

## INSTRUCTION MANUAL

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This manual forms an integral part of the pump and must accompany it until its demolition. The series AMP peristaltic pump is a machine destined to work in industrial areas and as such the instruction manual must form part of the legislative dispositions and the applicable technical standards and does not substitute any installation standard or eventual additional standard.

### GENERAL SAFETY WARNING

Pumps are machines that present dangers due to their operating under pressure and containing numerous moving parts.

- Improper use
- Removing the protections and/or disconnecting the protection device
- The lack of inspections and maintenance

### CAN CAUSE SERIOUS DAMAGE OR INJURY

The person in charge of safety should therefore guarantee that

- The pump is transported, installed, put in service, used, maintained and repaired by qualified personnel who should possess:

- Specific training and sufficient experience.
- Knowledge of the technical standards and applicable laws.
- Knowledge of the general national and local safety standards and also of installation.

Any work carried out on the electrical part of the pump should be authorized by the person responsible for safety. Given that the pump is destined to form part of an installation, it is the responsibility of whoever supervises the installation to guarantee absolute safety, adopting the necessary measures of additional protection.

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## **TRANSPORT AND STORAGE**

### TRANSPORT

- The pump is protected by a wood packaging.
- The packaging materials are recyclable.
- During transportation, the pump is in a resting position (the hose is not compressed)

### STORAGE

- The pump should be in a resting position. (The hose should not be compressed).
- Avoid areas open to inclement weather or excessive humidity.
- For storage periods of longer than 60 days, protect the coupling surfaces (clamps, reducers, motors) with adequate anti-oxidant products.
- Spare hoses should be stored in a dry place away from direct light.

## GENERAL SAFETY STANDARDS



- Instructions in this manual that compromise safety standards are identified by this symbol



- Instructions in this manual that compromise electrical safety are identified by this symbol.

WARNING!

- Instructions in this manual that compromise the proper operation of the pump are identified with this symbol.



Do not start the pump without first having installed the front cover.



For any manipulation of the equipment, it is necessary to make certain that the pump is stopped and the electricity supply disconnected.



Changing the hose should be done with the pump stopped.

WARNING!

Do not exceed the nominal pressure, speed or temperature of the pump (SEE IDENTIFICATION RECORD OF EQUIPMENT), or use the pump for applications other than that originally planned without first consulting the manufacturer or distributor.

**WARNING!**

Cleaning hose and connecting pipe should be done with fluids that are compatible with the construction of the pump and in accordance with recommended maximum temperatures.

**WARNING!**

Do not start the pump without it being properly secured to the floor.



Do not attempt carry out any maintenance operations or dismantle the pump without first making sure that the suction and discharge pipes are not under pressure, and are empty or isolated by proper valves.



The start system of the motor should be provided with a direction inverter, stop-go button and emergency stop button (near the pump), in such a way that the pump can be operated with total safety.



Peristaltic pumps are positive displacement devices capable of generating high pressures. To prevent a possible overload of pressure, due to for example, the accidental closure of a valve. It is advisable to fit a safety device such as: a safety relief valve or other pressure limiting device (by others) in the discharge piping.



Check the direction of rotation of the pump, as it is reversible it could generate pressure in the suction and compromise the safety of the installation. The desired circulation of the fluid should be in the same direction as the rotation of the pump as seen from the inspection plate situated on the front cover.



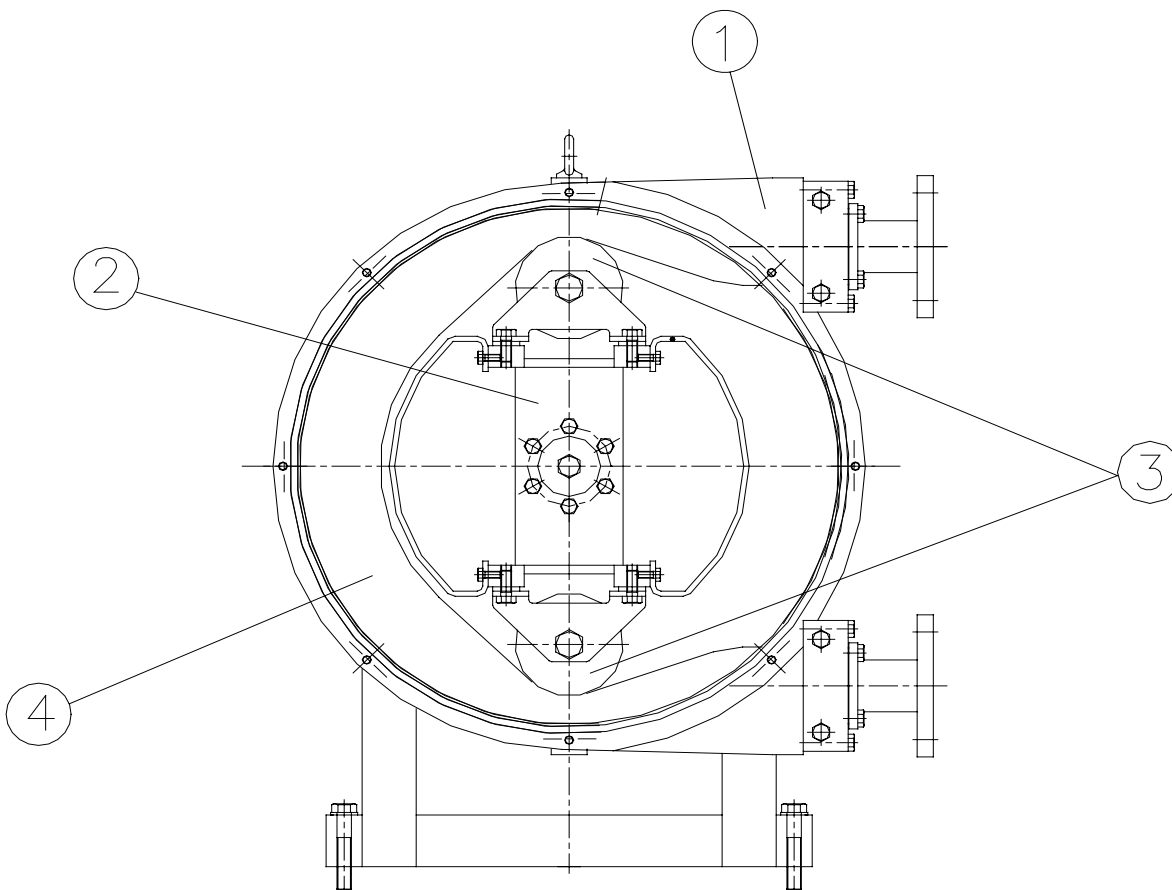
The durability of the hose may vary due to operating conditions, so the possibility of a rupture and subsequent leakage of fluid should be anticipated. The (optional) hose leakage detection probe can be interlocked to stop the pump and/or actuate an automatic isolation valve and/or alarm.

## GENERAL DESCRIPTION

### PERISTALTIC PUMP

- **Construction of the pump.**

As shown in the figure below, the pump design is very simple, robust and has very few moving parts.



The outer casing (1) terminates with flanged connections. Inside the casing are found the rotor (2), complete with two rollers (3). As the rotor revolves, it compresses the reinforced hose (4) and generates

a pumping action. A change in the direction of rotation will change in direction of the pumping action.

## **INSTALLATION**

- Installation should normally be made in a well ventilated area away from heat sources. If it is necessary to place the pump outside, it should be provided with a cover to protect it from sunlight and inclement weather.
- The positioning of the pump should allow easy access for all kinds of maintenance operations, including the replacement of the hose. It is advisable to use easily removed connectors. There should be a minimum space of approximately 54 inches for Model FMP60.

### **Piping - Correct Installation:**

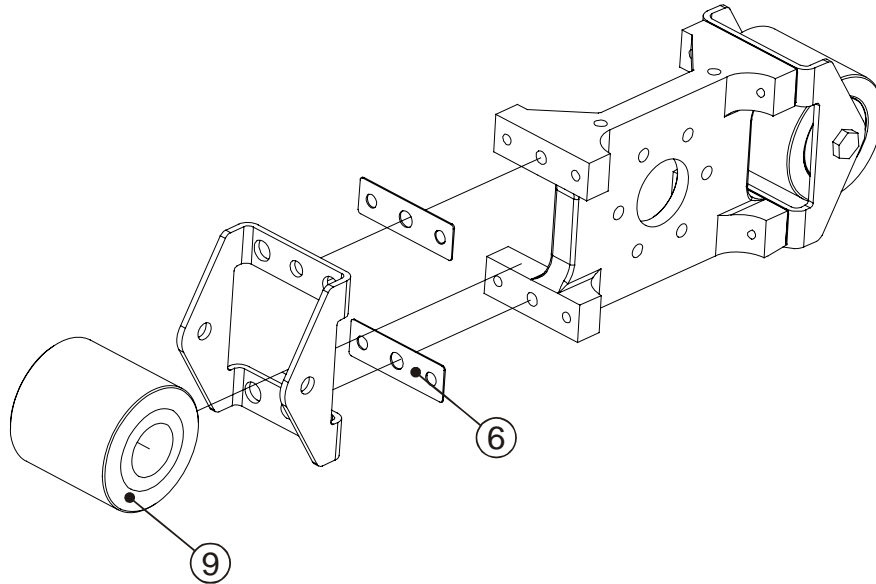
**Removable Sections:** Removable piping sections should be provided at the suction and/or the discharge to facilitate the easy removal and/or installation of the hose.

- Suction. The pump should be as near as possible to the supply of liquid so that the suction pipe is as short and straight as possible. The suction pipe should be perfectly airtight and made of suitable material so that it does not collapse due to internal vacuum.
  - The minimum diameter should be similar to that of the hose element.
  - With viscous fluids a larger diameter is recommended.  
(Consult manufacturer or distributor).
  - The pump has automatic suction and does not need an inlet valve.
- The pump is reversible, so the suction and discharge connections are interchangeable.  
(The pump is normally piped in a manner that best adapts to the physical installation)
- It is recommended to install a flexible connection between the fixed piping and the pump in order to reduce the transmission of vibration to the piping.
- Discharge. To reduce power requirements, use the straightest and shortest piping possible. The diameter should be the same as the nominal diameter of the pump, excepting precise calculations of pipe and system losses.
  - With viscous fluids a larger diameter is needed.  
(Consult the manufacturer or distributor).
- Connecting the fixed piping to the pump with a length of flexible pipe facilitates maintenance and avoids vibrations and piping loads on the pump. Fix the piping firmly.

—The discharge will pulse: To reduce pulsation, it is advisable to install adequate pulsation dampening equipment in the discharge piping. (optional equipment, contact PeriFlo for details).

## ROLLER PRESSURE ADJUSTMENT

The peristaltic pump, includes shims ( Figure 6 ), that are used to adjust the exact pressing distance of the roller ( figure 9 ) to achieve full compression of the hose.



The number of shims required will depend on the operating speed and pressure of the pump as shown in the following tables:

FMP-60 (number of shims of 1 mm.)

rpm	0-19	20-39	40-59	60-79	80-99
PSI					
7.5	7	6	6	6	6
29	7	7	7	7	6
59	7	7	7	7	7
88	8	7	7	7	7
118	8	8	8	7	-

## WORK CONDITIONS

Temperature and pressure limitations will depend on the hose material selected:

MATERIAL	TEMPERATURE MIN. (°F)	TEMPERATURE MAX. (°F)	AMBIENT TEMPERATURE MIN. (°F)	PRESSURE MAX. (PSI)
NR	-4	176	-40	118
NBR	14	176	-40	118

EPDM	14	176	-40	118
NR-A	14	176	-40	118
NBR-A	14	176	-40	118

## **CHECKS BEFORE SWITCHING ON THE PUMP**

- Check that the pumping equipment has not suffered any damage during transportation or storage, any damage should be notified to the supplier immediately.
  - Check that the network voltage and power distribution equipment are suitable for the motor.
  - Make sure that the hose is suitable for the fluid to be pumped, that it will not be chemically affected and that the temperature of the fluid does not exceed that recommended for the hose material.
- If the hose is in a resting position, then the pump has come from storage or transportation; now is the moment to install the second roller. **Do not switch on the pump without the pump body cover being correctly installed.**
  - **Lubrication.** Check that the drive, the hose and rollers are correctly greased. The specially formulated grease can be obtained from PERIFLO, INC. or from the authorized distributor.

Check that the protectors of the moving parts are correctly assembled.

Check that the thermal overload protection corresponds with that of the values on the motor nameplate.

Check that the direction of rotation is the desired one. (rotation test).

Check that the optional electrical components are connected to the control panel and test that they function correctly.

Check that a proper pressure gauge is installed in the discharge. If the application involves a highly viscous fluid, it is recommended that a proper absolute-pressure gauge be installed in the suction.

Check predicted operating conditions to verify that flow, pressure, temperature and motor power correspond to the project.

## **MAINTENANCE**

Any work carried out on the pump must be done when the pump is stationary and disconnected from the electricity supply.

### Lubrication

Check that the lubricant levels in the gear reducer and/or other drive components are correct, and carry out periodic changes of lubricant according to their manufacturer's recommended maintenance schedule.

## **REMOVING THE HOSE - DISASSEMBLY**

- Close suction and discharge valves to properly isolate the pump and prevent loss of the product.
- Disconnect the suction and discharge piping.
- Remove the suction/discharge connections and remove the press flanges
- Remove the front cover and remove one roller (not compressing the hose)
- Replace the front cover (using 2 screws only) and bump the driver ~ 180° until the second roller is not in contact with the hose.
- Remove the hose through the suction/discharge opening.

## **INSTALLING THE HOSE - ASSEMBLY**

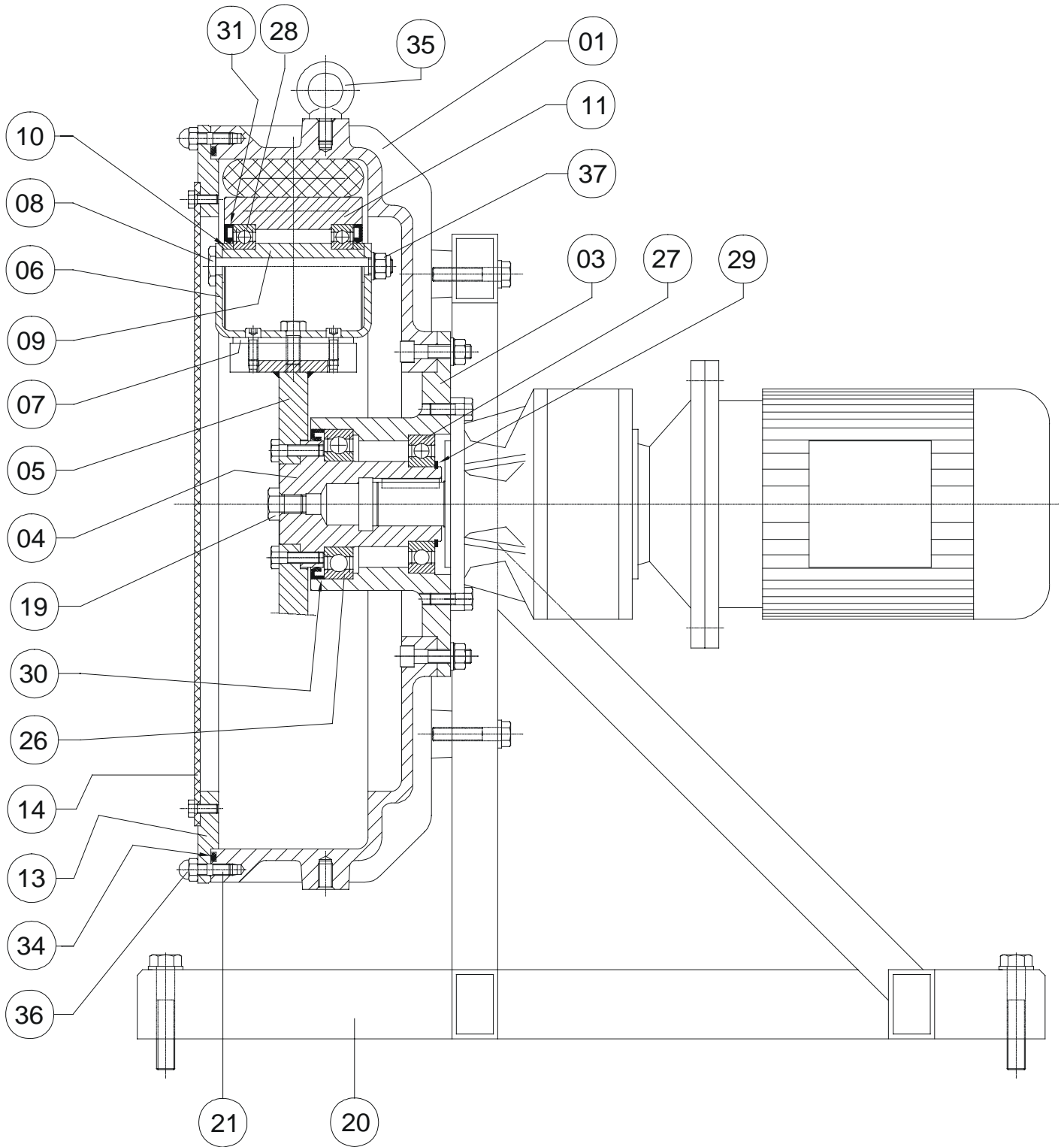
- Remove the front cover.
- Clean the internal surfaces of the pump body. Lubricate the internal faces of the pump body where there could be friction with the hose and lubricate the rollers with grease.
- Install the hose in the pump body and lubricate with grease.
- Install the hose inserts into each end of the hose.
- Loosely assemble the rear segments of the press flange housings to the body of the pump.
- Position the hose inserts into the rear press flange segments and attach front press flange segments. Tighten press flange segment bolts securing the insert to the hose
- Attach the press flanges to pump housing tightening bolts in alternating fashion to a recommended torque of 200 in lbs.
- Install connection flanges, insuring that connection flange O'ring's are properly positioned
- Fit the front cover (using only 2 bolts).
- Bump the driver until the rotor is in the correct position to install the second roller.
- Remove the front cover.
- Install the second roller.

- Replace the front cover using all bolts.
- Connect suction/discharge piping.

## **PROBLEMS, CAUSES AND SOLUTIONS**

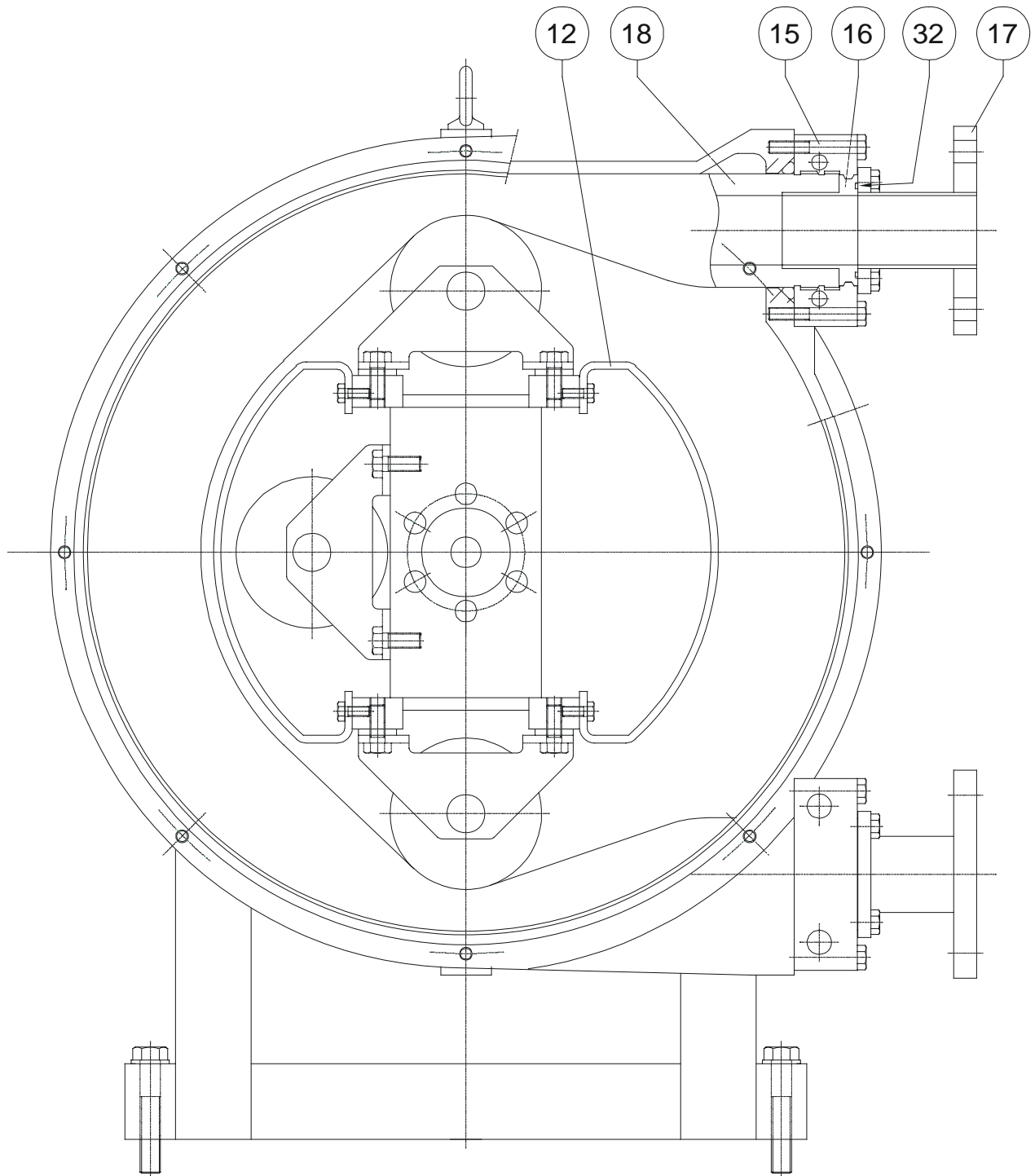
PROBLEM	POSSIBLE CAUSE	SOLUCIÓN
<b>Elevated Temperature</b>	Hose with no lubricant Elevated temperature of product Poor or bad suction conditions  Excessive pipe tightening  Excessive pumping speed	Use special lubricant PERIFLO Reduce pumping temperature Check there are no obstructions Recalculate pipe sections and lengths Check rollers shaft mounting  Reduce drive speed
<b>Reduction of Capacity/pressure</b>	Suction or impulsion valve closed. Hose insufficiently compressed  Rupture of the hose (product leaks in casing)  Partial obstruction of suction piping Insufficient product amount in suction reservoir Insufficient diameter of suction piping Excessive length of suction pipe High viscosity of product  Entry of air via the suction connections High pulsation on suction	Open valves Check rollers shaft mounting  Replace drive hose  Clean piping Fill suction reservoir or stop pump Increase suction pipe diameter Shorten suction piping Reduce viscosity Increase diameter of piping Reduce pump speed Confirm that the pump is suitable Tighten connections and accessories Mount pulsation dampening equipment Reconsider application (speed etc.)
<b>Vibrations in pump and piping</b>	The piping is not correctly fitted together Excessive pumping speed  Insufficient diameter of piping Baseplate of pump loose Elevated pulsation of pump	Refit piping Reduce the speed of the pump  Increase pipe diameter Anchor the baseplate firmly Mount suction and/or outlet pulsation dampening equipment
<b>Short hose life</b>	Chemical attack  High speed of pump High pumping temperature High working pressure  Abnormal elevation of temperature Unsuitable lubricant Insufficient quantity of grease Cavitation of the pump	Confirm compatibility of the hose with the pumped fluid and the cleaning fluid Reduce speed of pump Reduce temperature of product Reduce speed of pump Increase section diameter of piping Check rollers shaft mounting Use lubricant PERIFLO Top up lubricant Reconsider suction conditions
<b>Stretching of the hose inside the pump</b>	Insufficient grease High suction pressures (>44 psi) Hose full of sediment Brackets insufficiently tightened	Top up lubricant Reduce suction pressure Clean hose Retighten brackets

<b>The pump does not start</b>	Insufficient starter power Insufficient power from VFD  Blockage in the pump	Increase starter power Increase power boost Check that the voltage is adequate Do not drop below a frequency of 10Hz (confirm this point with the distributor) Start up will occur at minimum 10Hz. Check there are no obstructions in the pipe
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FMP-60

(1/2)



FMP-60

(2/2)

## FMP-60

Nº	DESCRIPTION	QTY	CODE	MATERIAL
1	Pump Housing	1	110.00.01	Cast Iron – Powder Epoxy Coated
3	Bearing Housing	1	110.00.03	Cast Iron
4	Rotor Shaft	1	110.00.04	Carbon Steel
5	Rotor	1	110.00.05	Cast Iron
6	Roller support	2	110.00.06	Carbon Steel
7	Shim	2	110.00.07	Carbon Steel
8	Shaft screw	2	110.00.08	
9	Roller shaft	2	110.00.09	Carbon Steel
10	Separator	4	110.00.10	Carbon Steel
11	Roller	2	110.00.11	Anodized Steel
12	Lateral rotor	2	110.00.12	Carbon Steel
13	O-ring cover	1	110.00.13	
14	Front cover transparent	1	110.00.14	
15	Press flange	2	110.00.15	Anodized Steel
16	Insert – Stainless Steel	2	110.00.16	316 Stainless Steel
	Insert – Polypropylene	2	110.00.46	Polypropylene
	Insert - PVDF	2	110.00.47	PVDF
17	Connection flange 150 lb.	2	110.00.17	Carbon Steel - Anodized
	Connection flange 150 lb.	2	110.00.45	Carbon Steel – Halar Coated
	Connection Sanitary Tri-Clamp	2	110.00.42	316 Stainless Steel
18*	Hose NR	1	110.00.18	Natural Rubber
	Hose NR-A	1	110.00.19	Natural Rubber – Food Grade
	Hose NBR	1	110.00.20	Buna N
	Hose NBR-A	1	110.00.21	Buna N – Food Grade
	Hose EPDM	1	110.00.22	EPDM (Nordel)
19	Bearing box cap	1	110.00.23	
20	Base	1	110.00.24	
21	Stud	2	110.00.25	
26	Front Bearing (Rotor)	1	110.00.26	
27	Rear Bearing (Rotor)	1	110.00.27	
28	Roller ball bearing	4	110.00.28	
29	Elastic o-ring for shaft	1	110.00.29	
30	Lip Seal (Bearing Housing)	1	110.00.30	
31	Lip Seal (Roller)	1	110.00.31	
32	O-ring connection	2	110.00.32BN	Buna N
34	O-ring (Cover)	1	110.00.33	
35	Eye bolt	1	110.00.34	
36	Nut	2	110.00.35	
37	Nut	2	110.00.36	
	Check Valve	1	110.00.53	
*	Food Grade Silicon Grease	1	106.00.41	

## **WARRANTY**

- PeriFlo warrants it's RBT and FMP pump equipment against all defects in materials, manufacturing and workmanship for two years from the date of shipment. This warranty does not include normal wearing items such as the hose or the lubricant since their life is highly dependent on the specific operating conditions of the application and installation.
  
- This warranty is valid as long as the equipment functions within the parameters indicated in the technical information card supplied with every pump or on subsequent changes authorized by PERIFLO, Inc.
  
- This warranty includes materials and labor only, and does not include transportation of materials to or from our warehouses in Loveland, Ohio. Transportation charges will be the responsibility of the customer.

# PERIFLO

## Operation and Maintenance Bonfiglioli Planetary Gearboxes

1. **LUBRICATION-** Standard lubrication is oil bath. Use ISO VG 150 oils with E.P. properties

### **MOST RECOMMENDED BRANDS OF LUBRICANTS:**

<u>Ambient Temperature: -10 C/+30 C</u>		<u>+20 c/+45 C</u>
Castrol	Alpha SP 150	Alpha SP 220
Chevron	N. L. gear compound 150	N. L. gear compound 220
Mobil	Mobilgear 629	Mobilgear 630
Shell	Omala EP150	Omala EP220

2. **FILLING – !!GEARBOXES ARE SUPPLIED WITHOUT OIL!!.**

*All gearboxes are equipped with filler/breather, level, and drain plugs(2). The fill level plug is located near the output flange ABOVE the gearbox centerline (about the 10:00 position). Do not confuse it with another plug located on the other side of the gearbox in the 4:00 position. To fill the gearbox secure it in its exact working position, unscrew both the oil filler/breather plug and the level plug, add oil until it reaches the bottom of the level plug port. To drain remove the magnetic drain plug and the input housing plug and drain off oil. If possible, drain while oil is hot and remove the filler/breather plug from the top of the gearbox to give optimum oil flow.*

3. **OIL QUANTITY – 3\_\_L SERIES**

<u>Model/stages</u>	<u>Qty (liters)</u>
300/L2	0.9
300/L3	1.2
303/L2	1.6
303/L3	1.9

4. **START-UP**

*Before starting the gearbox check the position of the oil plug and make sure the breather is not blocked by dirt or paint. If the breather is blocked, pressure can build up inside the gearbox and blow out the seal rings. If possible start the gearbox without load and at low speed. Check that the gearbox runs smoothly and does not generate excessive noise. After a few hours check the temperature of the gearbox housing. At its hottest point it should not exceed 70-75 C. Also check that the bolts are tight.*

5. **MAINTENANCE**

*Gearboxes are virtually maintenance free under normal operating conditions. The only periodic operations required are checks on oil level and oil changes as follows:*

#### **OIL CHANGES:**

**!!Important!!: Change the oil after first 50-100 hours of operation.** This removes any trace contaminants.

*Subsequently, change the oil only every 2000-3000 hours operation depending on application. Alternatively change oil once a year.*

*Check the oil level every month and top off as necessary.*

**Note:** We recommend that you also change the oil seals on the following occasions:

- whenever the seal rings are removed
- whenever the gearbox is serviced/reconditioned

**Note:** Fill a gearbox completely with oil before any long idle period. Drain to the normal level prior to re-starting operation.

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