

# INSTRUCTION MANUAL

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## DulcoFlex Peristaltic Pump DFDa60

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**

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MANUFACTURER:

IMPORTER / SUPPLIER:

MODEL OF PUMP:

DFD60

SERIAL NUMBER:

DRIVER MARK:

DRIVER POWER / SPEED:

REDUCER MARK &amp; 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:

216 PSI

HOSE MATERIAL:

CONNECTIONS MATERIAL:

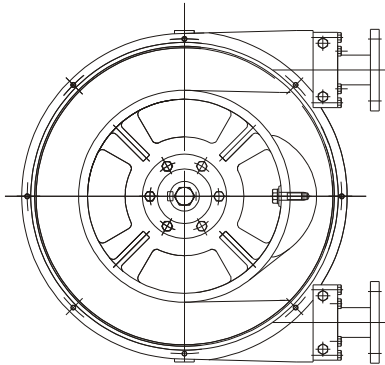
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**TRANSPORT, STORAGE AND MOVEMENT**

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## TRANSPORT

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

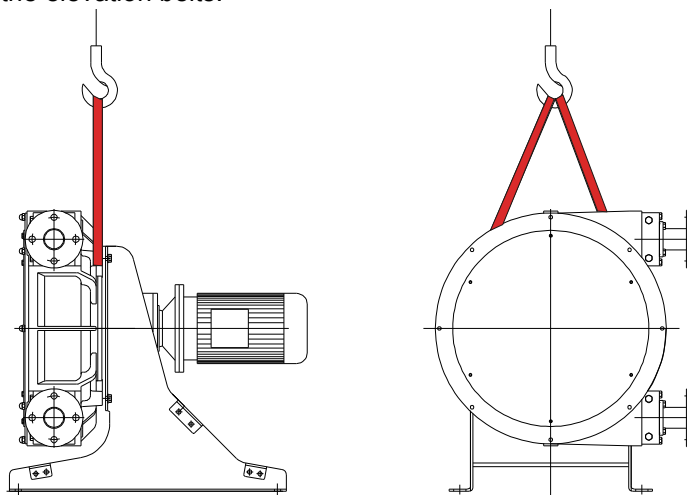


## STORAGE

- The pump should be in a resting position. (The hose should not be compressed).
- 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.
- Pipe spares should be stored in a dry place away from direct light.

## ELEVATION

- To transport the pump, it's necessary to use elevation belts. In the next picture it can be seen the way to use the elevation belts:



## 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.

WARNING!

- 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 and the inspection covers.



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



Changing the hose should be done with the front cover and inspection covers correctly fixed in place.

WARNING!

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.

WARNING!

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 manipulated or the hose be changed with total safety.



In the case of the hose becoming stuck during extraction or fitting it is necessary to reverse the direction of the pump, re-lubricate, and then repeat the operation.



As the peristaltic pump is volumetric and its functioning is positive displacement, it is necessary to prevent a possible overload of pressure, due to the accidental closing of a valve – also known as a “deadhead” condition. For this reason it is advisable to fit a safety device such as: a pressure relief valve.



Check the direction the pump is turning, 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 it can cause the pump to stop or actuate an electric valve. (See accessories).



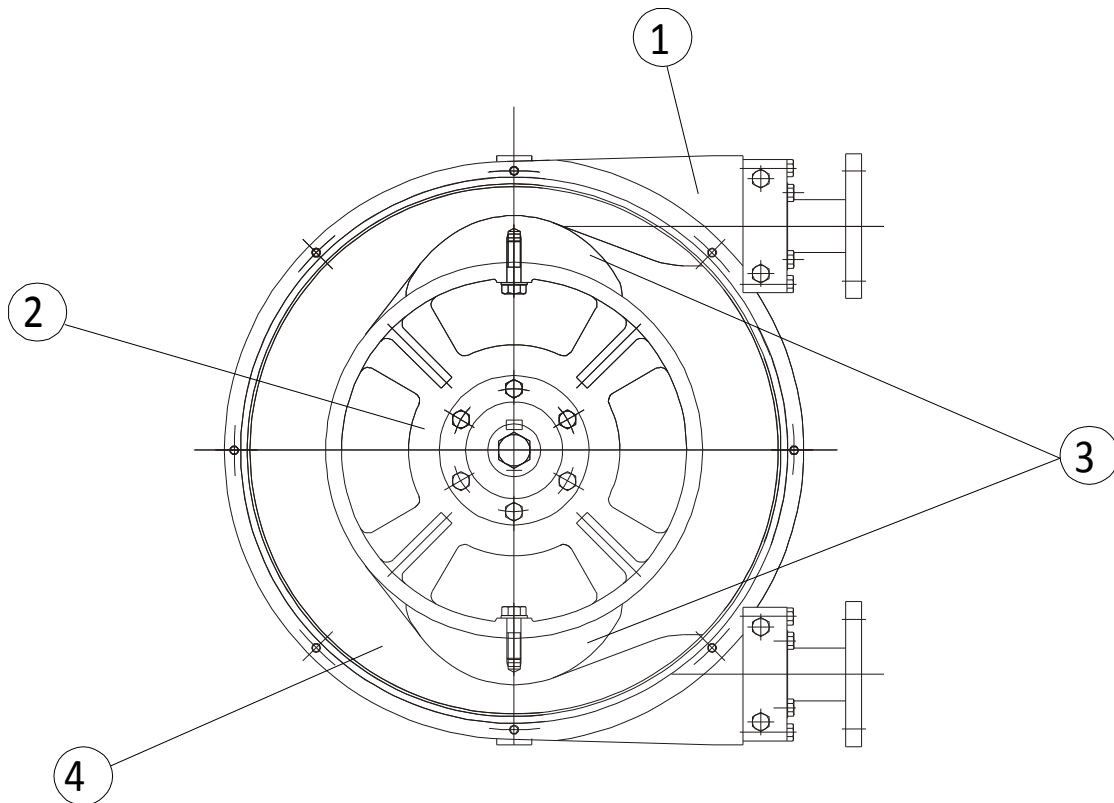
As the hose having an indeterminate life, and due to the possibility of its breakage or deterioration, the user is responsible for the prevention of a possible (although most unlikely ) incorporation of breaks from the hose into the product being pumped, once the breakage phase or its deterioration has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



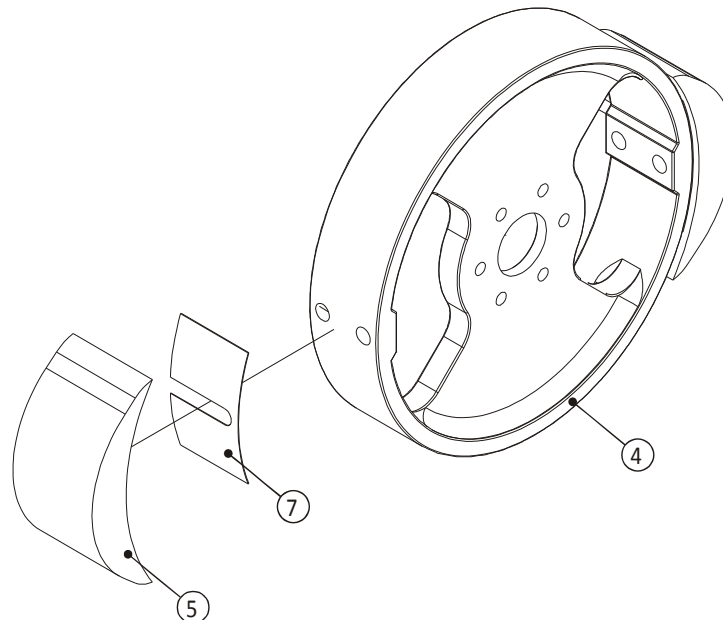
The outer casing (1) terminates with clamp connectors PN-16. Inside the casing are found the rotor (2), completed with two rotor shoes (4). As this is revolving it compresses the reinforced tube (3) and in this way generates a pumping action. A change in the direction of rotation will give rise to a 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. In general, and to facilitate the changing of the hose, it is advisable to use easily removed connectors.
- 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 positive suction and does not need an inlet valve. The pump is reversible, and so the suction connection can be either one of the two. (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 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 loads on the pump. Fix the piping firmly.
- The discharge has pulsation: The pulsations increase with the number of rotations and the pressure. For this reason it is advisable to install adequate pulsation dampeners. (See accessories.)

## SHOES PRESSURE ADJUSTMENT

The peristaltic pump, includes a shims (Figure 7 ), that are used to adjust the exact pressing distance of the shoe ( figure 5 ).





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:

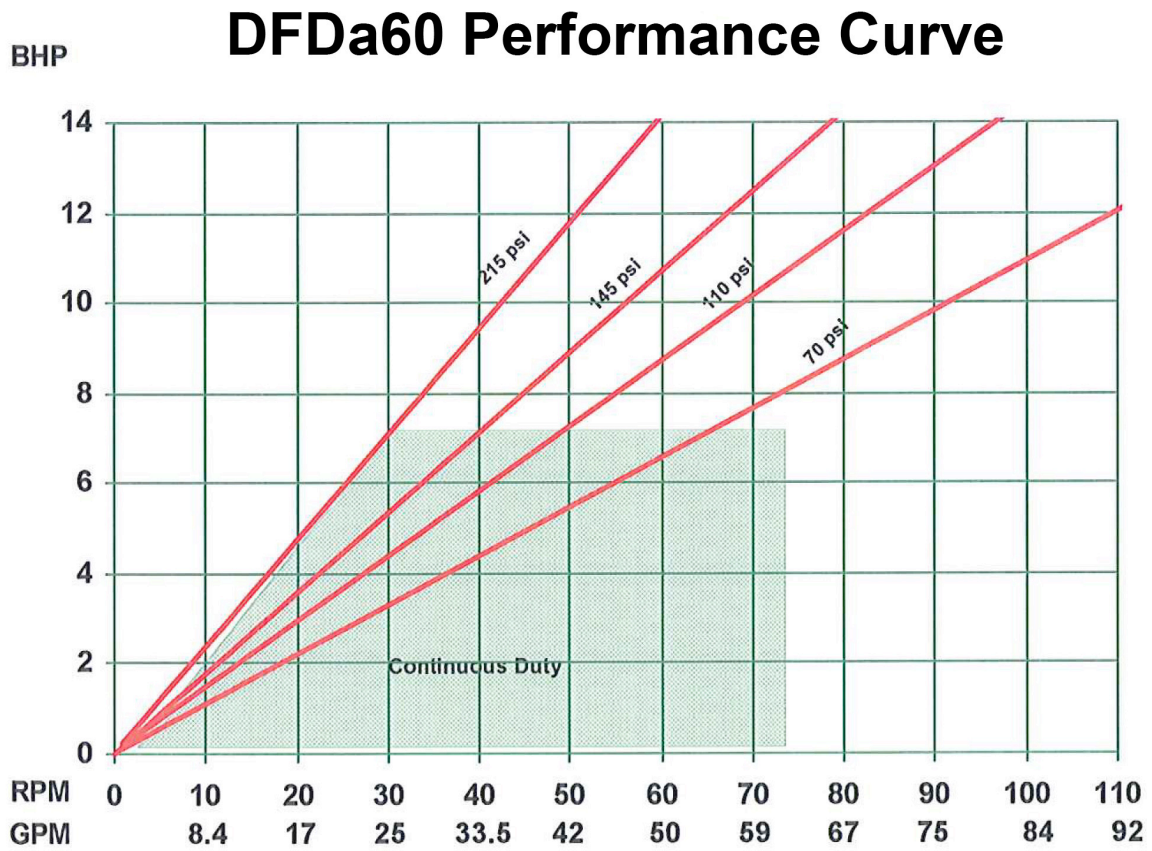
r.p.m.	0 – 19	20 – 39	40 – 59	60 – 79	80 – 99
PSI					
7.25	3	2	2	2	1
36.25	3	3	3	2	2
72.5	4	3	3	3	3
108.75	4	4	4	3	3
145	5	4	4	4	-
181.25	5	5	5	4	-
217.5	6	5	5	-	-

## 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	217.5
NBR	14	176	-40	217.5
EPDM	14	194	-40	217.5
NR-A	14	194	-40	217.5
NBR-A	14	194	-40	217.5

## PERFORMANCE CURVES



0.84 gal/rev

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## CHECKS BEFORE SWITCHING ON THE PUMP

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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 shoe and its corresponding spacers (see corresponding table). **Do not switch on the pump without the pump body cover and the transparent inspection plates being correctly positioned and fixed.**

### Lubrication.

Check that the level of the lubricant in the casing of the pump is correct. (DFD60 = 10 liters).

The specially formulated DulcoLube lubricant can be obtained from the authorized DulcoFlex distributor.

The use of the aforementioned lubricant ensures a longer life of the pipe.

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 side.

Check in predicted working conditions that the values of flow, pressure and absorbed power of the motor correspond to the project.

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## MAINTENANCE

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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 level is correct. The correct level is shown on the lower inspection cover installed on the front cover of the body of the pump. Add lubricant as necessary.

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

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## REPOSITIONING OF HOSE – DISMANTLING

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- Firstly, all valves must be closed to prevent losses of the product.
- The outer body of the pump must be drained of all lubricating liquid, removing both the interior drain plug and the upper suction plug. The plugs are found on the back part of the casing.
- Disconnect the suction and outlet pipes.
- Disconnect suction/outlet clamping flanges
- Dismount the front cover.
- Dismount the shoe that is not compressing the hose.
- Mount the front cover.
- Turn on the motor for 1/2 turn.
- Dismount the front cover.
- Take off the peristaltic hose.
- Dismount the inserts mounted in the extremities.

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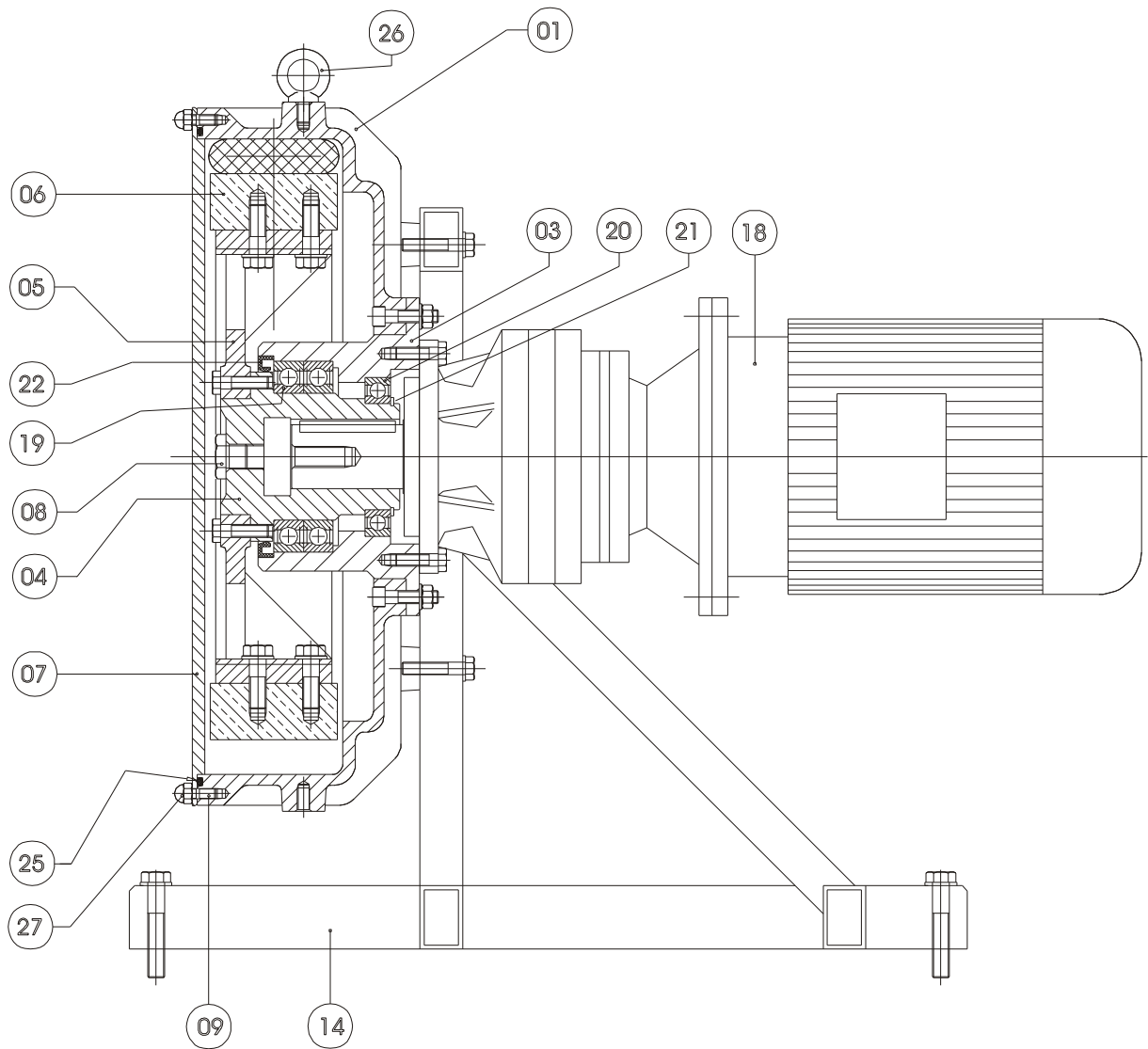
## REPOSITIONING OF HOSE – MOUNTING

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- Clean the internal surfaces of the pump body. All contamination should be removed. Lubricate the internal faces of the body of the pump where there could be friction with the hose. To carry out this operation correctly it is advisable to remove the front cover.
- Inspect the shoe, checking that there is no damage to the pressure surface. If the machine is being set up for the first time, see paragraph Rotor in the section CHECKS BEFORE SWITCHING ON THE PUMP.
- The exterior surface of the new hose should now be cleaned and lubricated, applying manually one coat of lubricant.
- Insert the hose into the pump body.
- Insert the o-ring in the extremity of the hose.
- Install the insert and the press flange.
- Repeat this operation with the other extremity.
- Fix the lower drain plug.
- Fill the body of the pump with lubricant via the upper filling and inspection cover.
- Reconnect suction/outlet pipes.

## PROBLEMS, CAUSES AND SOLUTIONS

PROBLEM	POSSIBLE CAUSE	SOLUCIÓN
<b>Elevated Temperature</b>	Use of non-original lubricant Low level of lubricant Elevated temperature of product Poor or bad suction conditions  Excessive number of shims Excessive pumping speed	Use original lubricant Fill according to manufacturer's table Reduce pumping temperature Check there are no obstructions Recalculate sections and lengths Confirm the number of necessary shims Reduce velocity of pump
<b>Reduction of Capacity/pressure</b>	Suction or impulsion valve closed. Insufficient number of shims. 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 Confirm the number of necessary shims Replace hose  Clean piping Fill reservoir Increase section length/reduce pump speed Shorten suction piping Reduce viscosity Increase section length of piping  Confirm that the pump is suitable Tighten collar joints and accessories Mount antipulsation equipment Reconsider application (speed etc.)
<b>Vibrations in Pump and piping</b>	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 antipulsation equipment
<b>Short life of the hose</b>	Chemical attack  High speed of pump High pumping temperature High working pressure  Abnormal elevation of temperature Unsuitable lubricant Insufficient quantity of lubricant 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 number of shims Use original lubricant Top up lubricant Reconsider suction conditions
<b>Stretching of the hose inside the pump</b>	Insufficient lubricant High suction pressures (>3 Bar) 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 frequency convertor    Blockage in the pump Disalignment of the equipment	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 least 10Hz. Check there are no obstructions in the pipe Revise alignment of the pump and motor



(1/2)

# DFD60

N°	DENOMINATION	N°	CODE	DESCRIPTION	MATERIAL
1	Pump casing	1	110.00.01		
2	Shim		111.00.02		
3	Ball bearing box	1	111.00.03		
4	Rotor shaft	1	111.00.04		
5	Rotor	1	111.00.05		
6	Pressing shoe	2	111.00.06		
7	Front cover	1	111.00.07		
8	cap M24	1	111.00.08		
9	Stud	4	106.00.27		
10	Press flange	2	111.00.10		
11	Insert S.S.	2	111.00.11		
	Insert Polypropylene	2	111.00.35		
	Insert PVDF	2	111.00.36		
12	Connection flange DIN	2	111.00.12		
	Connection flange ANSI	2	111.00.32		
	Connection flange DIN (Halar)	2	111.00.33		
	Connection flange ANSI (Halar)	2	111.00.34		
13	Hose NR	1	111.00.18		
	Hose NR-A	1	111.00.19		
	Hose NBR	1	111.00.20		
	Hose NBR-A	1	111.00.21		
	Hose EPDM	1	111.00.22		
14	Base left	1	111.00.14		
15	Base right	1	111.00.15		
16	Middle 100mm	1	111.00.16		
17	Middle 60mm	2	111.00.17		
18	Driver	1			
19	Ball bearing	2	111.00.28		
20	Ball bearing B	1	111.00.29		
21	Elastic o-ring for shaft	1	111.00.30		
22	Lip seal	1	111.00.31		
23	O-ring connection	2	111.00.23		
24	O-ring hose	2	111.00.24		
25	O-ring front cover	1	111.00.25		
26	Eye bolt	1	111.00.26		
27	Drain plug DFD	2	100.00.44		

**DECLARATION OF CONFORMITY**

**The company:**

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

**Model:**

**Serial number:**

☐ **CE DECLARATION OF CONFORMITY ( Ann. II.A, 89/392/EEC)**

The pump is conform to the safety requirements according to the 89/392/EEC norms and amendments.

☐ **MANUFACTURER DECLARATION ( Ann. II.B, 89/392/EEC )**

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 89/392/EEC 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.



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## GUARANTEE

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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.