INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

VERTICAL AGITATOR NHS

Original Manual

20.050.30.01EN

EC Declaration of Conformity

INOXPA S.A.U.
Telers, 60
17820 - Banyoles (Spain)

hereby declare under our sole responsibility that the

Machine:	**VERTICAL AGITATOR**
Model:	**NHS**
Serial number:	**IXXXXXXXXX** to **IXXXXXXXXX** **XXXXXXXXXIINXXX** to **XXXXXXXXXIINXXX**

fulfils all the relevant provisions of the following directive:

Machinery Directive 2006/42/EC
Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment

and with the following harmonized standards:

EN ISO 12100:2010
EN 60204-1:2018
EN IEC 63000:2018

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

David Reyero Brunet
Technical Office Manager
25th June 2024

CE

Document: 20.050.30.07EN
Revision: (A) 2024/06

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fulfils all the relevant provisions of these regulations:

Supply of Machinery (Safety) Regulations 2008
The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 (as amended)

and with the following designated standards:

EN ISO 12100:2010
EN 60204-1:2018
EN IEC 63000:2018

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1. Safety Instructions

1.1. SAFETY INSTRUCTIONS

This instruction manual contains basic indications which should be fulfilled during the installation, starting and maintenance. Consequently, it is indispensable that prior to the installation, the installer as well as the technical personnel responsible for the plant read this instruction manual and that this remains permanently available in the proximity of the corresponding agitator or installation.

Not only should the safety instructions indicated in this chapter be observed and fulfilled, but so should the special measures and recommendations included in the other chapters of this manual.

1.2. SYMBOLS USED.

The safety instructions contained in this manual, whose non-fulfilment could cause a risk for persons or for the machine and its operation, are expressed through the symbols indicated in the following:

Danger for people in general.

Danger! Suspended loads.

Electric danger.

Danger of injury caused by the agitator.

Danger for the agitator and its operation.

Commitment to guarantee safety at the workplace.

1.3. GENERAL SAFETY INSTRUCTIONS

- Read the instructions in this manual before installing and starting up the agitator
- The installation and use of the agitator should always be in accordance with applicable regulations in regard to health and safety.
- Before starting up the agitator, check that it is properly anchored and its shaft is perfectly aligned. Incorrect alignment and/or excessive stress during coupling can cause serious mechanical problems in the agitator.

- All the electric work should be carried out by specialised personnel.
- Keep the motor and the switchboard under control, particularly in areas where there is a risk of fire or explosion. The responsible person of the user company must define the risk zones (zone 0–1–2).
- When cleaning, do not spray directly on the engine.
- Do not disassemble the agitator until the switchboard has been disconnected. Remove the fuses and disconnect the power cable supplying the motor.

- Do not operate the agitator when the rotating parts are not equipped with their guards or are not properly assembled.
- The agitator has rotating parts. Do not place hands or fingers in the agitator while it is operating. This may cause serious injuries.
- Do not touch the parts of the agitator that are in contact with the fluid when in operation. When the agitator operates with hot fluids (temperatures above 50 ºC), there is a risk of skin burning. In such cases, collective-protection means (in this order of priority: separation, protective screen, heat-insulating material) or, in the absence of this, individual protection gear (gloves) must be used.

- Take all possible precautions when lifting the agitator. Always use properly attached slings when moving the agitator with a crane or other lifting device.

- Before starting up the agitator, remove all the tools used during the assembly.
- The agitator cannot operate without fluid. Standard agitators are not designed to work during the filling or emptying of tanks.

- The maximum operating conditions of the agitator should not be exceeded. Nor should the operating parameters for which the agitator was initially designed be modified without written authorisation from INOXPA.
- The agitator and its installation can generate sound levels above 85 dB(A) under unfavourable operating conditions. In such cases, the operators must use devices for protection against noise.

1.4. GUARANTEE

Finally, we must stress that any warranty provided shall immediately be cancelled and void, and we 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 authorisation;
- 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;
- All wearing parts are excluded from this guarantee.

The General Delivery Terms already provided also apply.

1.5. INSTRUCTION MANUAL

The information published in the instruction manual is based on updated information.
We reserve the right to modify the design and/or manufacture of our products when we consider it appropriate, without having any obligation to appropriately adapt any product supplied beforehand.
The technical and technological information issued in this instruction manual, together with the graphs and technical specifications we provide, will continue to be our property and should not be used (unless it is used for the starting of this installation), copied, photocopied, delivered or communicated to third parties without prior written notice.
INOXPA reserves the right to modify this instruction manual without prior notice.

1.6. INOXPA SERVICE

Please do not hesitate to contact us in case of doubts or if more complete explanations are required on specific details (e.g. configuration, assembly, disassembly).

2. Table of contents

3. Receipt, storage and transport

INOXPA is not liable for any deterioration of the material caused by its transport or unpacking. Visually check that the packaging has not been damaged.

The following documentation is included with the mixer:

- Shipping documents.
- Instruction and Service manual for the agitator.
- Instruction and Service manual for the gear-motor.

3.1. RECEIPT

When receiving the agitator, check the packaging and its content to ensure that it matches the delivery note. INOXPA packs the agitators in their fully assembled form or disassembled on a case-by-case basis. Ensure that the agitator has not been damaged in any way; if it is not in good condition and/or any parts are missing, the carrier must submit a report as soon as possible.

3.2. STORAGE

If the agitator is not to be installed immediately, it must be stored in an appropriate place. The shaft must be stored in a horizontal position and placed on wooden supports or of a similar material. In this position, the shaft will not become deformed but it must not be subject to any type of load.

3.3. TRANSPORT

Take all possible precautions when lifting the agitator. Always use properly attached slings when moving the agitator with a crane or other lifting device.

According to the model, the agitators are too heavy to be stored or installed manually. Use an appropriate mode of transport. Do not handle the agitator by the shaft as this may become deformed.

Type	Weight[kg.] with gearbox drive
NHS 1.11-07003-500	25
NHS 1.11-03003-600	27
NHS 1.11-07007-600	40
NHS 1.11-03007-700	58
NHS 1.11-07011-700	46
NHS 1.11-07015-750	64
NHS 1.11-03015-800	66
NHS 1.6-07003-500	24
NHS 1.6-07007-600	38
NHS 1.6-07011-700	42
NHS 1.6-07015-800	60
NHS 1.6-14011-450	39
NHS 1.6-14015-600	43

4. Identification, description and use

4.1. IDENTIFICATION

The agitator is identified using a rating plate fixed onto the motor. The type of agitator and the serial number appear on the nameplate. See figure 4.1.

Figure 4.1: Rating plate.

Example:

NHS	**1**	**11**	**-**	**070**	**03**	**-**	**500**
1	2	3		4	5		6

1. Agitator name.

NHS = type vertical agitator.

2. Number of agitation elements.

1 = One agitation element.
3 = Three agitation element.

3. Type of agitation element.

11 = 4 inclinable blades.
6 = 2 inclinable blades.

4. Rotation speed.

070 = 70 rpm.
030 = 30 rpm.
140 = 140 rpm.

5. Motor power.

03 = 0,37 kW.
15 = 1,5 kW.

6. Diameter of agitation element.

500 = 500 mm.
600 = 600 mm.
700 = 700 mm.
800 = 800 mm.

4.2. DESCRIPTION

The NHS series range is a vertical agitator with the agitator shaft fixed directly onto gear motor, with a service factor able to withstand the radial and thrust load of the agitation element. The lantern connected to the tank has a base plate made of stainless steel. This range includes a leak mechanism that prevents undesired products from entering the mixing process. Additionally the base plate has two holes that serve to remove any leaking oil from the reduction unit to avoid, with the help of the leak mechanism, their entering the tank.
All the parts that come into contact with the product are made of stainless steel, AISI 316L (1.4404).The standard mixing elements (interchangeable) are the inclined blades type 11 and 6.
Depending on the working conditions or application, other types of stirring elements can be mounted.

4.3. USING THE AGITATOR

Depending on the selected agitation element, this range can be used to carry agitation and mixing processes in closed tanks with a variable viscosity according to the working conditions.
These agitators are suitable for industries as foodstuffs.

Each agitator has performance limits. The agitator was selected for a given set of mixing conditions when the order was placed. INOXPA shall not be held responsible for any damage that might be suffered or malfunctioning of the equipment if the information provided by the buyer is incomplete or incorrect (e.g. nature of the fluids or installation details).

5. Installation and assembly

5.1. INSTALLATION AND ASSEMBLY

If the agitator is supplied without a drive or other element, the buyer or user shall be responsible for assembling it, installing it, starting it up, and operating it.

5.2. LOCATION

Place the agitator in such a way as to facilitate inspections and checks. Leave enough room around the agitator for service, disassembly and maintenance operations. It is very important to be able to access the electric connection device of the agitator, even when in operation.
For a good agitation process, it may be necessary to place a deflector in the tank. Ask our Technical Dept. for information on any particular application. If required, the approximate dimensions of the deflector for different tank diameters are shown in figure 5.1 and table 5.1.

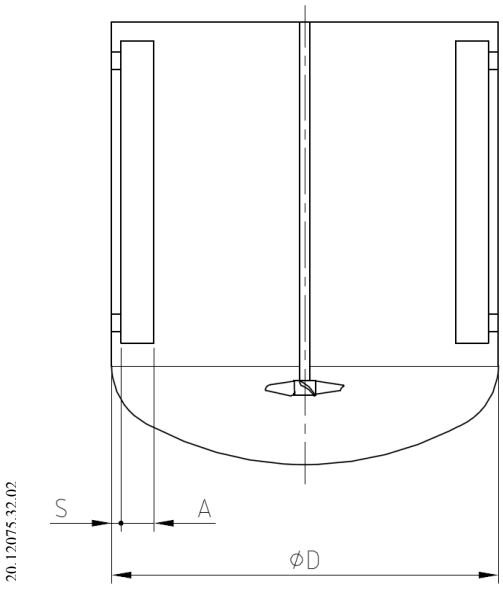


Figure 5.1

∅ D	300	400	500	600	800	1000	1200	1600	2000	2500	3000	3500	4000
A	20	30	35	40	50	70	80	115	130	180	200	240	280
S	5	5	10	10	10	15	20	20	30	30	50	50	50

Table 5.1

5.3. ASSEMBLY

To locate and fix the agitator in the support flange of the tank, the propeller must be removed from the shaft. Once the base of the agitator is placed on the supporting flange, the fixing nuts and screws will be assembled in the corresponding holes, without being tightened. When this operation has been carried out, the agitator must be levelled using the following method.

- Place a spirit level on the agitator shaft.
- Check 4 points at 90º from each other around the circumference of the shaft and at the same height.

Once the agitator has been levelled, tighten the screws and nuts. Finally, the propellers are mounted on the shaft. Take into account that when fitting the agitator element, to prevent any deformation the agitation shaft must not be struck or forced.

Force must never be applied on the end of the agitation shaft, since it can be easily deformed permanently.

5.4. ELECTRICAL CONNECTION

Before connecting the electrical motor to the mains, check local regulations on electrical safety as well as the applicable standards. Special attention should be given to the control and command section of the agitator. Check the instruction manual of the manufacturer of the motor for information on how to connect it to the mains.

The connection of the electrical motors must be performed by qualified personnel. Take the appropriate measures to prevent any fault.
The motor must be provided with devices for protection against power overload and short-circuits.
The agitator cannot be used in areas where there is a risk of fire or explosion when this has not been specified in the order. Risk areas (area 0-1- 2).

6. Start-up, operation and shutdown

The start-up of the agitator can be carried out provided the instructions indicated in the chapter on Installation and Assembly have been followed.

6.1. START-UP

- Check that the power supply matches the rating indicated on the motor plate.
- Check the alignment of the agitator shaft.
- Check the level of fluid in the tank. When not specified in the order, the agitator cannot be operated during the filling or emptying of the tank.

The agitator can NEVER operate without fluid. The agitation elements may only be submerged to a height equal to 1.5 times its diameter.

- All the guards must be in place.
- Start up the agitator.
- Check that the direction of rotation of the propellers is correct (it must rotate clockwise when seen from the drive side) See figure 6.1

Follow the direction of rotation of the agitation components as indicated by the arrow attached to the engine. An incorrect direction of rotation results in a loss of agitation performance.

- Check the electrical consumption of the motor.

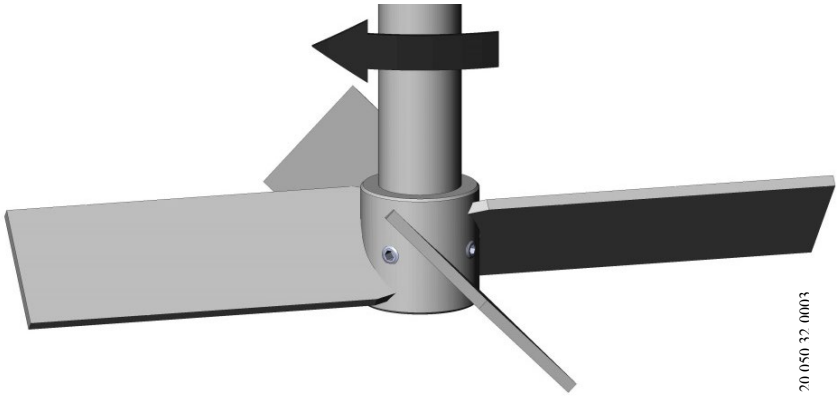


Figure 6.1

6.2. OPERATION

Do not modify the operating parameters for which the agitator was initially designed without written authorisation from INOXPA. (Risk of damage and user hazard).
Follow the instructions for use and the safety requirements described in the instruction manual for the tank in which the agitator is mounted.

Mechanical risks (e.g. drag, shear, cutting, impact, flattening, and pinching). If the agitation element is accessible from the top or the tank inspection hatch, then the user will be exposed to the above-mentioned risks.

The tank must be fitted with protective devices and safety equipment; consult the manufacturer's instruction manual.

Introducing an object or solid raw material may cause the agitation component and other mechanical parts to break and compromise its safety or guarantee.

7. Maintenance and conservation

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

Before beginning maintenance work, ensure that the electric motor is disconnected and that the tank is empty.

The symbol indicates that the product should not be discarded as unsorted waste but must be sent to separate collection facilities for recovery and recycling.

7.1. MAINTENANCE

- Inspect the agitator regularly.
- Always take care to clean the agitator.
- Check the state of the gearbox motor.
- Check the sealing: Lip seal.

The maintenance of the motor and reducer shall be carried out according to the manufacturer's indications (See instruction manual).

7.2. LUBRICATION

The motor and gearbox drive bearings must be greased according to the manufacturer's indications.

7.3. SPARE PARTS

When ordering spare parts, it is necessary to indicate the type and serial number, which can be found on the agitator rating plate, and also the position and description of the part, which can be found in chapter 10, technical specifications.

7.4. CONSERVATION

If the agitator is to be taken off line for a long period of time, clean and treat the parts with mineral oil VG 46. The shaft must be stored in a horizontal position and placed on wooden supports or of a similar material.

8. Operating problems: causes and solutions

Operating problems	Probable causes
Motor overload.	1, 2.
Insufficient agitation.	1, 3, 4, 5.
Vibrations and noise.	4, 6, 7, 8, 9.
Leaks	10, 11.

	Probable causes	Solutions
1	Viscosity of the liquid too high.	Reduce the viscosity, e.g. by heating the fluid.
2	High density	Increase engine power.
3	Tank oversized for the agitator selected.	Check with the Technical Department.
4	Wrong direction of rotation	Reverse the direction of rotation.
5	Agitator speed too low.	Increase speed.
6	Liquid level too low or no liquid.	Check the level of fluid in the tank.
7	Twisted shaft.	Replace the shaft.
8	Critical speed.	Check with the technical department.
9	Worn bearing driver	Replace the bearing driver.
10	Lip seal damaged or worn.	If the lip seal is worn, replace it. If the lip seal is damaged, consult the technical department.
11	Damaged O-ring.	Check with the Technical Dept.

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

9. Disassembly and assembly

Assembly and disassembly of the agitators must only be carried out by qualified staff. Ensure that all staff reads this instruction manual attentively, particularly the instructions that relate to their work.

9.1. ELECTRICAL SAFETY

Stop the motor from starting up when carrying out assembly and disassembly work on the agitator.

- Place the agitator switch in the "off" position.
- Lock out the electrical switchboard or place a warning sign.
- Remove the fuses and take them to the workplace.

9.2. DISASSEMBLY

Once the motor has been disconnected, start to disassemble the agitator.

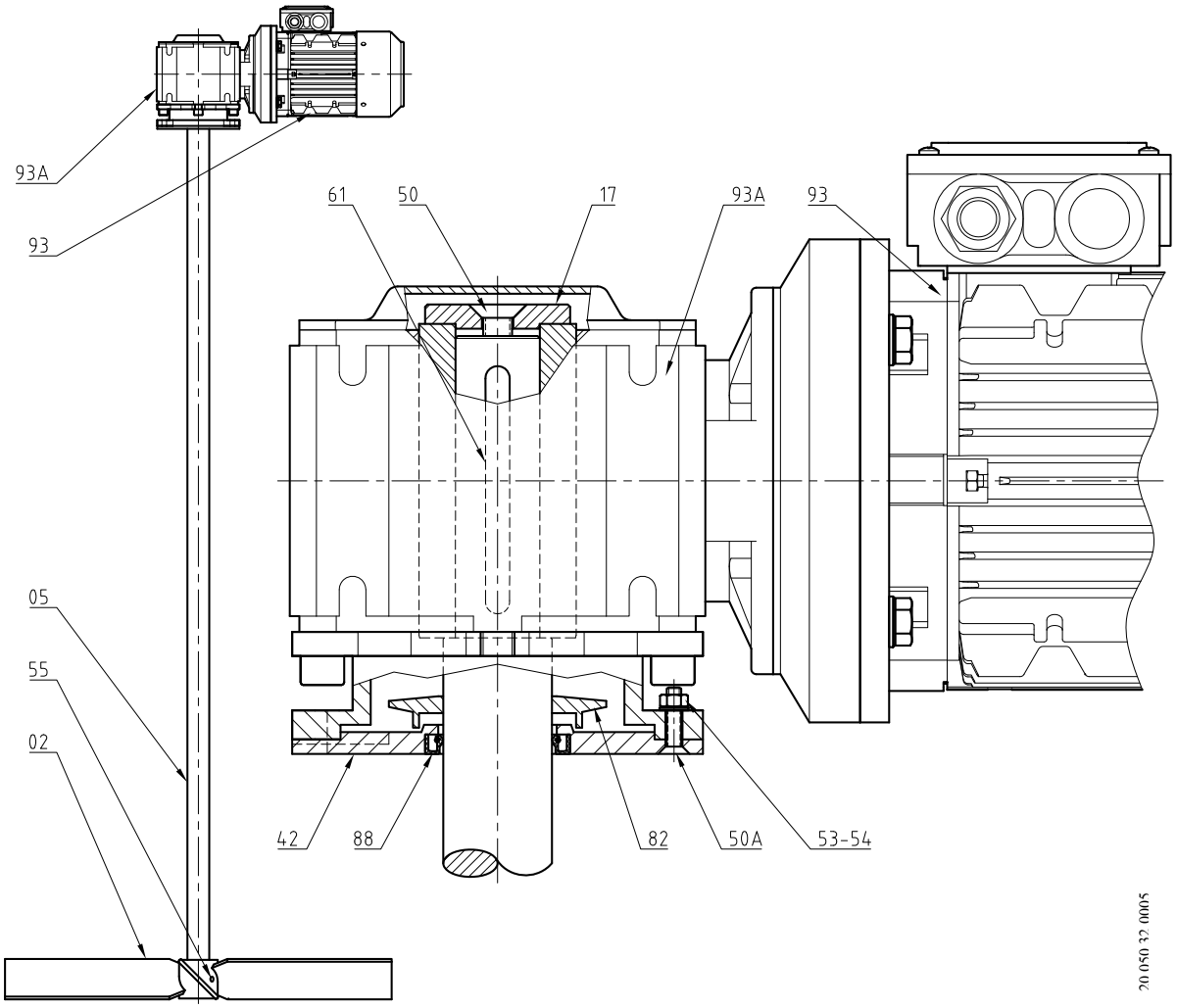
- Empty the tank.
- Remove the Allen studs (55) to remove the propeller (02).
- Remove the screws that fix the agitator to the tank, then take the agitator out of the tank.
- Hold and support the shaft (05) with a soft base.
- Remove the top cover of the reducer (93A). Unscrew the countersunk screw (50) and the washer (17) securing the shaft (05).
- Remove the two countersunk screws (50A) with their nuts (54) and washers (53) securing the baseplate (42) to the reduce flange (93A).
- Lift the gear motor (93, 93A) straight up to separate from the shaft (05).
- Remove the key (61), splash ring (82) and the base plate (42) with the lip seal (88) on the shaft.

9.3. ASSEMBLY

- Place the splash ring (82) in position on the shaft (05) as indicated in chapter 10.2 Sealing: splash ring (assembly dimensions).
- Insert hte key (61) in the keyway of the shaft (05).
- Introduce the agitator shaft (05) with the splash ring (82) into the gear motor (93A) as far as it will go and then fix the shaft (05) with the washer (17) and the contersunk screws (50).
- Slide the base plate (42) onto the shaft (05) and secure it to the reducer flange with the countersunk screws (50A), nuts (54) and washers (53)
- Mount the lip seal (88) in its housing on the base plate (42).
- Place the agitator in the tank and secure it to the tank flange.
- Finally, mount the propeller (02) on the shaft (05) with the Allen studs (55).

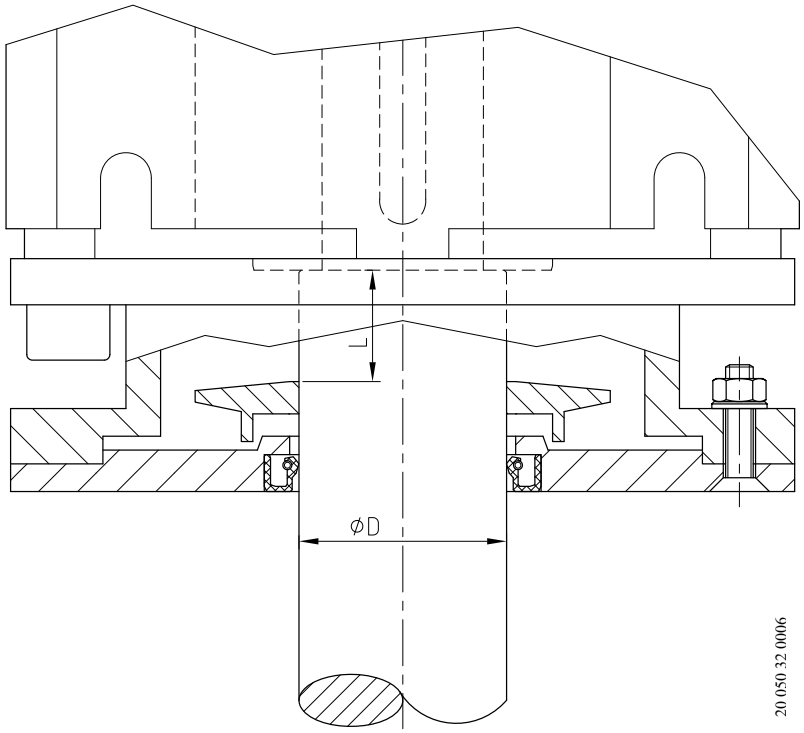
10. Technical specifications

10.1. NHS AGITATOR PART LIST



Position	Quantity	Description	Material
02	1	Propeller	AISI 316L
05	1	Agitator shaft	AISI 316L
17	1	Washer	AISI 304
42	1	Base plate	AISI 316L
50	1	Countersunk screw	A2
50A	2	Countersunk screw	A2
53	2	Flat washer	A2
54	2	Hexagonal nut	A2
55	2	Allen stud	A2
61	1	Key	F 1140
82	1	Splash ring	SILICONE
88	1	Lip seal	NBR
93	1	IEC Motor	-
93A	1	Worm gear unit	-

10.2. SEALING: SPLASH RING (ASSEMBLY DIMENSIONS)



ØD	L
35	24
40	17
45	24

NOTES

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How to contact INOXPA S.A.U.:
Contact details for all countries are
continually updated on our website.
Please visit www.inoxpa.com to access the information.

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