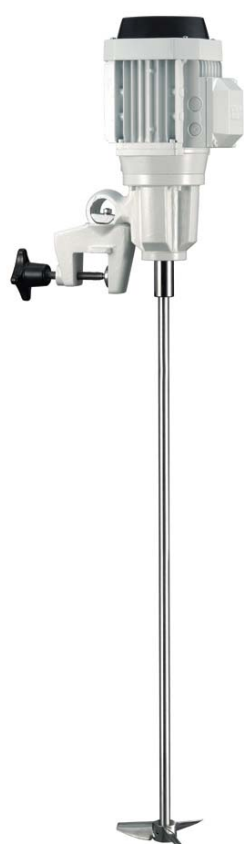




## INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

### PBC / PBR PORTABLE AGITATOR



#### **INOXPA, S.A.**

c/Telers, 54 Aptdo. 174

E-17820 Banyoles

Girona (Spain)

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**MANUFACTURER DECLARATION**  
**According the EC directive about machines**  
**98/37/CE, Annex II B**

The manufacturer:

**INOXPA, S. A.**

c/ Telers, 54

17820 Banyoles (Girona) - Spain

Hereby declares, that the agitators

\_\_\_\_\_

Denomination

\_\_\_\_\_

Type

\_\_\_\_\_

Manufacturing year

Comply with the pertinent disposition, in the execution supplied by **INOXPA, S.A.** for the incorporation in a machine or installation, or for the assembly with other machines as a subunit of other higher order machine.

Harmonized norms used, particularly:

EN 292 part 1 and 2, EN 809

The machine above must not be put into service until the machinery into which it has been incorporated have been declared in conformity with the EC Machinery Directive. It must meet, particularly, the standards EN 294, EN 563, EN 809 y EN 953 in its respective current editions.

Year of CE marking: CE 95

Banyoles, January 1995



Josep Maria Benet Technical Manager

**EC DECLARATION OF CONFORMITY**  
**According the EC directive about machines**  
**98/37/CE, Annex II B**

The manufacturer:

**INOXPA, S. A.**

c/ Telers, 54

17820 Banyoles (Girona) - Spain

Hereby declares, that the agitators

\_\_\_\_\_

Denomination

\_\_\_\_\_

Type

\_\_\_\_\_

Manufacturing year

Are in conformity with the essential requirements of the Machinery Directive 98/37/CE (latest modifications included), according the following Council Directives and harmonized norms:

- 72/23/CE Directive "low voltage"
- Norms EN 292 part 1 and 2, EN 809

Year of CE marking: CE 95

Banyoles, January 1995



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.

## **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.**

**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 motor IEC, IP-55
PBC 1.18-4007-1-100	16
PBC 1.18-4007-1-130	
PBC 1.18-4007-1-150	
PBC 1.18-6005-1-130	16,5
PBC 1.18-6005-1-150	

Type	Weight [Kg] with motor IEC, EExdIIBT4
PBC 1.18-4007-3-100	32
PBC 1.18-4007-3-130	
PBC 1.18-4007-3-150	
PBC 1.18-6005-3-130	32,5
PBC 1.18-6005-3-150	

## 3. Identification, description and use.

### 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.

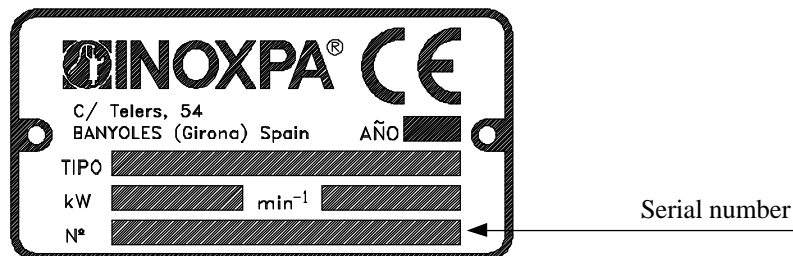


Figure 3.1: Characteristics plate.

### Example:

<b>PBC</b>	<b>1.</b>	<b>18</b>	<b>-</b>	<b>4</b>	<b>007</b>	<b>-</b>	<b>1</b>	<b>-</b>	<b>150</b>
1	2	3		4	5		6		7

#### 1. Name of the agitator.

PBC = portable agitator with motor.

PBR = portable agitator with gear motor.

#### 2. Number of agitation elements.

1 = one agitation element.

2 = two agitation elements.

#### 3. Type of agitation elements.

18 = type lineflux.

#### 4. Motor speed.

4 poles = 1500 rpm.

6 poles = 1000 rpm.

8 poles = 750 rpm.

#### 5. Motor power.

001 = 0.18 kW.

005 = 0.55 kW.

007 = 0.75 kW.

#### 6. Motor.

1 = IP-55.

2 = IP-65.

3 = Flameproof.

4 = Explosion-proof.

5 = Single phase.

#### 7. Diameter of the agitation element.

100 = 100 mm.

130 = 130 mm.

150 = 150 mm.

**DESCRIPTION.**

The PBC / PBR series agitators are portable agitators. A single size motor has been standardised for all the series' models. In spite of being very compact, these agitators have a bearing support that is completely independent of the motor. This support is fixed onto the tank with a clamp that can be turned in all directions. The half shaft is guided by two bearings that support the axial and radial forces transmitted by the agitation elements. The agitator shaft is attached directly to the half shaft with two allen pins.

All the parts that come into contact with the product are made of stainless steel, AISI-316 (1.4401). Its surface finish is electropolished.

The standard agitation element is a type 18 lineflux propeller.

**USE OF THE AGITATOR.**

Its application is for agitation and mix processes on open tanks with a maximum volume of 1000 l. and a maximum viscosity of 400 cPs.

## 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.

The agitator is attached to the tank by means of a clamp and it has to have a base that is sufficiently rigid to prevent any kind of vibrations.

The agitator must be placed with an appropriate inclination, as shown in figure 4.1, to obtain the flow required and so that the propeller does not touch the tank's wall.

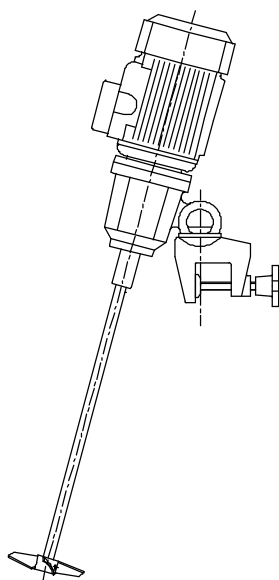


Figure 4.1

The design of the gag, with a swivel ball and socket joint, allows for a triple mixing action. Fixing the agitator with the correct angle for the required mixing is instantaneous and a tried and tested mixing result can be recorded and reproduced with the three positions (see figure 4.2).

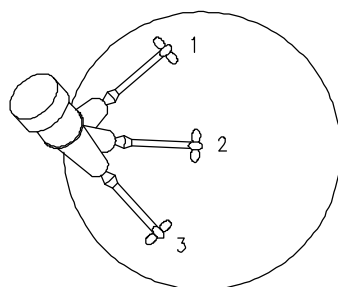


Figure 4.2

1. **Decentred position right.** This is the most recommendable. Intense up and down currents are obtained with a simultaneous rotation, which blend the products thoroughly. The currents of the propellers sweep the bottom, maintaining the solids in suspension.
2. **Centred position.** With the shaft centred, the forces are balanced, creating an eddy or a vortex. This position is good for dragging solid particles with a tendency to float down to the bottom, but it is not effective for general mixing.
3. **Decentred position left.** With the agitator shaft in this quadrant, there is a large slipstream without a vortex and with few vertical currents. It is recommended for the inclusion of liquid gases.

**ASSEMBLY.**

After the agitator's location has been defined, it has to be fixed to the tank with the gag (72), fastening the knob (74) tightly until it butts with the tank. In order to put the agitator in the correct position for the required work, the hexagonal nut has to be loosened (54) and after it has been orientated, it has to be secured tightly.

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 agitator shaft, as it can easily suffer permanent damage.**

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

**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 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.

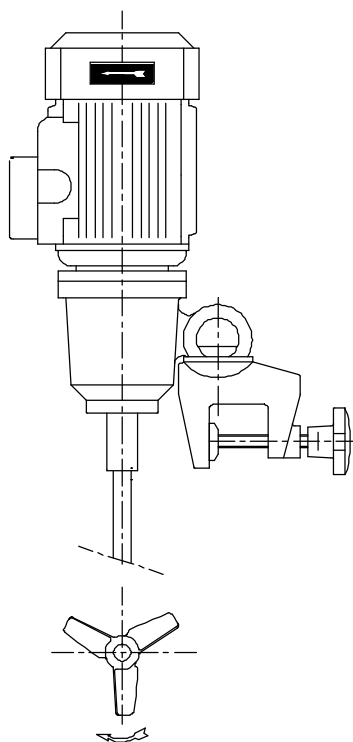


Figure 5.1

**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 sealing: seal.

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

### LUBRICATION.

PBC / PBR vertical agitators are mounted on permanently greased bearings, which do not need maintenance.

The bearings can be re-greased by stripping the support, cleaning the previous grease off the bearings or by replacing them.

The bearing housings are also cleaned and finally re-greased with a 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 / gear motor will be carried out according to 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.

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 bearings agitator.
10	Lip seal damaged or worn.	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. 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:

- Take the agitator out of the tank.
- Disassemble the propeller (02) and the agitator shaft (05), removing their respective Allen pins (55, 55A).
- Remove the Allen screws (51) and take out the IEC motor / gear motor (93).
- Release the elastic ring (66) with appropriate pliers. Hit the lower end of the head half shaft (26) with a nylon hammer and take out the unit formed by the head half shaft and the ball bearings (70, 70A).
- Remove the lip seal (88), which is housed in the bottom part of the head (06).

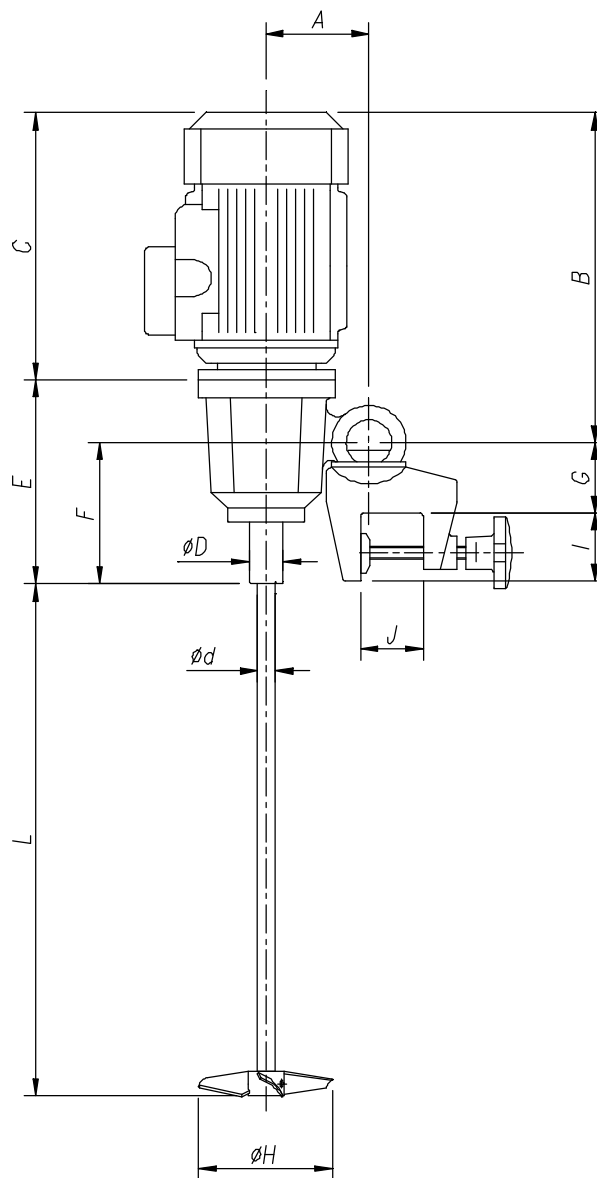
### **ASSEMBLY.**

- Insert the seal (88) into the head (06).
- Put the upper ball bearings (70) and the lower ones (70A) in the head half shaft (26).
- After the half shaft / ball bearing unit has been assembled, put it in the head until it butts below with the lower ball bearings and fix the unit with the elastic ring (66).
- Place the IEC motor / gear motor (93) and tighten the Allen screws (51) and the flat washers (53) that hold it in place.
- Join the agitator shaft (05) with the head half shaft using the Allen pins (55A).
- Place the propeller (02) in the agitator shaft and tighten the Allen pins (55).
- Fit the agitator over the tank.

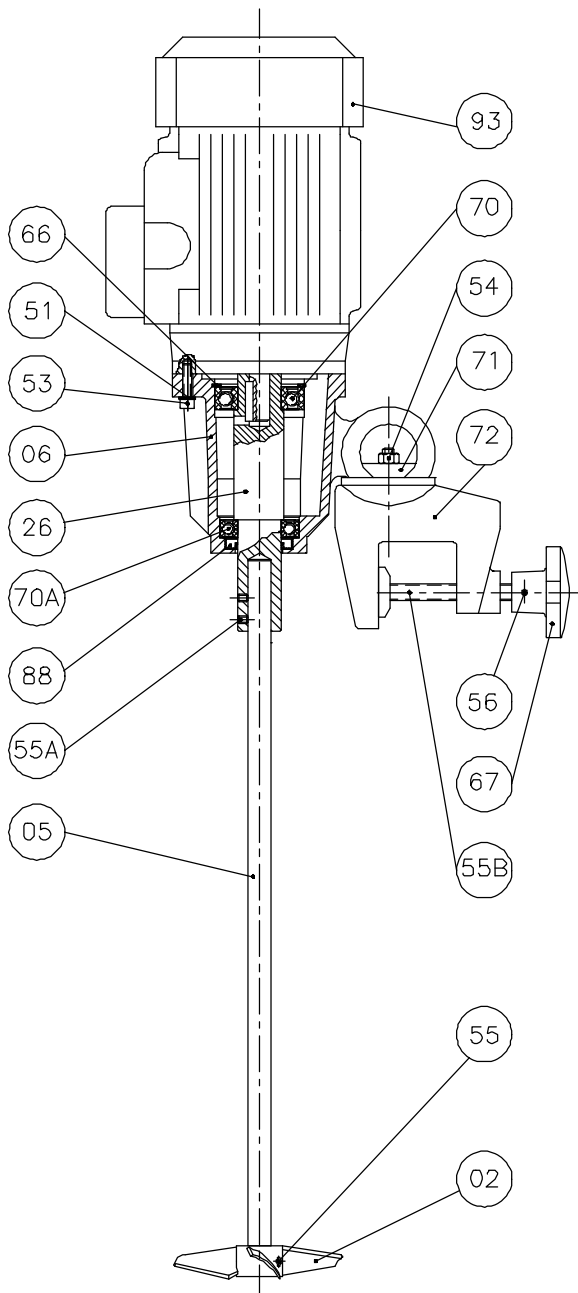
# 9. Technical Specifications.

## TECHNICAL SPECIFICATIONS AND DIMENSIONS.

<b>Tipo agitador</b> Type agitator Modèle agitateur		<i>PBC I.18-4007-1-100</i>			<i>PBC I.18-4007-1-130</i>		<i>PBC I.18-4007-1-150</i>		<i>PBC I.18-6005-1-130</i>		<i>PBC I.18-6005-1-150</i>		
<b>Potencia motor</b> Motor Power Puissance du moteur	[ Kw ]	0,75						0,55					
<b>Velocidad</b> Speed Tours/minute	[r/min]	1415						940					
<b>Volumen [H<sub>2</sub>O]</b> Capacity [H <sub>2</sub> O] Volumen [H <sub>2</sub> O]	[ m <sup>3</sup> ]	0,1 0,6	0,2 0,8	0,4 1,5	0,1 0,7	0,15 1							
<b>Dimensiones</b> Dimensions Dimensions	A	90											
	B	290											
	C	234											
	D	30											
	E	180											
	F	124											
	G	55											
	I	60											
<b>Eje agitador</b> Agitator shaft Arbre agitateur	Ø d	16											
	L máx.	1250											
<b>Tipo</b>	<b>18</b>	Lineflux	Ø H	100	130	150	130	150					
<b>Peso</b>	<b>Weight</b>	<b>Poids</b>	[ Kg ]	16	16	16	16,5	16,5					



## AGITATOR PBC / PBR AND PARTS LIST.



Position	Quantity	Description	Material
02	1	Propeller	AISI-316
05	1	Agitator shaft	AISI-316
06	1	Head	Aluminium
26	1	Head half shaft	AISI-316
51	4	Allen screw	A2
53	4	Flat washer	A2
54	1	Nut	A2
55	2	Allen pin	A2
55A	2	Allen pin	A2
55B	1	Pin	A2
66	1	Elastic ring	Steel
70	1	Ball bearings	Steel
70A	1	Ball bearings	Steel
71	1	Clamp	Aluminium
72	1	Gag	Aluminium
73	1	Hose coupling	Steel
74	1	Knob	Plastic
88	1	Seal	NBR
93	1	IEC Motor / Gear motor	-