

INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

VERTICAL AGITATOR

BFI



20.006.32.0002



EC Declaration of Conformity

We,

INOXPA, S.A.U.

Telers, 60
17820 – Banyoles (Spain)

Hereby declare under our sole responsibility that the machine

BFI VERTICAL AGITATOR

From serial number **IXXXXXX** to **IXXXXXX** ⁽¹⁾ / **XXXXXXXXXXIIN** to **XXXXXXXXXXIIN** ⁽¹⁾

Fulfills all the relevant provisions of the following directive:

Machinery Directive 2006/42/CE
Regulation (EC) n° 1935/2004
Regulation (EC) n° 2023/2006

Applicable harmonized standards:

EN ISO 12100:2010
EN 60204-1:2018
EN ISO 14159:2008
EN 1672-2:2005+A1:2009

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

A handwritten signature in black ink, appearing to be "David Rejero Brunet", written over a light gray rectangular background.

David Rejero Brunet
Technical Office Manager
Banyoles, 28th May 2021

⁽¹⁾ The serial number may be preceded by a slash and by one or two alphanumeric characters

1. Table of Contents

1. Table of Contents	
2. Generalities	
2.1. Instructions manual	4
2.2. Compliance with the instructions	4
2.3. Warranty.....	4
3. Safety	
3.1. Warning symbols.....	5
3.2. General safety instructions	5
4. General Information	
4.1. Description	7
4.2. Operating principle	7
4.3. Application.....	7
5. Installation	
5.1. Reception of the agitator	8
5.2. Identification of the agitator	8
5.3. Transport and storage.....	10
5.4. Location.....	10
5.5. Electrical installation	11
5.6. Assembly.....	11
6. Start-up	
7. Troubleshooting	
8. Maintenance	
8.1. General considerations	15
8.2. Maintenance.....	15
8.3. Lubrication.....	15
8.4. Spare parts.....	15
8.5. Conservation	15
8.6. Disassembly and assembly of the agitator	16
9. Technical Specifications	
9.1. Materials.....	17
9.2. Other features	17
9.3. Weights	17
9.4. Dimensions	18
9.5. Technical section and parts list.....	19

2. Generalities

2.1. INSTRUCTIONS MANUAL

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

Carefully read the instruction prior to starting the agitator, familiarize 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.

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 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.

2.3. WARRANTY

The conditions of the warranty are specified in the General Sales Conditions 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 equipment



Electric hazard

ATTENTION

Important instruction for the protection of the equipment and its functions

3.2. GENERAL SAFETY INSTRUCTIONS



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

3.2.1. During the installation

The [Technical Specifications](#) of [chapter 9](#).

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.

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

Keep the motor and the switchboard under control, particularly in areas where there is a risk of fire or explosion.



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.

All electric work should be carried out by specialised 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.



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, with temperatures above 50°C, there is a risk of skin burning. In such cases, collective-protection means (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.

3.2.3. During maintenance



The [Technical Specifications](#) of [chapter 9](#) 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 to 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.

4. General Information

4.1. DESCRIPTION

The range of the BFI agitators is vertical agitators with a direct motor-driven and a stainless steel base. Despite it being very compact, these agitators have bearing support independent of the motor. The shaft is guided for two bearings which support the axial and radial forces transmitted by the agitation element.

4.2. OPERATING PRINCIPLE

The agitators are normally installed inside the tank either centrally with current deflectors or offset so that the offsetting itself prevents the rotation of the stirred product.

The rotation of the propeller makes the fluid to the bottom and then up to the surface of the product along the walls of the tank. The effect is promoted if the bottom of the tank is curved.

The marine propeller agitates vigorously the fluid of the tank encouraging the mixture while the sawtooth turbine encourages the dispersion of the product.

4.3. APPLICATION

The BFI vertical agitators are used in processes of mixing, dissolution, dispersion and maintenance whenever powerful and high-speed agitation is required in the food processing, cosmetics, pharmaceutical or chemical industries.

The agitators are normally fitted to small or medium volume tanks for work with low-viscosity products.



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 (nature of the fluids, viscosity, rpm, etc.).

5. Installation

5.1. 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.



If the agitator is supplied without a drive or other element, the purchaser shall be responsible for its assembly, installation, start-up and operation.

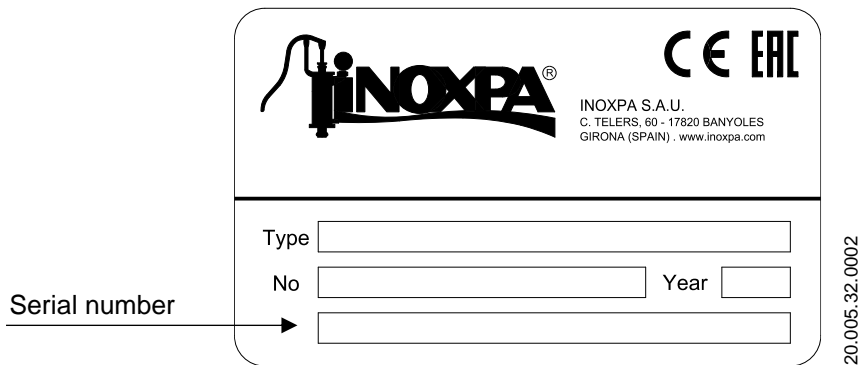
When receiving the agitator, check the packaging and its content to ensure that it matches the delivery note. INOXPA packs the agitator in their fully assembled form or disassembled on a case-by-case basis. Ensure that the agitator has not been damaged in any way. If it is not in good condition and/or 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 when the agitator is supplied by INOXPA.

5.2. IDENTIFICATION OF THE AGITATOR

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



BFI	1.	10	-	4	011	-	1	-	160
									Diameter of the agitation element
									150 150 mm
									160 160 mm
									175 175 mm
									200 200 mm
									225 225 mm
									Motor
									1 IP-55
									2 IP-65
									3 Flameproof
									4 Explosion-proof
									5 Single-phase
									Motor power
									007 0,75 kW
									011 1,1 kW
									015 1,5 kW
									022 2,2 kW
									030 3 kW
									040 4 kW
									055 5,5 kW
									Motor speed
									4 poles 1500 rpm
									6 poles 1000 rpm
									8 poles 750 rpm
									Type of the agitation elements
									10 Marine propeller
									4 Cowler propeller
									Number of agitation elements
									1 One agitation element
									2 Two agitation element
									Name of the agitator
BFI									Vertical agitator with motor

5.3. 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



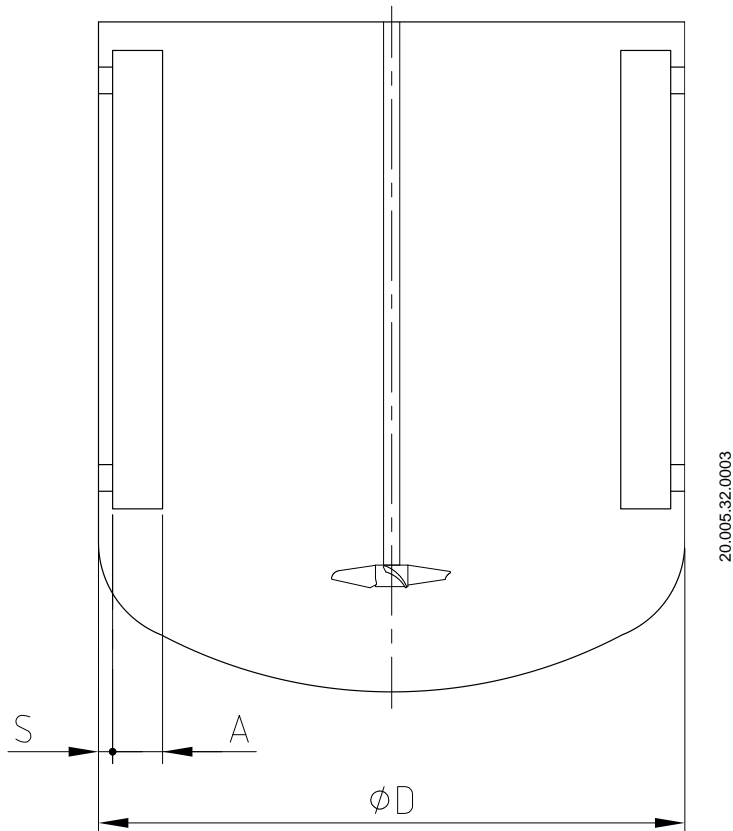
Take all possible precautions when lifting the agitator. Always use properly attached slings when moving the agitator with a crane or other lifting device.

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

5.4. 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 diameters are shown in the next figures 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

5.5. ELECTRICAL INSTALLATION

Before connecting the electrical motor to the mains, check local regulations on electrical safety as well as the applicable standards.

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.

5.6. 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 their corresponding holes, without being tightened. When this operation has been carried out, the agitator must be levelled using the following method:

1. Place a spirit level against the shaft.
2. Check 4 points at 90° to each other around the circumference of the shaft and at the same height.
3. Once the shaft is level, firmly tighten the fixing nuts and screws. Finally, the propeller is mounted on the end of the shaft. Be careful when assembling the shaft not to hit or strain it to avoid it being bent.

ATTENTION



Force should never be applied to the end of the agitator shaft, as it can easily suffer permanent damage.

ATTENTION



Check the alignment of the agitator shaft with the half shaft once its assembly is completed.

6. Start-up



The start-up of the agitator can be carried out provide the instructions indicated in the chapter [5. Installation](#) has been followed.

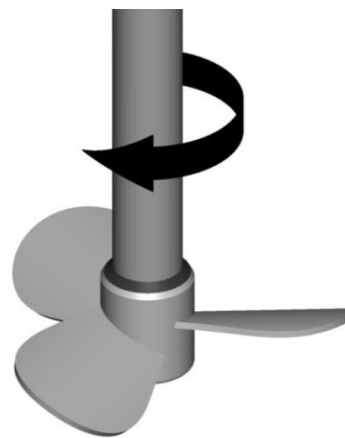
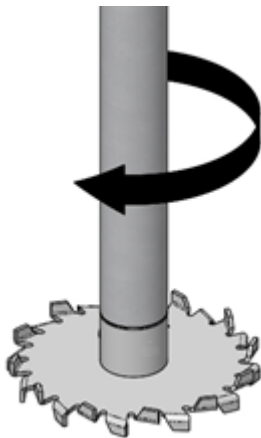
- Check that the power supply matches the rating indicated on the motor plate.
- Check the alignment of the agitator shaft.
- Check the level of fluid in the tank. When not specified in the order, the agitator cannot be operated during the filling or emptying of the tank.

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 see form the drive side). See the following figure:



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.

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 risk (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.

7. 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 liquid</td> </tr> <tr> <td>• High density</td> <td>Increase motor power</td> </tr> <tr> <td>• Tank too big for the chosen agitator</td> <td>Check with the technical department</td> </tr> <tr> <td>• Wrong direction of rotation</td> <td>Change direction of rotation</td> </tr> <tr> <td>• Agitator speed too low</td> <td>Increase the speed</td> </tr> <tr> <td>• Liquid level insufficient or none</td> <td>Check liquid level in the tank</td> </tr> <tr> <td>• Shaft bended</td> <td>Replace the shaft</td> </tr> <tr> <td>• Critical speed</td> <td>Check with the technical department</td> </tr> <tr> <td>• Worn bearings</td> <td>Replace the bearings agitator</td> </tr> <tr> <td>• Lip seal worn or damaged</td> <td>If the lip seal is worn, replace it. If the lip seal is damaged, consult the technical department.</td> </tr> </tbody> </table>	PROBABLE CAUSES	SOLUTIONS	• Viscosity of the liquid too high	Reduce the viscosity, e.g. by heating the liquid	• High density	Increase motor power	• Tank too big for the chosen agitator	Check with the technical department	• Wrong direction of rotation	Change direction of rotation	• Agitator speed too low	Increase the speed	• Liquid level insufficient or none	Check liquid level in the tank	• Shaft bended	Replace the shaft	• Critical speed	Check with the technical department	• Worn bearings	Replace the bearings agitator	• Lip seal worn or damaged	If the lip seal is worn, replace it. If the lip seal is damaged, consult the technical department.
PROBABLE CAUSES	SOLUTIONS																						
• Viscosity of the liquid too high	Reduce the viscosity, e.g. by heating the liquid																						
• High density	Increase motor power																						
• Tank too big for the chosen agitator	Check with the technical department																						
• Wrong direction of rotation	Change direction of rotation																						
• Agitator speed too low	Increase the speed																						
• Liquid level insufficient or none	Check liquid level in the tank																						
• Shaft bended	Replace the shaft																						
• Critical speed	Check with the technical department																						
• Worn bearings	Replace the bearings agitator																						
• Lip seal worn or damaged	If the lip seal is worn, replace it. If the lip seal is damaged, consult the technical department.																						



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

8. Maintenance

8.1. 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 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.

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

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 agitator is disconnected.

8.2. MAINTENANCE

- Inspect the agitator regularly
- Do not fail to keep the agitator clean.
- Check the state of the motor or the gear motor.
- Check the state of the bearings.
- Check the sealing: seal and/or V-ring.

The time interval between each preventive maintenance may vary in accordance with the work conditions.

Motor or gear motor maintenance shall be carried out in accordance with the manufacturer's instructions, see the instructions manual.

8.3. LUBRICATION

The BFI vertical agitators are supported on permanently lubricated bearings, which means maintenance is not required. The bearings can be re-greased by disassembling the support, cleaning the previous grease off the bearings or replacing them. The bearing houses are also cleaned and finally re-greased with 50% - 70% grease.

When re-greasing, use only special grease for ball bearings with the following properties:

- Lithium-based or made up of high quality lithium,
- Viscosity 100-140 cSt at 40°C,
- Consistency NLGI grade 2 or 3,
- Continuous work temperature -30°C to 120°C.

The lubrication of the bearings of the motor or the gear motor will be carried out according to the manufacturer's instructions.

8.4. SPARE PARTS

To order spare parts it is necessary to indicate the type and serial number included on the agitator's characteristics plate, as well as the position and description of the part as found in chapter 9. [Technical Specifications](#).

8.5. CONSERVATION

If the agitator is out of service for a considerable period of time, clean and treat the parts with VG46 mineral oil. The shaft must be stored in the horizontal position and on wooden supports or on supports of similar material.

8.6. DISASSEMBLY AND ASSEMBLY OF THE AGITATOR



The disassembly and assembly of the agitators should only be carried out by qualified personnel using only appropriate tools. 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.

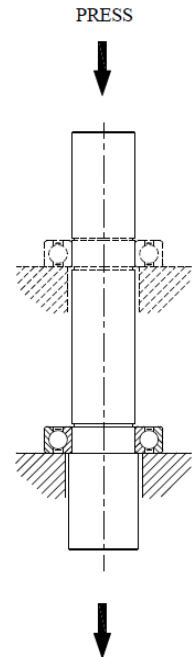
8.6.1. Disassembly of the agitator

Once the motor is disconnected, disassembly work may begin:

1. Empty the tank.
2. Remove the propeller (02) unscrewing it from the shaft (02) and remove the O-ring (80A).

Then, start the disassembly of the bearing support unit:

3. Remove the screws (52), the washers (53) and retire the motor (93).
4. Remove the screws (51) and the washer (53A) and retire the base plate (42) with the lip seal (88) from the bottom part.
5. Remove the elastic ring (66A) from the base plate (42) and retire the lip seal (88) with the help of a nylon hammer.
6. Hit the upper part of the shaft (05) with a nylon hammer and remove the unit composed of the shaft (05), ball bearings (70,70A) and the sleeve (13) from the head (06).
7. Remove the elastic rings (66A) from the shaft.
8. Disassemble the ball bearing (70A) with the help of pressure according to the figure beside.
9. Remove the other elastic rings (66) and disassemble the other ball bearing (70) by a pressure according to the figure beside.
10. Remove the pin (55B) and, then, remove the sleeve (13) and its O-rings (80).



8.6.2. Assembly of the agitator

1. Mount the O-rings (80) in their holes.
2. Assemble the sleeve (13). Is important to assemble it with its correct orientation according to the technical section in the chapter [9.5. Technical Section and parts list](#).
3. Introduce the ball bearing (70) pressing the upper part of the sleeve (13) and fix it with the elastic ring (66).
4. Place the lower elastic ring (66) of the ball bearing (70A) in its hole and mount the ball bearing (70A) above it. After, fix the ball bearing with the elastic ring (66).
5. Introduce the previous assembly on the head (06) by the base plate side (42) until it reaches the stop. Hit with a nylon hammer to sure the mechanical stop.
6. Introduce the lip seal (88) in its holes of the base plate (42), with a help of the nylon hammer and fix it with an elastic ring (66A). Take care that the mount the lip seals in the correct orientation, consult the chapter [9.5. Technical Section and parts list](#).
7. Mount the base plate (42) with the lip seal (88) positioned around the sleeve (13) with the screws (51) and the washers (53A).
8. Mount the motor (93) on the head (06) and fix it with the screws (52) and the washers (53).
9. Place the O-rings (80A) on the propeller (02) and thread the propeller to the shaft (05). Add food grease in the threaded joint of the propeller and the shaft for a correct assemble.
10. Place the agitator on the tank.

9. Technical Specifications

9.1. MATERIALS

Parts in contact with the product	1.4404 (AISI 316L)
Other steel parts	1.4307 (AISI 304L)
Lip seal	GYLON according to FDA 177.1550
Bearing support	1.4301 (AISI 304)
Surface finish	Ra ≤ 0,8 μm (except cowler propeller)

9.2. OTHER FEATURES

Motor	IEC B14, IP 55, F class insulation
Speed (rpm)	1500 – 1000
Maximum motor power (kW)	5,5 kW
Shaft length (mm)	1500 (maximum)
Shaft diameter (mm)	30
Propeller diameter (mm)	150 -160 -175 – 200 - 225
Propeller	Marine (type 10) – Cowler (type 4)

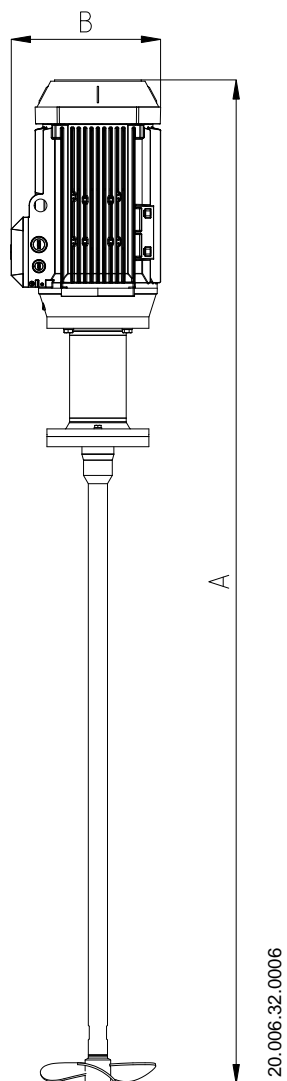
9.3. WEIGHTS

Type agitator	Weight (kg)
BFI 1.10-4011-1-160	40
BFI 1.10-4015-1-175	40
BFI 1.10-4030-1-200	60
BFI 1.10-4055-1-225	65
BFI 1.10-6007-1-175	40
BFI 1.10-6011-1-200	60
BFI 1.10-6015-1-225	60
BFI 1.4-4022-1-150	60
BFI 1.4-4040-1-200	65

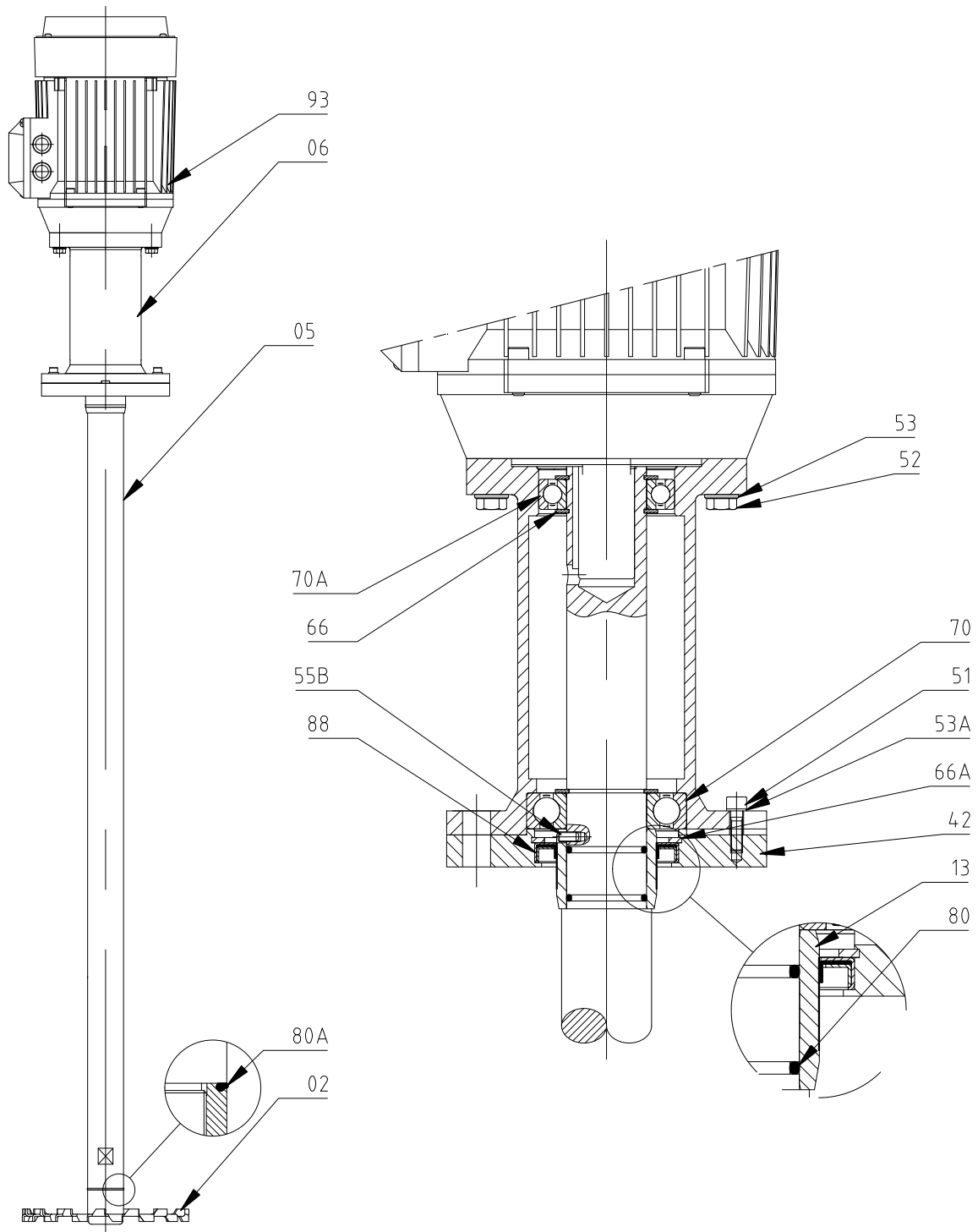
9.4. DIMENSIONS

Type agitator	Dimensions (mm)	
	A*	B
BFI 1.10-4011-1-160	2015	215
BFI 1.10-4015-1-175	2015	215
BFI 1.10-4030-1-200	2045	235
BFI 1.10-4055-1-225	2050	260
BFI 1.10-6007-1-175	2015	260
BFI 1.10-6011-1-200	2045	235
BFI 1.10-6015-1-225	2045	235
BFI 1.4-4022-1-150	2045	235
BFI 1.4-4040-1-200	2050	260

*Dimension with shaft length 1500 mm maximum



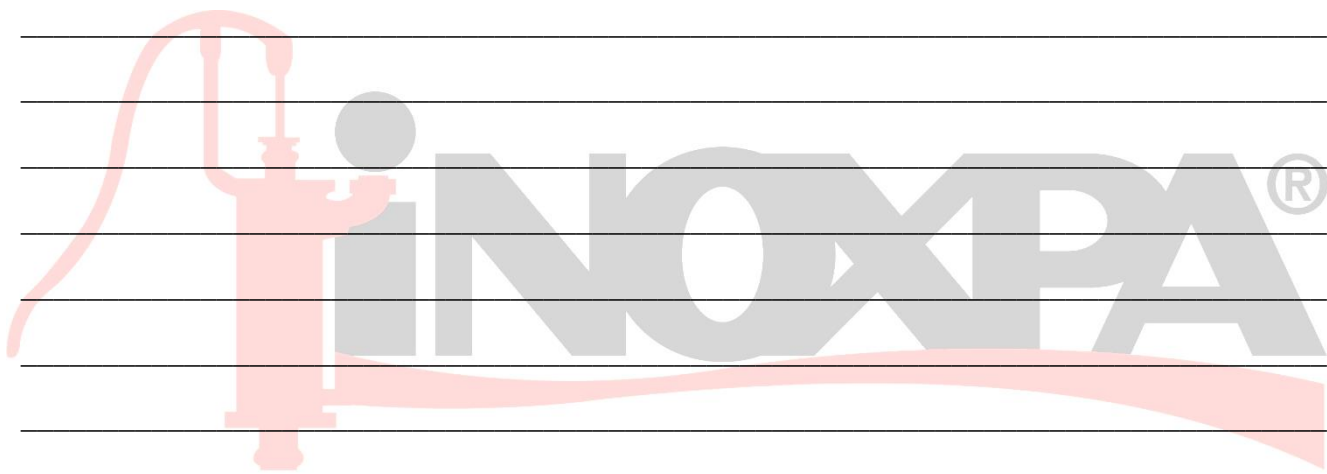
9.5. TECHNICAL SECTION AND PARTS LIST



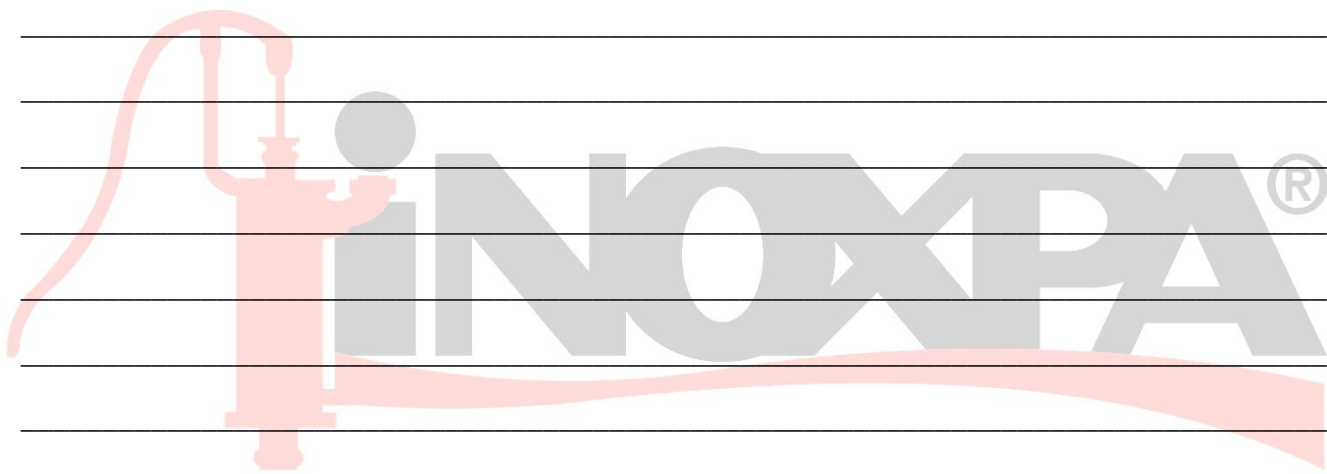
20.006.32.0007

Position	Description	Quantity	Material
02	Propeller	1	1.4404 (AISI 316L)
05	Shaft	1	1.4404 (AISI 316L)
06	Head	1	1.4307 (AISI 304L)
13	Sleeve	1	1.4404 (AISI 316L)
42	Base plate	1	1.4404 (AISI 316L)
51	Allen screw	2	A2
52	Hexagonal screw	4	A2
53	Flat washer	4	A2
53A	Flat washer	2	A2
55B	Allen pin	2	A2
66	Elastic ring	3	Steel
66A	Elastic ring	1	Steel
70	Upper ball bearing	1	Steel
70A	Lower ball bearing	1	Steel
80	O-ring	2	EPDM
80A	O-ring	1	EPDM
88	Lip seal	1	GYLON
93	Motor	1	-

NOTES



NOTES



NOTES



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.



INOXPA S.A.U.

Telers, 60 – 17820 – Banyoles – Spain