



INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

NHS VERTICAL AGITATOR



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ISO 9001

BUREAU VERITAS
Certification



Original Manual

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EC declaration of conformity

(according to Directive 2006/42/EC, annex II, part A)

Manufacturer: INOXPA, S.A.
C/ Telers, 54
17820 Banyoles (Girona) - SPAIN

Hereby declares, that the product:

VERTICAL AGITATOR

NHS

Name

Type

conforms to the specifications of the Council Directive:

Machine Directive 2006/42/EC, and complies with the essential requirements of the Directive and Harmonised Standards:

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

Low Voltage Directive 2006/95/CE (what repeal 73/23/EEC Directive), and conforms to UNE-EN 60204-1:2006 and UNE-EN 60034-1:2004

EMC Directive 2004/108/CE (what repeal 89/336/CEE Directive), and conforms to UNE-EN 60034-1:2004

In compliance with Regulations **(CE) nº 1935/2004**, relating to materials and articles intended to come into contact with foodstuff (repeal Directive 89/109/ECC), the materials in contact with the product do not transfer their components in quantities which may jeopardise consumer's health.

Banyoles, 2012

Josep Maria Benet
Technical Manager

1. Safety Instructions

1.1 SAFETY INSTRUCTIONS.

This instruction manual contains the basic indications that should be complied with during installation, start-up and maintenance. Consequently, it is essential that, before installation, both the installer and the plant technical manager read this instruction manual and that it be permanently available alongside the agitator or corresponding installation.

Not only must the detailed safety instructions in this chapter be complied with, but so also should the special measures and recommendations added in the other chapters of this manual.

1.2 SYMBOLS USED

The safety instructions included in this manual, whose non-compliance may cause risk to persons or to the machine and its correct operation, are expressed by means of the symbols indicated below:



Danger to people in general.



Electrical hazard.



Danger of injury caused by the agitator.



Danger due to suspended loads.



Danger for the agitator and its correct operation.



General obligation.

1.3 GENERAL SAFETY INSTRUCTIONS



- Read the instructions in this manual before installing the agitator and before starting it up.
- The installation and use of the agitator must always be in accordance with the rules applying to health and safety.
- Before starting up the agitator, check that it be correctly anchored and that the shaft be perfectly aligned. Poor alignment and/or excessive force in fitting, may cause serious mechanical problems for the agitator.



- Specialised personnel should carry out all electrical work.
- To control the engine characteristics and its control panel, especially in areas where there is a risk of fire or explosion, the user company's technical manager shall establish danger areas (area 1 – 2 – 3).
- Do not spray the motor directly during cleaning.
- Do not disassemble the agitator without previously disconnecting the power supply. Remove the fuses and disconnect the motor feed cable.



- Do not operate the agitator if turning components do not have the protection system or if they are badly fitted.
- The agitator has rotating parts. Do not put hands or fingers into an agitator whilst it is operating. This may cause serious injury.
- Do not touch any of the parts of the agitator that are in contact with liquid whilst in operation. If the agitator works with hot products at temperatures exceeding 50 °C, there is a risk of burns. In these cases, collective protective measures should be put in order of priority (distance, protective screen, heat resistance), or –failing this possibility- to provide individual protection (gloves).



- Take all possible precautions in lifting the agitator. Always ensure that it securely attached when being transported by crane or any other lifting mechanism.



- Withdraw all the tools used in mounting before starting up the agitator.
- The agitator is unable to work without liquid. Standard agitators are not designed to operate during the filling or emptying of tanks.



- Do not exceed the agitator's maximum operating conditions. Do not modify the operating parameters that were initially set for the agitator without the prior written consent of INOXPA.
- The agitators and their installation may cause noise levels that exceed 85 dB (A) in some unfavourable operating environments. In such cases, operators should wear hearing protection.

1.4 WARRANTY

We wish to point out that any warranty issued will be null and void and that we are entitled to an indemnity for any civil liability claim for products which might be filed by third parties if:

- operation and maintenance work has not been done following the corresponding instructions; the repairs have not been made by our personnel or have been made without our written authorization;
- modifications are made to our material without prior written authorization;
- the parts or lubricants used are not original INOXPA parts/lubricants;
- the material has been improperly used due to error or negligence or have not been used according to the indications and the intended purpose.
- all components subject to wear are excluded from the guarantee.

The General Delivery Terms which you have already received are also applicable.

1.5 INSTRUCTIONS MANUAL

The information provided in the instruction manual refers to updated data.

We reserve the right to modify the design and/or manufacturing specifications of our products as required, devoid of any obligation on our part to adapt any product supplied prior to such alteration.

The technical information made available in this instruction manual, together with the graphs and technical specifications provided, shall continue to belong to us and should not be used (except for starting up this installation), copied, photocopied, made available or otherwise given to third parties without our prior written consent.

INOXPA is reservation the right to modifying this instructions manual without previous notice.

1.6 INOXPA SERVICE

In the event of doubt or should you require a fuller explanation on particular data (adjustment, assembly, disassembly...), please do not hesitate to contact us.

Index

1. Safety instructions

Safety instructions	1.1
Symbols used	1.2
General safety instructions	1.3
Warranty	1.4
Instructions manual	1.5
INOXPA Service	1.6

Index

2. Reception, storage and transport

Reception	2.1
Storage	2.2
Transport	2.3

3. Identification, description and use

Identification	3.1
Description	3.2
Use of the agitator	3.3

4. Installation and assembly

Installation and assembly.....	4.1
Site	4.2
Assembly	4.3
Electrical connection	4.4

5. Start-up, operation and shutdown

Start-up	5.1
Operation	5.2

6. Maintenance and conservation

Maintenance	6.1
Lubrication	6.2
Spare parts	6.3
Conservation	6.4

7. Operating problems: causes and solutions

8. Disassembly and assembly

Electrical safety	8.1
Disassembly	8.2
Assembly	8.3

9. Technical specifications

Technical specifications and dimensions	9.1
NHS agitator. Parts list	9.2
Sealing: Lip seal and leak mechanism	9.3

2. Reception, storage and transport.

2.1 RECEPTION

On reception of the agitator, check the packing and its contents to ensure that it agrees with delivery note. INOXPA packs the agitators completely assembled or disassembled according to the case. Ensure that the agitator has not suffered any damage. In the case of it being found not to be in correct condition and/or some part(s) are missing, the forwarder shall prepare a report as quickly as possible.

2.2 STORAGE

If the agitator is not immediately installed, it must be stored in an appropriate place. The shaft must be stored in a horizontal position and on some wooden or similar supports. The shaft in such a position will not become deformed and must not support loads of any description.

2.3 TRANSPORT

Take all possible precautions in lifting the agitator. Always use the sling hooks when moving the agitator with a crane or any other type of lifting equipment.



Depending on the model, the agitators are too heavy to store or install manually. Use an adequate means of transport. Do not manipulate the agitator by the shaft because it can easily become deformed.

Type	Weight with gear motor [kg]
NHS 1.11-07003-500	21
NHS 1.11-03003-600	24
NHS 1.11-07007-600	38
NHS 1.11-03007-700	52
NHS 1.11-07011-700	43
NHS 1.11-07015-750	60
NHS 1.11-03015-800	63
NHS 1.6-07003-500	21
NHS 1.6-07007-600	38
NHS 1.6-07011-700	43
NHS 1.6-07015-800	60
NHS 1.6-14011-450	35
NHS 1.6-14015-600	40

3. Identification, description and use.

3.1 IDENTIFICATION

The agitator is identified by means of a plate stating its characteristics attached to the motor. The type of agitator and serial number are on the plate. See figure 3.1.

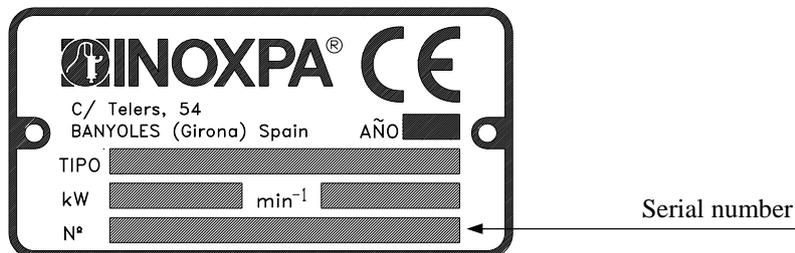


Figure 3.1: Characteristics plate.

Example:

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

1. Name of the agitator.

NHS = vertical agitator.

2. Number of agitation elements.

1 = one agitation element.

2 = two agitation elements.

3. Type of agitation elements.

11 = inclined blades.

6 = inclined blades.

4. Speed.

070 = 70 rpm.

030 = 30 rpm.

140 = 140 rpm.

5. Motor power.

03 = 0,37 kW.

15 = 1,5 kW.

6. Diameter of the agitation element.

500 = 500 mm.

600 = 600 mm.

700 = 700 mm.

800 = 800 mm.

3.2 DESCRIPTION

The NHS construction range includes vertical agitators with the agitator shaft fixed directly onto the gear motor. The lantern connected to the tank has a base plate made of stainless steel. This range includes a sealing system with a lip seal and a leak mechanism that prevent 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 and 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-316 (1.4401). It has an electropolished surface finish. The standard mixing elements (interchangeable) are the inclined blades type 11 and 6.

3.3 USE OF THE AGITATOR

Depending on the mixing element selected, this lightweight range allows mixing and blending processes to be carried out in open and closed tanks with a variable viscosity of 1 to 5000 cPs.

4. Installation and assembly.

4.1 INSTALLATION AND ASSEMBLY



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

4.2 SITE

Place the agitator in such a way as to facilitate inspection and servicing. Leave sufficient room around the agitator for adequate servicing, separate, even when it is in operation. It is very important to be able to obtain access to the electrical connection mechanism of the agitator, even when it is in working mode.

To achieve an effective mixing process it may be necessary to fit baffles to the bottom of the tank. Consult our technical department for each particular application. If required, the approximate dimensions of the baffles in relation to the diameter of the tank are shown in figure 4.1 and table 4.1.

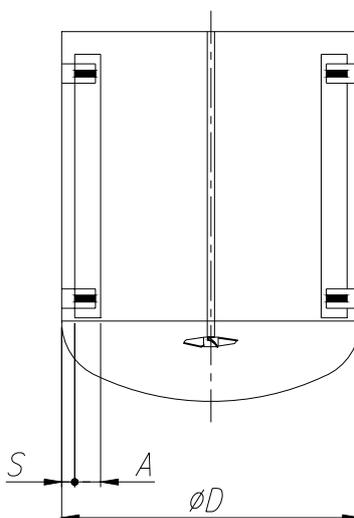


Figure 4.1

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

Table 4.1

4.3 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 their 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 against the shaft.
- Check 4 points at 90° to each other around the circumference of the shaft and at the same height.

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 so as to avoid it being bent.



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

4.4 ELECTRICAL CONNECTION

Before connecting the electric motor to the mains, check the local regulations and the corresponding standards regarding electrical safety. Take special account of those parts referring to command and control of the agitator. Check the manufacturer's instruction manual of the motor for connecting it to the mains.

Let the electrical connection of the motors to qualified personnel. Take the necessary measures in order to prevent any type of breakdown.



The motor should be protected with devices against overload and short-circuits.

It is not possible to use the agitator in areas of risk of fire or explosion if this has not been included in the order. Risk areas (zones 1 -2 - 3).

5. Start-up, operation and shutdown

Agitator start-up shall be able to be carried out if the detailed instructions in the section on installation and assembly have previously been realised.

5.1 START-UP

- Check that the electrical supply is appropriate for what is indicated on the motor plate.
- Check the alignment of the agitator shaft.
- Check the tank's liquid level. Unless specified in the order, the agitators cannot function during tank filling or emptying.



The agitator can NEVER run without a product. The agitation element must be submerged at least to a height of 1.5 times its diameter.

- All the protectors must be in place.
- Start up the agitator.
- Check that the rotation of the propeller is correct (clockwise when viewed from the side of the motor). See figure 5.1.



Respect the direction of rotation of the agitation element as indicated by the arrow stuck on the motor. The wrong direction will cause a loss of agitation efficiency.

- Check the motor's electrical consumption.

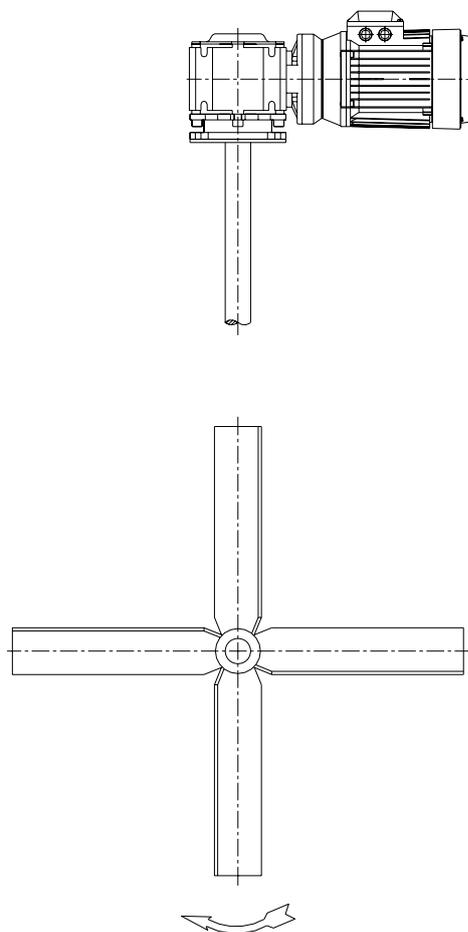


Figure 5.1

5.2 OPERATION



Do not modify the operating parameters for which the agitator was initially selected without prior written consent of INOXPA. (Risk of deterioration and danger for the user).

Follow the operating instructions and safety indications described in the instructions manual of the tank on which the agitator is mounted.



Mechanical hazards (drag, shearing, cutting, strike, squashing, clipping. etc.). If the agitation element is accessible from above or at the man way of the tank then the user is exposed to the aforementioned hazards.

The tank should be equipped with protection devices and safety equipment. Check the manufacturer's instructions manual.



The introduction of a solid object or raw material may cause breakage of the agitation element or the breakage of other mechanical parts and endanger safety.

6. 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.

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

5.1 MAINTENANCE

- Inspect the agitator regularly.
- Do not fail to keep the agitator clean.
- Check the state of the gear motor.
- Check the sealing: Lip seal.

Gear motor maintenance shall be carried out in accordance with the manufacturer's instructions. See the instructions manual.

5.2 LUBRICATION

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

5.3 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, of technical specifications.

5.4 CONSERVATION

If the agitator is out of service for a considerable period of time, clean and treat the parts with VG 46 mineral oil. The shaft must be stored in the horizontal position and on wooden supports or on supports of a similar material.

7. Operating problems: causes and solutions

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

Probable causes		Solutions
1	Viscosity of the liquid too high.	Reduce the viscosity, e.g. by heating the liquid.
2	High density.	Increase motor power.
3	Tank too big for the chosen agitator.	Check with the technical department.
4	Wrong direction of rotation.	Change direction of rotation.
5	Agitator speed too low.	Increase the speed.
6	Liquid level insufficient or none.	Check liquid level in the tank.
7	Shaft bended.	Replace the shaft.
8	Critical speed.	Check with the technical department.
9	Worn bearings driver.	Replace the bearings 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	O-ring damaged.	Consult the technical department.



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

8. Disassembly and assembly.

The assembly and disassembly of the agitators should only be carried out by qualified personnel. Ensure that staff read this instruction manual carefully, especially those parts that make direct reference to their work.

8.1 ELECTRICAL SAFETY

Ensure that the motor starter is turned off when carrying out disassembly or assembly work on the agitator.



- Place the agitator switch in the “off” position.
- Block the electrical panel and put up a notice not to unblock It.
- Take out the fuses and take them to the place where the work is to be carried out.

8.2 DISASSEMBLY

Once the motor is disconnected, disassembly work may begin:

- Empty the tank.
- Remove the Allen studs (55) to remove the propeller (02).
- Remove the screws that fix the agitator to the tank.
- Hold and support the shaft (05) with a soft base.
- Remove the hexagonal screw (52) and the washer (17) from the upper part of the gear motor (93A).
- Remove two Allen screw (51) and washers (53) fix the base plate (42) and the gear motor 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 on the shaft.

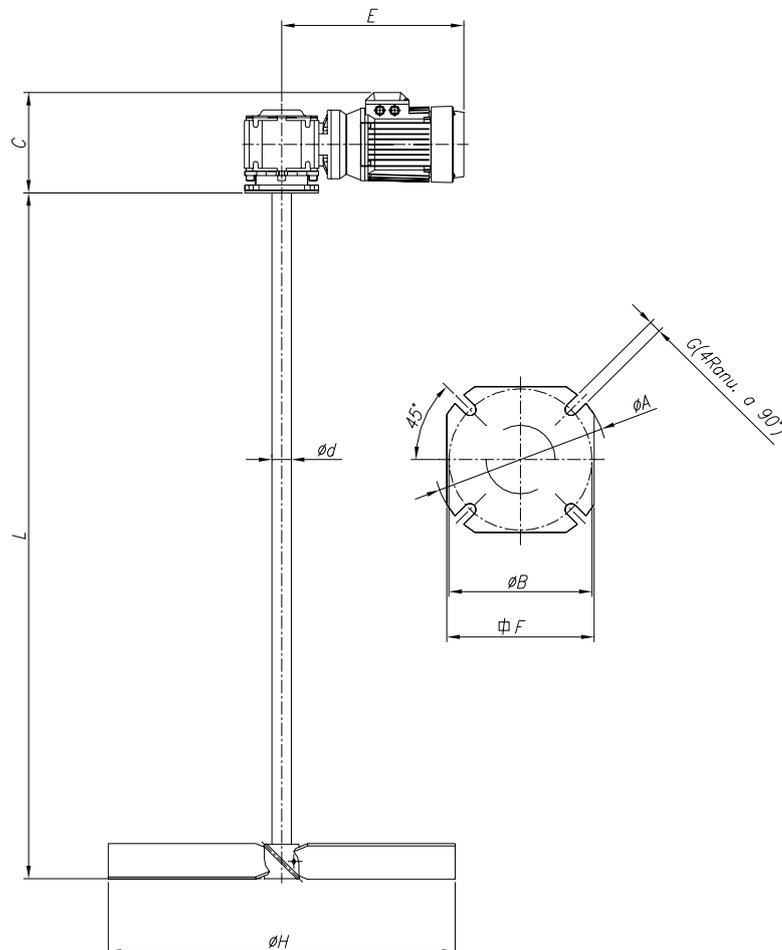
8.3 ASSEMBLY

- Put the splash ring (82) as indicated on Fig. 9.3. Place the key (61) on 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 hexagonal screws (52).
- Mount the base plate (42), sliding it along the shaft and fix it to the gear motor flange by means of the two allen screws (51) and washers (53).
- Mount the lip seal (88) in its housing on the base plate (42).
- Finally, mount the propeller (02) on the shaft (05) with the allen studs (55).
- Fix the agitator to the tank.

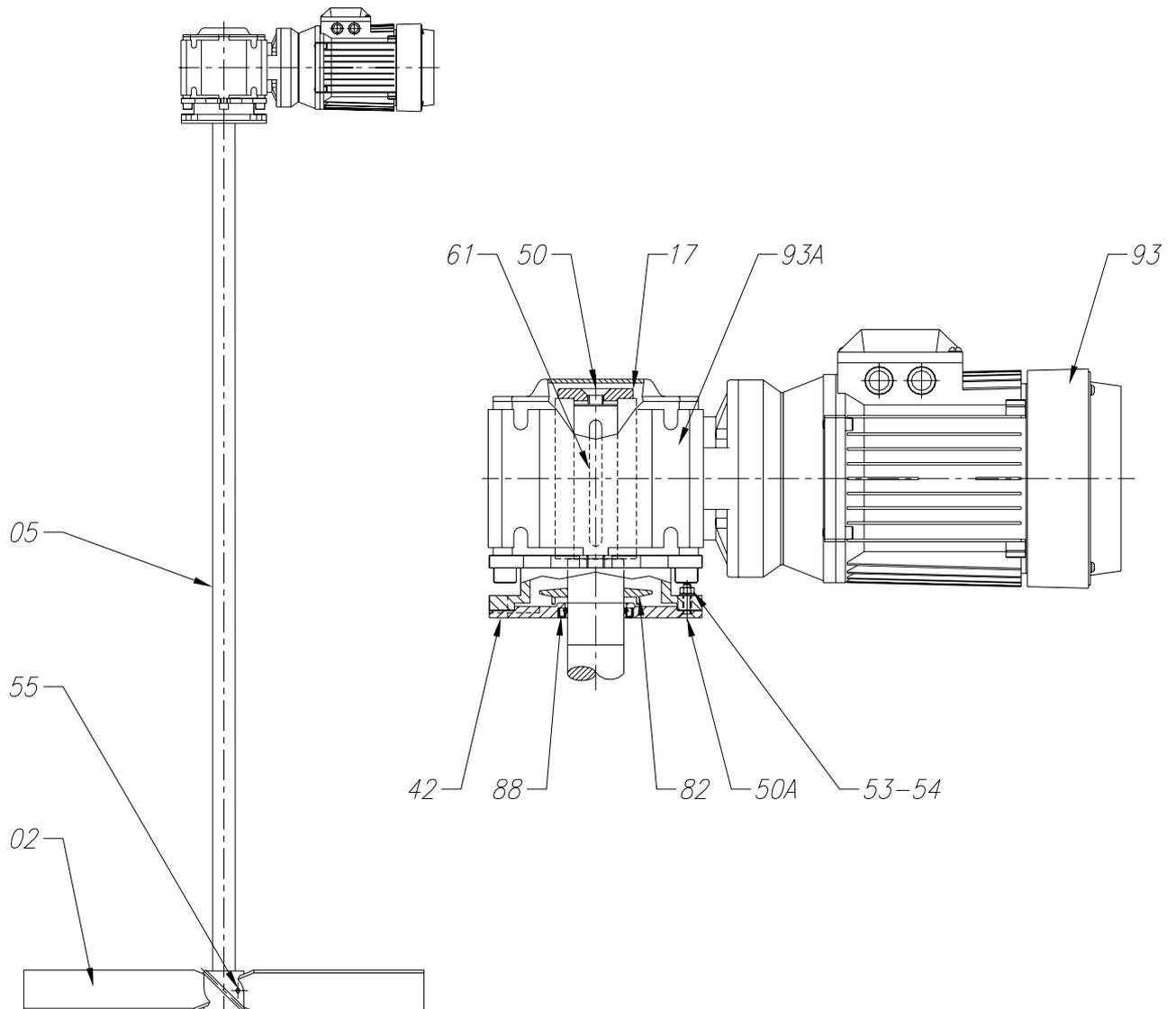
9. Technical Specifications

9.1 TECHNICAL SPECIFICATIONS AND DIMENSIONS

Agitator type	Moto power	Spees	Dimensions								Agitador shaft		Type	
			C	E	Flange					Ø d	Lmáx	11	6	
					Ø A	Ø B	Ø DN	F	Ø G			Inclined blades	Inclined blades	
NHS 1.11-07003-500	0,37	70	196	311.5	125	85	50	110	11	35	1200	500		
NHS 1.11-03003-600		35			180	150	100	142	11			40		1400
NHS 1.11-07007-600	0,75	70	220	343.5	200	170	125	165	14	45	1800	700		
NHS 1.11-03007-700		35			180	150	100	142	11			40		1400
NHS 1.11-07011-700	1,1	70	222	395	200	170	125	165	14	45	1800	750		
NHS 1.11-07015-750	1,5	70	235	420	200	170	125	165	14	45	1800	800		
NHS 1.11-03015-800		35			196	311.5	125	85	50			110		11
NHS 1.6-07003-500	0,37	70	196	311.5	125	85	50	110	11	35	1200	500		
NHS 1.6-07007-600	0,75		220	343.5	180	150	100	142	11	40	1400	600		
NHS 1.6-07011-700	1,1		222	395	180	150	100	142	11	40	1400	700		
NHS 1.6-07015-800	1,5	70	235	420	200	170	125	165	14	45	1800	800		
NHS 1.6-14011-450	1,1	140	222	395	180	150	100	142	11	40	1400	450		
NHS 1.6-14015-600	1,5											600		

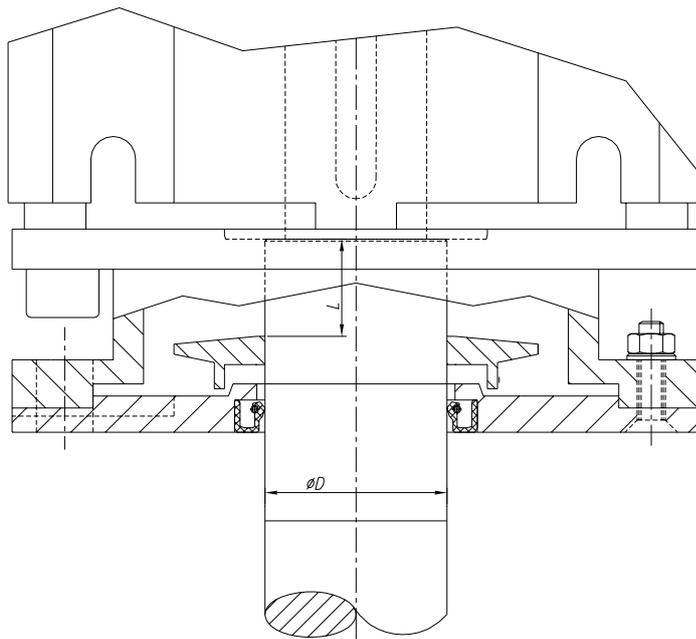


9.2 NHS AGITATOR. PARTS LIST



Position	Quantity	Description	Material
02	1	Propeller	AISI-316
05	1	Agitator shaft	AISI-316
17	1	Washer	AISI-304
42	1	Base plate	AISI-316
50	1	Countersunk screw	A2
50A	2	Countersunk screw	A2
53	2	Flat washer	A2
54	4	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	-

9.3 SEALING: LIP SEAL AND SPLASH RING



$\varnothing D$	L
35	24
40	17
45	24