INSTRUCTION MANUAL

DFB 10, DFB 13, DFB 16, DFB 19, DFB 22

This manual forms an integral part of the pump and must accompany it until its demolition. The series DFBu 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 operate under pressure and have numerous moving parts.

- Improper use
- Removing the protections and/or disconnecting the protection device
- 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.

INDEX

DULCO®flex DFBu IdentCode

DFBu	DULCO®flex DFBu

	pump size
010	DFBu 010, 0.006 gal/revolution
013	DFBu 013, 0.010 gal/revolution
016	DFBu 016, 0.025 gal/revolution
019	DFBu 019, 0.032 gal/revolution
022	DFBu 022, 0.066 gal/revolution

	speed	
*005	5 rpm	DFB10-19
006	6 rpm	
007	7 rpm	
009	9 rpm	
011	11 rpm	
013	13 rpm	
017	17 rpm	
*021	21 rpm	* Denotes stocked reducer
024	24 rpm	
029	29 rpm	
*039	39 rpm	
043	43 rpm	
049	49 rpm	
054	54 rpm	
*061	61 rpm	
068	68 rpm	
077	77 rpm	
086	86 rpm	
209	9 rpm	DFB22
212	12 rpm	
*216	16 rpm	
218	18 rpm	
220	20 rpm	
*225	25 rpm	
227	27 rpm	
230	30 rpm	
*236	36 rpm	
239	39 rpm	
245	45 rpm	
249	49 rpm	
*257	57 rpm	
264	64 rpm	
272	72 rpm	
287	87 rpm	

	motor type
0	no motor provided
1	TEFC 115/1/60
2	TEFC 230-460/3/60 1000:1
3	WD/Chem Duty TENV 230-460/3/60 1000:1
4	X1 120/1/60
5	XV 230-460/3/60 1000:1
6	DC 90V

	hose material
0	NR
B	NBR
E	EPDM
H	Hypalon
N	Norprene (max 30 psi)

	connection
B	SS NPT
G	PVC NPT
F	PVDF NPT
H	Tri-Clamp SS

	base plate
4	base plate, HDPE

	leakage sensor
0	without leakage detector
L	with leakage detector
R	with leakage detector and relay kit

	orientation
R	right facing (standard)
L	left facing
U	up facing
D	down facing

	vfd
0	without vfd
A	with basic vfd 115/1/60
B	with basic vfd 460/3/60
C	with advanced vfd 115/1/60
D	with advanced vfd 460/3/60
E	DC - SCR drive 120VAC in, 90V out

	special version
0	standard model
H	chemical version (Halar coated)

	discharge pressure
1	30 psi (max tube)
2	60 psi
3	90 psi
4	115 psi (max hose)

TRANSPORT and STORAGE

TRANSPORT

- The pump is protected by cardboard packaging.
- The packaging materials are recyclable.

STORAGE

- 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 the direct light.

GENERAL SAFETY STANDARDS

- Instructions of this manual that may compromise safety standards are identified by this symbol.

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

WARNING!

- Instructions of this manual that may 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 operation of the equipment, it is necessary to make certain that the pump is stopped and the electrical 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, or use the pump for applications other than that originally planned without first consulting the manufacturer.

WARNING!

Cleaning the pump, including the hose, should be done with fluids compatible with the construction of the pump and hose, and in accordance with recommended maximum temperatures.

WARNING!

Do not start the pump without it being properly secured.

Do not attempt to carry out any maintenance operations or dismantle the pump without first making sure that the piping is not under pressure and contain no fluid and are isolated by proper valving.

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 with total safety.

In the case of the hose becoming stuck during removal and/or installation it is recommended to reverse the direction of the pump, lubricate, and then repeat the operation.

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 valve or other pressure limiting device 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 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 may vary due to operating conditions, so the possibility of a rupture and subsequent leakage of the fluid should be anticipated. The (optional) hose leakage detector can be interlocked to stop the pump and/or actuate isolation valve and/or alarm.

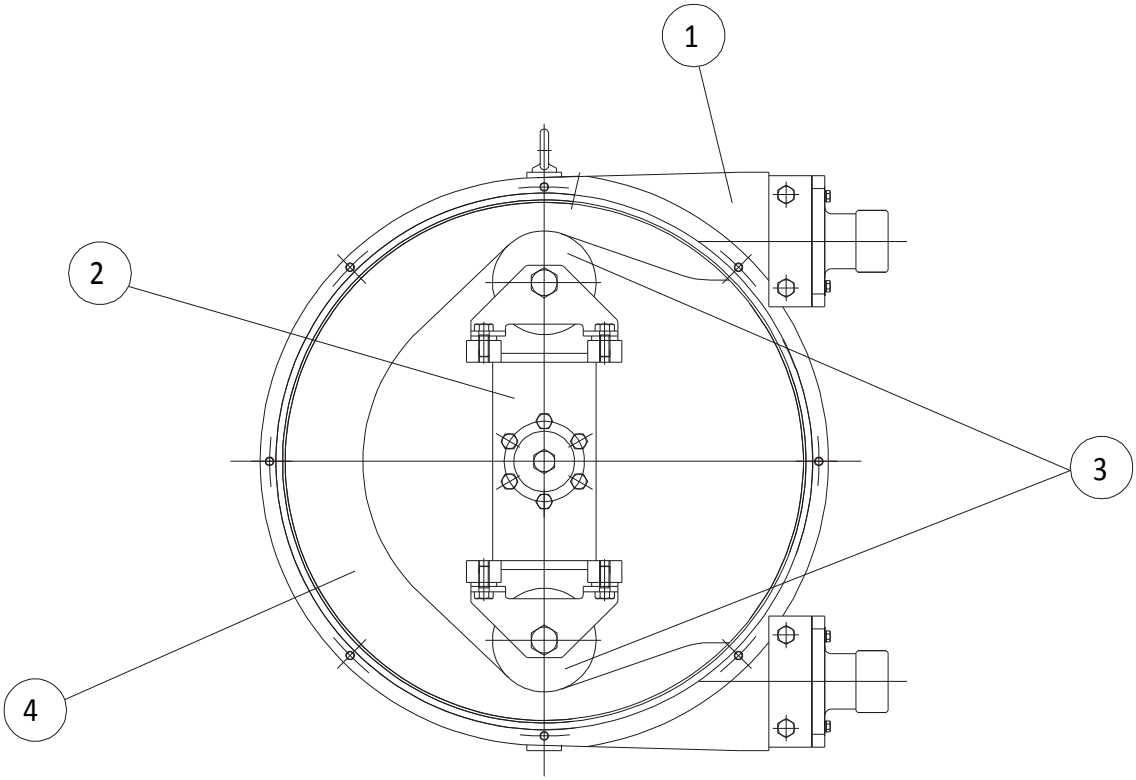
For C.I.P. or S.I.P. applications, please consult the factory.

GENERAL DESCRIPTION

PERISTALTIC PUMP

- **Construction of the pump.**

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



The outer casing (1) terminates with threaded connections. Inside the casing are found the rotor (2), complete with two rollers (3). As the rotor turns, the rollers compress the reinforced hose/tube (4), trapping a volume of fluid and forcing it out through the discharge. 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.

Piping: Correct installation

Suction:

- The pump should be located 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 vacuum.
  - The minimum diameter should be similar to that of the hose/tube 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 recommendable to use a flexible connection between the piping and the pump in order to avoid the transmission of vibration to the piping.

Discharge:

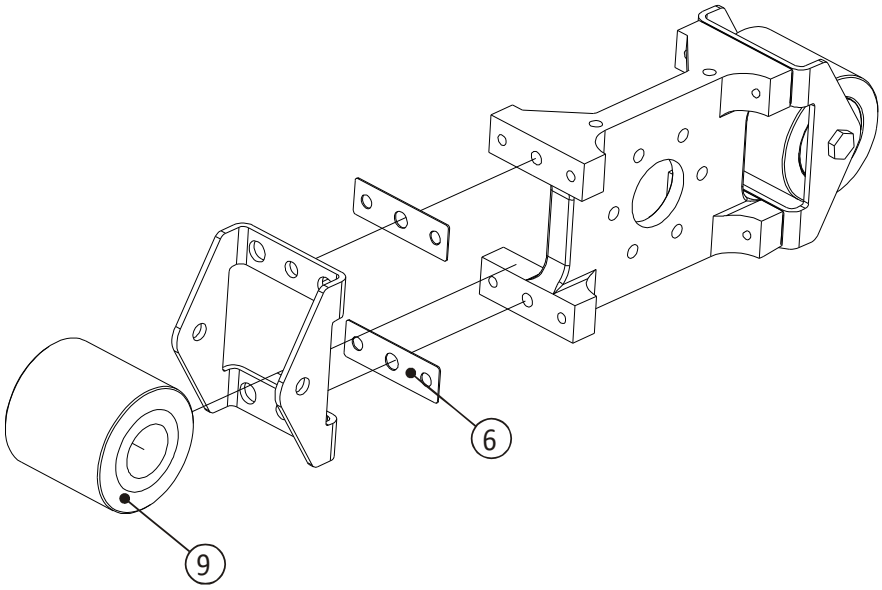
- To reduce power requirements, use the straightest and shortest piping possible. The diameter should be the same as the nominal diameter of the pump, except where precise calculations of piping losses have been performed.
  - With viscous fluids a larger diameter is needed.
    (Consult the manufacturer or distributor).

- Connect the fixed piping to the pump with a length of flexible pipe to facilitate maintenance, reduce vibrations and relieve piping stress on the pump. Fix the piping firmly.

- The discharge will pulse: To reduce the effect, it is advisable to install adequate pulsation dampeners. (See accessories.)

ROLLER ADJUSTMENT

The DFB series peristaltic pumps, include shims (item 6), that are used to adjust the compression of the hose/tube for design discharge pressure.



The shims are installed from factory to work at the operating conditions indicated in the application proposal, and according to the following table:

	DFB10	DFB13	DFB16	DFB19	DFB22
PSI	**Rubber Hoses**				
30	1	1	1	NA	2
60	2	2	2	NA	3
90	3	3	2	NA	3
115	3	3	3	NA	4

	DFB10	DFB13	DFB16	DFB19	DFB22
PSI	**Norprene Tube**				
30	5	5	9	5	12

OPERATING CONDITIONS

Operating temperatures and pressures are limited by hose/tube construction as follows:

MATERIAL	TEMPERATURE MIN. (ºF)	TEMPERATURE MAX. (ºF)	PRESSURE MAX. (PSI)
NR	-4	176	115
NBR	14	176	115
EPDM	14	176	115
HYPALON	14	176	115
NORPRENE		275	30

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 supply voltage is suitable for the drive and motor.

Hose/Tube: Make sure that the hose/tube is chemically compatible with the fluid to be pumped, that the operating temperature of the fluid does not exceed that recommended and that the operating pressure does not exceed that recommended for the hose/tube.

Rollers: If the roller supports are in a resting position, then the pump has come from storage or transportation; change the position to working position. **Do not switch on the pump without the pump body cover being correctly installed.**

Lubrication. Check that the pump head, the hose/tube and the rollers are liberally lubricated. The specially formulated food grade silicon grease can be obtained from Prominent Fluid Controls or from the local authorized distributor.

Check that the thermal protector corresponds with the motor nameplate data.

Check for proper direction of rotation. (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 or a long suction pipe, it is recommended that a proper absolute-pressure gauge be installed in the suction.

If excessive pulsation is anticipated or could be harmful to the system, the installation of a discharge pulsation dampening device is recommended.

Check in predicted working conditions 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 electrical supply.

Lubrication

Every hose replacement, Check that the rollers and the hose are properly greased. Add lubricant as necessary to maintain liberal lubrication. The specially formulated food grade silicon grease can be obtained from Prominent Fluid Controls or from the local authorized distributor.

REMOVING OF HOSE - DISASSEMBLY

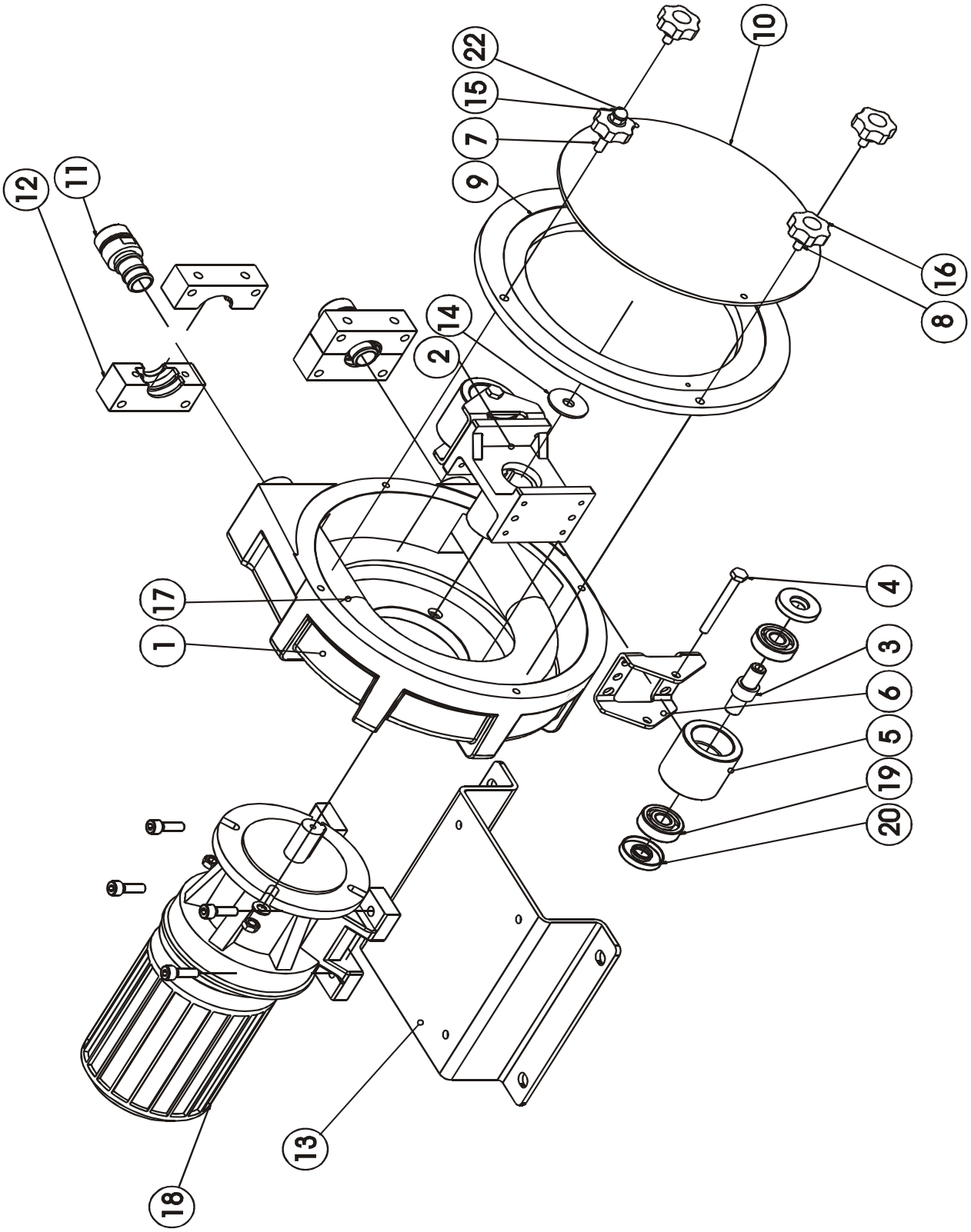
- Isolate the pump – all suction and discharge valves must be closed to prevent loss of product and limit personnel exposure.
- Disconnect the suction and discharge piping. (flexible connections are suggested)
- Remove the front cover.
- Remove the roller assembly that is not in contact with the hose/tube.
- Replace the cover and rotate the rotor approximately 180° to release the other roller from the hose/tube.
- Separate the press flanges to free the hose/tube, and remove the hose/tube (along with the inserts if desired).

INSTALLING THE HOSE - ASSEMBLY

- Clean the internal surfaces of the pump body. Lubricate the internal faces of the body of the pump where there could be friction with the hose.
- Inspect the rollers, checking for any damage to the surface and condition of the roller bearings.
- Insert the connections in each hose end.
- Install the hose in the pump body, and liberally lubricate the hose and the rollers with food grade silicon grease.
- Install the press flanges that fasten the hose and its connections to the pump body.
- Replace the roller assembly.
- Install the front cover.
- Reconnect the suction/discharge piping.

PROBLEMS, CAUSES AND SOLUTIONS

PROBLEM	POSSIBLE CAUSE	SOLUTIÓN
Elevated temperature	Hose with no lubricant Elevated temperature of product Poor or bad suction conditions Rollers not turning properly Excessive pumping speed	Use special lubricant Reduce pumping temperature Clear any obstructions Recalculate sections and lengths Check roller to shaft mounting, bearings Reduce velocity of pump
Reduction of capacity/pressure	Suction or discharge 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 as necessary Check roller/shaft positioning, shimming Replace drive hose Clean piping Fill or stop Increase pipe size/reduce pump speed Shorten suction piping Reduce viscosity Increase suction pipe size Confirm that the pump is suitable Tighten connections and accessories Install pulsation dampener Reconsider application (speed etc.)
Vibrations in pump and piping	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 or discharge 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 Pump Cavitation of the pump	Confirm compatibility of the hose with the pumped fluid and any cleaning fluids Reduce speed of pump Reduce temperature of product Reduce speed of pump Increase diameter of discharge pipe Check roller shimming Use lubricant from factory Top off 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 off lubricant Reduce suction pressure Clean hose Retighten brackets
The pump does not start	Insufficient starter power Insufficient power from frequency converter 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) Start-up will occur at least 10Hz. Check there are no obstructions in the pipe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PARTS LISTING

			DFB 10	DFB 13	DFB 16	DFB 19	DFB 22
ITEM		**Q**	**Part #**	**Part #**	**Part #**	**Part #**	**Part #**
1	Pump body	1	7761086	7761086	7761068	7761068	7761321
2	Rotor	1	7761088	7761088	7761069	7761069	7761322
3	Roller shaft	2	7501012	7501012	7501013	7501013	7501014
4	Roller shaft screw	2	NA	NA	NA	NA	7501092
5	Roller	2	7501015	7501015	7501018	7501018	7501020
6	Roller support	2	7501016	7501016	7501017	7501017	7501019
7	Long stud	1	7761074	7761074	7761074	7761074	7761074
8	Short stud	3	7761077	7761077	7761077	7761077	7761077
10	Front cover	0	7501037	7501037	7501038	7501038	7501039
11	Connection SS-NPT	2	7500991	7500996	7500999	7501004	7501007
11	Connection PVC-NPT	2	7500994	7500998	7501003	7501006	7501011
11	Connection PVDF-NPT	2	7500992	7500997	7501000	7501005	7501008
11	Connection TRI_CLAMP	2	7761081	7761103	7761061	7761130	7761332
12	Press flange - Hose	2	7500990	7500995	7501001	NA	7501009
12	Press flange - Tube	2	7500993	7500990	7501002	7501001	7501010
13	Base plate - plastic	1	7747100	7747100	7747100	7747100	7747100
14	Rotor washer	1	7761095	7761095	7761070	7761070	7761337
15	Cover press knob	1	7761084	7761084	7761084	7761084	7761084
16	Cover press knob - blind	3	7761085	7761085	7761085	7761085	7761085
17	Hose in NR,BN,EP,HY,NO	1	Application Specific				
18	Gear Reducer / Motor	1	Application Specific				
19	Roller ball bearing	4	7501021	7501021	7501022	7501022	7501023
20	Roller lip seal	4	NA	NA	NA	NA	7761339
21	Cover Gasket	1	7761090	7761090	7761073	7761073	7761502
23	Shims 0.5mm		7500987	7500987	7500986	7500986	7500988
23	Shims 5.0mm		NA	NA	NA	NA	7500989

WARRANTY

- 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 warranty does not include the hose or the lubricant as these are elements that have a normal function wear, irrespective of their duration.

- This warranty is valid as long as the equipment functions within the parameters as quoted or on subsequent changes authorized.

- This warranty includes materials and labor only, and does not include transportation of materials to or from our warehouse in Pittsburgh, PA. Transportation charges will be the responsibility of the customer.