

INSTRUCTION MANUAL

DulcoFlex Peristaltic Pump DFCa 60

This manual forms an integral part of the pump and must accompany it until its demolition. The 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 due to their functioning under pressure and moving parts can present dangers.

- 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 therefore 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 authorised 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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IDENTIFICATION RECORD OF EQUIPMENT

MANUFACTURER:

IMPORTER / SUPPLIER:

MODEL OF PUMP:

SERIAL NUMBER:

DRIVER MARK:

DRIVER POWER / SPEED:

REDUCER MARK & MODEL:

REDUCTION RATIO:

FIXED SPEED MOTOR GEAR REDUCER:

MECHANICAL VARIATOR + GEAR REDUCER:

GEAR REDUCER WITH ELECTRONIC INVERTER:

WORK SPEED:

MAXIMUM SPEED:

MINIMUM SPEED:

WORKING MANOMETRIC PRESSURE:

MAXIMUM DESIGN PRESSURE:

HOSE MATERIAL:

CONNECTIONS MATERIAL:

TRANSPORT, STORAGE and ELEVATION

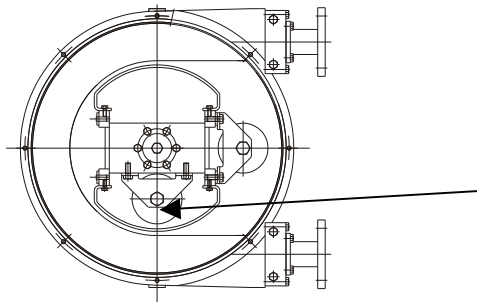
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TRANSPORT

- The pump is protected by a wood packaging.
- The packaging materials are recyclable.

STORAGE

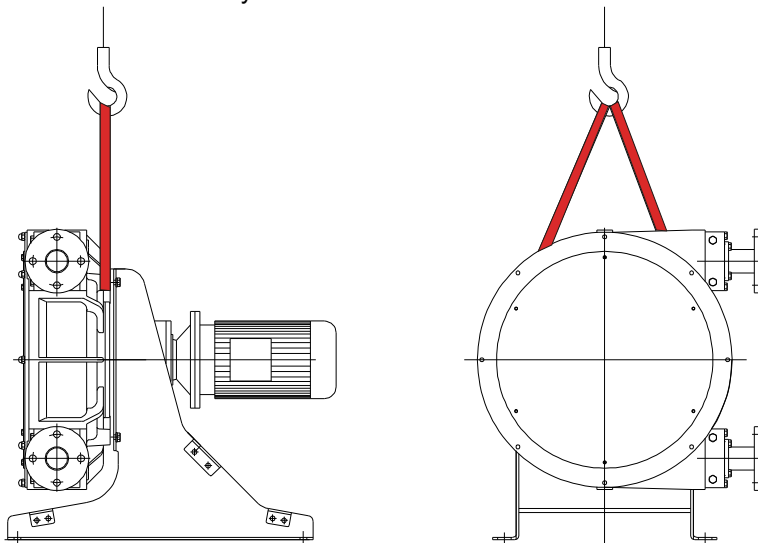
- The pump should be in a resting position. (The hose should not be compressed). (Figure A)



- 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 tubes should be stored in a dry place away from direct light.

ELEVATION

- It's necessary to use elevation belts for the transport and the elevation of the pump. In the next figure it's shown the way to use the elevation belts:



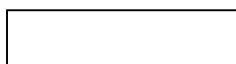
GENERAL SAFETY STANDARDS



- The instructions of this manual, whose inobservance is determined as a failure to meet safety standards, are identified by this symbol



- The instructions of this manual, whose inobservance compromises electrical safety, are identified by this symbol.



- The instructions of this manual, whose inobservance compromises the correct working of the pump, are identified with this symbol.



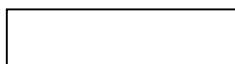
Do not start the pump without first having installed the front cover.



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



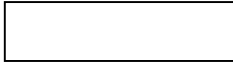
Changing the hose should be done with the pump stopped and electrically tagged out.



Do not exceed the nominal pressure, speed or temperature of the pump, or use the pump for applications other than that originally planned without first consulting the manufacturer or distributor.



Cleaning the pipe, including the hose, should be done with fluids compatible with the mentioned drive pump and at its maximum temperature recommended.



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



Do not carry out any maintenance operations or dismantle the pump without first making sure that the pipes are not under pressure and are empty or isolated.



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



As the peristaltic pump is volumetric and its functioning is positive displacement, it is necessary to prevent a possible overload of pressure, "dead heading", an example would be the closure of a valve. For this reason it is advisable to fit a safety device such as pressure relief valve.



Check the turning direction of the pump, as it is reversible it could generate pressure in the suction 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 from the inspection plate situated on the front cover.



The durability of the hose cannot be defined precisely so it is necessary to foresee the possibility of a hose failure and subsequent leakage of fluid. If the hose failure detection probe is fitted (optional part), it can cause the pump to stop or actuate an electric valve.



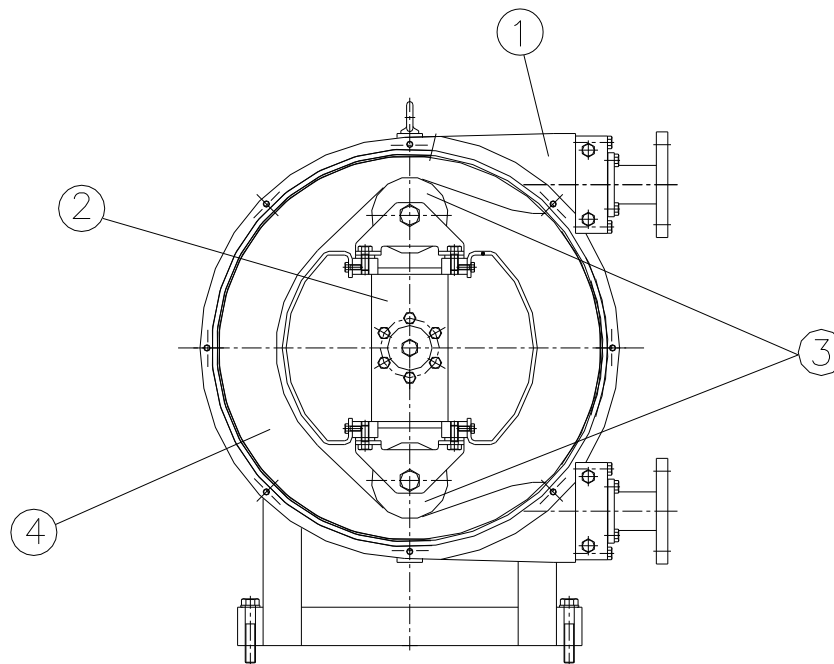
As the hose having an indeterminate life, and due to the possibility of its breakage or deterioration, the user is responsible for the prevention of a possible (although most unlikely) incorporation of breaks from the hose into the product being pumped, once the breakage phase or its deterioration has begun, either by means of filtration or a detection and removal of the possible breaks.

GENERAL DESCRIPTION

PERISTALTIC PUMP

- **Construction of the pump.**

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



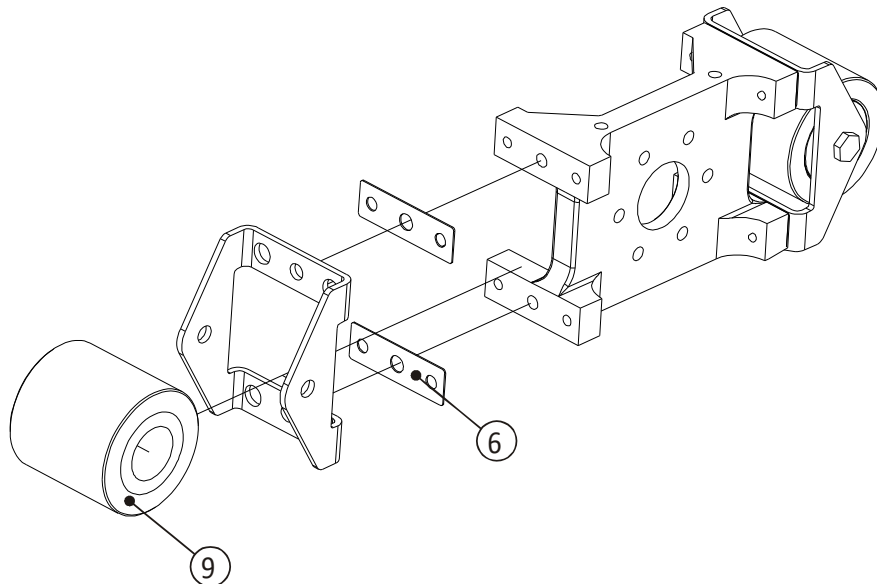
The outer casing (1) terminates with flanged connections. Inside the casing are found the rotor (2), completed with two rollers (3). As this is revolving it compresses the reinforced tube (4) and in this way generates a pumping action. A change in the direction of rotation will give rise to a change in direction of the pumped fluid.

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.
- **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 the internal drop in vacuum. The minimum diameter should be similar to that of the tubular element. With viscous fluids a larger diameter is recommendable. (Consult manufacturer or distributor). The pump has a positive suction and does not need an inlet valve. The pump is reversible. (Normally the one which adapts itself physically better to the installation would be chosen). It is recommendable to use a flexible connection between the piping and the collars of the pump in order to avoid the transmission of vibration to the piping.
- **Discharge.** To reduce power being absorbed, use the straightest and shortest piping possible. The diameter should be the same as the nominal diameter of the pump, excepting precise calculations of load losses. With viscous fluids a bigger 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 loads on the pump. Mount the piping firmly. The discharge has pulsation: To avoid such effect, it is advisable to install adequate pulsation dampeners. (See accessories.)

ROLLER PRESSURE ADJUSTMENT

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



The shims are installed from factory to work at the work conditions indicated (in function of the speed and the work pressure), and following the next tables:

DFC60 (number of shims of 1 mm.)

rpm	0-19	20-39	40-59	60-79	80-99
PSI					
7.25	7	6	6	6	6
29	7	7	7	7	6
58	7	7	7	7	7
87	8	7	7	7	7
116	8	8	8	7	-

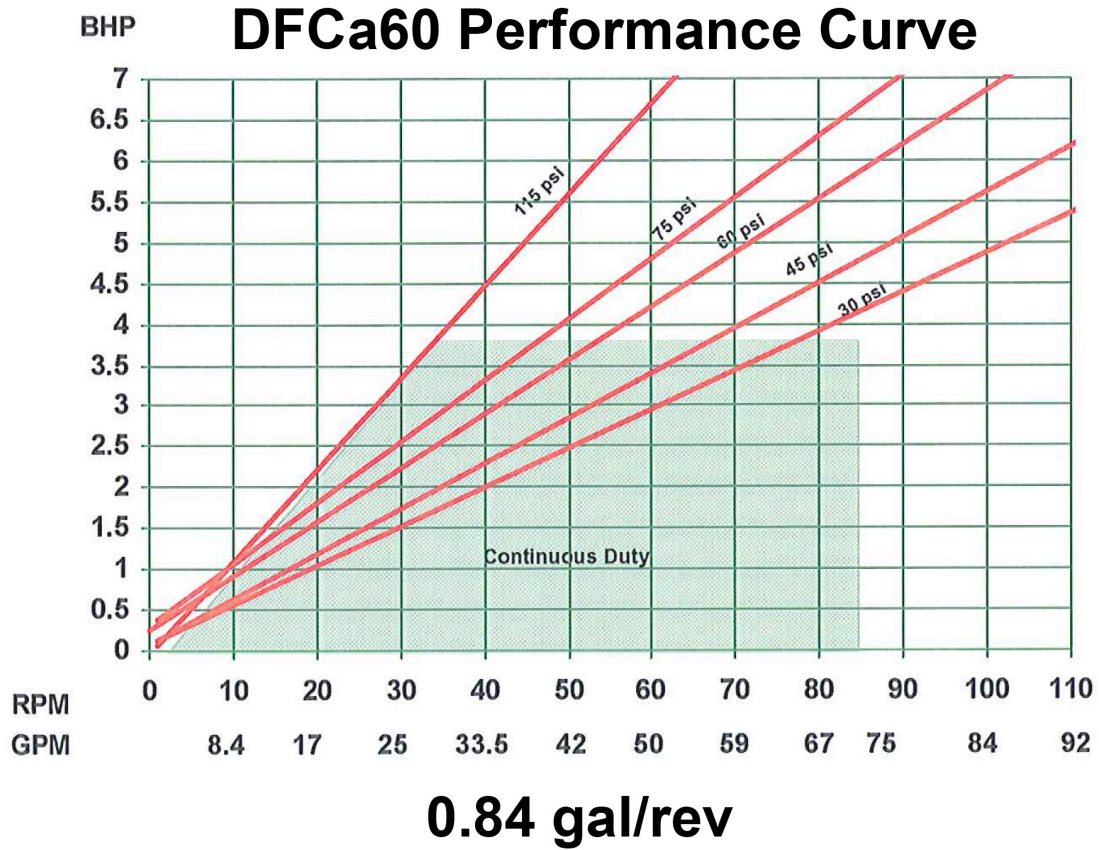
WORK CONDITIONS

There are a limits of temperatures and pressures, in function of the hose selected. Those limits are the next:

MATERIAL	TEMPERATURE MIN. (°F)	TEMPERATURE MAX. (°F)	AMBIENT TEMPERATURE MIN. (°F)	PRESSURE MAX. (PSI)
NR	-4	194	-40	116
NBR	14	176	-40	116
EPDM	14	194	-40	116
NR-A	14	194	-40	116
NBR-A	14	194	-40	116

PERFORMANCE CURVE

DFC 60



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 is suitable for the motor.

Make sure that the hose is suitable for the fluid to be pumped and that it will not be chemically affected; check also that the temperature of the fluid does not exceed that recommended.

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 front cover being correctly installed.**

Lubrication. Check that the drive pump, the hose and rollers are correctly greased. The specially formulated grease can be obtained from the authorized distributor.

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

Check that the thermal protector corresponds with that of the values on the plate on the motor.

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.

In cases of doubt of the valuation of discharge pressure (e.g. high viscosity), mount a pressure gauge on the discharge.

Check the approved specifications that the values of flow, pressure and absorbed power of the motor 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 rollers and the hose are correctly greased. Check it every 200 hours of work. Add lubricant as necessary.

Check that the lubricant level in the gear reducer is correct and carry out periodic changes of lubricant according to the maintenance manual.

REPOSITIONING OF HOSE - DISMANTLING

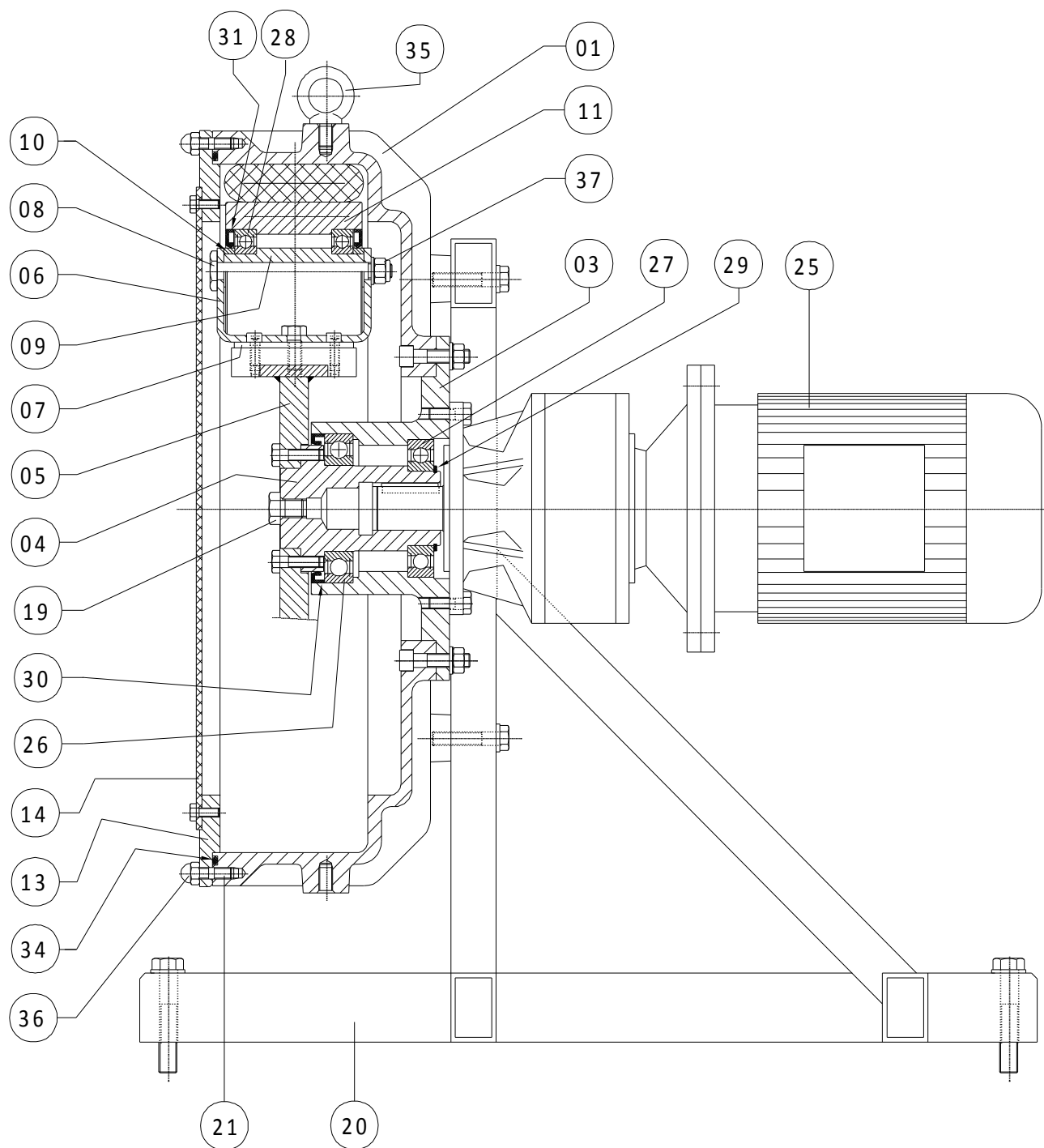
- First, all valves must be closed to prevent losses of the product.
- Disconnect the suction and discharge pipes.
- Dismantling of the suction/impulsion connections. Dismantling one roller. With the front cover mounted, start the pump 180° until the other roller does not compress the hose of the rollers that compress the drive pump. Dismantle the other roller and the hose.

REPOSITIONING OF HOSE - MOUNTING

- Clean the internal surfaces of the pump body. Lubricate the internal faces of the pump body where there could be friction with the hose. To carry out this operation correctly it is necessary to remove the front cover.
- Insert the connections in each hose end.
- Install the hose in the pump body, lubricating with grease the hose and the rollers.
- Mount the tightening collars that fasten the hose and its connections to the pump body.
- Fit the front cover (two screws only).
- Start the driver until the position of the rotor is in the correct position to fit the second roller.
- Dismantling the front cover.
- Fit the second roller.
- Fit the front cover.
- Connect suction/discharge pipes.

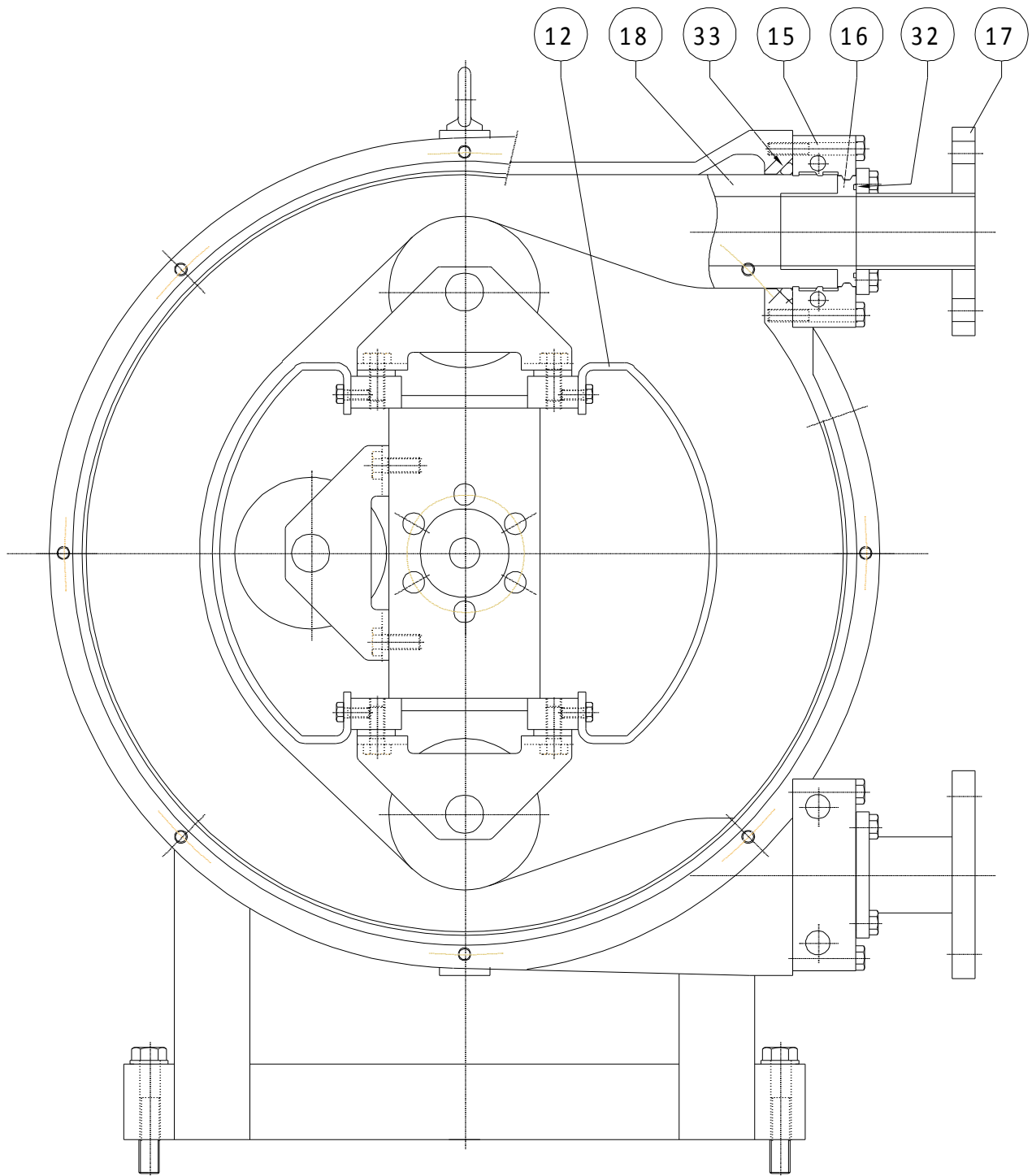
PROBLEMS, CAUSES AND SOLUTIONS

PROBLEM	POSSIBLE CAUSE	SOLUCIÓN
Elevated Temperature	Hose with no lubricant Elevated temperature of product Poor or bad suction conditions Excessive pipe tightening Excessive pumping speed	Use original lubricant Reduce pumping temperature Check there are no obstructions Recalculate sections and lengths Check roller pressure adjustment Reduce velocity of pump
Reduction of Capacity/pressure	Suction or impulsion valve closed. Hose insufficiently compressed Rupture of the hose (the product leaks to the 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 roller pressure adjustment Replace drive hose Clean piping Fill or stop Increase section length/reduce pump speed Shorten suction piping Reduce viscosity Increase section length of piping Confirm that the pump is suitable Tighten connections and accessories Mount pulsation dampening equipment Reconsider application (speed etc.)
Vibrations in pump and piping	The piping is not correctly fixed together Excessive pumping speed Insufficient diameter of piping Bedplate of pump loose Elevated pulsation of pump	Refix piping Reduce the speed of the pump Increase pipe diameter Fix the bedplate firmly Mount suction or outlet pulsation dampening equipment
Short life of the hose	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 roller pressure adjustment Use original lubricant Top up lubricant Reconsider suction conditions
Stretching of the hose inside the pump	Insufficient grease High suction pressures (>3 Bar) Hose full of sediment Brackets insufficiently tightened	Top up lubricant Reduce suction pressure Clean hose Retighten brackets
The pump does not start	Insufficient starter power Insufficient power from frequency convertor Blockage in the pump	Increase starter power Increase power Check that the voltage is adequate Do not drop below a frequency of 10Hz (confirm this point with the distributor) The starting up will occur at at least 10Hz. Check there are no obstructions in the pipe



FMP-60

(1/2)



FMP-60

(2/2)

DFC60

Nº	DENOMINATION	Nº	CODE	DESCRIPTION	MATERIAL
1	Pump housing	1	110.00.01		
3	Ball bearing box	1	110.00.03		
4	Rotor shaft	1	110.00.04		
5	Rotor	1	110.00.05		
6	Roller support	2	110.00.06		
7	Shim	2	110.00.07		
8	Shaft screw	2	110.00.08		
9	Roller shaft	2	110.00.09		
10		4	110.00.10		
11	Roller	2	110.00.11		
12	Lateral rotor	2	110.00.12		
13	O-ring cover	1	110.00.13		
14	Front cover transparent	1	110.00.14		
15	Press flange	2	110.00.15		
16	Insert	2	110.00.16		
17	Connection flange	2	110.00.17		
18	Hose NR	1	110.00.18		
	Hose NR-A	1	110.00.19		
	Hose NBR	1	110.00.20		
	Hose NBR-A	1	110.00.21		
	Hose EPDM	1	110.00.22		
19	Bearing box cap	1	110.00.23		
20	Base	1	110.00.24		
21	Stud	2	110.00.25		
25	Driver	1			
26	box anterior ball bearing	1	110.00.26		
27	box posterior ball bearing	1	110.00.27		
28	Roller ball bearing	4	110.00.28		
29	Elastic o-ring for shaft	1	110.00.29		
30	bearing box lip seal	1	110.00.30		
31	roller lip seal	1	110.00.31		
32	O-ring connection	2	110.00.32		
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		

DECLARATION OF CONFORMITY

Declares under its own sole responsibility that the next industrial peristaltic pump:

Model:

Serial number:

☐ **CE DECLARATION OF CONFORMITY (Ann. II.A, 98/37/CE)**

The pump is conform to the safety requirements according to the 98/37/CE norms and amendments.

☐ **MANUFACTURER DECLARATION (Ann. II.B, 98/37/CE)**

The pump cannot be operated before the machine in which is assembled the pump, will be declared in conformity with the safety requirements according to the 98/37/CE norms and amendments.

☐ **FOOD PRODUCTS-CONTACT SUITABILITY DECLARATION**

The pump is made with materials suitable to come in contact with food grade product according to the 89/109/EEC norms and amendments.

on:

The technical Director.

GUARANTEE

- The contractor shall obtain from the manufacturer its warranty that the equipment shall be warranted for a period of one (1) year from the date of start-up or 18 months from signed delivery acknowledgement, whichever comes first, to be free from defects in materials and workmanship. This guarantee does not include the hose or the lubricant as these are elements that have a normal function wear, irrespective of their duration.
- This guarantee 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 authorised.
- This guarantee includes materials and work but not the transportation of materials to or from our warehouses, being necessary to do so arising from the necessities of the client, the corresponding costs of displacement and expenses will be charged.