



## INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

# NBI VERTICAL AGITATOR



20.047.32.0001

### **INOXPA S.A.U.**

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## EC Declaration of Conformity

We,

**INOXPA, S.A.U.**

Telers, 60

17820 – Banyoles (Girona)

hereby declare under our sole responsibility that the machine

**NBI VERTICAL AGITATOR**

With the serial number:

Conforms to the relevant provisions of the following directives:

**Machinery Directive 2006/42/EC**

**Low voltage Directive 2014/35/EU**

**Electromagnetic Compatibility Directive 2014/30/EU**

Applicable harmonised standards:

**UNE-EN ISO 12100:2012**

**UNE-EN 14120:2016**

Identification of the person empowered to draw up the Declaration on behalf of the manufacturer, and qualified to compile the technical file established by the community

A handwritten signature in black ink, appearing to be "David Rejero Brunet".

David Rejero Brunet  
Technical Office Manager

Banyoles, 21st December 2017

# 1. Safety

## 1.1. INSTRUCTIONS MANUAL

This manual contains information about the reception, installation, operation, assembly, disassembly and maintenance of the NBI vertical agitator.

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

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

## 1.2. INSTRUCTIONS FOR START-UP

This instruction manual contains essential and useful information for the correct handling and maintenance of your agitator.

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

## 1.3. WARNING SYMBOLS



Safety hazard for people in general and/or for equipment



Electric hazard



Important instruction for the protection of the equipment

## 1.4. GENERAL SAFETY INSTRUCTIONS



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

### 1.4.1 During the installation

The [Technical specifications](#) of chapter 8 should always be observed.



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.

#### 1.4.2. During operation

The [Technical specifications](#) of Chapter 8 should always be observed. Under no circumstances can the specified limit values be exceeded.

Before starting up the agitator, remove all the tools used during the assembly.

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°C), there is a risk of skin burning. In such cases, collective-protection means (in this order or priority: separation, protective screen, heat-insulating material) or, in the absence of this, individual protection gear (gloves) must be used.

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.

#### 1.4.3. During maintenance

The [Technical specifications](#) of Chapter 8 shall always be observed.



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 authorisations from INOXPA.



Do not leave loose parts on the floor.

Do not disassemble the agitator until the switchboard has been disconnected. Remove the fuses and disconnect the power cable supplying the motor.

All the electric work should be carried out by specialised personnel

#### 1.4.4. Compliance with the instructions

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

This non-compliance may result in the following risks:

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

#### 1.4.5. Warranty

Any warranty will be void immediately and lawfully; additionally, INOXPA will be compensated for any civil liability claims submitted by third parties, in the following cases:

- The service and maintenance work have not been carried out in accordance with the service instructions, the repairs have not been carried out by our personnel or have been carried out without our written authorisation.
- Modifications have been carried out on our material or equipment without written authorisation.
- The material or equipment has been improperly used, has been used negligently, or has not been used according to the instructions and their intended.

The General Conditions of Delivery already in your possession are also applicable.



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 authorisation from INOXPA

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

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## 3. General Information

### 3.1. DESCRIPTION

The NBI series range is sanitary vertical agitators with shaft mount directly to gear motor. The stub shaft is rigidly supported by two bearings to withstand the thrust and radial loads transmitted by the mixing element. In turn the agitator shaft is held directly onto the half shaft with two allen studs.

### 3.2. USING THE AGITATOR

Depending on the selected agitation element, it can use in agitations and mixing processes in closed tank with a variable viscosity.

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).

# 4. Installation

## 4.1. RECEPTION OF THE AGITATOR



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.

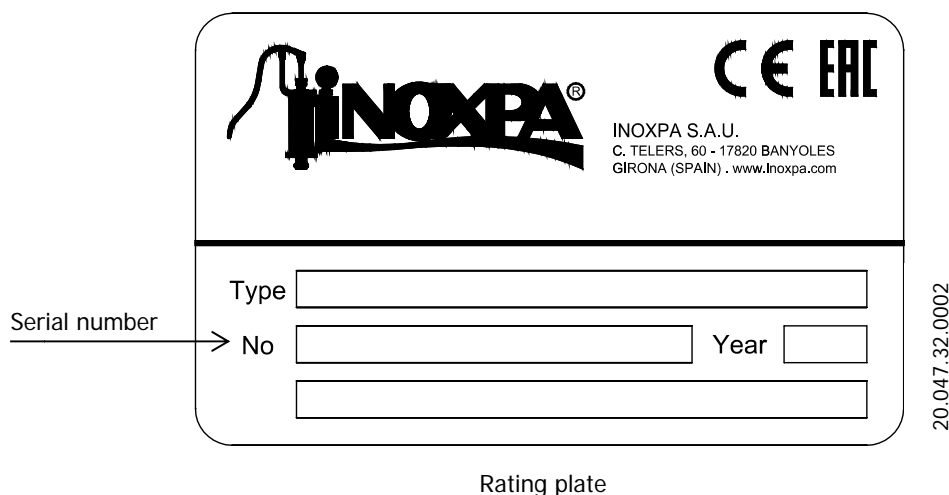
When receiving the agitator, check the packaging and its content to ensure that it matches the delivery note. INOXPA packs the agitators in their fully assembled form or disassembled on a case-by-case basis. Ensure that the agitator has not been damaged in any way. If it is not in good condition and/or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

The following documentation is included with the agitator:

- Shipping documents
- Instructions and Servicing manual for the agitator
- Instructions and Servicing manual for the gear-motor

### 4.1.1. 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.



Example:

**NBI 1. 10 - 200 05 - 200**  
 1 2 3 4 5 6

- 1. Agitator name**  
NBI = Vertical agitator NBI
- 2. Number of agitation elements**  
 1 = One agitation element  
 2 = Two agitation element  
 3 = Tree agitation element
- 3. Type of agitation element**  
10 = Marine Propeller
- 4. Rotation speed**  
200 = 200 rpm

**5. Motor power**

05 = 0,55 kW

11 = 1,10 kW

**6. Diameter of agitation element**

200 = 200 mm

250 = 250 mm

300 = 300 mm

350 = 350 mm

400 = 400 mm

**4.2. TRANSPORT AND STORAGE**



**ATTENTION**

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.



**ATTENTION**

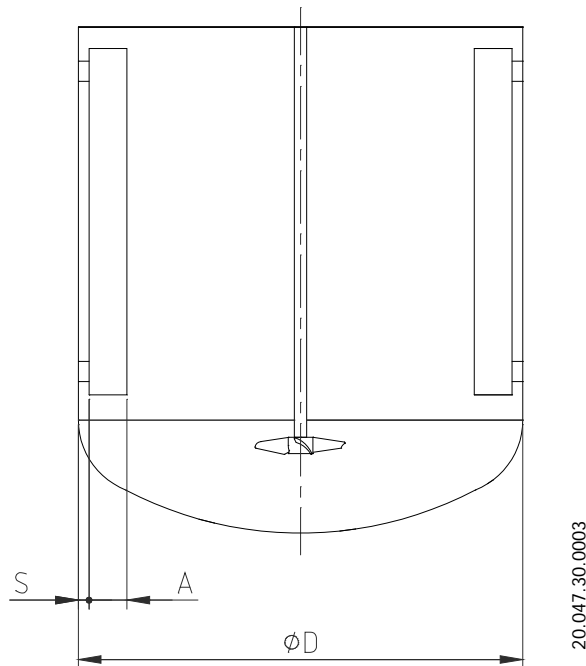
Take all possible precautions when lifting the agitator. Always use properly attached slings when moving the agitator with a crane or other lifting device.

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 for a similar material. In this position, the shaft will not become deformed but it must not be subject to any type of load.

**4.3. 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 Department for information on any particular application. If required, the approximate dimensions for the deflector for different tank diameter are shown in the next figure and the next table:





Ø 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

#### 4.4. ELECTRICAL INSTALLATION

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 instructions manual of the manufacturer of the motor for information on how to connect it to the mains.



- Take 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)

#### 4.5. ASSEMBLY

After the base of the agitator has been placed on the supporting flange, fit the screws and nuts in the appropriate bores, without tightening. After this, the agitator should be levelled by doing the following:

1. Place a spirit level on the agitator shaft
2. Check 4 points at 90° from each other and at the same height
3. Once the agitator has been levelled, tighten the screws and nuts. Take into account that when fitting the agitator element, to prevent any deformation the agitation shaft must not be struck or forced.



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.



**ATTENTION**

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

# 5. Starting

The start-up of the agitator can be carried out provided the instructions indicated in the chapter [4. Installation](#) have been followed.

## 5.1. START-UP

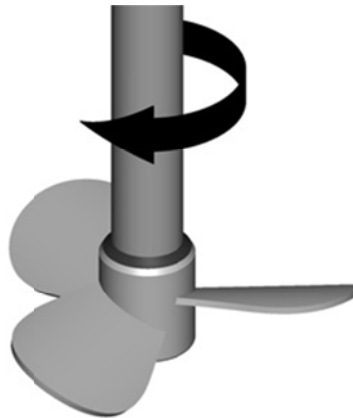
- Check that the power supply matches the rating indicated on the motor plate.
- Check the alignment of the agitator shaft.
- Check the level of fluid in the tank. When not specified in the order, the agitator cannot be operated during the filling or emptying of the tank.

**ATTENTION**



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 the next figure.



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

- Check the electrical consumption of the motor.

## 5.2. OPERATION

**ATTENTION**



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 instructions 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 inspections 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 instructions manual.

**ATTENTION**



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

## 6. Troubleshooting

The attached table lists solutions to problems that may arise while operating the agitator. It is assumed that the agitator has been properly installed and that it has been selected correctly for the specific application.

Contact INOXPA if technical assistance is required.

Motor overload																									
□	Insufficient agitation																								
□	Vibrations and noise																								
□	Leaks																								
□	<table border="1"> <thead> <tr> <th>PROBABLE CAUSES</th> <th>SOLUTIONS</th> </tr> </thead> <tbody> <tr> <td>Viscosity of the liquid too high</td> <td>Reduce the viscosity, e.g. by heating the fluid</td> </tr> <tr> <td>High density</td> <td>Increase engine power</td> </tr> <tr> <td>Tank oversized for the agitator selected</td> <td>Check with the Technical Department</td> </tr> <tr> <td>Wrong direction of rotation</td> <td>Reverse the direction of rotation</td> </tr> <tr> <td>Agitator speed too low</td> <td>Increase speed</td> </tr> <tr> <td>Liquid level too low or no liquid</td> <td>Check the level of fluid in the tank</td> </tr> <tr> <td>Twisted shaft</td> <td>Replace the shaft</td> </tr> <tr> <td>Critical speed</td> <td>Check with the Technical Department</td> </tr> <tr> <td>Worn bearing driver</td> <td>Replace the bearing driver</td> </tr> <tr> <td>Head lip seal worn</td> <td>Replace the head lip seal</td> </tr> <tr> <td>Damaged O-ring</td> <td>Check with the Technical Department</td> </tr> </tbody> </table>	PROBABLE CAUSES	SOLUTIONS	Viscosity of the liquid too high	Reduce the viscosity, e.g. by heating the fluid	High density	Increase engine power	Tank oversized for the agitator selected	Check with the Technical Department	Wrong direction of rotation	Reverse the direction of rotation	Agitator speed too low	Increase speed	Liquid level too low or no liquid	Check the level of fluid in the tank	Twisted shaft	Replace the shaft	Critical speed	Check with the Technical Department	Worn bearing driver	Replace the bearing driver	Head lip seal worn	Replace the head lip seal	Damaged O-ring	Check with the Technical Department
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If the problems persist, stop using the agitator immediately. Contact agitator manufacturer or their representative.

# 7. Maintenance

## 7.1. GENERAL CONSIDERATIONS

This agitator, 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 [8. Technical specifications](#)

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.

## 7.2. MAINTENANCE

- Inspect the agitator regularly
- Always take care to clean the agitator
- Check the state of the gearbox drive

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

## 7.3. LUBRICATION

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

## 7.4. 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 [8. Technical specifications](#).

## 7.5. CONSERVATION

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

## 7.6. ASSEMBLY/DISASSEMBLY OF THE AGITATOR



Assembly/disassembly of the agitators must only be carried out by qualified staff. Ensure that staff read these instructions manual attentively, particularly the instructions that relate to their work.



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.

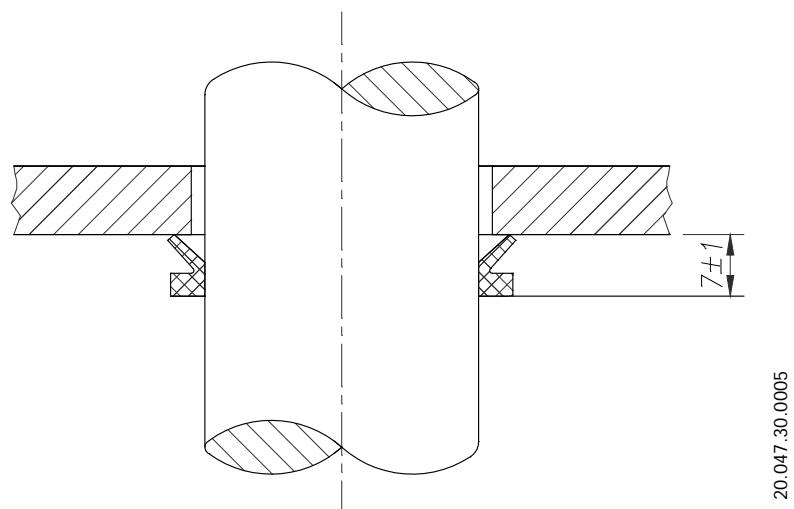
### 7.6.1. Disassembly

Once the motor has been discontinued, start to disassemble the agitator:

- Empty the tank
- Access to interior of the tank if it's possible
- Remove the propeller (02) from the shaft loosening the allen stud (55)
- Then, loosen the other allen studs (55A) that are situated a half shaft (26) and support the agitator shaft (05). Remove the agitator shaft (05)
- Loose screw from gear box and special washer (51A, 35)
- Remove the V-ring (81)
- Finally, remove the stainless steel base plate (42) through the countersunk screws (51)

### 7.6.2. Assembly

- Place the base plate (42) on the output flange of the gear motor (93A), fixing it with the countersunk screws (51)
- Fit the V-ring (81) on stub shaft (26) as shown in the follow figure



- Introduce special washer (35) and tighten the screw (51A)
- Assemble the agitator shaft (05) into half shaft (26) and fix with allen studs (55A)
- Finally, fix at the other end of agitator shaft (05) the propeller (02) with the allen studs (55)



## 8. Technical specifications

### 8.1. TECHNICAL SPECIFICATIONS

#### Materials

Parts in contact with the product	AISI 316L (1.4404)
V-ring	NBR

#### Other features

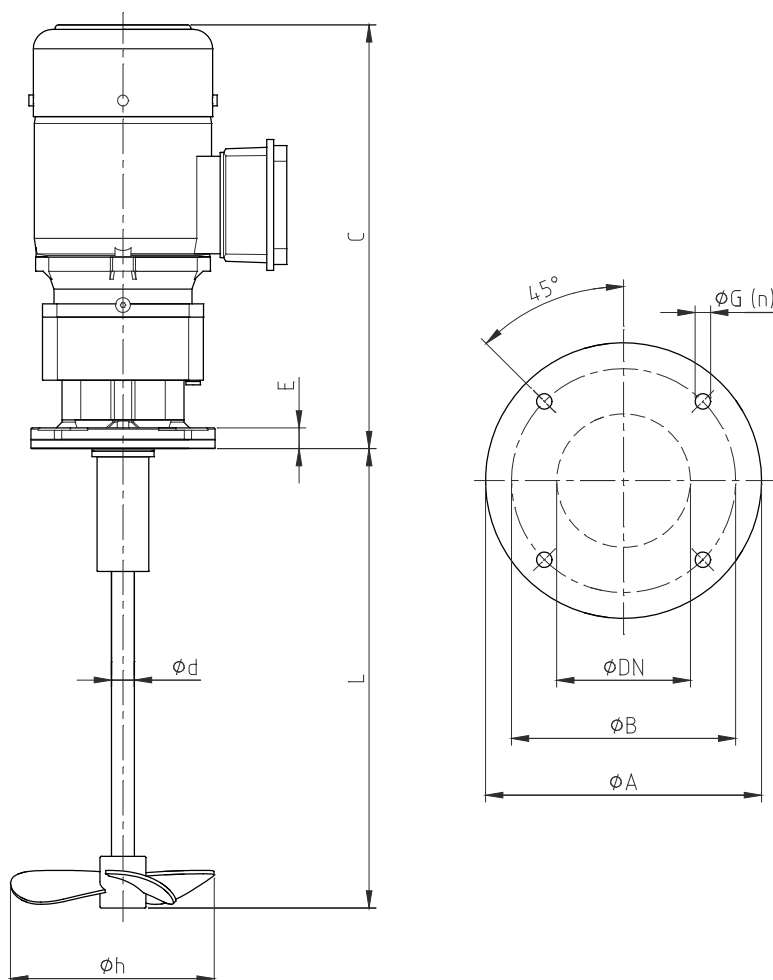
Motor Power (kw)	0,55 – 1,10
Speed (rpm)	200
Actuator shaft length (mm)	1.400
Actuator shaft diameter (mm)	20 - 25
Marine propeller diameter (mm)	200 – 400

### 8.2. WEIGHTS

Type	Weigh with gearbox drive (kg)
NBI 1.10-20005-200	20
NBI 1.10-20005-250	21
NBI 1.10-20005-300	21
NBI 1.10-20011-350	35
NBI 1.10-20011-400	35

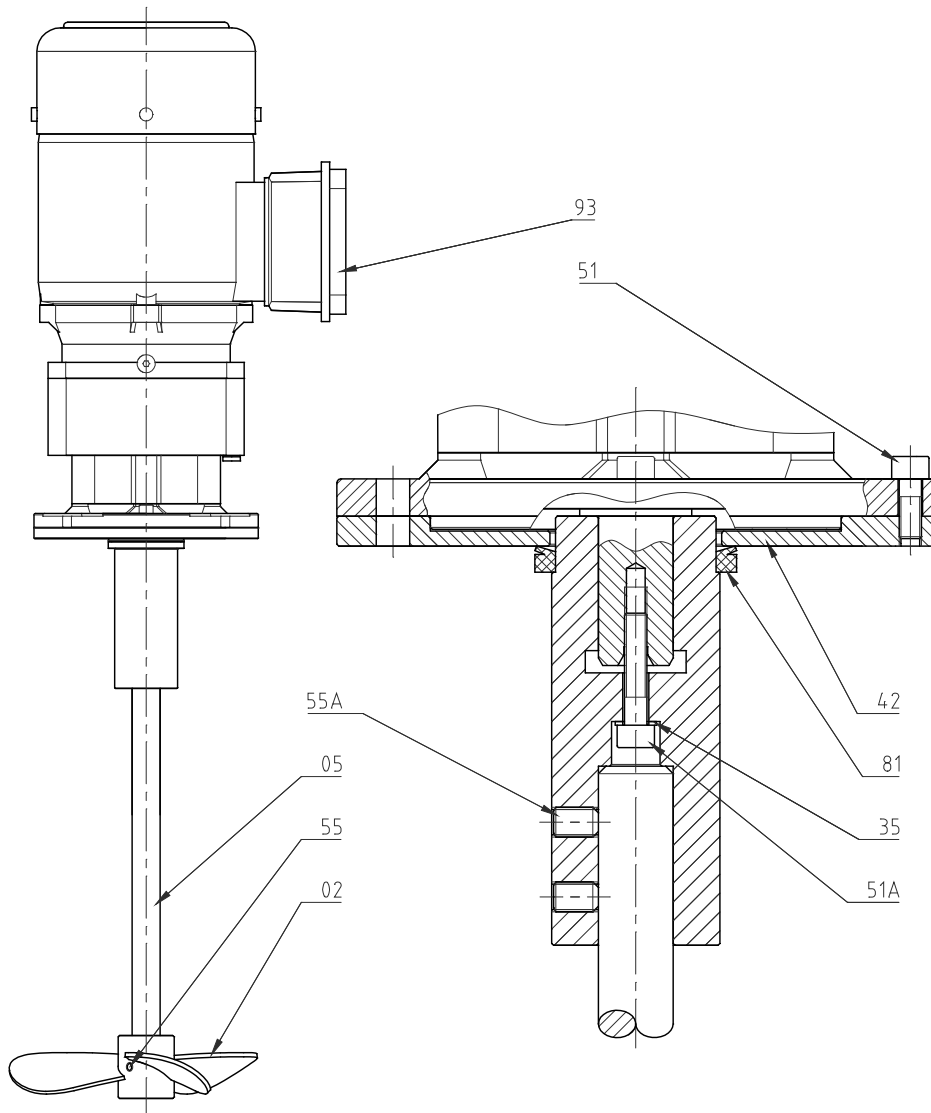
### 8.3. TECHNICAL SPECIFICATIONS AND DIMENSIONS

Agitator type	Dimensions (mm)						Agitator shaft		
	C	E	Flange				Ø d	L max (mm)	
			Ø A	Ø B	Ø DN	Ø G(n)			
NBI 1.10-20005-200	367	18	160	130	77,5	9(4)	20	1400	
NBI 1.10-20005-250									
NBI 1.10-20007-300									
NBI 1.10-20011-350	476						25		
NBI 1.10-20011-400									



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#### 8.4. NBI AGITATOR'S EXPLODED DRAWING



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#### 8.5. NBI AGITATOR'S PARTS LIST

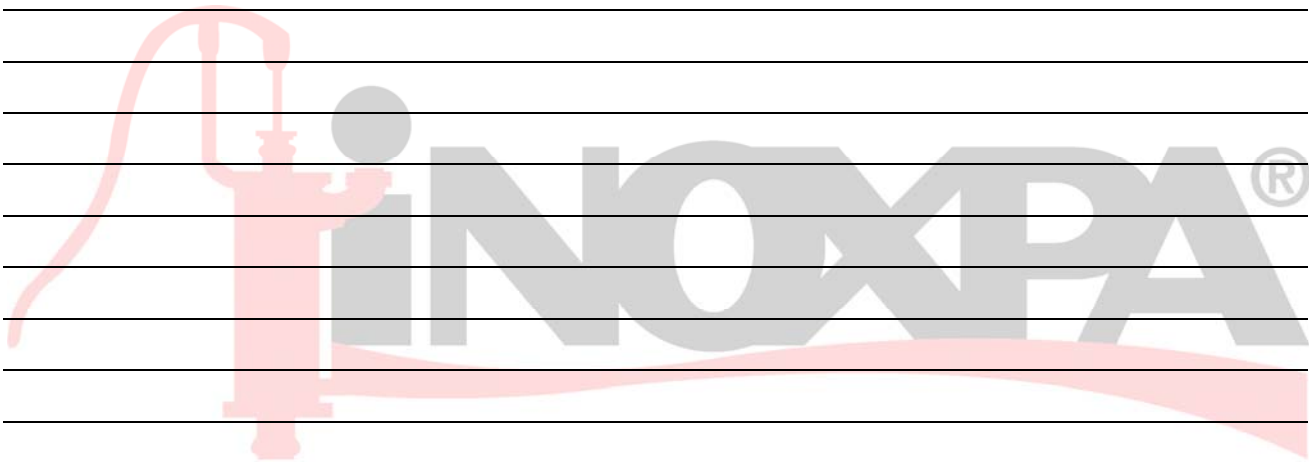
Position	Quantity	Description	Material
02	1	Propeller	AISI 316L
05	1	Shaft	AISI 316L
26	1	Half shaft	AISI 316L
35	1	Special Washer	Inox/FPM
42	1	Base plate	AISI 316L
51	2	Screw DIN 912	A2
51A	1	Screw DIN 912	A2
55	2	Stud	A2
55A	2	Stud	A2
81	1	V-ring	NBR
93A	1	Gear motor	-





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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](http://www.inoxpa.com) to Access the information

