

INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

CENTRIFUGAL PUMP WITH HELICOIDAL IMPELLER

RV



01.214.32.0013



Original Instructions

01.214.30.03EN

(A) 2021/10



INOXPA S.A.U.

Telers, 60

17820 - Banyoles (España)

hereby declare under our sole responsibility that the

Machine: **CENTRIFUGAL PUMP WITH HELICOIDAL IMPELLER**

Model: **RV**

Type: **RV-65, RV-80, RV-100**

Serial number: **IXXXXXXXXXX to IXXXXXXXXX**
XXXXXXXXXXIINXXX to XXXXXXXXXXXIINXXX

fulfills all the relevant provisions of the following directive:

Machinery Directive 2006/42/EC

Regulation (EC) n° 1935/2004

Regulation (EC) n° 2023/2006

and with the following harmonized standards and/or regulations:

EN ISO 12100:2010

EN 809:1998+A1:2009/AC:2010

EN 12162:2001+A1:2009

EN 60204-1:2006+A1:2009

The technical file has been prepared by the signer of this document.

A handwritten signature in black ink, appearing to read "David Reyero Brunet".

David Reyero Brunet

Technical Office Manager

25th October 2021



Document: 01.214.30.04EN

Revision: (A) 2021/10



INOXPA S.A.U.

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17820 - Banyoles (Spain)

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fulfils all the relevant provisions of these regulations:

Supply of Machinery (Safety) Regulations 2008

and with the following designated standards:

EN ISO 12100:2010
EN 809:1998+A1:2009/AC:2010
EN 12162:2001+A1:2009
EN 60204-1:2018

The technical file has been prepared by the signer of this document.

A handwritten signature in black ink, appearing to read "DRB", is positioned above the printed name and title of the signatory.

David Reyero Brunet
Technical Office Manager
25th October 2021



Document: 01.214.30.05EN
Revision: (0) 2021/10

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2. Generalities

2.1. INSTRUCTIONS MANUAL

This manual contains information about the reception, installation, operation, assembly and maintenance of the RV pumps.

Carefully read the instruction before starting the pump, familiarize yourself with the installation, operation and correct use of the pump and strictly follow the instructions. These instructions should be kept in a safe location near the installation area.

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

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

2.2. COMPLIANCE WITH THE INSTRUCTIONS

Not following the instructions may impose a risk for the operators, the environment and the machine, and may cause the loss of the right to claim damages.

This non-compliance may cause the following risks:

- failure of important machine/plant functions,
- failure of specific maintenance and repair procedures,
- possible electrical, mechanical and chemical hazards,
- the risk to the environment due to the type of substances released.

2.3. WARRANTY

The conditions of the warranty are specified in the General Sales Condition that have been delivered at the time of placing your order.



The machine may not undergo any modification without prior approval from the manufacturer.

For your safety, only use original spare parts and accessories. The usage of other parts will relieve the manufacturer of any liability.

Changing the service conditions can only be carried out with prior written authorization from INOXPA.

The non-compliance of the prescribed indications in this manual means misuse of this gear on the technical side and the personal safety and this, exempt INOXPA of all responsibility in case of accidents and personal injuries and/or property damage. Also, excluded from the warranty all breakdowns caused by improper use of the gear.

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

3. Safety

3.1. WARNING SYMBOLS



Safety hazard for people in general and/or for the equipment



Electric hazard

ATTENTION

Important instruction to prevent damage to the equipment and/or its function

3.2. GENERAL SAFETY INSTRUCTIONS



Read the instruction manual carefully before installing and starting the pump. Contact INOXPA in case of doubt.

3.2.1. During installation



Always take into account the [Technical Specifications of chapter 9](#).

Never start the pump before connecting it to the lines.

Do not operate the pump if the pump casing is not fitted.

Check for proper specifications of the motors, especially if working conditions create an explosions hazard.



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

3.2.2. During operation



The [Technical Specifications of chapter 9](#) should always be observed. Under no circumstances can the specified limit values be exceeded.

NEVER touch the pump or the pipework during operation if the pump is being used for transferring hot liquids or during cleaning.

The pump contains moving parts. Never place your fingers inside the pump during operation.

NEVER operate with the suction and discharge valves closed.

NEVER spray water directly on the electrical motor. The standard motor protection is IP55: protection against dust and water spray.

3.2.3. During maintenance



The [Technical Specifications of chapter 9](#) shall always be observed.

NEVER disassemble the pump until the pipes have been emptied. Remember that liquid will remain inside the pump's pump casing (if does not have a purge). Bear in mind that the pumped liquid may be hazardous or extremely hot. Consult the regulations in effect in each country for these cases.

Do not leave loose parts on the floor.



ALWAYS disconnect the electrical power to the pumps prior to carrying out any maintenance.

Remove the fuses and disconnect the cable from the motor's terminals.

All electrical work must be carried out by authorized personnel.

4. General Information

4.1. DESCRIPTION

The centrifugal pumps with helicoidal impeller RV are monobloc pumps with axial suction and radial discharge and sanitary connections. The RV range is designed for continuous operation.

The main components of the RV pump are a pump casing with drainage, a helicoidal impeller and a single mechanical seal in silicon carbide with EPDM seals.

All parts of the RV pump that are in contact with the product are stainless steel 1.4404 (AISI 316L). The internal surface of the pump can be polished or matt and the external surface is always matt. The motor is standard IEC 60034 type IM B35.

4.2. APPLICATION

The centrifugal pumps with helicoidal impeller RV are the best solution for the transfer of liquids with a high concentration of solid particles. These liquids need to be pumped gently and without clogging and this is achieved with a helicoidal design of the impeller.

It is ideal for applications of the transfer of pieces of fruit or whole fruits, olives, mushrooms, vegetables, fish or any product which require the preservation of the form of the solids in suspension.

It is also suitable in the wine industry for the pump-over process where the high capacity and minimum destruction of the solid parts (seeds, skins, etc.) is required.

ATTENTION



The range of application for each type of pump is limited. The pump was selected for a given set of pumping conditions when the order was placed. Misuse of the pump or its use beyond the operating limits may be dangerous or cause permanent damage to the equipment. 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.).

5. Installation

5.1. RECEPTION OF THE PUMP



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

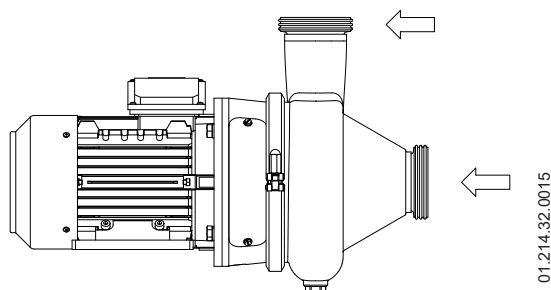
The pump package includes the following documents:

- shipping documents,
- installation, service and maintenance instructions manual,
- instructions and service manual of the motor¹

1) if the pump has been supplied with a motor from INOXPA

Unpack the pump and check the following:

- the suction and discharge connections of the pump, removing any rest of packaging materials,



- the pump and the motor are not damaged,

If the equipment is not in good condition and/or any part is missing, the carrier should report accordingly as soon as possible.

5.2. IDENTIFICATION OF THE PUMP

Each pump has a nameplate with the basic data required to identify the model.



CE EAC

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GIRONA (SPAIN) . www.inoxpa.com

Type

No

Year

Serial number →

5.3. TRANSPORT AND STORAGE

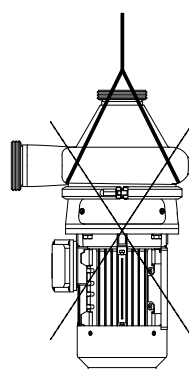
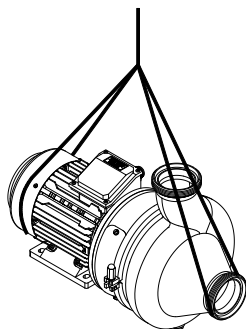
ATTENTION



The RV pumps are often too heavy to be stored manually.
Use an appropriate means of transport.
Use the points which are indicated in the drawing for lifting the pump.
Only authorized personnel should transport the pump.
Do not work or walk under the heavy loads.

Lift the pump as indicated below:

- always use two support points placed as far apart as possible.



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- secure the supports so that they will not move.

See chapter 9. [Technical Specifications](#) to consult the dimensions and weight of the pump.

ATTENTION



During the transport, disassembly or assembly of the pump, there is a risk of loss of stability and that the pump could fall down and cause damages to the operators. Make sure that the pump is properly supported.

5.4. LOCATION

Place the pump as close as possible to the suction tank whenever possible below the liquid and leaving enough space around to can access the pump and the motor. If necessary, consult in chapter 9. [Technical Specifications](#) the dimensions of the pump.

Once a place is chosen, the pump should be mounted on a flat and level surface.

ATTENTION



Install the pump so as to allow proper ventilation.
If the pump is installed outdoors, it should be covered by a roof. Its location should allow easy access for inspection or maintenance operations.

5.4.1. Excessive temperatures

Depending on the fluid to be pumped, high temperatures can be reached inside and around the pump.



Over 68°C the operator should take protective measures and place warning notices advising of the danger which exists if the pump is touched.
The type of protection selected should not isolate the pump entirely. It should allow for the bearings to be cooled more efficiently and for the bearings to be lubricated.

5.5. PIPES

About the installation pipes:

- As a general rule, install the suction and discharge lines in straight sections, with the minimum possible number of elbows and fittings to reduce any pressure losses that may be caused by friction.
- Make sure that the pump's ports are properly aligned with the pipework and have a diameter similar to that of the pump connections.
- Place the pump as close as possible to the suction tank and whenever possible below the liquid level, or even below the tank level in order to achieve the largest possible static head for suction.
- Install support brackets for the lines as close as possible to the pump's suction and discharge ports to avoid vibrations and stress on the pump.

5.5.1. Shut-off valves

The pump may be isolated for maintenance. To accomplish this, shut-off valves must be installed and connected to the pump's suction and discharge connections.

5.6. ELECTRICAL INSTALLATION



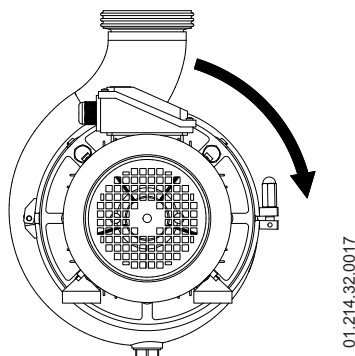
Only qualified personnel can connect the electric motors.
Take the necessary measures to prevent damage to cables and connections.



Electrical equipment, terminals and components of the control systems may still carry current when they are disconnected. Contacting them may impose a hazard to operators or cause irreparable material damage.
Before handling the pump, make sure that the motor is stopped.

To do the electrical installation:

- connect the motor in accordance with the instructions supplied by the motor manufacturer, in accordance with the current national legislation and in compliance with EN 60204-1,
- check the direction of rotation (see the signalling label on the pump),
- start and stop the pump motor momentarily. Make sure that the direction of rotation is correct. If the pump rotates in the wrong direction it could cause serious damage.



ATTENTION



See indicator label on the pump.
ALWAYS check the direction of rotation of the motor with liquid inside the pump.

6. Start-up



Before starting the pump, carefully read the instructions in section [5. Installation](#). Carefully read section [9. Technical Specifications](#). INOXPA will not be liable for improper use of the equipment.



NEVER touch the pump or the lines of hot liquids are being pumped.

6.1. CHECKS BEFORE STARTING THE PUMP

Before starting the pump:

- completely open the shut-off valves on the suction and discharge lines,
- if liquid does not flow towards the pump, fill it with the liquid to be pumped,



ATTENTION

The pump must never turn dry.

- check that the power supply matches the rating indicated on the motor plate,
- check that the motor rotation direction is correct.

6.2. CHECKS WHEN STARTING THE PUMP

When starting the pump check:

- that the pump is not making any strange noises,
- if the absolute inlet pressure is sufficient to prevent cavitation in the pump. See the curve to determine the minimum pressure required above steam pressure (NPSHr).
- the discharge pressure,
- that there are no leaks in the sealing areas.



ATTENTION

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

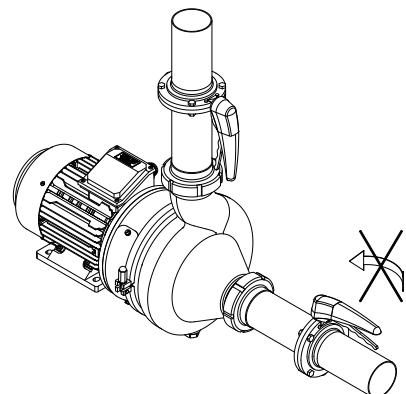


ATTENTION

Control the motor consumption to prevent an electrical overload.

To reduce the flow rate and the electrical power consumed by the motor:

- reduce regulating the pump's discharge flow,
- decrease the motor speed.



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Use special protection when the sound pressure in the operation area exceeds 85 dB(A).

7. Troubleshooting

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

Motor overload									
The pump does not provide enough flow or pressure									
No pressure on the discharge side									
Uneven delivery flow / pressure									
Noise and vibrations									
The pump gets clogged									
Overheated pump									
Excessive wear									
The mechanical seal leaks									
					PROBABLE CAUSES		SOLUTIONS		
•	•				Wrong direction of rotation		- Reverse the direction of rotation		
					NPSH is not high enough		- Place the suction tank higher - Place the pump lower - Increase the diameter of the suction pipe - Shorten and simplify the suction pipe		
•	•	•	•		Pump not drained		- Drain or fill		
•	•	•	•	•	Cavitation		- Increase the suction pressure		
•	•	•	•	•	Air is sucked in by the pump		- Check the suction pipe and all its connections		
	•	•	•		Clogged suction tube		- Check the suction pipe		
•		•	•		Discharge pressure too high		- If necessary, reduce load losses, e.g. by increasing the diameter of the pipe.		
•	•		•	•	Flow too high		- Reduce the flow by means of a diaphragm - Partially shut off the delivery valve - Reduce speed		
•	•	•	•	•	Fluid viscosity too high		- Decrease the viscosity by injecting liquid or increasing the diameter of the piping		
•		•	•	•	Fluid temperature too high		- Reduce the temperature by cooling the fluid		
				•	Mechanical seal damaged or worn		- Replace the seal		
				•	O-rings unsuitable for the fluid		- Fit suitable O-rings after checking with the supplier		
•		•	•	•	The impeller scrapes		- Reduce temperature - Reduce suction pressure		
			•		Tension in the lines		- Connect the pipes to the pump without tension		
•					Pump speed too low		- Increase speed		
	•				The cut-off valve on the suction side is closed		- Check and open		
•					Discharge pressure too low		- Increase the pump speed		

8. Maintenance

8.1. GENERAL CONSIDERATIONS

This pump, just like any other machine, requires maintenance. The instructions contained in this manual cover the identification and replacement of spare parts. The instructions are aimed at maintenance personnel and those responsible for the supply of spare parts.



Carefully read chapter [9. Technical Specifications](#).

Maintenance work can only be carried out by qualified personnel that are trained and equipped with the necessary resources to carry out this work.

All parts or materials that are replaced must be properly disposed of/recycled in accordance with the current directives applicable in each area.



ALWAYS disconnect the pump before beginning any maintenance work.

8.2. CHECK THE MECHANICAL SEAL

Periodically check that there are no leaks around the shaft. If leakage is detected through the mechanical seal, replace it following the instructions in chapter [8.7. Disassembly and assembly of the pump](#).

8.3. MAINTENANCE OF THE SEALS

SEALS REPLACEMENT	
Preventive maintenance	Replace after twelve (12) months. We also recommend replacing the gaskets during seal or pump shaft replacement.
Maintenance after a leak	Replace at the end of the process
Scheduled maintenance	Regularly check that there are no leaks and that the pump is operating correctly. Keep a maintenance record of the pump. Use statistics to plan inspections.
Lubrication	During assembly, use soapy water or oil compatible for the food industry when fitting the different gaskets to allow them to slide better.

The period between each preventive maintenance service will vary depending on the operating condition of the pump: temperatures, flow, number of operating hours, cleaning solutions used, etc.

8.4. TIGHTENING TORQUE

Size	Nm	lbf·ft
M6	10	7
M8	21	16
M10	42	31
M12	74	55
M16	112	83

8.5. STORAGE

Before being stored the pump must be completely emptied of liquids. Avoid, as far as possible, the exposure of the parts to excessively damp atmospheres.

8.6. CLEANING



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

Use rubber gloves during cleaning procedures.

Always use protective goggles.

8.6.1. Automatic CIP (clean-in-place)

If the pump is installed in a system with a CIP process, it is not necessary to disassemble the pump. If the automatic cleaning process is not provided, proceed to disassemble the pump as indicated in the chapter [8.7. Disassembly and assembly of the pump](#).

Two types of solutions can be used for CIP processes:

a. alkaline solution: 1% by weight of caustic soda (NaOH) a 70°C (150°F). To make this solution:

1 kg NaOH + 100 l H₂O¹ = cleaning solution

2,2 l NaOH 33% + 100 l H₂O = cleaning solution

b. acid solution: 0,5% by weight of nitric acid (HNO₃) a 70°C (150°F). To make this solution:

0,7 l HNO₃ 53% + 100 l H₂O = cleaning solution

1) only use chlorine-free water to mix with the cleaning agents

ATTENTION



Check the concentration of the cleaning solutions. Incorrect concentrations may lead to the deterioration of the pump seals.

To remove any traces of cleaning products ALWAYS perform a final rinse with clean water at the end of the cleaning process.

8.7. DISASSEMBLY AND ASSEMBLY OF THE PUMP

The assembly and disassembly of the pumps should be done by qualified personnel. Make sure that the personnel read carefully this instruction manual and, in particular, those instructions which refer to the work they will perform.

ATTENTION



Incorrect assembly or disassembly may cause damage in the pump's operation and lead to high repair costs and a long period of downtime.

INOXPA is not responsible for accidents or damages caused by a failure to comply with the instructions in this manual.

Preparation

Provide for a clean working environment so some parts, including the mechanical seal, require very careful handling and others have close tolerances.

Check that the parts which are used are not damaged during transport. When doing this, you need to inspect the adjustment edge, the butted faces, the tight fit, burrs, etc.

After each disassembly, carefully clean the parts and check for any damage. Replace all damaged parts.

Tools

Use the proper tools for assembly and disassembly operations. Use them correctly.

Cleaning

Before disassembling the pump, clean it outside and inside.

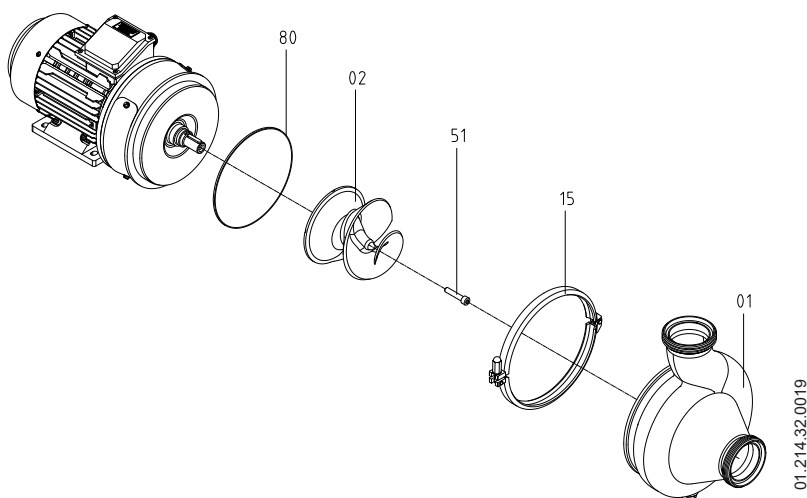
8.7.1. Pump casing and impeller

Disassembly:

1. Loosen the retention ring nut (15) and remove it.
2. Remove the pump casing (01) and the O-ring (80).
3. Loosen the impeller (02) allen screw (51) and remove both.

Assembly:

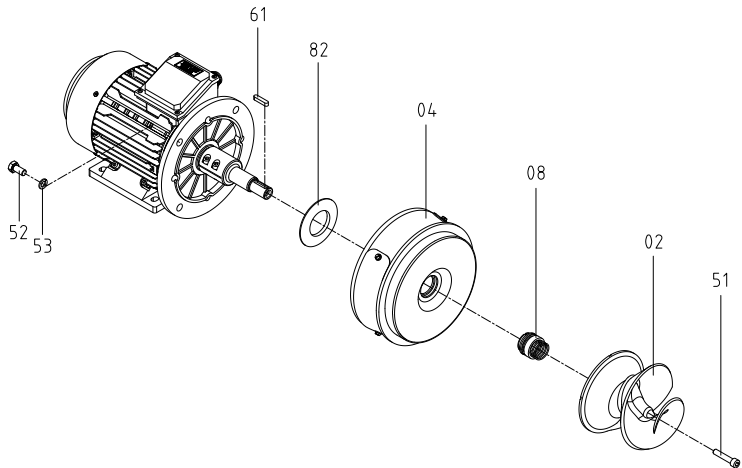
1. Place the O-ring (80).
2. Place the impeller (02) and fix it with the allen screw (51).
3. Mount the pump casing (01) with the retention ring (15).
4. Tighten the retention ring (15) nut.



8.7.2. Lantern and mechanical seal

Disassembly:

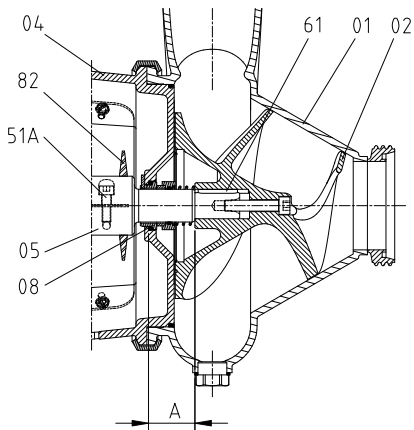
- 1. Remove the key (61) and extract the rotary part of the mechanical seal (08).
- 2. Loosen the 4 hexagonal screws (52) and remove them and their grower washers (53).
- 3. Remove the lantern (04), the stationary part of the mechanical seal (08) that is housing inside the lantern and the splash ring (82).
- 4. Loosen the allen screws (51A) and remove the shaft.



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Assembly:

- 1. Place the shaft and fix it with the allen screws (51A) according to the tightening torque value indicated in chapter 8.4. Tightening torque.
- 2. Slide the splash ring (82) over the pump shaft (05) without pushing it to the end.
- 3. Mount the lantern (04) and fix it with the hexagonal screws (52) and their grower washers (53).
- 4. Place the stationary part of the mechanical seal (08) in the lantern (04) taking into account the position of the impeller knob.
- 5. Mount the rotary part of the mechanical seal (08) by entering the seal through the pump shaft (05).
- 6. Check that the assembly dimension “A” of the following figure like the same detailed in the next table.



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Pump	Seal	A
RV-65	Ø25	40,5±0,5
RV-80	Ø30	42,5±0,5
RV-100		

- 7. Place the key (61) and continue with the assembly of the pump casing and impeller according to chapter 8.7.1. Pump casing and impeller.

9. Technical Specifications

Maximum flow rate	180 m ³ /h
Maximum differential head	22 m
Maximum working pressure	1000 kPa (10 bar)
Operating temperature range	-10°C a 120°C (EPDM)
Maximum speed	1800 rpm
Sound level	60-80 dB(A)
Suction/discharge connections	DIN 11851

Materials

Parts in contact with the product	1.4404 (AISI 316L)
Other parts in stainless steel	1.4301 (AISI 304)
Seals in contact with the product	EPDM - standard
Other materials for the seal	consult with INOXPA
Internal surface finish	polished or matt
External surface finish	matt

Mechanical seal

Type	single mechanical seal
Material of stationary part	silicon carbide (SiC)
Material of rotary part	silicon carbide (SiC)
Seal material	EPDM

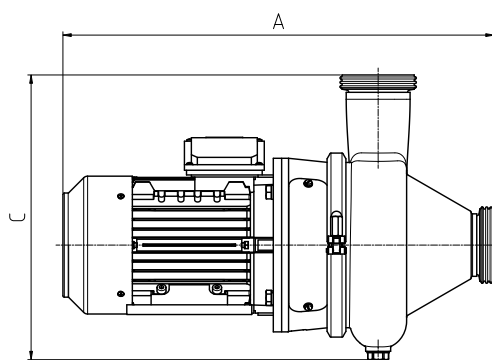
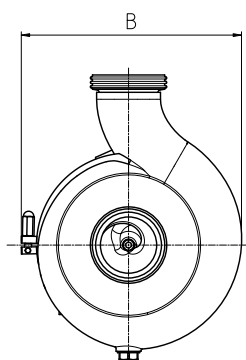
Motor

Type	Three-phase asynchronous motor, IEC B35 type, 4 poles, IP55 protection, class F-insulation
Power	0,75 - 4 kW
Speed	1500 rpm
Voltage and frequency	220-240 VΔ / 380-420 V Y, ≤4 kW 380-420 VΔ / 660-690 V Y, ≥ 5,5 kW

9.1. WEIGHTS

Pump	Weight (kg)
RV-65	26
RV-80	49
RV-100	67

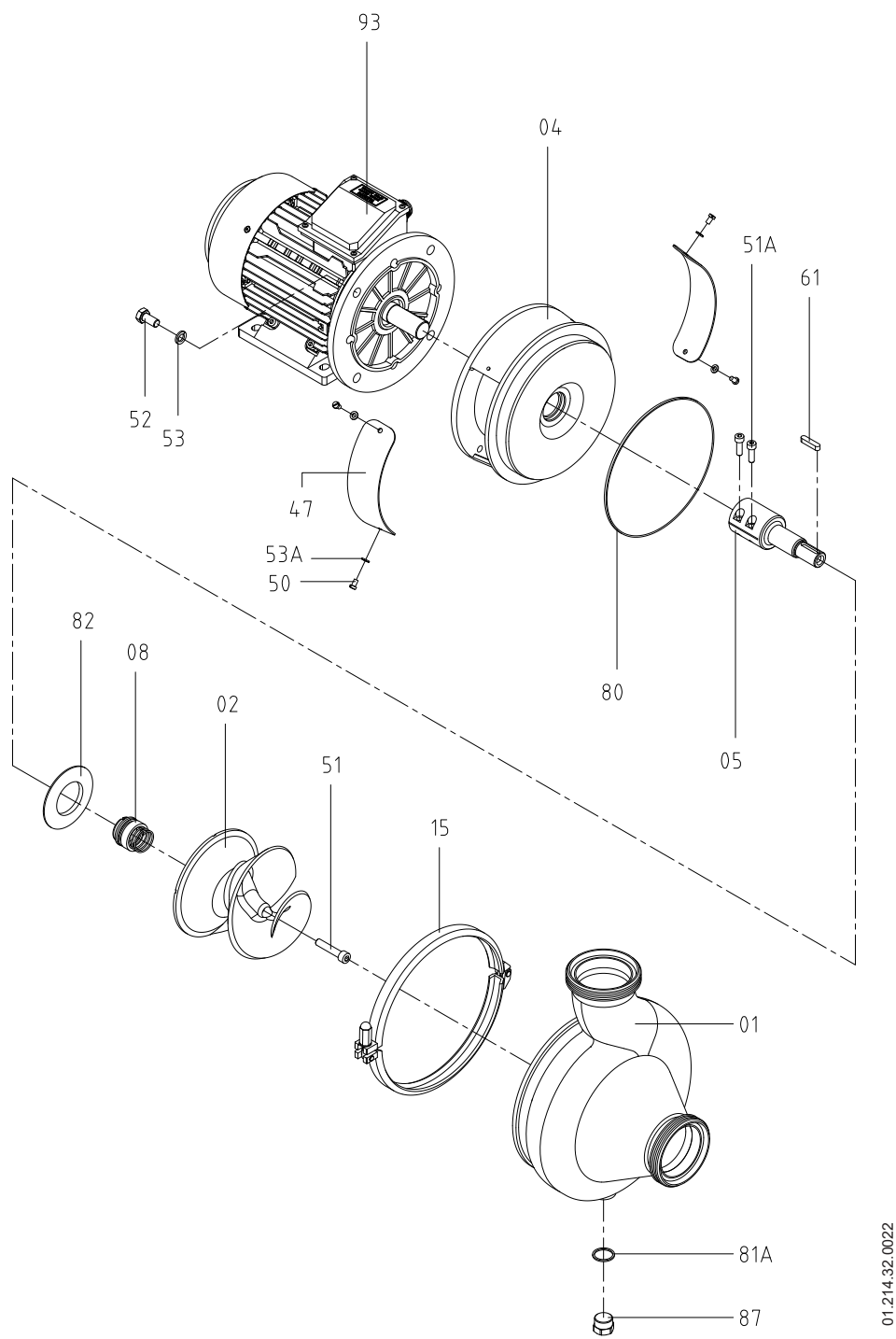
9.2. DIMENSIONS



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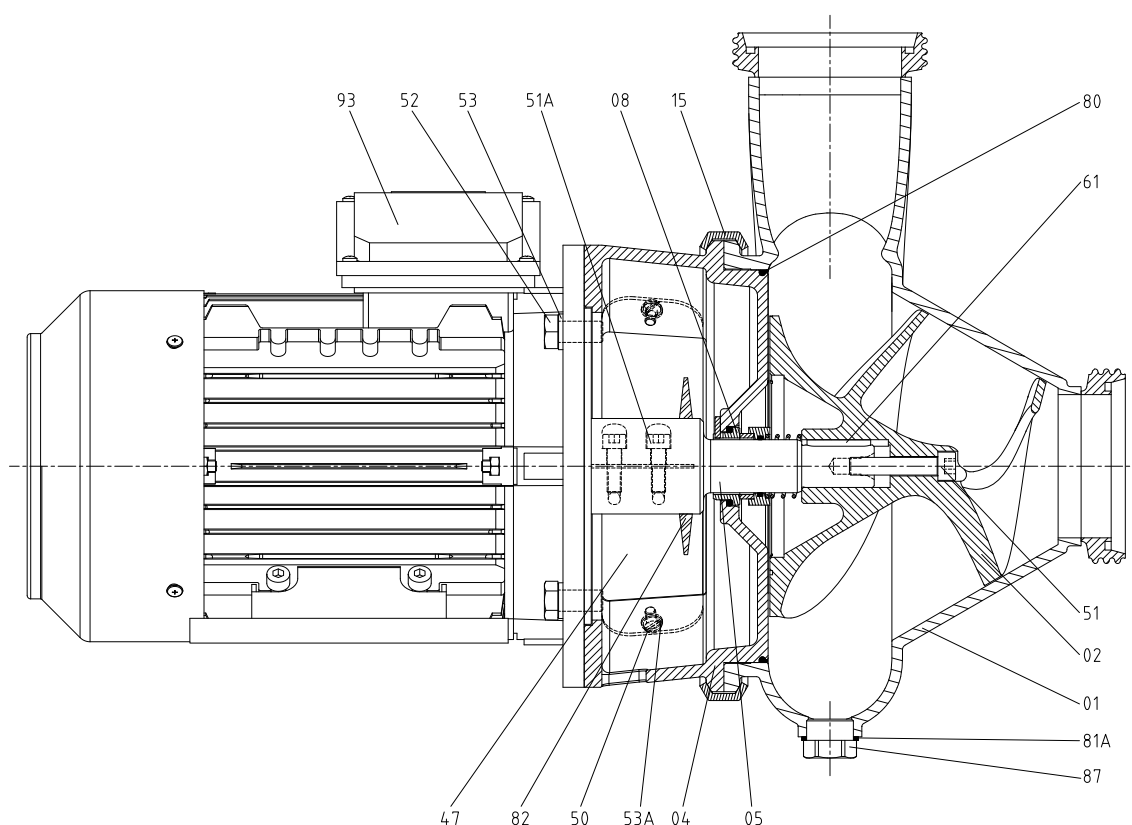
Pump	A	B	C
RV-65	120	250	345
RV-80	170	320	410
RV-100	190	345	470

9.3. EXPLODED DRAWING



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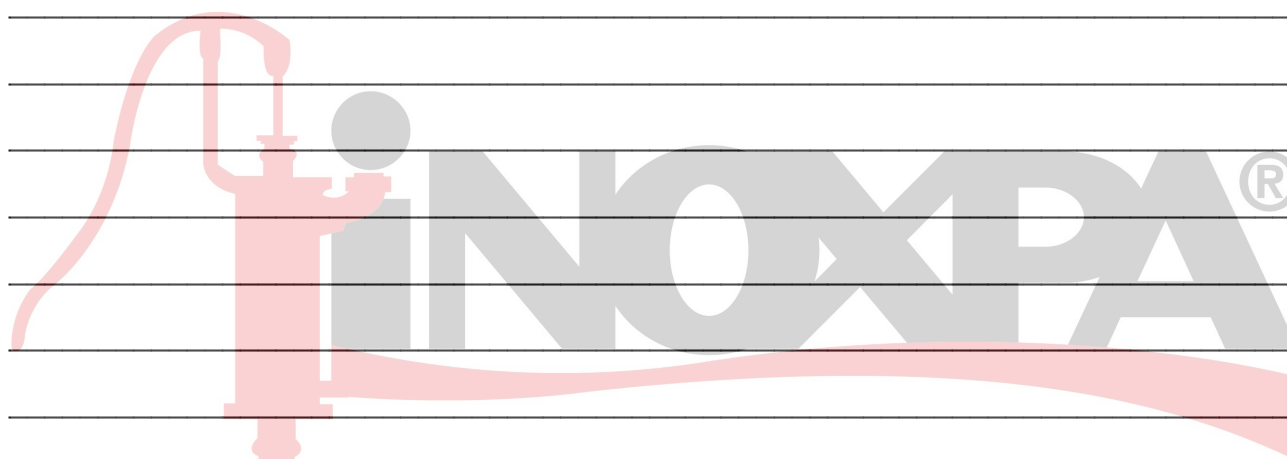
9.4. TECHNICAL SECTION AND PARTS LIST

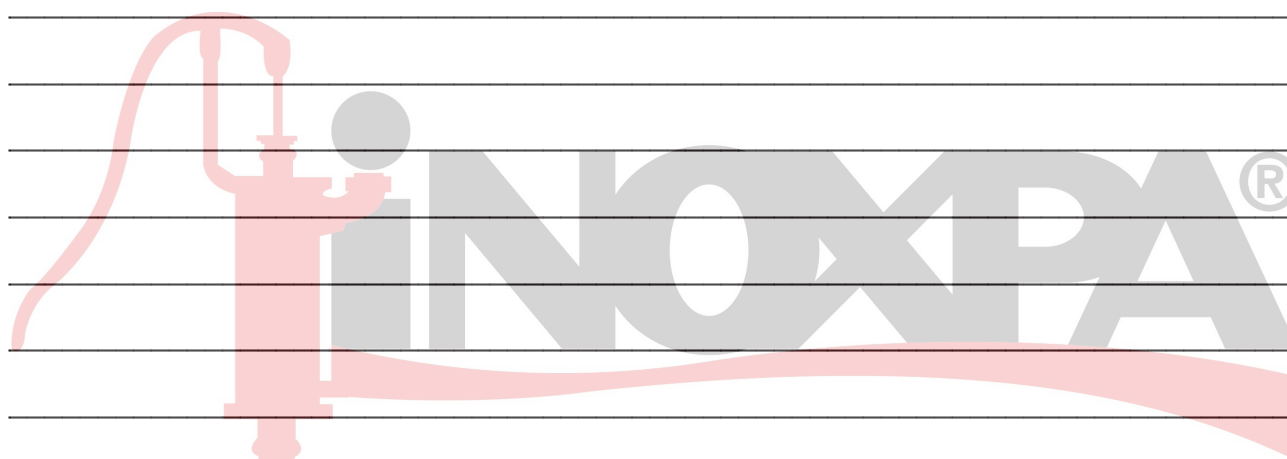


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Position	Description	Quantity	Material
01	pump housing	1	1.4404 (AISI 316L)
02	helical impeller	1	1.4404 (AISI 316L)
04	lantern	1	1.4404 (AISI 316L)
05	shaft	1	1.4404 (AISI 316L)
08	mechanical seal ¹	1	Si/Si/EPDM
15	retention ring	1	1.4301 (AISI 304)
47	protection	2	methacrylate
50	hexagonal screw	4	A2
51	allen screw	1	A4
51A	allen screw	2	A2
52	hexagonal screw	4	A2
53	grower washer	4	A2
53A	flat washer	4	A2
61	key	1	1.4404 (AISI 316L)
80	O-ring ¹	1	EPDM
81A	gasket ¹	1	PTFE
82	splash ring	1	NBR
87	drain plug	1	-
93	motor	1	-

1) recommended spare parts

The logo for INOXPA features a stylized red industrial pump or valve on the left, with a red hose extending from it. To the right of the pump is the word "INOXPA" in a large, bold, grey sans-serif font, followed by a registered trademark symbol (®). The entire logo is set against a background of horizontal grey lines.

The image features the INOXPA logo in a bold, grey, sans-serif font. To the left of the text is a stylized red illustration of an industrial pump or sprayer. A red hose curves upwards from the pump's handle and then downwards to the right, ending in a wide, shallow arc. The entire graphic is set against a background of horizontal grey lines.

How to contact INOXPA S.A.U.:

Contact details for all countries are continually updated
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