



INSTALLATION, SERVICE AND MAINTENANCE INSTRUCTIONS

BCI / BCA / BCR VERTICAL AGITATOR



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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:

VERTICAL AGITATOR

BCI / BCA / BCR

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) n° 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.

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
BCI 1.18-4007-1-100	16,5
BCI 1.18-4007-1-130	
BCI 1.18-4007-1-150	
BCI 1.18-6005-1-130	17
BCI 1.18-6005-1-150	

Type	Weight [Kg] with motor IEC, EExdIIBT4
BCI 1.18-4007-3-100	32,5
BCI 1.18-4007-3-130	
BCI 1.18-4007-3-150	
BCI 1.18-6005-3-130	33
BCI 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.

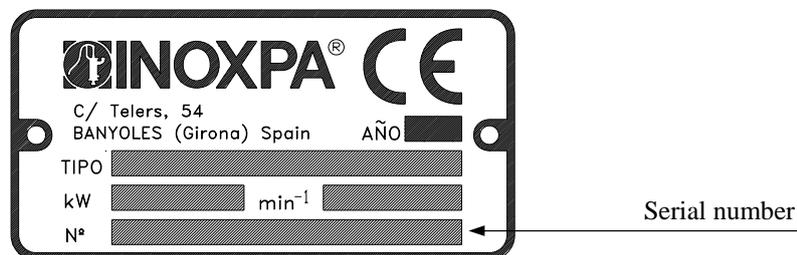


Figure 3.1: Characteristics plate.

Example:

BCI	1.	18	-	4	007	-	1	-	150
	1	2	3	4	5	6	7		

1. Name of the agitator.

BCI = vertical agitator with motor.
 BCA = vertical agitator without base plate.
 BCR = vertical 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 BCI / BCA / BCR series agitators are vertical agitators with a stainless steel base. 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. 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.

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.

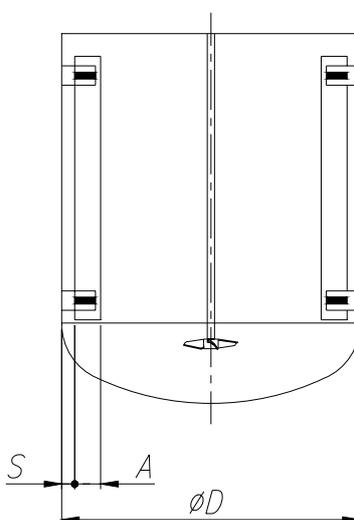


Figure 4.1

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

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 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.

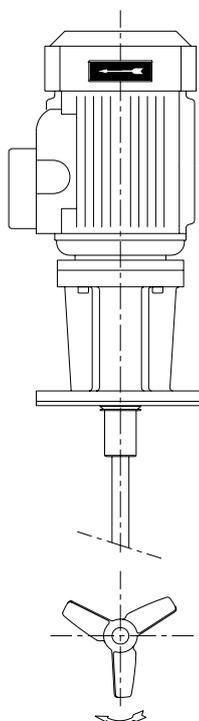


Figure 5.1

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 and/or V-ring.

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

LUBRICATION.

BCI / BCA / BCR 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.	10,11.

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 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.
11	V-ring worn or damaged.	Replace the V-ring.



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 V-Ring (81), depending on the version of the agitator.
- 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).
- Finally, remove the countersunk screws (50) in order to remove the base plate (42), depending on the version of the agitator.

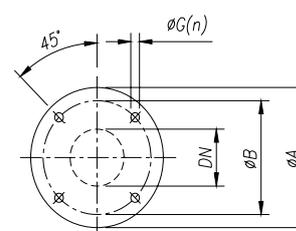
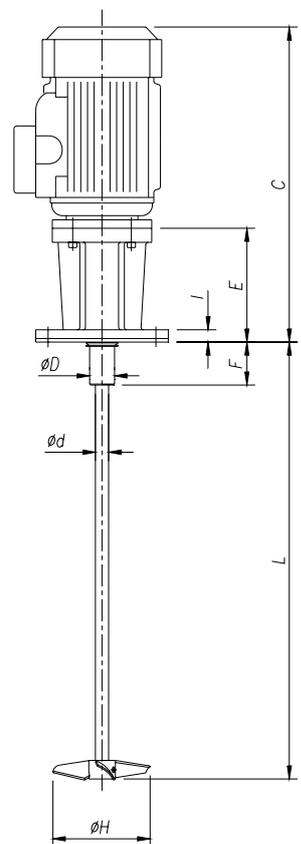
ASSEMBLY.

- 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 bearings 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.
- Put the base plate (42) in the head (06) with the countersunk screws (50), depending on the version of the agitator.
- Assemble the V-ring (81), depending on the version of the agitator.
- 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.

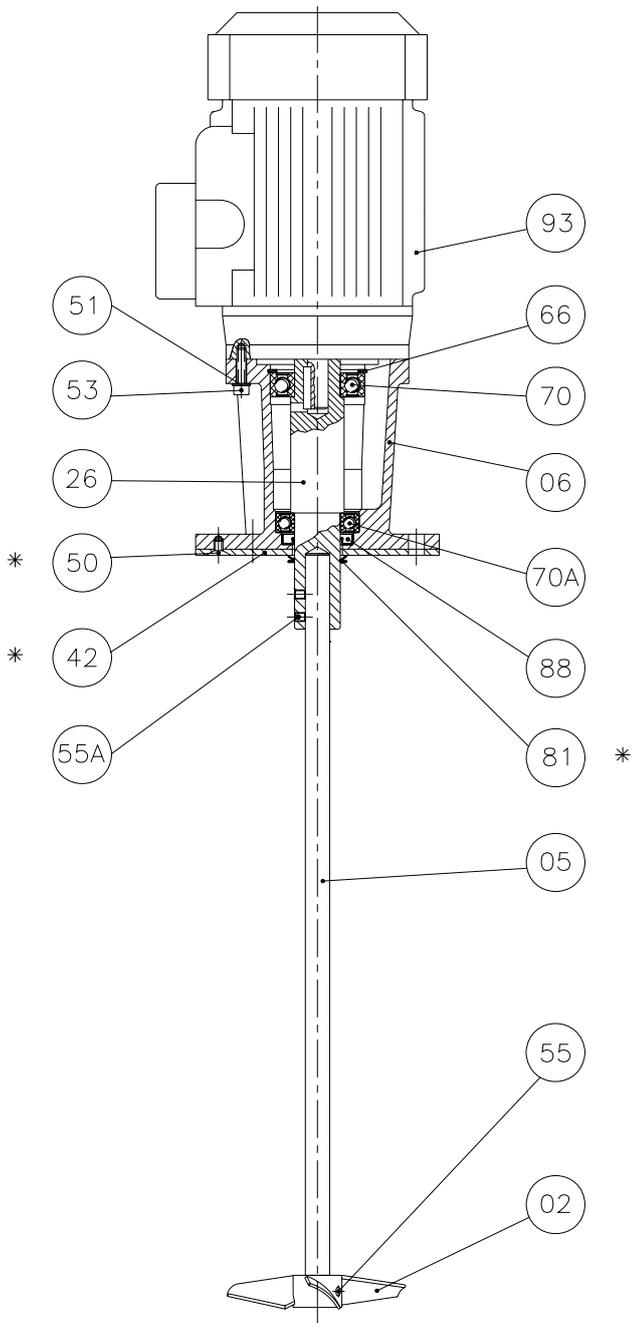
TECHNICAL SPECIFICATIONS AND DIMENSIONS.

Tipo agitador Type agitator Modèle agitateur		BCI.1.18-4007-I-100			BCI.1.18-4007-I-130			BCI.1.18-4007-I-150		
Potencia motor Motor Power Puissance du moteur	[Kw]	0,75			0,55					
Velocidad Speed Tours/minute	[min ⁻¹]	1415			940					
Volumen [H₂O] Capacity [H ₂ O] Volumen [H ₂ O]	[m ³]	0,1 0,6	0,2 0,8	0,4 1,5	0,1 0,7	0,15 1				
Dimensiones Dimensions Dimensions	A	160								
	B	130								
	C	360								
	D	30								
	E	130								
	F	50								
	G	10,5 (4)								
	I	14								
Eje agitador Agitator shaft Arbre agitateur	Ø d	16								
	L máx.	1250								
Tipo	18	Lineflux	Ø H	100	130	150	130	150		
Peso Weight Poids			[Kg]	16,5	16,5	16,5	17	17		



Agitator base

AGITATOR BCI / BCA / BCR 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
42	1	Base plate	AISI-316
50	4	Countersunk screw	A2
51	4	Allen screw	A2
53	4	Flat washer	A2
55	2	Allen pin	A2
55A	2	Allen pin	A2
66	1	Elastic ring	Steel
70	1	Ball bearings	Steel
70A	1	Ball bearings	Steel
81	1	V-ring	NBR
88	1	Lip seal	NBR
93	1	IEC motor / Gear motor	-

* Parts correspond to the BCI / BCR version.