



INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

PERISTALTIC PUMP PV-60 / PVT-60



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ISO 9001

BUREAU VERITAS
Certification



Original Manual

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EC DECLARATION OF CONFORMITY

(In accordance with Directive 2006/42/EC, annex II, part A)

We, the manufacturer: **INOXPA, S.A.**
c/ Telers, 54
17820 Banyoles (Girona) - Spain

Hereby declare that the products

PERISTALTIC PUMP

PV-60 / PVT-60

Name

Type

are in conformity with the provisions of the Council Directives:

Machine Directive 2006/42/EC, and comply with the essential requirements of said Directive and the harmonised standards:

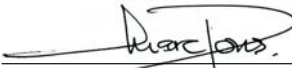
UNE-EN ISO 12100-1/2:2004
UNE-EN 809/A1/AC:2001
UNE-EN ISO 13857:2008
UNE-EN 953:1997
UNE-EN ISO 13732-1:2007

Low-Voltage Directive 2006/95/CE (replacing Directive 73/23/CE), and conform to UNE-EN 60204-1:2006 and UNE-EN 60034-1:2004.

Electromagnetic Compatibility Directive 2004/108/CE (replacing Directive 89/336/CE), and conform to UNE-EN 60034-1:2004.

In conformity with **Regulation (CE) No. 1935/2004** on materials and objects intended to come into contact with foodstuffs (repealing 89/109/EEC), in accordance with which the materials in contact with the product do not transfer its constituents to the foodstuffs in quantities large enough to put human health at risk.

Banyoles, 2012


Marc Pons Bague Technical Manager

1. Safety

1.1. INSTRUCTIONS MANUAL

This manual contains information about the receipt, installation, operation, assembly, disassembly and maintenance of the PV-60 / PVT-60 peristaltic pumps.

The information published in the instruction manual is based on updated information.

INOXPA reserves the right to modify this instruction manual without prior notice.

1.2. START-UP INSTRUCTIONS

This Instructions Manual contains essential and useful information for properly operating and maintaining your pump.

Read these instructions carefully before starting up the pump; become familiar with the operation and use of your pump and follow the instructions closely. These instructions should be kept in a safe location near the installation.

1.3. SAFETY

1.3.1. Warning symbols



Danger for persons in general



Danger of injury caused by rotating equipment parts.



Electrical danger



Danger! Caustic or corrosive agents.



Danger! Suspended loads



Danger to the correct operation of the equipment.



Commitment to safety at the workplace.



Protective goggles requirement.

1.4. GENERAL SAFETY INSTRUCTIONS



Read this Instructions Manual carefully before installing the pump and starting it up. Contact INOXPA in case of doubt.

1.4.1. During installation



The *Technical Specifications* of Chapter 8 should always be observed.

Never start up the pump before it has been connected to the pipeline.

Do not start up the pump if the housing cover is not placed.

Check that the motor specifications meet the requirements, especially when working under conditions that involve the risk of explosion.



During the installation, all the electric work should be carried out by authorised personnel.

1.4.2. During operation



The *Technical Specifications* of Chapter 8 should always be observed. Under no circumstances can the limit values specified be exceeded.

NEVER touch the pump or the pipes during operation when the pump is being used to decant hot fluids or when it is being cleaned.



The pump contains moving parts. Never place your fingers inside the pump while the pump is in operation.



NEVER operate the pump with the suction and delivery valves closed.

NEVER spray the electrical motor directly with water. The standard protection for the motor is IP-55: Protection against dust and sprayed water.

1.4.3. During maintenance



The **Technical Specifications** of Chapter 8 should always be observed.

NEVER disassemble the pump before the pipes have been emptied. Note that the pumped fluid may be dangerous or very hot. Consult the regulations in effect in each country for these cases.

Do not leave parts loose on the floor.



ALWAYS disconnect the pump from the power supply before starting maintenance work. Remove the fuses and disconnect the cables from the motor terminals.

All electrical work should be carried out by authorised personnel.

1.4.4. Compliance with the instructions

Any non-fulfilment of the instructions may result in a risk for the operators, the environment and the machine, and may result in the loss of your right to claim damages.

This non-fulfilment may result in the following risks:

- Failure of important functions of the machines/plant.
- Failure of specific maintenance and repair procedures.
- Possibility of electric, mechanical and chemical risks.
- Will place the environment in danger due to the release of substances.

1.4.5. Guarantee

Any warranty provided shall immediately be cancelled and void *ipso jure*, and INOXPA shall be compensated for any product liability claim from third parties, if:

- the service and maintenance work was not carried out in accordance with the service instructions, or the repair work has not been carried out by our personnel or it has been conducted without our written authorization;
- our equipment has been changed without prior written authorization;
- the parts or lubricants used are not original INOXPA parts and products;
- the materials were used incorrectly or negligently, or not in accordance with these instructions and their intended use;
- pump parts were damaged by excessive pressure owing to the lack of a safety valve.

The General Delivery Terms already provided also apply.



No change can be made to the equipment without prior discussion with the manufacturer. For your safety, please use original spare parts and fittings.
The use of other parts will exempt the manufacturer from any liability.

The service terms can only be changed with prior written authorisation from INOXPA.

Please do not hesitate to contact us in case of doubts or if more complete explanations are required on specific data (adjustments, assembly, disassembly, etc.).

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3. General Information

3.1. DESCRIPTION

The peristaltic pump is part of the range of positive displacement pumps. Its operating principle is based on pressure from rollers which repeatedly squeeze the hose. The oscillation between compression and decompression of the hose creates a fall in the pressure and thus the continuous suction of the fluid, converting it into a self-suction pump. The impulse is turned into a continuous flow, the rate is directly proportionate to the oscillation speed. The fluid inside the hose is pumped in its integral state, without suffering the slightest damage.

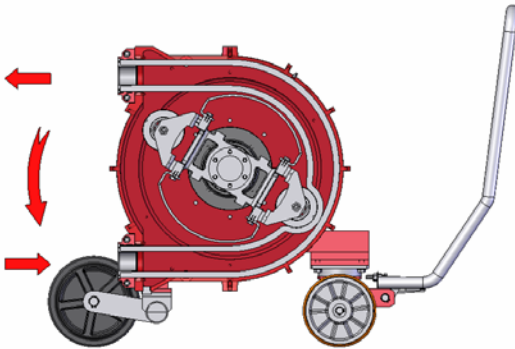
Its main features are:

- Suction up to 8m.
- Can be dry run.
- Totally sealed, without mechanical locking devices or gaskets.
- Excellent dosing accuracy $\pm 1\%$.
- Flow rate independent from pressure.
- Reversible pumping direction
- Easy to clean.
- Low noise.
- Easy, low-cost maintenance.
- Gentle pumping of fluids.
- Resistance to abrasion.

This equipment is suitable for use in food processing.

3.2. OPERATING PRINCIPLE

The operation of the pump can be seen on the following picture:



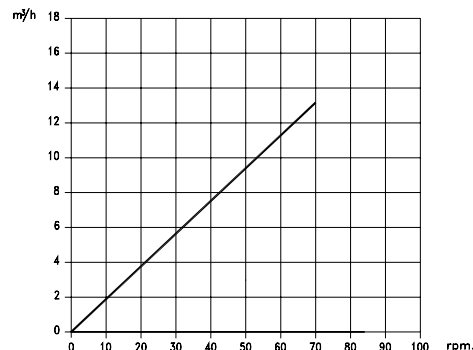
As illustrated, the pump unit has a simple robust design with very few moving parts.

Both ends of the flexible hose are fixed to the pump housing by means of a robust clamp. The housing interior contains two pressure rollers that rotate concentrically with an iron-cast support, with at least one of them compressing the flexible hose, thus generating the pumping action.

3.3. APPLICATION

- Filtering
- Decanting.
- Bottling.
- Devatting.
- Pumping over.

3.3.1. Range of application



PV-60



Each pump has performance limits. The pump was selected for certain pumping conditions at the time the order was placed. INOXPA shall not be liable for any damage resulting from the incompleteness of the information provided by the purchaser (nature of the fluid, RPM, etc.).

4. Installation

4.1. PUMP RECEIPT

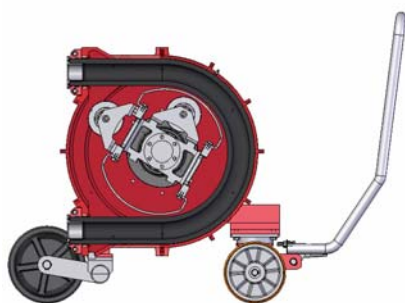


INOXPA cannot be held responsible for the damage sustained by the equipment during transport or unpacking. Visually check that the packaging is not damaged.

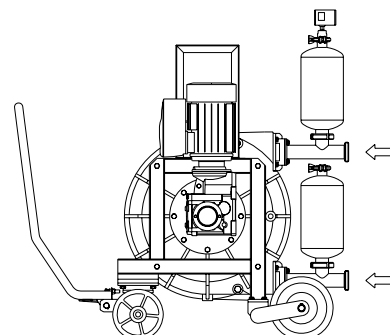
The pump will be accompanied by the following documents:

- Dispatch notes.
- Pump Instructions and Service Manual.
- Motor Instructions and Service Manual (*)
- (*) when the pump is supplied with a motor by INOXPA.


Unpack the pump and check the following:



- The pump suction and delivery connections, removing the remains of any packaging materials.
- Check that the pump and the motor have not suffered any damage.
- If the equipment is not in good condition and/or any part is missing, the carrier should draw up a report accordingly as soon as possible.
- Check that the pump contains one of the rollers has been rotated and that none of them are pressing on the tube or have damaged it during transport. Before starting up the pump, this roller should be assembled correctly.



4.1.1. Pump identification

		INOXPA S.A. C. Telers, 54 - P.O. BOX 174 17820 BANYOLES - GIRONA (SPAIN) Tel. 972 57 52 00 - Fax 972 57 55 02	CE
TIPO	<input type="text"/>	Nº	<input type="text"/>
KW	<input type="text"/>	min ⁻¹	<input type="text"/>
	<input type="text"/>	V	<input type="text"/>
QM ³ /h	<input type="text"/>	Hm	<input type="text"/>
	<input type="text"/>	ØRODETE	<input type="text"/>
		AÑO	<input type="text"/>

Serial number

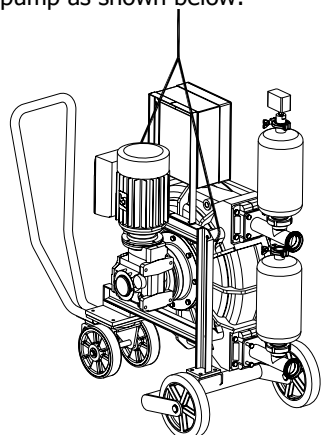
Pump plate

4.2. TRANSPORT AND STORAGE



The PV-60 pump is too heavy to be carried into its storage area manually.

Lift the pump as shown below:



- Always use two support points situated as far apart as possible. Make use of the studs protruding from the housing in order to grip the pump.
- Secure the supports so that they can not slip.

4.3. LOCATION

Place the pump as close as possible to the suction tank, and if possible below the fluid level.

Place the pump so as to allow sufficient space around it to access the pump and the motor. (See Chapter 8 [Technical Specifications](#) for dimensions and weight).

Place the pump on a flat, level surface.



Install the pump so as to allow sufficient ventilation.

If the pump is installed outdoors, it should be protected by a roof. Its location should enable easy access for any inspection or maintenance operations.

4.4. PIPES

- As a general rule, the suction and delivery pipes should be fitted in straight sections, with the least possible number of bends and fittings, in order to minimise head loss caused by friction.
- Ensure that pump input and output fittings are properly aligned with the pipes and of a similar diameter to the pump connections.
- Place the pump as close as possible to the suction tank, if possible below the fluid level, or even below the tank, to achieve the maximum static suction head.
- Place pipe supports as close as possible to the pump suction inlet and discharge outlet.

4.5. SHUT-OFF VALVES

The pump can be isolated for maintenance purposes. To this end, shut-off valves should be fitted to the pump suction and discharge connections.

These valves should ALWAYS be open when the pump is operating.

4.6. ELECTRICAL INSTALLATION



The connection of the electrical motors must be performed by qualified personnel. Take all necessary measures to prevent damage to connections and cables.



The electrical equipment, terminals and components of the control systems may still contain electric current when switched off. Contact with them may be dangerous for operators or cause irreversible damage to the equipment.

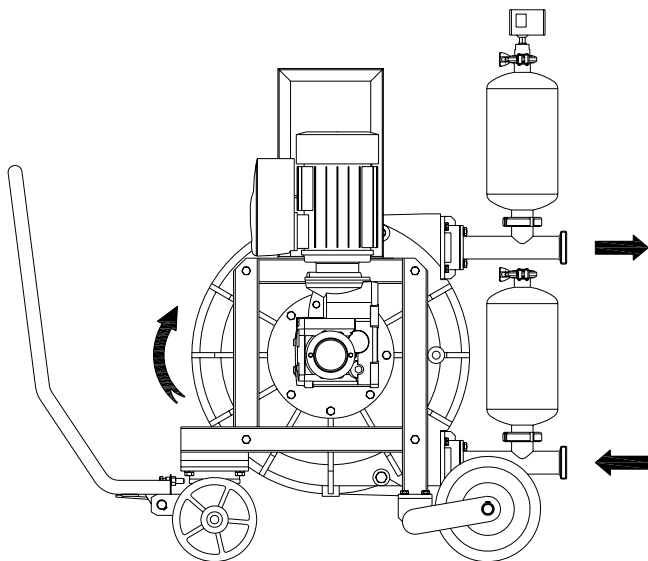
Before opening the pump, make sure that the electrical circuit is switched off.

Connect up the motor following the manufacturer's instructions.

Check the direction of rotation. The pump is fully reversible.

The rotation direction determines which is the suction and which is the delivery pipe on the pump. The pressostat and pressure transducer must always be placed in the delivery pipe.

The electrical switchboard diagram shall be provided on a sheet separate to this manual.



5. Start-up



Before starting the pump, carefully read the instructions provided in Chapter 4. *Installation*.

5.1. START-UP.



Read Chapter 8, *Technical Specification* thoroughly. INOXPA cannot be held responsible for the incorrect use of the equipment.



NEVER touch the pump or the pipes when hot fluid is being pumped.

5.1.1. Checks before starting up the pump

- Check that the those and rollers are correctly assembled and lubricated. The grease used in the INOXPA pump is silicone based food grade grease. All the pumps are provided with a tub of grease for maintaining the pump.
- Fully open the shut-off valves on the suction and delivery pipes.
- Check that the motor's direction of rotation is correct.
- Check that the optional electrical components are connected to the control panel and check that it is working.



The hose and rollers should always be greased.

Check that the rollers are mounted correctly, as the hose may be damaged if the pump is switched on when one of them is disassembled. See chapter 7, *Maintenance*.



Do not start up the pump if the housing cover is not placed.

5.1.2. Checks when starting up the pump

- Check that the pump is not making any unusual noises.
- Check the flow pressure.
- Check that there are no leaks in the pump seals.
- Check that the pressure regulator is set at approximately 3 bars.



A shut-off valve on the suction pipe must not be used to regulate flow. Shut-off valves must be fully open during operation.



Check the motor power consumption to avoid electric overload.

6. Operating Problems

The following table provides solutions to problems that might arise during pump operation. The pump is assumed to have been properly installed and correctly selected for the application. Please contact INOXPA if technical assistance is required.

Operating Problems	Probable causes
Overheating.	1, 2, 3, 4, 5, 6.
Fall in capacity / pressure.	7, 8, 9, 10, 11, 12, 13, 14, 15, 16.
Vibrations in the pump and pipes.	6, 12, 17, 18.
Short lifetime of the hose.	1, 2, 3, 6, 19, 20, 21, 22.
Stretching of the hose inside the pump.	2, 23, 24, 25.
The pump will not start up.	26, 27, 28.

Probable causes	Solutions
1 Use of non-original lubricant.	Use special INOXPA lubricant.
2 Insufficient amount of grease.	Grease correctly.
3 Fluid temperature too high.	Reduce the pump temperature.
4 Poor suction.	Check that there are no obstructions.
5 Hose is squeezed excessively.	Check that the shaft of the rollers is assembled in the correct position.
6 Pump speed is too high.	Reduce the pump speed.
7 Suction or delivery valve closed.	Open the valves.
8 Hose is insufficiently squeezed.	Check that the shaft of the rollers is assembled in the correct position.
9 Rupture of the hose (the product leaks into the machinery).	Change the hose.
10 Partial obstruction of the suction pipe.	Clean the pipes.
11 Lack of product in the suction tank.	Fill the tank.
12 Suction pipe section too narrow.	Increase section / reduce pump pressure.
13 Suction length too long.	Shorten the suction pipe.
14 Product viscosity is too high.	Reduce viscosity. Increase the tube section. Check that the pump is appropriate.
15 Air is entering through the suction connections.	Tighten the flange seals and fittings.
16 Strong pulsations during suction.	Install a stilling basin. Re-analyse the application (speed, etc.)
17 The pipes are not anchored correctly.	Fix the pipes.
18 Strong pulsations in the pump.	Install delivery and/or suction pulse dampers.
19 Chemical corrosion.	Check the compatibility of the tube both with the fluid being pumped and the cleaning product.
20 Operating pressure too high.	Reduce the pump speed. Increase the pipe section.
21 Abnormally high temperature.	Check that the shaft of the rollers is assembled in the correct position.
22 Cavitation.	Re-analyse suction conditions.
23 High suction pressure (>3 bar).	Reduce suction pressure.
24 The pipe is filled with sediment.	Clean the pipe.
25 Clamps insufficiently tightened.	Tighten clamps.
26 Operating equipment torque insufficient.	Increase operating power.
27 Frequency converter torque insufficient.	Increase torque. Check that there is sufficient power supply. Do not operate below a frequency of 12 Hz. The motor will start up at less than 12 Hz.
28 Blocked pump.	Check that there are no blockages in the pump.



If the problems persist, stop using the pump immediately. Contact the pump manufacturer or their representative.

7. Maintenance

7.1. GENERAL INFORMATION

Like any other machine, this pump requires maintenance. The instructions contained in this manual cover the identification and replacement of spare parts. The instructions have been prepared for maintenance personnel and for those responsible for the supply of spare parts.



Please carefully read Chapter 8 *Technical Specification*.

All replaced material should be duly eliminated/recycled according to the directives in effect in the area.



ALWAYS disconnect the pump from the power supply before undertaking maintenance work.

7.1.1. Checking the hose.

The flexible hose must be greased regularly - approximately every 100 hours - with silicone-based food-grade grease that is already supplied with the pump.

Check the hose regularly for signs of significant wear. The hose has a durability of approximately 1000 hours provided the pump is operated under normal conditions and the hose has been correctly greased. If significant wear is noted, replace the hose in accordance with the instructions in Chapter 7, in the section on Assembling and Disassembling the Pump.

The pump can be supplied with an optional safety system so that when a small auxiliary tank is filled up due to breakage of the flexible hose, the pump is automatically stopped.

7.2. CLEANING



The use of aggressive cleaning products such as caustic soda and nitric acid may cause burns to the skin.

Use rubber gloves during the cleaning process.



Always use protective goggles.

7.2.1. CIP (Clean-in-place) cleaning

If the pump is installed in a system with a CIP process, it is not necessary to dismantle the pump.

If there is no automatic cleaning process, dismantle the pump as indicated in the *Assembly and Dismantling* section.

Cleaning solutions for CIP processes.

Only use clear water (chlorine-free) to mix with the cleaning agents:

a) Alkaline solution: 1% by weight of caustic soda (NaOH) at 70°C (150°F)

1 Kg NaOH + 100 l. of water = cleaning solution

o

2.2 l. NaOH at 33% + 100 l. of water = cleaning solution

b) Acid solution: 0.5% by weight of nitric acid (HNO₃) at 70°C (150°F)

0.7 litres HNO₃ at 53% + 100 l. of water = cleaning



Check the concentration of the cleaning solutions to avoid damaging the pump seals.

To eliminate the remains of cleaning products, ALWAYS carry out a final rinse on completion of the cleaning process.

7.2.2. Automatic SIP (sterilisation-in-place)

The steam-sterilisation process is applied to all equipment including the pump.



DO NOT operate the equipment during the steam-sterilisation process.
The parts/materials will not suffer damage provided the instructions set out in this manual are followed.

Cold liquid cannot be introduced until the pump temperature is below 60°C (140°F).

The pump generates a substantial load loss through the sterilisation process; we recommend the use of a bypass circuit provided with a discharge valve to ensure that the steam / superheated water sterilises the entire circuit.

Maximum conditions during the steam or superheated-water SIP process

- a) **Max. temperature:** 140°C / 284°F
- b) **Max. time:** 30 mins
- c) **Cooling:** Sterilised air or inert gas
- d) **Materials:** EPDM / PTFE (recommended)
FPM / NBR (not recommended)

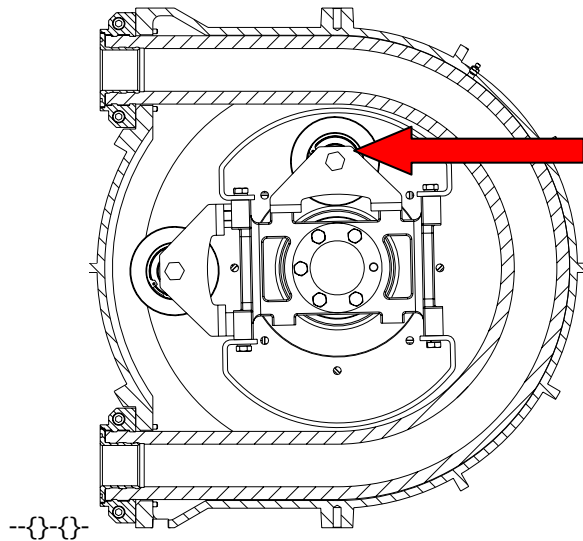
7.3. STORAGE

The pump must be completely emptied of fluid before storage. If possible, avoid exposing the components of the agitator to excessively damp environments.



Spare tubes should be stored in a dry place protected from direct sunlight.

If the pump is not used for extended periods of time, one of the rollers should be mounted inside the guide ring (06C). Then turn the rotor so that the other roller does not press the hose and damage it (see illustration below).



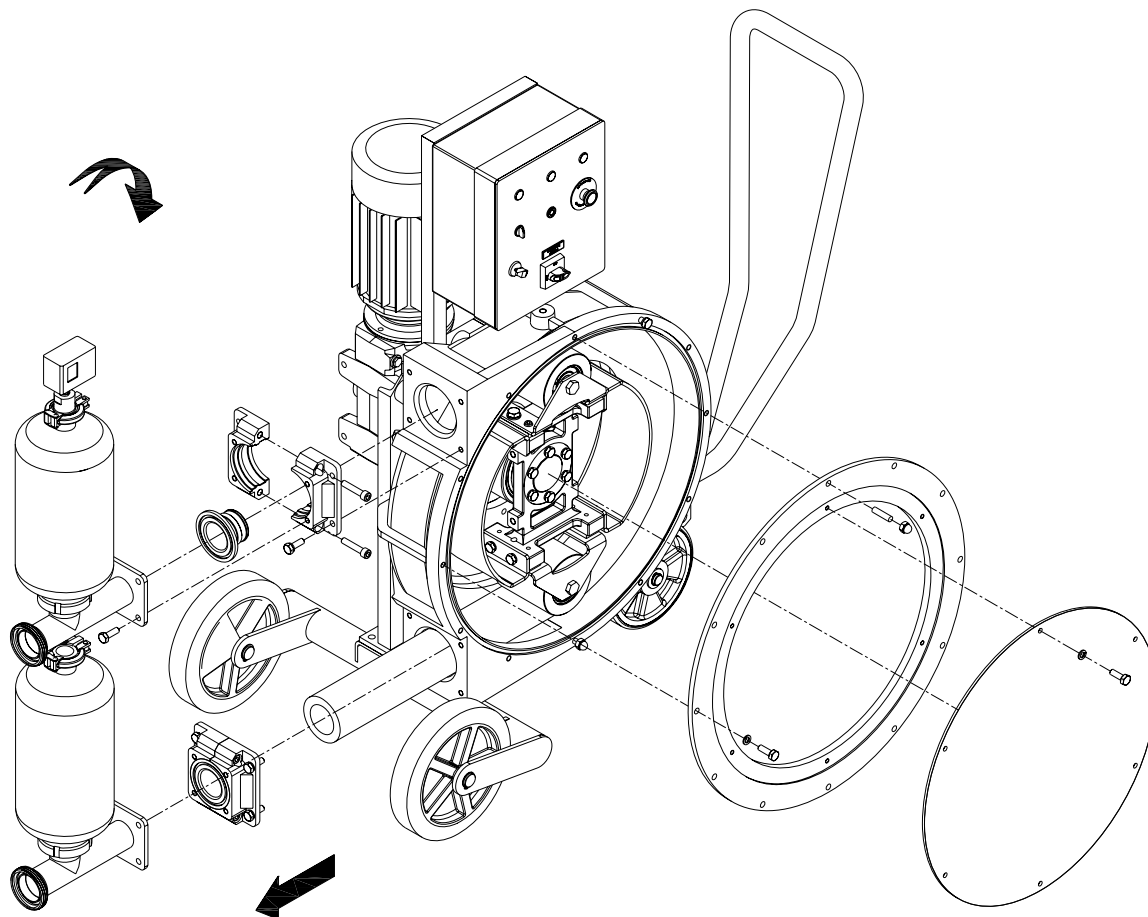
Dismantle a roller when the pump is not used for extended periods of time so that a roller does not press on the pipe and damage it.

7.4. DISASSEMBLY / ASSEMBLY OF THE PUMP

7.4.1. Changing the tube

⇒ Disassembly

First remove the stabiliser tanks (113) with the inlet and outlet pipes (98). Remove the screws (52D, 52E) in order to detach the pipe clamp (33A) and the pipe adapter (33). To remove the flexible hose (22), start up the pump in the clockwise direction as looking from in front of the electrical switchboard, as illustrated below, with the speed at the lowest setting, and remove the hose from the lower connection.



⇐ Assembly

Before fitting the hose, check that the rollers and the inside of the pump housing (01) are greased, and grease them if required. Place the new hose in the lower connection until it touches the roller. Start up the motor in a clockwise direction as viewed from in front of the electrical switchboard, as illustrated above, and as the rollers turn, they will move the flexible hose (22) into place. When the hose is fully inside the the housing, stop the motor. Fit the hose clamp (33A), and tube adapter (33) by fixing them in place with the screws (52D, 52E).

7.4.2. Hopper (optional)

The pump hopper has two gears that must be lubricated regularly by means of the grease nipple (83) in order to function correctly.



Grease the hopper gears.



Do not remove the hopper grille in order to avoid personal injury.

8. Technical Specifications

8.1. TECHNICAL SPECIFICATIONS

Operating temperature range	-10°C to +80°C 14°F to +176°F
Noise level	60-80 dB(A)
Suction / delivery connections	DIN 11851 (standard)



Use special protection when the noise level in the operation area exceeds 85 dB(A).

Pump with integrated gearbox drive and frequency selector.

Pump type	Flow rate [m ³ /h]	Max. pressure [bar]	Speed [r.p.m.]	Power [kW]
PV-60	3,5 - 12	4	15 - 60	3
PVT-60		3		

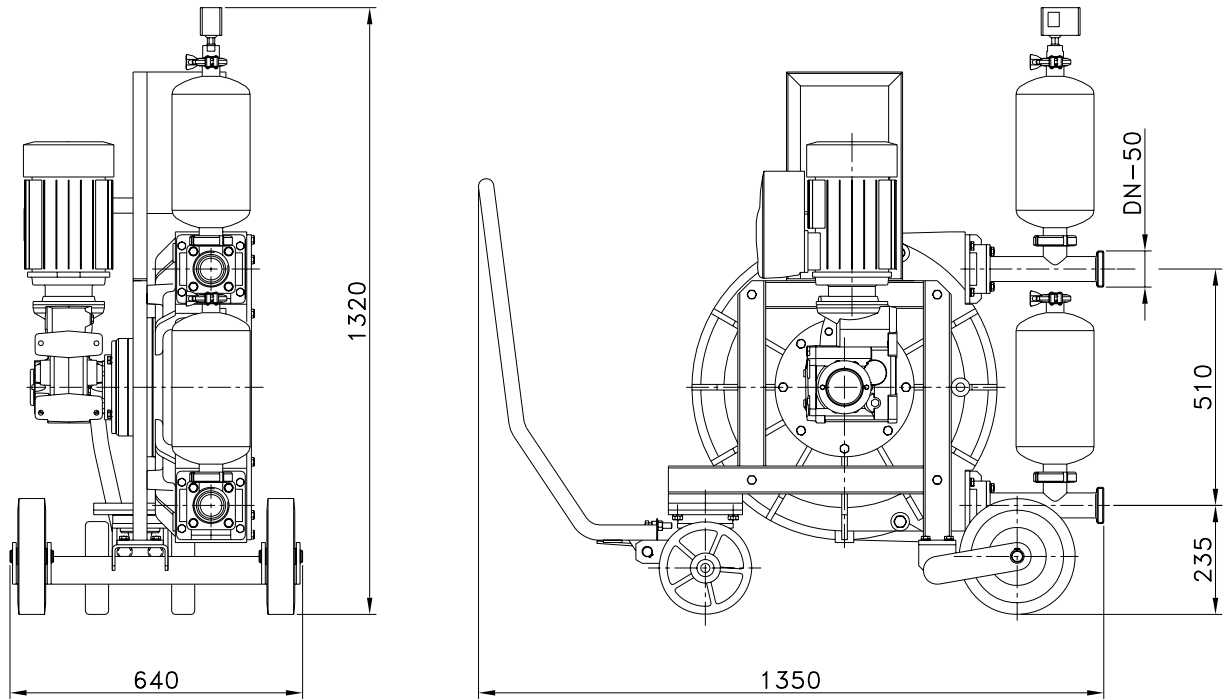
Materials

Parts in contact with the product	AISI 304
Flexible hose.....	NR-A (standard)

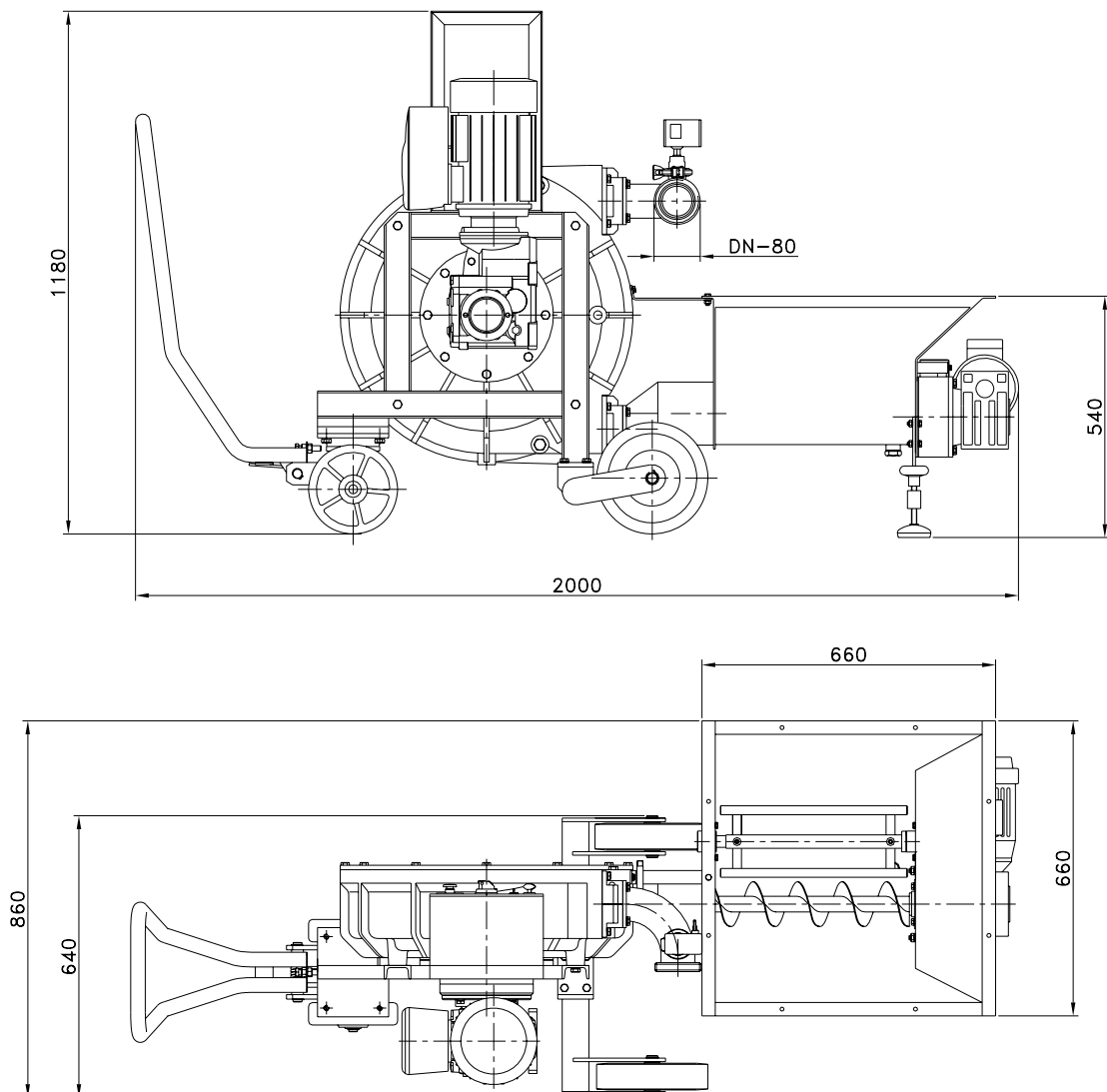
8.2. WEIGHTS

Pump type	Weight [Kg]	Weight [lbs]
PV-60	425	935
PVT-60	475	1050

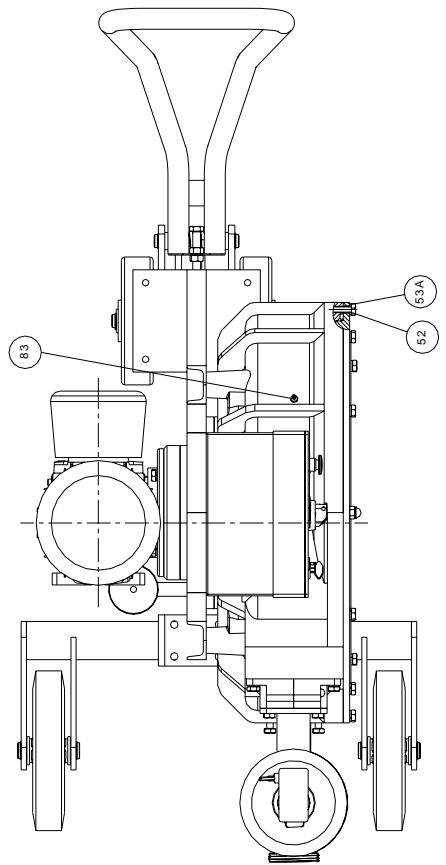
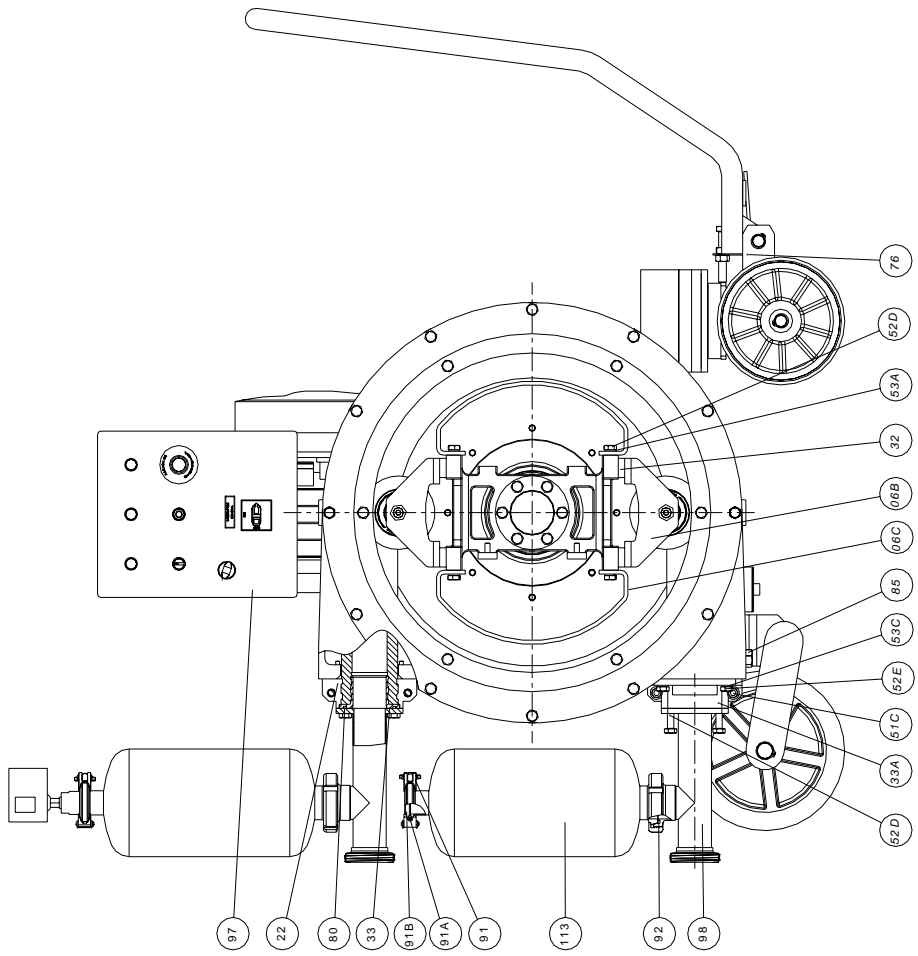
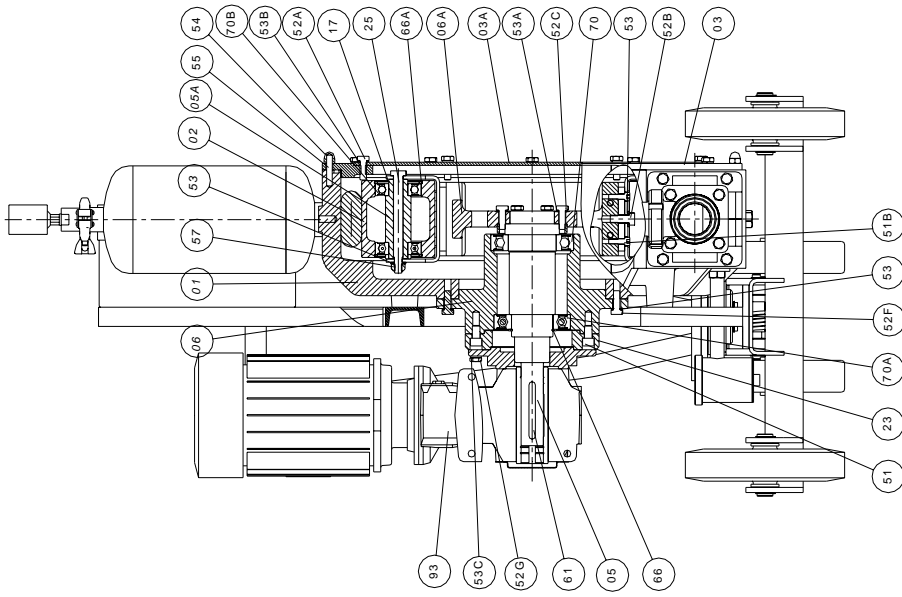
8.3. PV-60 PUMP DIMENSIONS WITH BUFFER TANKS.



8.4. PVT-60 PUMP DIMENSIONS.



8.5. PV-60 PUMP EXPLODED PARTS DIAGRAM

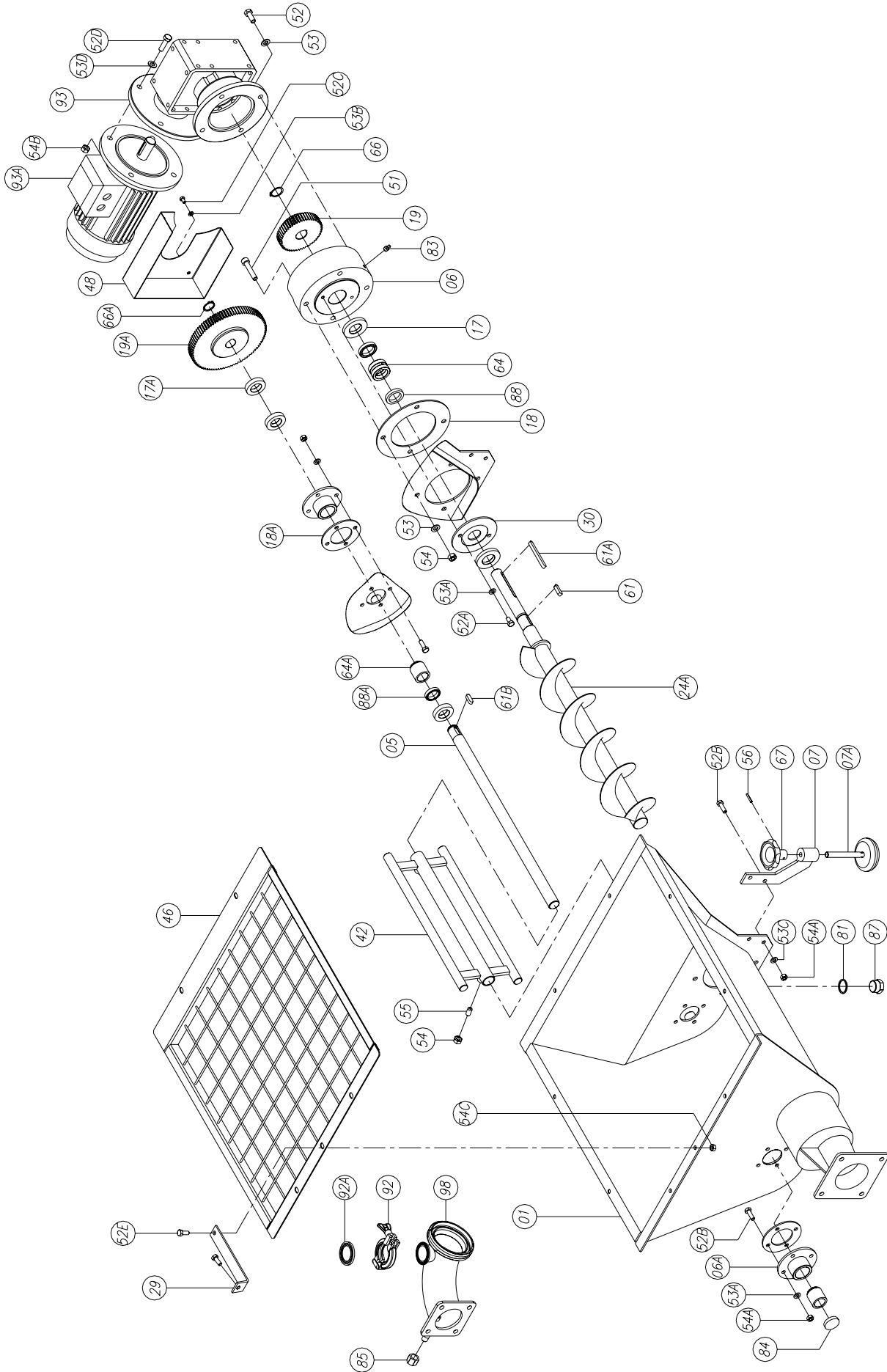


8.6. PV-60 PUMP PARTS LIST

Position	Description	Quantity	Material
01	Pump housing	1	GG-25
02	Roller	2	GG-25
03	Pump cover	1	GG-25
03A	Transparent cover	-{}-1	Dark methacrylate
05	Bearing shaft	1	F-114
05A	Roller shaft	2	F-114
06	Bearings support	1	GG-25
06A	Roller support	1	GG-25
06B	Roller support sheet	2	F-1
06C	Guide ring	2	F-1
17	Roller stop bushing	4	F-114
22	Flexible hose *	1	NBR-A
23	Drive counterflange	1	F-114
25	Roller shaft screw	2	F-124
32	Roller adjustment kit	4	F-1
33	Pipe adapter	2	AISI 304
33A	Flange	2	GG-25
51	Allen screw	4	8.8
51B	Allen screw	8	8.8
51C	Allen screw	4	8.8
52	Hexagonal screw	10	A2
52A	Hexagonal screw	6	A2
52B	Hexagonal screw	4	8.8
52C	Hexagonal screw	6	A2
52D	Hexagonal screw	16	A2
52E	Hexagonal screw	8	A2
52F	Hexagonal screw	8	8.8
52G	Hexagonal screw	4	8.8
53	Grower washer	14	8.8
53A	Flat washer	24	A2
53B	Flat washer	6	A2
53C	Grower washer	12	8.8
54	Cap nut	2	A2
55	Pin	2	A2
57	Self-locking nut	2	8.8
61	Key	1	F-114
66	Elastic ring	1	Steel
66A	Elastic ring	4	Steel
70	Ball bearing *	1	Steel
70A	Ball bearing *	1	Steel
70B	Ball bearing *	4	Steel
76	Rotary wheel and handle set	1	-
80	O-ring *	2	NBR
83	Grease nipple	1	-
85	Stopper	1	A4
91	Clamp	2	AISI 304
91A	Clamp gasket *	2	NBR
91B	Clamp blind bushing	1	AISI 304
92	Adapter seal	2	NBR
93	Operating switch	1	-
97	Switchboard	1	-
98	Input/output tube	2	AISI 304
113	Buffer tank	2	AISI 304

(*) Recommended spare parts

8.7. PVT-60 HOPPER EXPLODED PARTS DIAGRAM



8.8. PV-60 HOPPER PARTS LIST

Position	Description		Quantity	Material
01	Hopper		1	AISI 304
05	Blade shaft		1	AISI 304
06	Support		1	Aluminium
06A	Guide		2	AISI 304
07	Foot support		2	AISI 304
07A	Non-vibratory foot		2	AISI 304
17	Rotating washer	*	2	PTFE
17A	Flat washer	*	3	PTFE
18	Rotating seal	*	1	NBR
18A	Gasket	*	2	NBR
19	Reduction gear		1	F-114
19A	Blade pinion		1	F-114
24A	Rotating auger		1	AISI 304
29	Hopper attachment rod		1	AISI 304
30	Plate		1	AISI 304
42	Blade		1	AISI 304
46	Grille		1	AISI 304
48	Shield		1	AISI 304
51	Allen screw		4	A2
52	Hexagonal screw		3	A2
52A	Hexagonal screw		2	A2
52B	Hexagonal screw		12	A2
52C	Hexagonal screw		2	A2
52D	Hexagonal screw		4	8.8
52E	Hexagonal screw		6	A2
53	Flat washer		7	A2
53A	Flat washer		10	A2
53B	Flat washer		2	A2
53C	Grower washer		4	A2
53D	Flat washer		4	8.8
54	Hexagonal nut		6	A2
54A	Hexagonal nut		12	A2
54B	Hexagonal nut		4	8.8
54C	Hexagonal nut		5	A2
55	Pin		2	A2
56	Flexible pin		2	F-143
61	Key		1	F-114
61A	Key		1	F-114
61B	Key		1	F-114
64	Rotating guide bushing	*	1	Brass
64A	Blade guide bushing	*	2	PTFE
66	Elastic ring		1	Steel
66A	Elastic ring		1	Steel
67	Tightening knob		2	Plastic
81	Stopper gasket		1	PTFE + glass
83	Grease nipple		1	A2
84	Valve stopper	*	1	NBR
85	Nut cap		1	A2
87	Stopper		1	A4
88	Lock	*	2	NBR
88A	Lock	*	1	NBR
92	Clamp		1	AISI 304
92A	Clamp gasket		1	NBR
93	Circular mounting flange		1	-
93A	Motor		1	-
98	Outlet bend		1	AISI 304

(*) Recommended spare parts

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