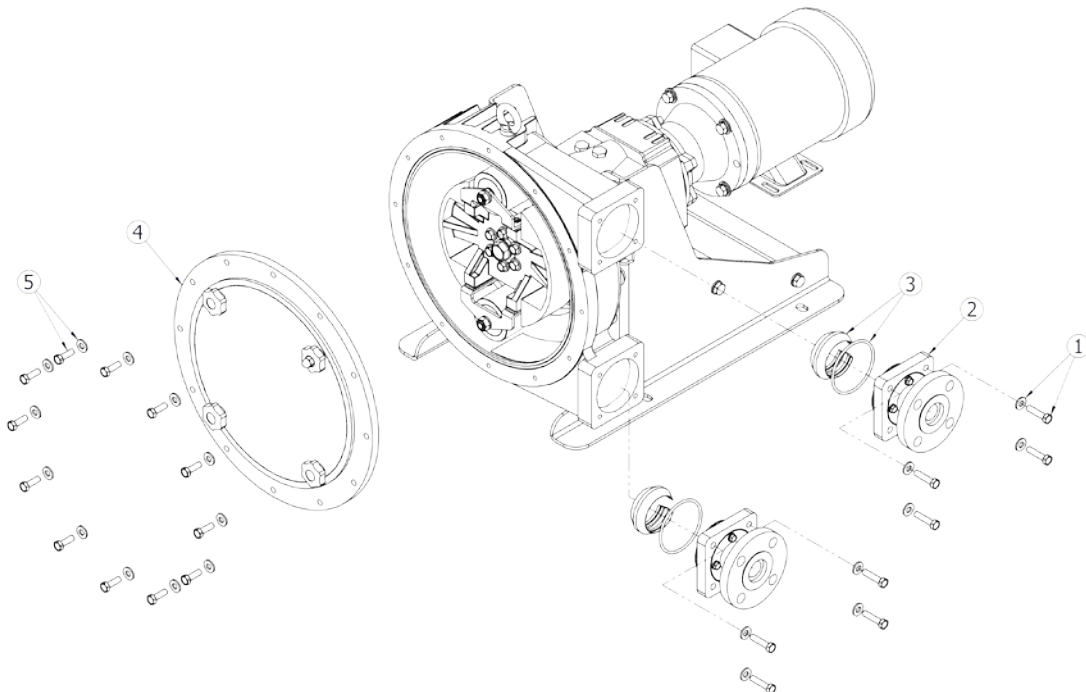


Figure 4 - Hose Change After Failure

4.2 Lubrication

PeriFlo FMP pumps are lubricated at the factory with specially formulated lubricating grease for use with PeriFlo hoses and tubes. For optimum pump performance, the grease should be replaced at all hose/tube changes. Grease should be applied to the outer layer of the hose/tube, inside diameter of the pump casing that supports the hose/tube, and the outer surface of the rollers.

Lubrication Chart	
FMP Series	Required Amount of Grease per Pump (oz)
FMP30	12
FMP40	16
FMP50	24

Keeping the hose/tube well lubricated is an important factor in extending hose life. See the chart below to determine how often the pump should have the lubricating grease redistributed or added to the hose based on the typical operating speed of the pump.

Pump Size	Service Time	
	<30rpm	≥30rpm
FMP30	1500hrs	500hrs
FMP40	1500hrs	500hrs
FMP50	1500hrs	500hrs

4.3 Hose/Tube Compression and Shimming

All PeriFlo FMP pumps use adjustable methods to shim the rollers to optimize hose/tube compression based on the speed and discharge pressure of the application. While the compression is set at the factory based on the specified application, it may be necessary to change the shimming in actual operating conditions and with the installation of a new hose/tube. FMP Series pumps use shims to adjust compression.

Over compression: The hose/tube is shimmed more than necessary to seal against the discharge pressure to prevent back flow. This can lead to shortened hose/tube life.

Under compression: The hose/tube is not shimmed enough to seal against the discharge pressure. This is seen as a reduction in output capacity (back flow) and/or the pump is unable to reach the required discharge pressure.

4.3.1 FMP Shimming

1. Jog the motor so that one roller is stopped in the open space between the suction and discharge ports.
2. Disconnect the power source to the drive motor. Follow local Lockout/Tagout procedures.
3. Relieve all pressure from the piping system. Close the inlet and outlet shut off valves.
4. If the hose/tube is also being replaced follow the steps in Section 4.1.1 to remove the hose/tube and grease.

5. Refer to Figure 5 for item identification. Remove the front cover (Item 4) and hardware (Item 5) to access the inside of the pump, continuing to follow safety precautions as appropriate.
6. Remove the bolts (Items 1 and 2) on the roller support bracket that retain the roller assembly and shims to the rotor. Add or remove shims (Item 4) as necessary and reinstall the roller assembly (Item 3) using the following Torque guide.

FMP Series	Fastener	Torque (IN-LB / N-M)
FMP30	M6 SH Cap Screw (Item 1)	36 / 4.0
	M8 Hex Screw (Item 2)	48 / 5.4
FMP40	M8 SH Cap Screw (Item 1)	36 / 4.0
	M10Hex Screw (Item 2)	96 / 10.8
FMP50	M8 SH Cap Screw (Item 1)	36 / 4.0
	M10 Hex Screw (Item 2)	96 / 10.8

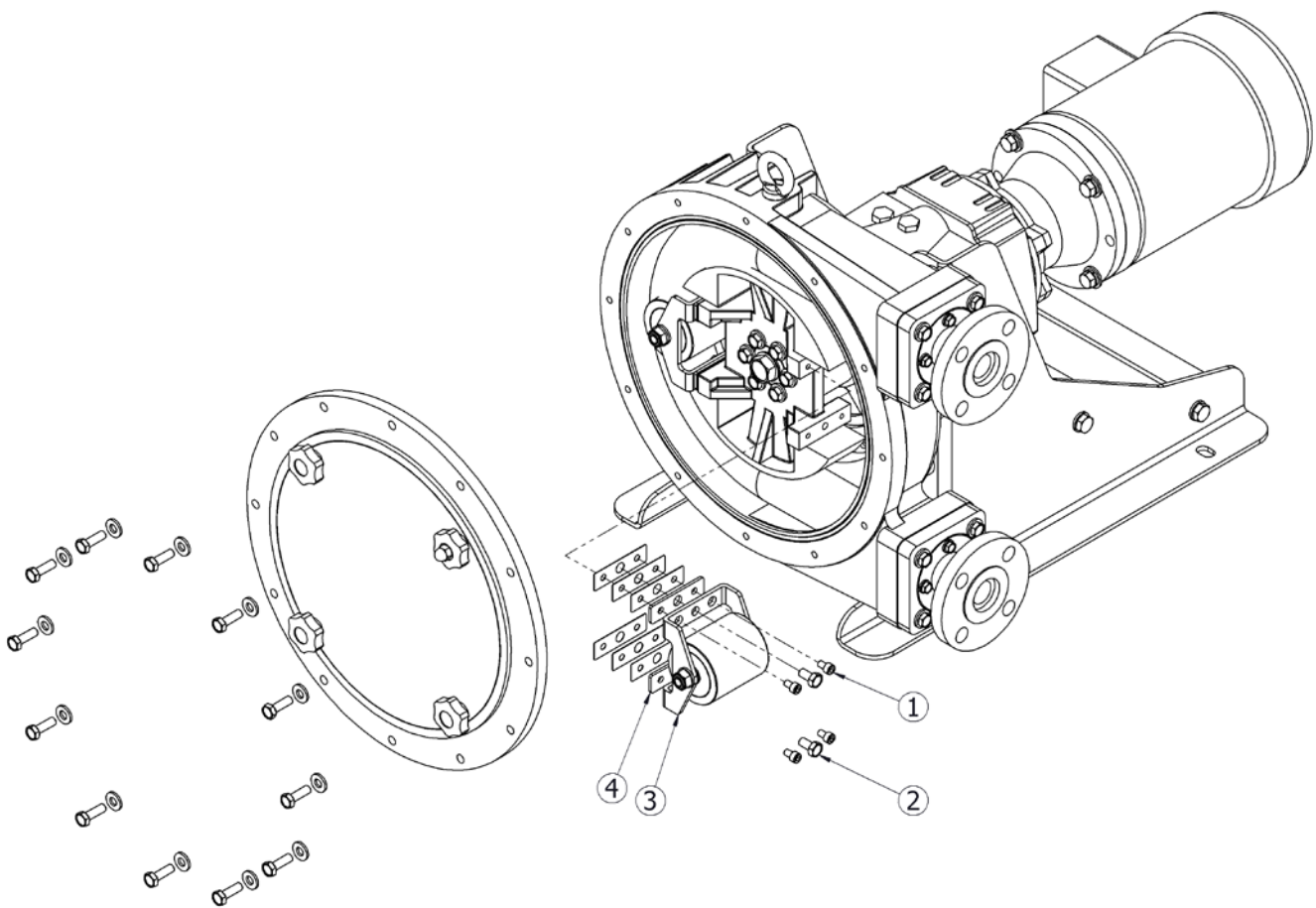


Figure 5- FMP Shimming



Note – Some FMP Series pumps are factory shimmed with blocks and shims. A combination of blocks and shims may be required to correctly shim the pump for the expected system discharge pressure.

7. Replace the front cover and hardware. Reconnect the motor to power and jog the motor so that the remaining roller is stopped in the open space between the suction and discharge ports.



NEVER place fingers or hands into any part of the pump while the pump is running.

8. Disconnect the motor from power following local Lockout/Tagout procedures. Remove the cover and repeat Step 7 to adjust the second roller.



Note – Both roller assemblies must have an equal number of shims to ensure uniform compression of the hose/tube.

9. Replace the front cover and front cover hardware. Prepare the pump for operation. Follow calibration procedure 3.4 as necessary.

4.4 Motor Removal & Reinstallation

Removal

1. Disconnect the power supply to the drive motor. Follow local Lockout/Tagout procedures.
2. Disconnect the motor wiring from the motor.
3. Remove the four bolts retaining the motor to the gear reducer. Slide the motor horizontally to pull the motor shaft out of the gear reducer.

Installation

1. Check the motor key is in place on the motor shaft. Install the motor by sliding the motor horizontally into the gear reducer.
2. Align the motor bolts holes to the gear reducer mounting plate.
3. Install the 4 motor retaining bolts.

Motor Bolt Torque	
Motor Size	Torque (IN-LB / N-M)
56C	96 / 10.8
143TC	96 / 10.8
182TC - 184 TC	216 / 24.4

4. Connect the motor wiring to the motor in accordance with Local, National and Motor Manufacturer requirements.
5. Restore power.
6. Confirm rotation is correct for the desired pump flow direction.



The PeriFlo FMP is designed to operate with any Motor rotation direction (clockwise or counter clockwise).

5. Replacement Parts

Throughout the life cycle of the pump the hose or tube will need to be replaced. Each user should perform regular inspections to determine the replacement interval that is appropriate to their system conditions. The replacement hose or tube must be coated with at least a 1/16" thick layer of PeriFlo lubricating grease before installation.

Model Series	Hose/Tube Part Number	Material	Lubricating Grease Part Number	Description	Grease Req'd per Hose/Tube (oz)	Quantity Required
FMP30	NH040011-RUB	NATURAL RUBBER	NH980003-001	SILICONE GREASE, 16oz	12	1
	NH040011-EPD	EPDM	NH980003-001	SILICONE GREASE, 16oz	12	1
	NH040011-NTR	BUNA	NH980003-001	SILICONE GREASE, 16oz	12	1
FMP40	NH040014-NRP	NORPRENE TUBE	NH980003-001	SILICONE GREASE, 16oz	16	1
	NH040013-RUB	NATURAL RUBBER	NH980003-001	SILICONE GREASE, 16oz	16	1
	NH040013-EPD	EPDM	NH980003-001	SILICONE GREASE, 16oz	16	1
	NH040013-NTR	BUNA	NH980003-001	SILICONE GREASE, 16oz	16	1
FMP50	NH040015-RUB	NATURAL RUBBER	NH980003-001	SILICONE GREASE, 16oz	24	2
	NH040015-EPD	EPDM	NH980003-001	SILICONE GREASE, 16oz	24	2
	NH040015-NTR	BUNA	NH980003-001	SILICONE GREASE, 16oz	24	2

6. Troubleshooting

Difficulty	Probable Cause	Remedy
Pump motor does not start	Faulty power source	Check power source
	Blown fuse, circuit breaker	Replace - eliminate overload
	Broken wire	Locate and repair
	Wired improperly	Check diagram
	Process piping blockage	Open valves, clear other obstructions.
No fluid delivery	Motor not running.	Check power source. Check wiring diagram
	Supply tank empty	Fill tank
	Line clogged	Clean and flush
	Closed in-line valve(s)	Open valve(s)
	Under compression	Add shims/increase compression setting
	Hose/tube ruptured	Replace hose/tube
Low fluid delivery	Motor speed too low	Check voltages, frequency, wiring, and terminal connections Check nameplate vs. specifications Increase motor speed
	Calibration system error	Evaluate and correct
	Under compression	Add shims to increase hose compression
	Hose/tube nearing end of life	Evaluate hose/tube condition, replace as necessary
	Product viscosity too high	Lower viscosity by increasing product temperature or dilution. Increase pump and/or piping size

Delivery gradually drops.	Leak in suction/discharge line	Locate and correct
	Product change	Check viscosity and other variables
	Supply tank vent plugged	Unplug vent
	Hose/tube nearing end of life	Evaluate hose/tube condition, replace as necessary
Delivery higher than rated.	Motor speed too high	Check voltages, frequency, wiring, and terminal connections Check nameplate vs. specifications Decrease motor speed
	Calibration system error	Evaluate and correct
Short hose/tube life	Chemical attack	Confirm compatibility of hose/tube, connections with pumped fluid
	Excessive pump speed	Reduce the speed of the pump
	Excessive discharge pressure	Reduce pressure, reduce pump speed, increase discharge pipe size
	High pumping temperature	Reduce temperature of product
	Abnormal elevation in temperature	Check rollers spin freely, apply additional grease
	Over compression	Remove shims to reduce hose compression
	Insufficient quantity of grease	Apply additional grease
Elevated Temperature	Hose/tube with no grease	Apply lubricating grease
	Elevated temperature of product	Reduce product temperature
	Rollers seized	Check fastener torque
	Excessive pump speed	Reduce pump speed
Noisy gearing, knocking	Water hammer	Install pulsation dampener
	Faulty gear reducer	Consult factory.
	Base assembly loose	Tighten base hardware Anchor base
Piping noisy.	Pipe size too small	Increase size of piping Install pulsation dampener
	Pipe runs too long	Install pulsation dampener in line
	Pulsation dampener inoperative or flooded	Refill with air or inert gas Inspect and replace diaphragm and recharge
	No surge chamber or dampener used	Install pulsation dampeners
Motor overheats.	Pump overloaded	Check operating conditions against pump design Verify discharge pressure
	High or low voltage	Check power source
	Loose wire	Trace and correct
	Incorrect motor wiring	Verify and correct

7. Piping Accessories

Pressure Relief Valves

Pressure relief valves are designed to protect chemical feed systems from damage that may be caused by defective equipment or a blockage in the discharge line. These valves function to limit the pressure downstream of the pump. Field adjust the pressure relief valve to operate when the system pressure exceeds operating discharge pressure by 10-15%. No potentially restrictive components, such as a valve, should be installed between the pump discharge and the PRV.

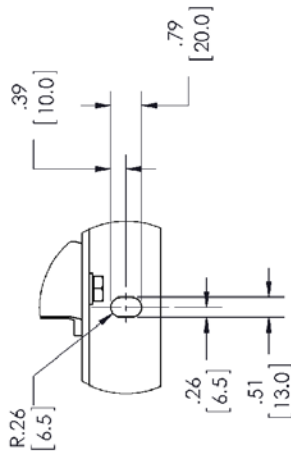
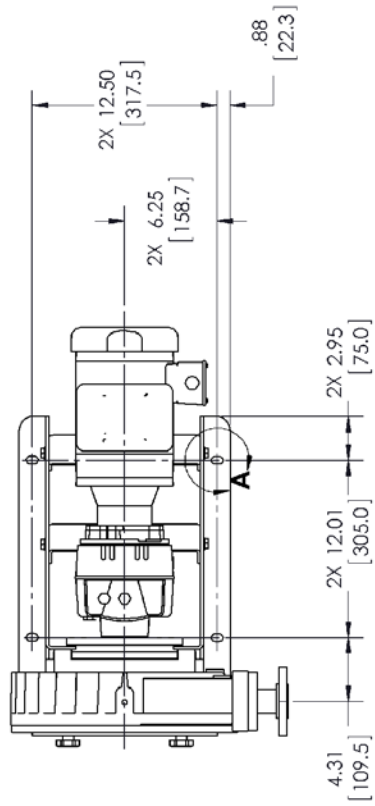
Pulsation Dampener

A pulsation dampener is a pneumatically charged diaphragm-type chamber that intermittently stores hydraulic energy. Used on the inlet, the dampener will stabilize pulsating flow variations as well as provide a full charge of process fluid to the pump. On the discharge line, it will reduce discharge pressure peaks and pulsating flow variations. The pulsation dampener should be charged according to the manufacturer's instructions.

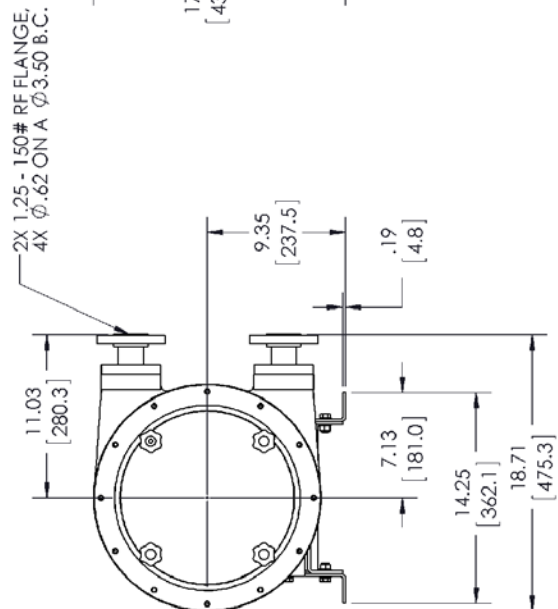
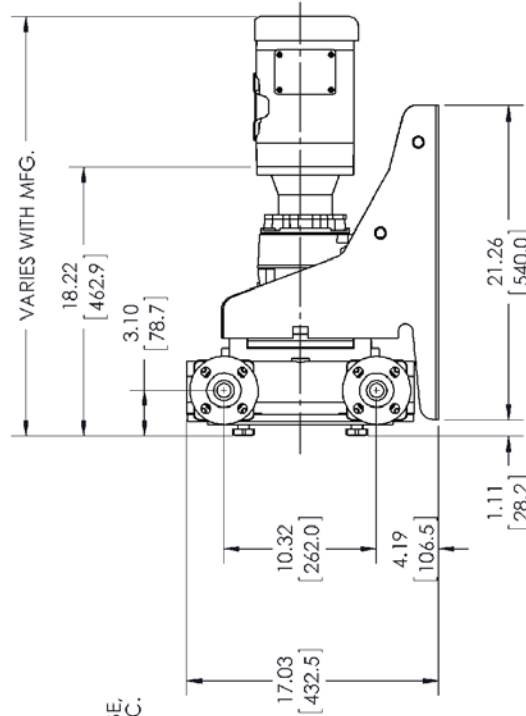
8. Dimensional Drawing

Dimensions in inches [mm]

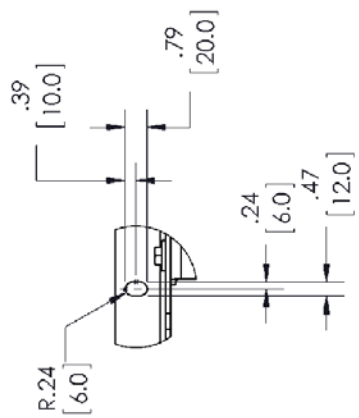
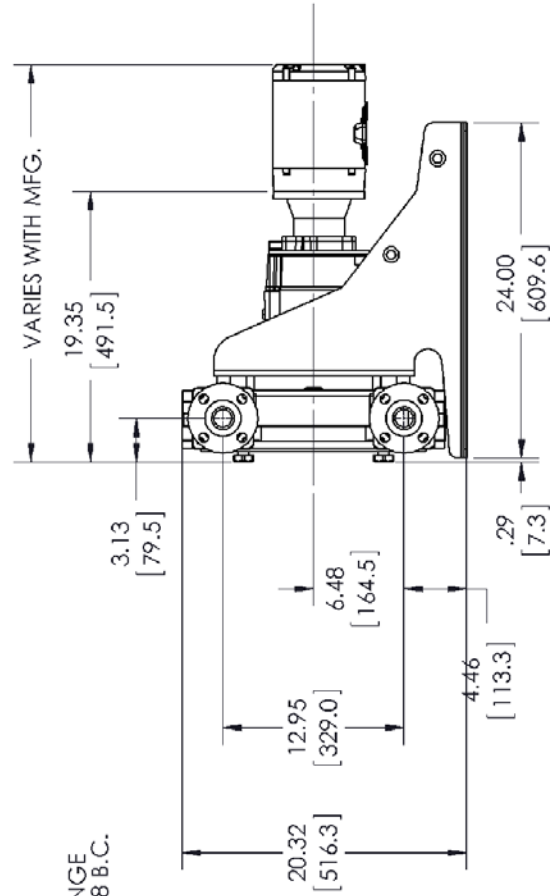
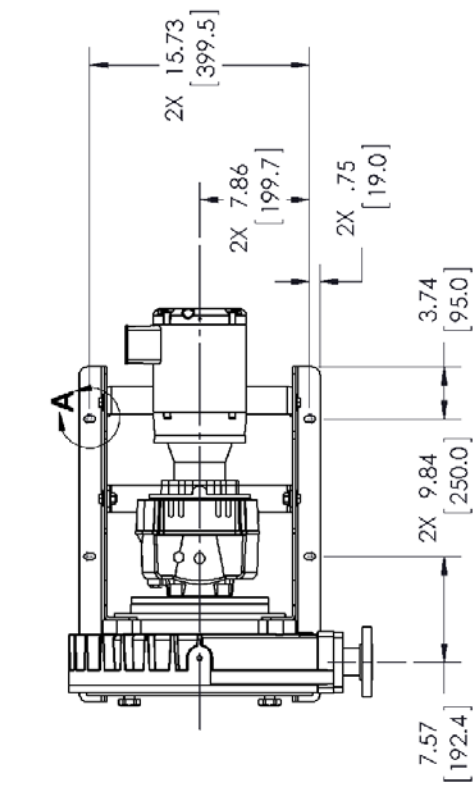
8.1 FMP30



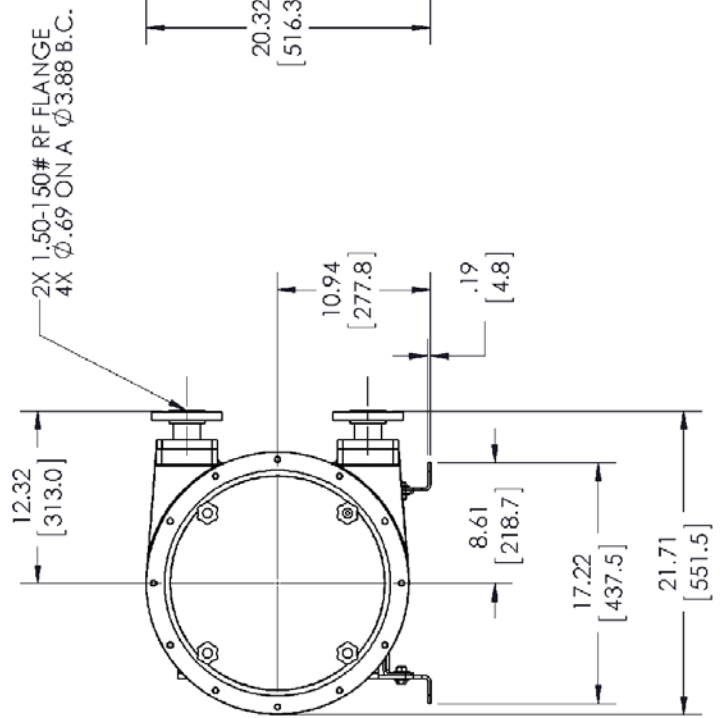
DETAIL A
SCALE 1 : 3
TYP 4 PLCS



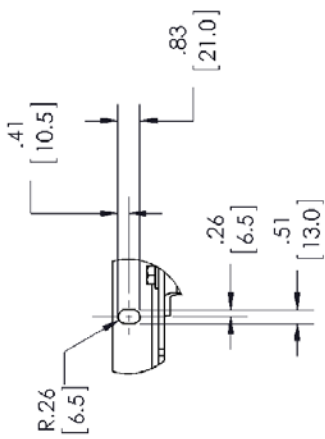
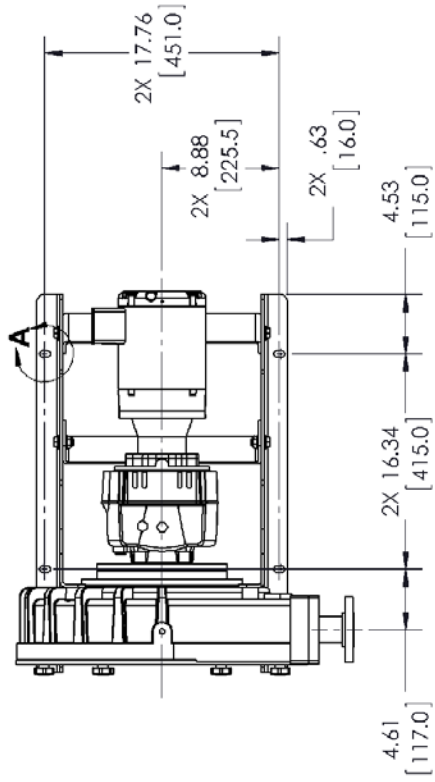
8.2 FMP40



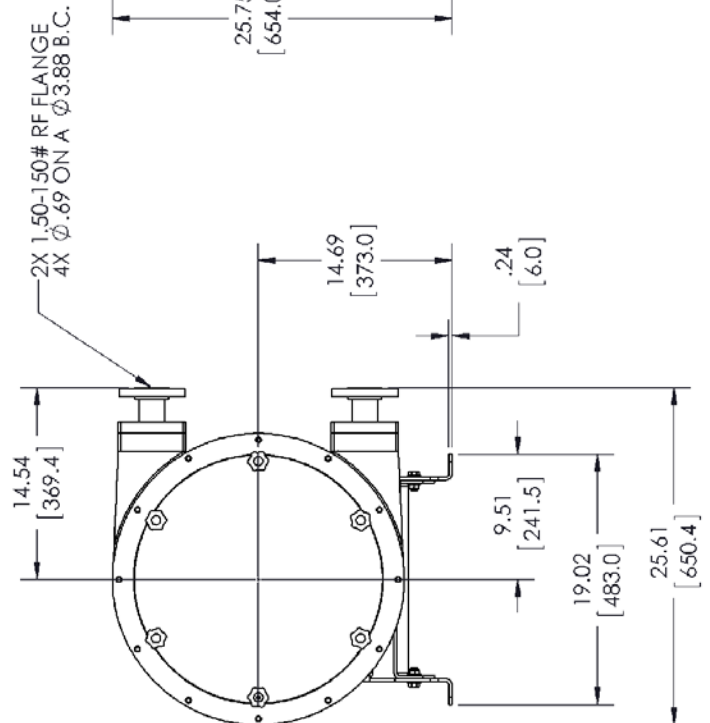
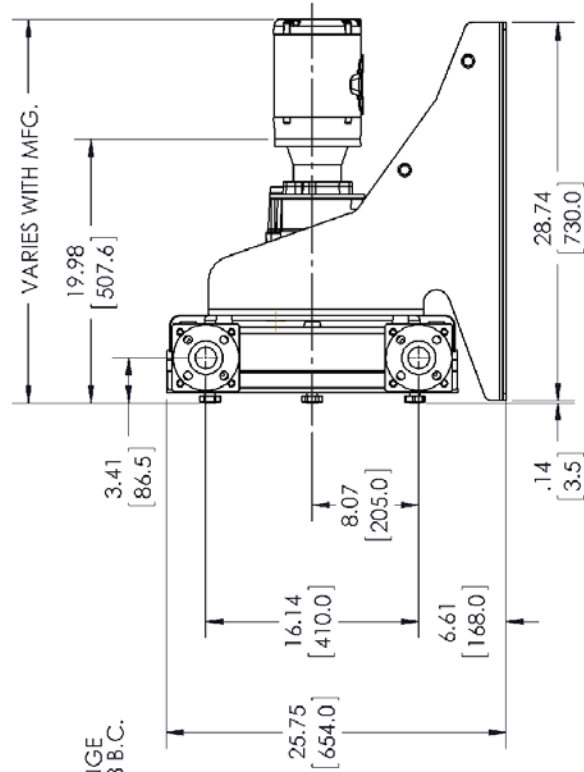
DETAIL A
SCALE 1 : 5
TYP 4 PLCS



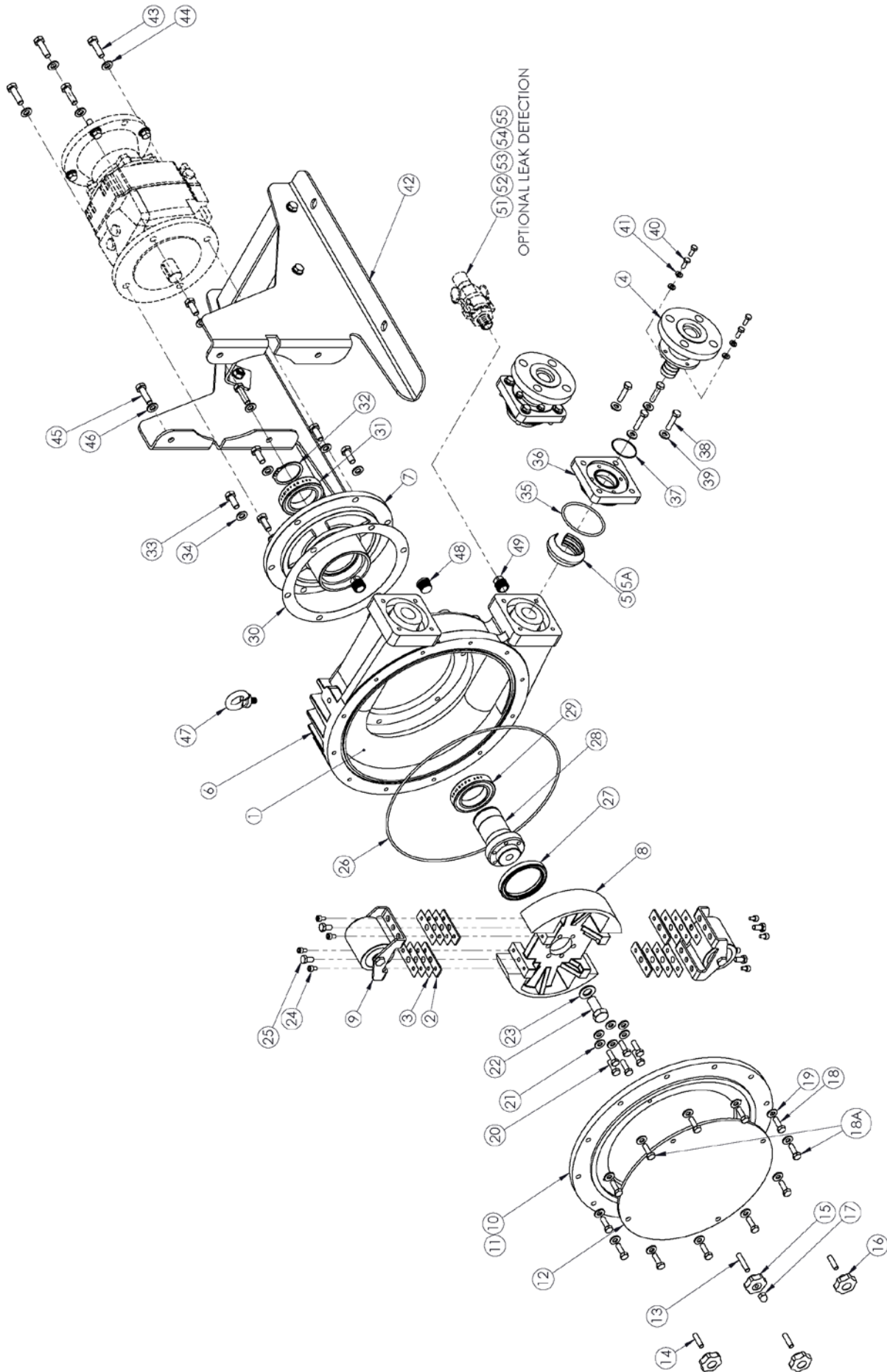
8.3 FMP50



DETAIL A
SCALE 1 : 5
TYP 4 PLCS



9. Parts Breakdown and Item Numbers



1	2			
LD	NO LD	W772568-188	.50 NPT PLUG SQHD SOLID SS188	49
	1	NH130001-000	BREATHER, .50 NPT PPL 100PSI	48
	1	NH999032-STL	EYEBOLT,SHLDR M10-1.5X17 STL	47
	4	NP991019-188	M10 FLT NARR WSHR 125-A2	46
	4	NP990438-188	M10-1.50 X 25 BOLT HEX HD 188	45
	4	NP991019-188	M10 FLT NARR WSHR 125-A2	44
	4	NP990540-188	M10-1.50 X 30 HEX HD BOLT 188	43
	1	NH580050-000	BASE ASSY,RBT25/FMP30	42
	8	NP991017-188	M 6 FLT NARR WSHR 125-A2	41
	8	NP990415-188	M 6-1.00 X 16 BOLT HEXHD 20188	40
	8	NP991018-188	M 8 WSHR FLAT DIN 125A A2	39
	8	W770533-188	M 8-1.25X 35MM BOLT HEXHD 0188	38
	2	W207266-NTR	GASKET,O RING 2-031	37
	2	NH360008-STL	PLATE,PRESS FLANGE FMP30/RBT25	36
	2	NP440234-NTR	GASKET, O RING 2-234	35
	6	NP991019-188	M10 FLT NARR WSHR 125-A2	34
	6	NP990438-188	M10-1.50 X 25 BOLT HEX HD 188	33
	1	NH999016-000	RING,SNAP SHAFT FMP30	32
	1	NH400011-000	BEARING,ROLLER FRT/REAR FMP30	31
	1	NH460011-000	GASKET,BEARING HSG FMP30	30
	1	NH400011-000	BEARING,ROLLER FRT/REAR FMP30	29
	1	NH410014-STL	SHAFT,ROTOR RBT25/FMP30 STL	28
	1	NH450014-000	SEAL,LIP BEARING HSG FMP30	27
	1	NH440010-NTR	GASKET,O RING FRONT CVR RBT25	26
	4	NP990478-188	M 8-1.25 X 16 BOLT HEX HD 188	25
	8	NP990491-188	M 6-1.00 X 10 SCREW SKHD 188	24
	1	NH990030-188	.62 WASHER BONDED SEALING 188	23
	1	NP990042-188	M16-2.0 X 35 BOLT HEX HD 188	22
	6	NP991018-188	M 8 WSHR FLAT DIN 125A A2	21
	6	W770541-188	M 8-1.25X25 BOLT HEXHD 0188	20
	12	NP991018-188	M 8 WSHR FLAT DIN 125A A2	19
	2	NP990427-188	M 8-1.25 X 20 BOLT HEX HD 188	18A
	10	W770541-188	M 8-1.25X25 BOLT HEXHD 0188	18
	1	NP994116-188	M 8-1.25 NUT ACORN 188	17
	3	NH260002-000	KNOB,COVER PRESS BLIND	16
	1	NH260001-000	KNOB,COVER PRESS 8MM THRU	15
	3	NP991004-028	M 8-1.25 X 30 CUP PT SETSC 188	14
	1	NP991004-025	M 8-1.25 X 40 SCREW SETSC 188	13
	1	NH240010-PCR	COVER,FRONT FMP30 PCR	12
	-	N/A		11
	1	NH240005-STL	RING,FRONT COVER FMP30 STL	10
	2	NH100004-000	ROLLER ASSY, FMP30	9
	1	NH030007-000	ROTOR,FMP30 IRN	8
	1	NH020001-000	HOUSING,BEARING FMP30 IRN	7
	1	NH010007-000	CASING,PUMP RBT25/FMP30 IRN	6
	-	N/A		5A
	2	NH240016-ALU	RING,PRESS FLANGE FMP30/RBT25	5
QTY	PART No.	DESCRIPTION	ITEM No.	
FMP30 COMMON PARTS				

2	NH880001-316	CONN ASSY,FLANGE FMP30 316	4
2	NH880001-HAR	CONN ASSY,FLANGE FMP30 HALAR	
12	NH470008-188	SHIM,ROLLER FMP30 .5MM 188SS	3
4	NH470009-188	SHIM,ROLLER FMP30 3MM 188SS	2
1	NH040011-NTR	NITRILE BUNA	1
1	NH040011-RUB	NATURAL RUBBER	
1	NH040011-EPD	EPDM	
QTY	PART No.	DESCRIPTION	ITEM No.
HOSE			
FMP30 BILL OF MATERIALS			

1	2				
LD	NO LD	W772568-188	.50 NPT PLUG SQHD SOLID SS188	49	
	1	NH130001-000	BREATHER, .50 NPT PPL 100PSI	48	
	1	NH999032-STL	EYEBOLT,SHLDR M10-1.5X17 STL	47	
	4	NP991019-188	M10 FLT NARR WSHR 125-A2	46	
	4	NP990438-188	M10-1.50 X 25 BOLT HEX HD 188	45	
	4	NP991019-188	M10 FLT NARR WSHR 125-A2	44	
	4	NP990540-188	M10-1.50 X 30 HEX HD BOLT 188	43	
	1	NH580051-000	BASE ASSY,RBT32/FMP40	42	
	8	NP991018-188	M 8 WSHR FLAT DIN 125A A2	41	
	8	NP990478-188	M 8-1.25 X 16 BOLT HEX HD 188	40	
	8	NP991019-188	M10 FLT NARR WSHR 125-A2	39	
	8	NP990488-188	M10-1.50 X 35 BOLT HEX HD 188	38	
	2	NP440134-NTR	GASKET,O RING 2-134	37	
	2	NH360009-STL	PLATE,PRESS FLANGE FMP40 ST	36	
	2	NP440234-NTR	GASKET, O RING 2-234	35	
	6	NP991019-188	M10 FLT NARR WSHR 125-A2	34	
	6	NP990438-188	M10-1.50 X 25 BOLT HEX HD 188	33	
	1	NH999017-000	RING,SNAP SHAFT FMP40 STL	32	
	1	NH400012-000	BEARING,ROLLER REAR FMP40	31	
	1	NH460012-000	GASKET,BEARING HSG FMP40	30	
	1	NH400013-000	BEARING,ROLLER FRONT FMP40	29	
	1	NH410015-STL	SHAFT,ROTOR FMP40 STL	28	
	1	NH450015-000	SEAL,LIP BEARING HSG FMP4	27	
	1	NH440011-NTR	GASKET,O RING FRONT CVR RBT32	26	
	4	NP994139-188	M10-1.5 X 16 SCREW SKHD	25	
	8	NP994143-188	M 8-1.25 X 14 SHCS 188	24	
	1	NH990030-188	.62 WASHER BONDED SEALING 188	23	
	1	NP990042-188	M16-2.0 X 35 BOLT HEX HD 188	22	
	6	NP991018-188	M 8 WSHR FLAT DIN 125A A2	21	
	6	W770541-188	M 8-1.25X25 BOLT HEXHD 0188	20	
	12	NP991019-188	M10 FLT NARR WSHR 125-A2	19	
	2	NP990507-188	M10-1.50 X 20 BOLT HEX HD 188	18A	
	10	NP990438-188	M10-1.50 X 25 BOLT HEX HD 188	18	
	1	NP994116-188	M 8-1.25 NUT ACORN 188	17	
	3	NH260002-000	KNOB,COVER PRESS BLIND	16	
	1	NH260001-000	KNOB,COVER PRESS 8MM THRU	15	
	3	NP991004-028	M 8-1.25 X 30 CUP PT SETSC 188	14	
	1	NP994085-188	M 8-1.25 X 50 SKHD SETSC 913A2	13	
	1	NH240011-PCR	COVER,FRONT FMP40 PCR	12	
	-	N/A		11	
	1	NH240006-STL	RING,FRONT COVER FMP40 STL	10	
	2	NH100005-000	ROLLER ASSY, FMP40 WITH BRKT	9	
	1	NH030008-000	ROTOR,FMP40 IRN	8	
	1	NH020002-000	HOUSING,BEARING FMP40 IRN	7	
	1	NH010008-000	CASING,PUMP RBT32/FMP40 IRN	6	
	2	-	NP440035-NTR	GASKET,O RING 2-035	5A
	2	-	NH240036-ALU	RING,PRESS FLANGE TUBE FMP40	5
	-	2	NH240017-ALU	RING,PRESS FLANGE FMP40/RBT32	
TUBE	HOSE	PART No.	DESCRIPTION	ITEM No.	
FMP40 COMMON PARTS					

2	2	NH880002-316	CONN ASSY,FLANGE FMP40 316	4
2	2	NH880002-HAR	CONN ASSY,FLANGE FMP40 HALAR	
12	12	NH470010-188	SHIM,ROLLER FMP40 1MM 188SS	3
8	4	NH470011-188	SHIM,ROLLER FMP40 5MM 188S	2
1	-	NH040014-NRP	NORPRENE	1
-	1	NH040013-NTR	NITRILE BUNA	
-	1	NH040013-RUB	NATURAL RUBBER	
-	1	NH040013-EPD	EPDM	
QTY	QTY	PART No.	DESCRIPTION	ITEM No.
HOSE				
FMP40 BILL OF MATERIALS				

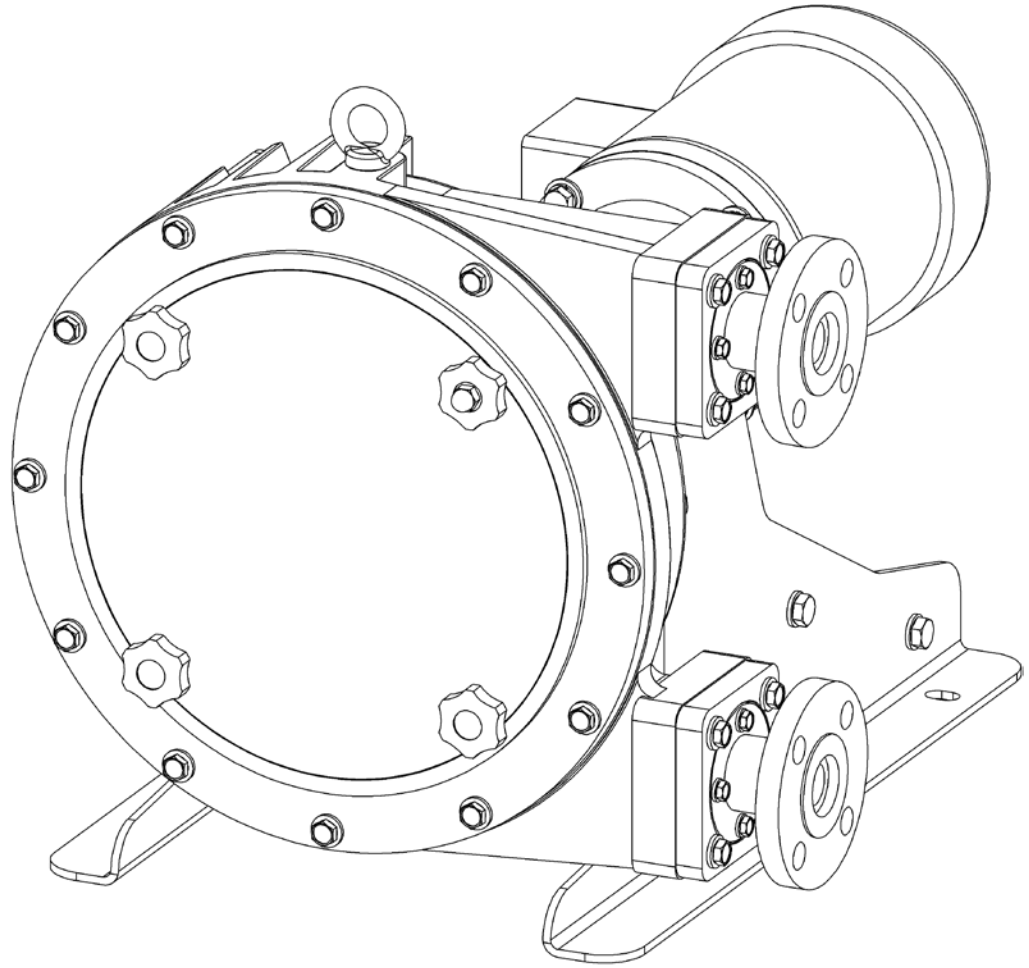
1	2	W772568-188	.50 NPT PLUG SQHD SOLID SS188	49
LD	NO LD			
	1	NH130001-000	BREATHER, .50 NPT PPL 100PSI	48
	1	NH999033-STL	EYEBOLT,SHLDR M12-1.75X20.5	47
	4	NP991020-188	M12 FLT NARR WSHR 125-A2	46
	4	NP990043-188	M12-1.75 X 30 BOLT HEX HD 188	45
	4	NP991020-188	M12 FLT NARR WSHR 125-A2	44
	4	NP990043-188	M12-1.75 X 30 BOLT HEX HD 188	43
	1	NH580052-000	BASE ASSY,RBT40/FMP50	42
	8	NP991018-188	M 8 WSHR FLAT DIN 125A A2	41
	8	NP990478-STL	M 8-1.25 X 16 BOLT 933-ZP	40
	8	NP991020-188	M12 FLT NARR WSHR 125-A2	39
	8	NP994029-188	M12-1.75 X 40 SCR HXHD CL:4.6	38
	2	W213034-NTR	GASKET,O RING 2-041	37
	2	NH360010-STL	PLATE,PRESS FLANGE FMP50 STL	36
	2	W210421-NTR	GASKET,O RING 2-154	35
	6	NP991019-188	M10 FLT NARR WSHR 125-A2	34
	6	NP990540-188	M10-1.50 X 30 HEX HD BOLT 188	33
	1	NH999018-000	RING,SNAP SHAFT FMP50 STL	32
	1	NH400014-000	BEARING,ROLLER REAR FMP50	31
	1	NH460013-000	GASKET,BEARING HSG FMP50	30
	1	NH400015-000	BEARING,ROLLER FRONT FMP50	29
	1	NH410016-STL	SHAFT,ROTOR FMP50 STL	28
	1	NH450016-000	SEAL,LIP BEARING HSG FMP50	27
	1	NH440012-NTR	GASKET,O RING FRONT CVR RBT40	26
	4	NP990063-188	M10-1.5 X 25 SKHD SCREW 188	25
	8	NP990058-188	M 8-1.25 X 20 SKHD SCREW 188	24
	1	NH990030-188	.62 WASHER BONDED SEALING 188	23
	1	NP990042-188	M16-2.0 X 35 BOLT HEX HD 188	22
	6	NP991019-188	M10 FLT NARR WSHR 125-A2	21
	6	NP990540-188	M10-1.50 X 30 HEX HD BOLT 188	20
	12	NP991019-188	M10 FLT NARR WSHR 125-A2	19
	2	NP990507-188	M10-1.50 X 20 BOLT HEX HD 188	18A
	10	NP990540-188	M10-1.50 X 30 HEX HD BOLT 188	18
	1	NP994116-188	M 8-1.25 NUT ACORN 188	17
	5	NH260002-000	KNOB,COVER PRESS BLIND	16
	1	NH260001-000	KNOB,COVER PRESS 8MM THRU	15
	5	NP991004-028	M 8-1.25 X 30 CUP PT SETSC 188	14
	1	NP994085-188	M 8-1.25 X 50 SKHD SETSC 913A2	13
	1	NH240013-PCR	COVER,FRONT FMP50 PCR	12
	1	NH460023-NTR	GASKET,COVER FMP50	11
	1	NH240007-STL	RING,FRONT COVER FMP50 STL	10
	2	NH100006-000	ROLLER ASSY, FMP50	9
	1	NH030009-000	ROTOR,FMP50 IRN	8
	1	NH020003-000	HOUSING,BEARING RBT40/FMP50	7
	1	NH010009-000	CASING,PUMP RBT40/FMP50 IRN	6
	-	N/A		5A
	2	NH240018-ALU	RING,PRESS FLANGE FMP50/RBT40	5
QTY	PART No.	DESCRIPTION		ITEM No.
FMP50 COMMON PARTS				

2	NH880003-316	CONN ASSY,FLANGE FMP50 316	4
2	NH880003-HAR	FLNG ASSY,FMP50/RBT40 HALAR	
24	NH470017-188	SHIM,ROLLER FMP50 188SS	3
-	N/A		2
1	NH040015-NTR	NITRILE BUNA	1
1	NH040015-RUB	NATURAL RUBBER	
1	NH040015-EPD	EPDM	
QTY	PART No.	DESCRIPTION	ITEM No.
HOSE			
FMP50 BILL OF MATERIALS			

Consult Factory for FMP50 pumps with motor HP Code "J"

J	1	NH480051-002	KIT,MTR MTG 182TC-256TC	50
C, D, E, F, G, H, I	1	NH480051-000	KIT,MTR MTG 56C, 143-5TC 3 PHASE	
MOTOR HP CODE	QTY	PART No.	DESCRIPTION	ITEM No.
HARDWARE KIT, MOTOR MOUNTING				

FMP50 ONLY	L2, L2C, L3, L3C	1	RS410051-304	.50 NPT 90 ELBOW 304 150#	54
	L2, L2C, L3, L3C	1	RS460026-304	.50NPT NIPPLE X 2 304 150#	53
	L2, L2C, L3, L3C	1	RS470166-FPP	ADAPTOR,.50 MALE/THD QC FPP	53
	L2, L2C, L3, L3C	1	RS470107-FPP	COUPLING,.75 FEM X .50 FPT FPP	52
	L3C	1	PCS100DCNCPNP	LEAK DETECT,10-48V DC NC	51
	L3	1	PCS100DCNOPNP	LEAK DETECT,10-48V DC NO	
	L2C	1	PCS100ACNC	LEAK DETECT,24-240VAC NC	
	L2	1	PCS100ACNO	LEAK DETECT,4-240VAC NO	
	OPTION CODE	QTY	PART No.	DESCRIPTION	ITEM No.
	LEAK DETECTION OPTIONS				



PeriFlo[®] FMP

PERISTALTIC PUMP

Bulletin #: IOM-PFL-4502



Pulsafeeder, Inc.
A unit of IDEX Corporation
2883 Brighton Henrietta Town Line Road
Rochester NY 14623
+1 (585) 292-8000
www.pulsa.com
pulsa@idexcorp.com

