



INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

LR / LM SIDE - ENTRY AGITATORS



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Original Manual

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EC DECLARATION OF CONFORMITY

(according to Directive 2006/42/EC, annex II, part 1, section A)

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

Hereby declares, that the product:

SIDE-ENTRY AGITATOR

LR / LM

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 953:1998
UNE-EN ISO 13732-1:2007

Low Voltage Directive 2006/95/EC (what repeal 73/23/CEE Directive), and are conforms with UNE-EN 60204-1:2006 and UNE-EN 60034-1:2004

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

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

Banyoles, 2012

Josep Maria Benet Technical Manager

1. Safety Instructions.

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.

SIMBOLS 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.

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.

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.

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.

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.

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2. Reception, storage and transport.

RECEPTION.

On reception of the agitator, check the packing and its contents to ensure that it agrees with delivery note. **INOXPA** packs the agitators fully assembled. 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 transporter shall have to prepare a report as quickly as possible.

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.

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 [Kg] with IEC, IP-55 motor
LM 1.10-4015-1-175	46
LM 1.10-4030-1-200	56
LM 1.10-4055-1-225	66
LM 1-10-4075-1-250	75
LM 1.10-4092-1-250	86
LM 1.10-4110-1-275	145
LM 1.10-6011-1-200	48
LM 1.10-6022-1-225	62
LM 1.10-6030-1-250	66
LM 1.10-6055-1-275	81
LM 1.10-6075-1-300	150
LM 1.10-6110-1-350	182

Type	Weight [Kg] with Gear motor
LR 1.10-20005-1-325	54
LR 1.10-20007-1-400	57
LR 1.10-20015-1-500	64
LR 1.10-20030-1-600	77
LR 1.10-20040-1-650	135

3. Identification, description and use.

IDENTIFICATION.

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

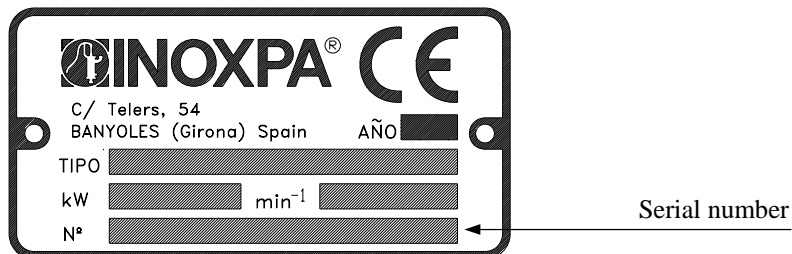


Figure 3.1: Characteristics plate.

LM agitator example:

LM	1.	10	-	4	015	-	1	-	175
	1	2	3	4	5	6	7		

1. Name of the agitator.

LM = Side-entry agitator with direct motor.

2. Number of agitation elements.

1 = one agitation element.
2 = two agitation elements.

3. Type of agitation elements.

10 = marine propeller.

4. Speed.

4 poles = 1500 rpm.
6 poles = 1000 rpm.

5. Motor power.

015 = 1,5 kW.
030 = 3 kW.
110 = 11 kW.

6. Motor.

1 = IP-55.
2 = IP-65.
3 = Flameproof.
4 = Explosion-proof.
5 = Single phase.

7. Diameter of the agitation element.

175 = 175 mm.
200 = 200 mm.
275 = 275 mm.

LR agitator example:

LR 1. 10 - 200 05 - 1 - 325
 1 2 3 4 5 6 7

1. Name of the agitator.

LR = Side-entry agitator with gear motor.

2. Number of agitation elements.

1 = one agitation element.

2 = two agitation elements.

3. Type of agitation elements.

10 = marine propeller.

4. Speed.

200 = 200 rpm.

5. Motor power.

05 = 0,55 kW.

07 = 0,75 kW.

15 = 1,5 kW.

6. Motor.

1 = IP-55.

2 = IP-65.

3 = Flameproof.

6 = Explosion-proof.

7 = Single phase.

7. Diameter of the agitation element.

325 = 325 mm.

400 = 400 mm.

500 = 500 mm.

DESCRIPTION.

The LM construction range includes the side-entry agitators with the agitator shaft fixed directly onto the motor and the LR construction range includes side-entry 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. The agitator shaft is guided by a bearing. The sealing of the shaft is carried out mechanically and is standardised according to DIN 24960.

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 element is the marine propeller type 10.

This equipment is suitable for his use in food process.

USE OF THE AGITATOR.

This lightweight range allows mixing and blending processes to be carried out in open and closed tanks with a variable viscosity between 1 and 1000 cPs.

SHAFT SEALING.

The mechanical seal of the side-entry agitator is in accordance with the DIN 24960 standard.

Table 3.1: materials for faces exposed to friction and internal mechanical seal elastomers.

	Rotating part	Stationary part	Elastomers
standard	graphite	Silicon	EPDM
optional	Tungsten carbide	Tungsten carbide	viton

The elastomers of the mechanical seal may be of Viton or EPDM.

4. Installation and assembly.

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.

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.

ASSEMBLY.

To situate and fit the agitator in the flange support of the tank, you should dismantle the propeller from the shaft. Then, the agitator flange should be fitted on to the one of the tank, the screws placed in position in their corresponding drilled holes, and then fit the nuts. When they are fully tightened, fit the propeller to the end of the agitator shaft. Be careful, when assembling the agitator element not to knock the agitator shaft, to avoid any distortion.



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

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

The most usual places to position the side agitator in vertical tanks, and the support which holds it, are shown in diagrams 4.1 and 4.2:

VERTICAL POSITION

HORIZONTAL POSITION

OUTSIDE

SALIENT

BUILT-IN

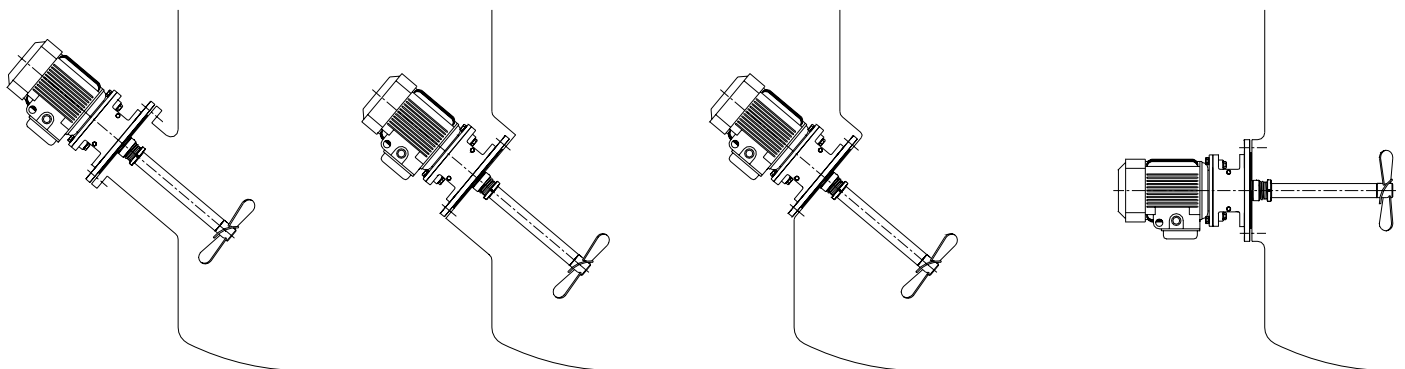
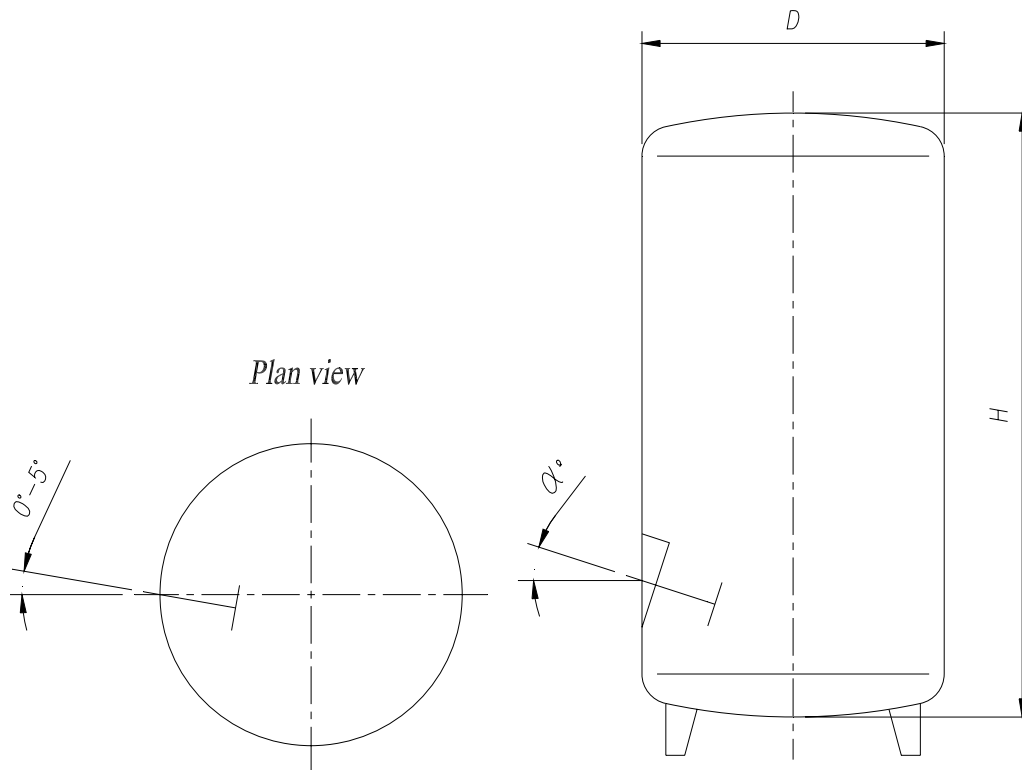


Figure 4.1.



ANGLES OF ATTACK




H/D Ratio	0,5	1	1,5	2	2,5	3	4	5
α°	0°	8°	14°	18°	25°	30°	40°	50°
Max. visc. cPs	3000	3000	1500	1500	500	300	150	100
BOTTOMS		o	o	o	o	-	-	-
		o	o	o	o	o	o	o
		o	o	o	o	o	o	o

Figure 4.2.

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.

START-UP.

- Check that the mechanical seal has not been damaged during transport.
- Fill the tank with liquid until the propeller and the mechanical seal are covered. The agitators cannot operate during the filling or emptying of the tank.
- Check that the electrical supply is appropriate for what is indicated on the motor plate.
- 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.



**The agitator can NEVER run without a product.
The mechanical seal can never run dry.**



**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.
The propeller could unscrew itself from the shaft.**

- Check the motor's electrical consumption.
- After a running-in period, check that the mechanical seal does not leak. If it does change it as shown in the assembly instructions (page 8.1).

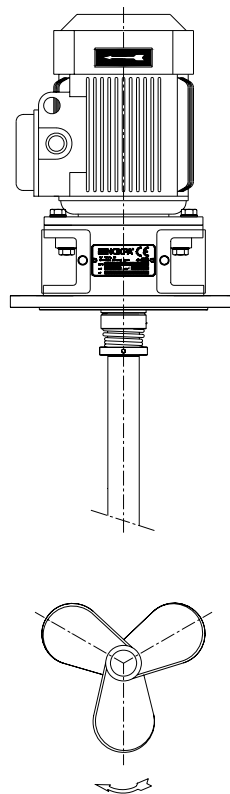


Figure 5.1

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.

MAINTENANCE.

- Inspect the agitator regularly.
- Do not fail to keep the agitator clean.
- Check the state of the motor / gear motor.
- Check the state of the bearings.
- Check the mechanical seal.

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

LUBRICATION.

The LR / LM side-entry agitators are supported on permanently lubricated bearings, which means maintenance is not required. The bearings can be re-greased disassembling the support, cleaning thoroughly to remove the old grease or changing them as well as the bearing housings and, finally, applying new grease at 50-70%.

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 greasing of the motor / gear motor bearings shall be carried out in accordance with the manufacturer's instructions.

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.

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.	Replace the agitator bearings.
10	Worn or damaged mechanical seal.	Replace the mechanical seal.
11	O-rings not the right ones for the liquid.	Fit the proper O-rings; check with the supplier.



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.

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 a warning notice on it.
- Take out the fuses and take them with you to the work area.

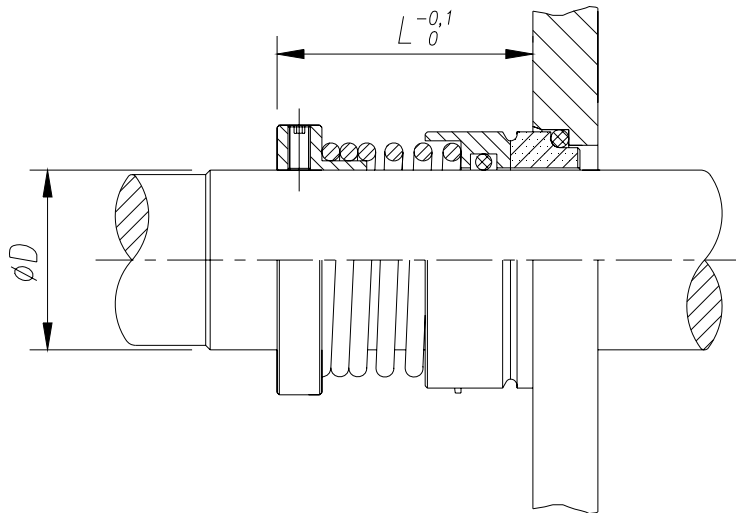
DISASSEMBLY.

Once the motor is disconnected, disassembly work may begin:

- Empty the tank.
- Remove the propeller (02) that is screwed to the agitator shaft (05) knocking a blade lightly with a plastic hammer in counter-clockwise direction as seen from the front of the propeller. Take care to retain the O-ring (80) in the shaft (05).
- Remove carefully the two parts of the mechanical seal (08, 08A), loosening the allen studs that hold them.
- Remove shaft guards (47) together with its screws (52B) and washers (53B).
- Remove the hexagonal screws (52C) from the motor or gear motor and loosen the allen studs (55A) from the bearing support (70).
- Move the motor / gear motor and the agitator shaft (05) backwards, taking care not to hit or strain the agitator shaft.
- Remove the allen studs (55) that fix the shaft to the motor and separate the motor (93) or gear motor (93, 93A) of the agitator shaft (05).
- Finally, remove the hexagonal screws (52, 52A), washers (53, 53A) that separate the flange (23) from the lantern (04) and the latter from the bearing (70).

ASSEMBLY.

- Assemble the agitator shaft (05) onto the motor (93) or gear motor (93, 93A). Locate the threaded holes above the keyway. Introduce the allen studs into these holes and tighten until they lock on the keyway. The allen studs must not protrude from the external diameter of the shaft.
- Assemble the bearing (70) in the lantern by means of the hexagonal screws (52A) and washers (53A), without tightening them.
- Introduce the agitator shaft and the motor through the bearing (70) until the flange of the lantern, and firmly tighten the screws (52C).
- Tighten the screws (52A) of the bearing (70).
- Next, place the flange (23) on the lantern centering (04) fixing through the hexagonal screws (52) and washers (53).
- Check that the surfaces of the agitator shaft (05) and the flange (23) are in good condition (perfectly polished finish).
- When fitting the new seals, be sure to wet the O-rings with soapy water so that the fixed parts slide easily into their locations and the rotating parts onto the shaft.
- Place the stationary part of the mechanical seal (08A) on its location on the flange (23).
- Place the rotating part of the mechanical seal (08) and fix it to the agitator shaft through its fixing studs as shown in the assembly instructions, figure 8.1.
- Locate the shaft guards (47) with the screw (52B) and washers (53B) to the lantern (04).
- Place the O-ring (80) on the agitator shaft (05).
- Install the agitator in the flange of the tank (refer to chapter 4 of this manual).
- Finally, mount the propeller (02) firmly on the agitator shaft (05), checking that it will not become loose.



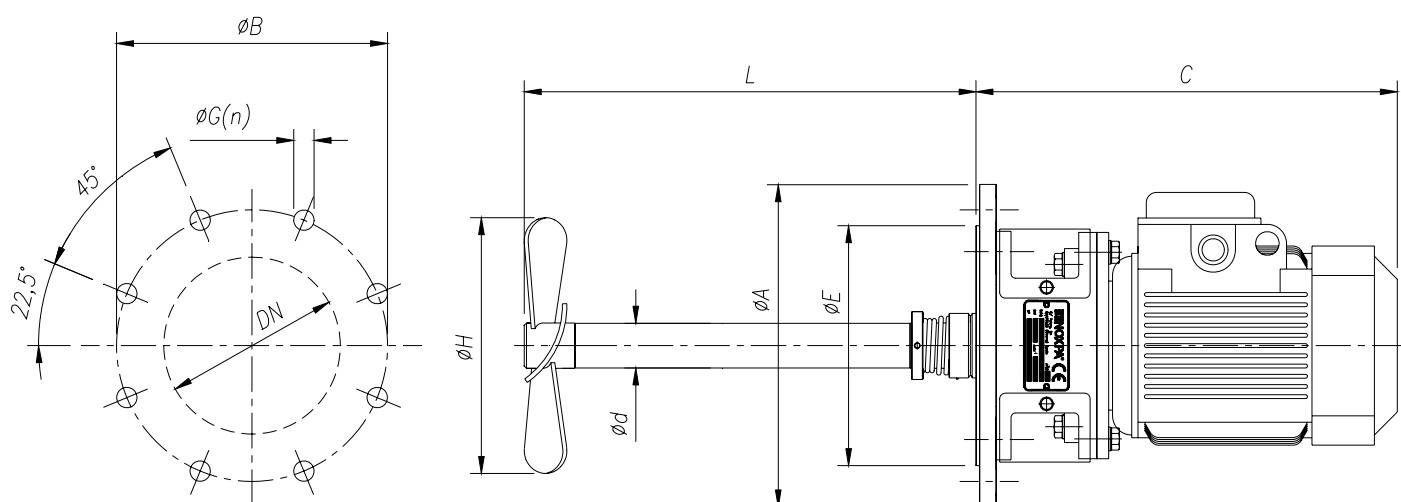
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40	47
50	51,5
60	61,5

Figure 8.1.

9. Technical Specifications.

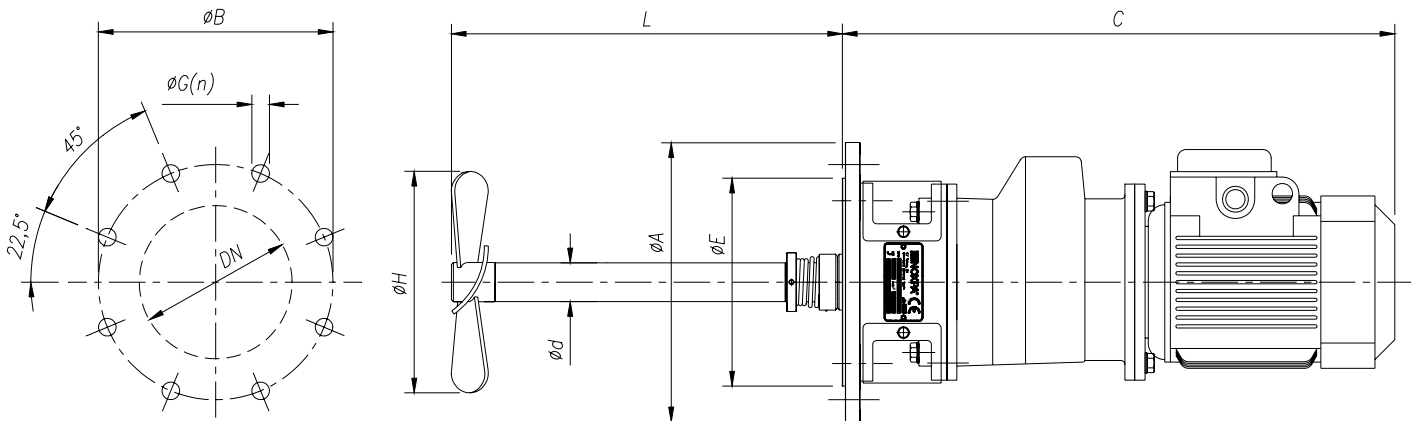
TECHNICAL SPECIFICATIONS AND LM AGITATOR DIMENSIONS.

Agitator type	Motor power [kW]	Speed [min ⁻¹]	Dimensions						Agitator shaft		Type
			C	Flange					Ø d	L	Marine propeller
				Ø DN	Ø A	Ø B	Ø E	Ø G(n)			
LM 1.10-4015-1-175	1,5	1420	375	150	285	240	212	18 (8)	40	400	175
LM 1.10-4030-1-200	3	1430	405								200
LM 1.10-4055-1-225	5,5	1450	500	200	340	295	259	23 (8)	50	500	225
LM 1.10-4075-1-250	7,5	1450									275
LM 1.10-4092-1-250	9,2	1450									250
LM 1.10-4110-1-275	11	1460	695	250	395	350	312	23 (12)	60	600	275
LM 1.10-6011-1-200	1,1	930	375	150	285	240	212	18 (8)	40	400	200
LM 1.10-6022-1-225	2,2	940	425								200
LM 1.10-6030-1-250	3	960	500	200	340	295	259	23 (8)	50	500	250
LM 1.10-6055-1-275	5,5	955									275
LM 1.10-6075-1-300	7,5	970	695	250	395	350	312	23 (12)	60	600	300
LM 1.10-6110-1-350	11	970									350

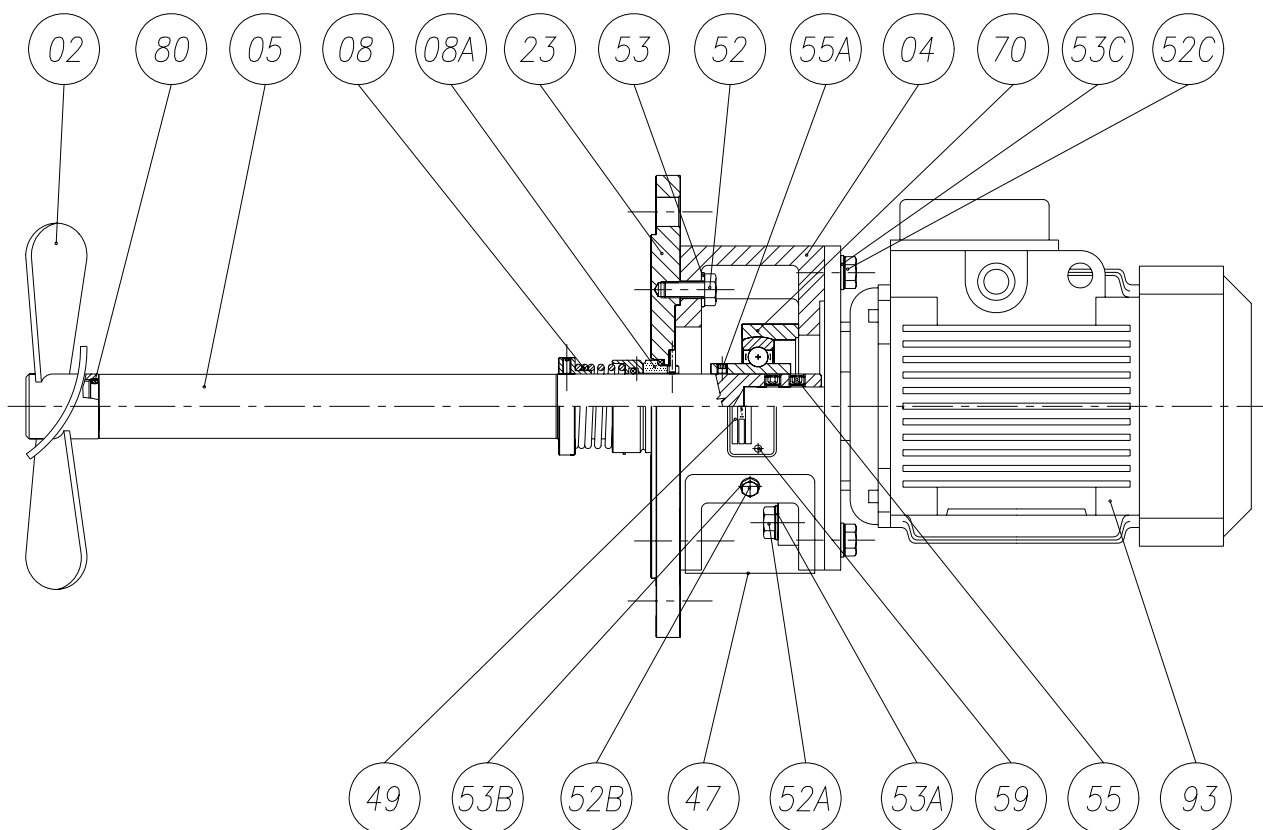


TECHNICAL SPECIFICATIONS AND LR AGITATOR DIMENSIONS.

Agitator type	Motor power [kW]	Speed [min ⁻¹]	Dimensions					Agitator shaft		Type 10 Marine propeller	
			C	Flange					Ø d	L	Ø H
				Ø DN	Ø A	Ø B	Ø E	Ø G(n)			
LR 1.10-20005-1-325	0,55	200	510	150	285	240	212	18 (8)	40	400	325
LR 1.10-20007-1-400	0,75										400
LR 1.10-20015-1-500	1,5										500
LR 1.10-20030-1-600	3		665	200	340	295	259	23 (8)	50	500	600
LR 1.10-20040-1-650	4		705	250	395	350	312	23 (12)	60	500	650

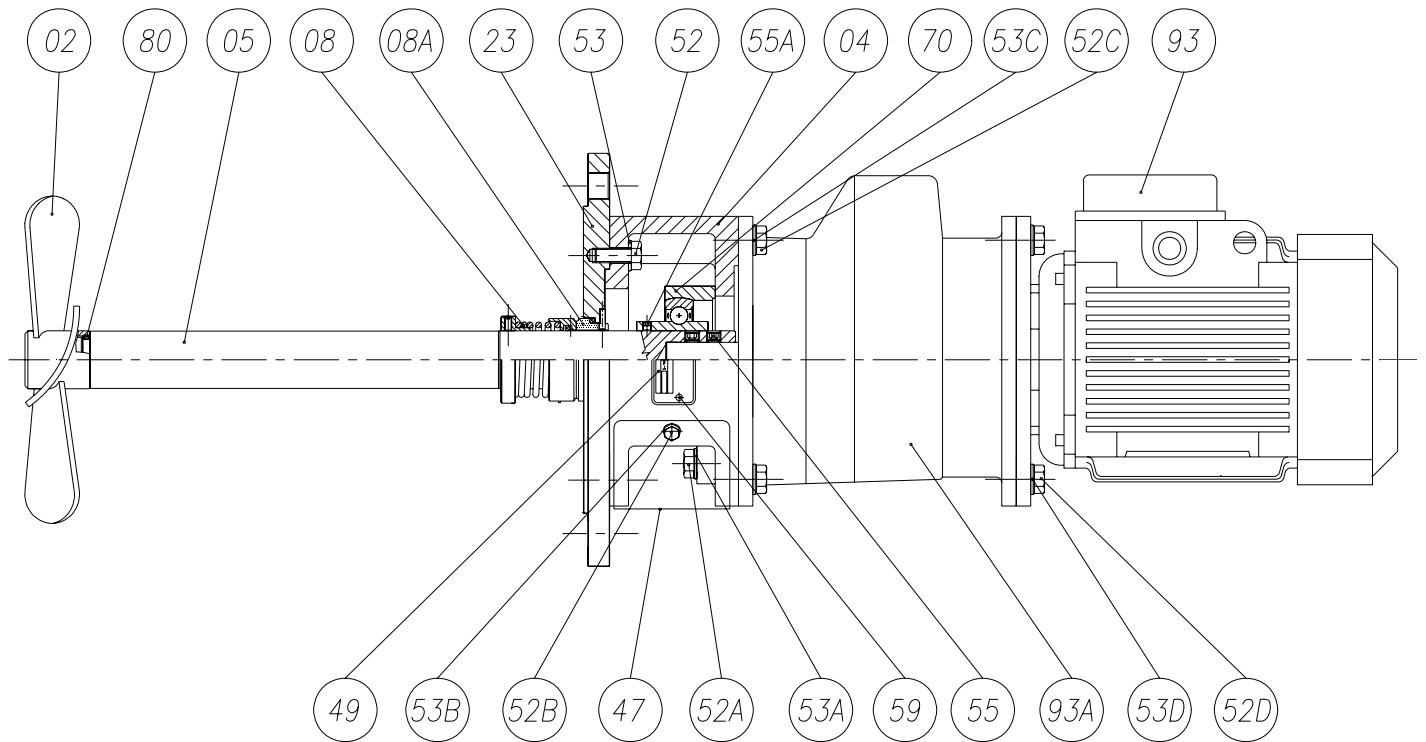


LM AGITATOR. PARTS LIST



Position	Quantity	Description	Material
02	1	Marine propeller type 10	AISI 316
04	1	Lantern	GG-15
05	1	Agitator shaft	AISI 316
08	1	Mechanical seal -rotary part-	-
08A	1	Mechanical seal -stationary part-	-
23	1	Flange	AISI 316
47	2	Shaft guard	Methacrylate
49	1	Characteristics plate	AISI 304
52	4	Hexagonal screw	8.8
52A	2	Hexagonal screw	8.8
52B	4	Hexagonal screw	8.8
52C	4	Hexagonal screw	8.8
53	4	Flat washer	8.8
53A	2	Flat washer	8.8
53B	4	Flat washer	8.8
53C	4	Flat washer	8.8
55	2	Allen stud	A2
55A	2	Allen stud	A2
59	2	Rivet	A2
70	1	Bearing support	Steel
80	1	O-ring	EPDM
93	1	IEC standard motor	-

LR AGITATOR. PARTS LIST



Position	Quantity	Description	Material
02	1	Marine propeller type 10	AISI 316
04	1	Lantern	GG-15
05	1	Agitator shaft	AISI 316
08	1	Mechanical seal -rotary part-	-
08A	1	Mechanical seal -stationary part-	-
23	1	Flange	AISI 316
47	2	Shaft guard	Methacrylate
49	1	Characteristics plate	AISI 304
52	4	Hexagonal screw	8.8
52A	2	Hexagonal screw	8.8
52B	4	Hexagonal screw	8.8
52C	4	Hexagonal screw	8.8
52D	4	Hexagonal screw	8.8
53	4	Flat washer	8.8
53A	2	Flat washer	8.8
53B	4	Flat washer	8.8
53C	4	Flat washer	8.8
53D	4	Flat washer	8.8
55	2	Allen stud	A2
55A	2	Allen stud	A2
59	2	Rivet	A2
70	1	Bearing support	Steel
80	1	O-ring	EPDM
93	1	Motor	-
93A	1	Reduction gearbox	-

SEALING: SINGLE MECHANICAL SEAL.

