



**Agitatori Miscelatori Dispensori**






**SIDE ENTRY MIXERS USE AND MAINTENANCE MANUAL**

## TABLE OF CONTENTS

1	Range of mixers	3
2	Positioning on vessel	5
3	Warnings and Warranty	7
4	General Safety Recommendations	9
5	Instructions for storage	11
6	Installation	12
7	Start up	25
8	Control and preventive maintenance plan	29
9	Corrective maintenance	31
10	Troubleshooting table	32
11	CE certificate	34

## SAFETY INSTRUCTIONS

These symbols    indicate the type of risk resulting from failure to observe the safety requirements:



**DANGER**  
RISK OF ELECTRIC  
SHOCK

Warning that failure to comply with the requirements may cause electric shocks or electrocution



**DANGER**  
GENERIC

Warning that failure to comply with the requirements may cause harm to people and objects.





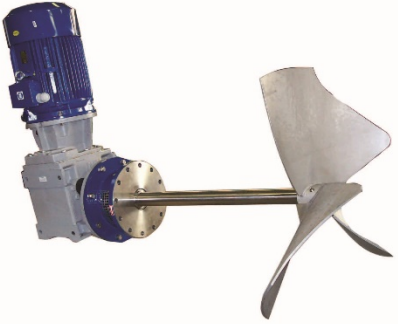
**WARNING**

Warning that failure to comply with the requirements may cause damage to the mixer or other equipment.

## 1 - THE RANGE OF MIXERS

**SIDE ENTRY MIXERS:** to be used only in storage tanks or simple mixing operations. They are not suitable for high viscosities.

They are distinguished by their installed power, but the parameter used to select them is the generated flow rate.

<p><b>FAST AL MODEL</b>  <b>Driving set:</b> Aluminium spider with bearing  <b>N. sizes:</b> 9  <b>Rotation speed:</b> 700-900 RPM  <b>Flow rate:</b> 60-1358 m<sup>3</sup>/h  <b>Power:</b> 0.25-11 kw  <b>Seal options:</b> only single mechanical seal, immersed in the product</p>	
<p><b>SLOW ALF MODEL (small sizes)</b>  <b>Driving set:</b> Worm screw gearbox  <b>N. sizes:</b> 24  <b>Rotation speed:</b> 90÷280 RPM  <b>Flow rate:</b> 86-2000 m<sup>3</sup>/h  <b>Power:</b> 0.12-4 kw  <b>Seal options:</b> single mechanical seal, immersed in the product.  Cartridge seal is available for larger sizes.</p>	
<p><b>SLOW ALC MODEL (large sizes)</b>  <b>Driving set:</b> Bevel gearbox  <b>N. sizes:</b> 7  <b>Rotation speed:</b> 190÷360 RPM  <b>Flow rate:</b> 2500-9000 m<sup>3</sup>/h  <b>Power:</b> 5,5-55 kw  <b>Seal options:</b> cartridge mechanical seal in any configuration, shut off, spacer joint.  Seal immersed in the product is available for smaller sizes.</p>	

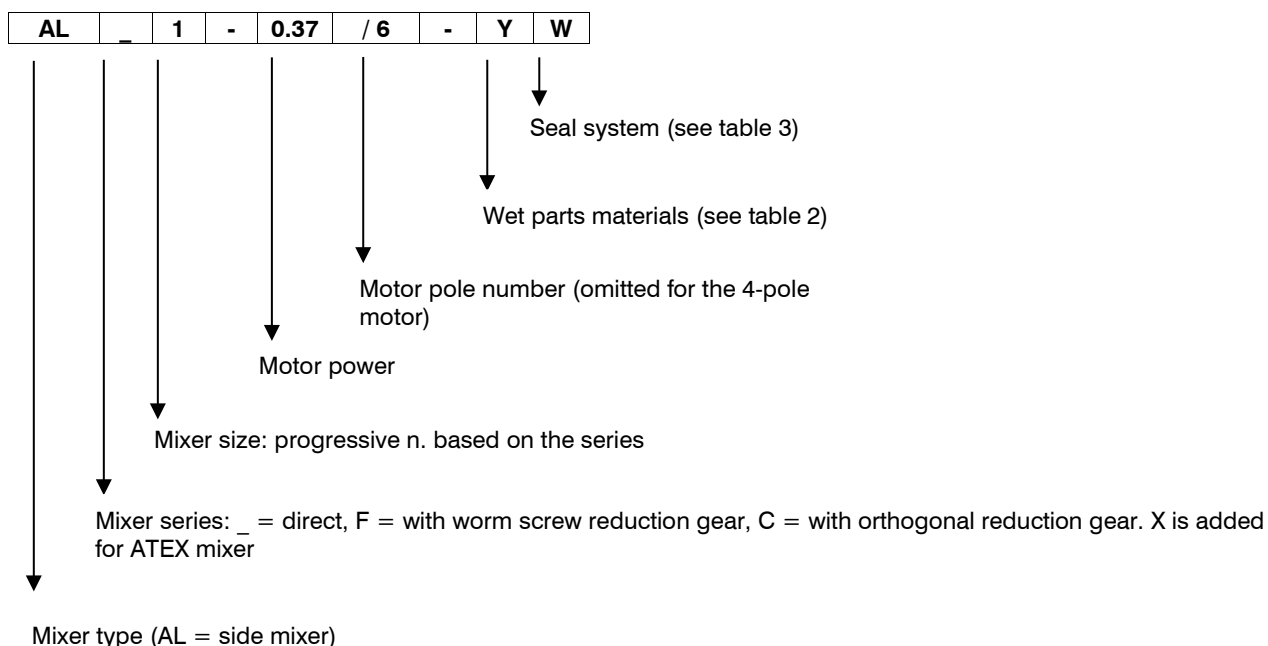


Table 2: Materials	
<b>A</b>	Carbon steel
<b>—</b>	SS304
<b>Y</b>	SS316L
<b>D</b>	SS904L
<b>E</b>	SAF 2205
<b>F</b>	SAF 2501
<b>G</b>	Hastelloy
<b>H</b>	Rubber-coated
<b>I</b>	Ebonite-coated
<b>J</b>	Abcrite-coated
<b>K</b>	PP-coated
<b>L</b>	Halar-coated
<b>M</b>	PFA-coated
<b>N</b>	SS304 polished
<b>O</b>	SS316L polished

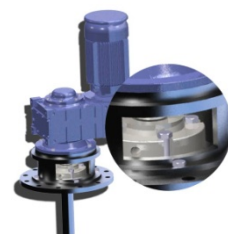
Table 3: Seal system					
Without stool		Single, with stool		Double, with stool	
<b>L</b>	Lip	<b>L</b>	Lip		
<b>B</b>	Packing	<b>C</b>	Packing		
	graphite/NBR (side) Without Seal (vertical)				
<b>W</b>	hard surfaces/NBR				
<b>V</b>	graphite/Viton	<b>S</b>	graphite/Viton	<b>D</b>	graphite/Viton
<b>WV</b>	hard surfaces/Viton	<b>SW</b>	hard surfaces/Viton	<b>DW</b>	hard surfaces/Viton
<b>E</b>	graphite/EPDM	<b>SE</b>	graphite/EPDM	<b>DE</b>	graphite/EPDM
<b>WE</b>	hard surfaces/EPDM	<b>SWE</b>	hard surfaces/EPDM	<b>DWE</b>	hard surfaces/EPDM
<b>T</b>	graphite/PTFE	<b>ST</b>	graphite/PTFE	<b>DT</b>	graphite/PTFE
<b>WT</b>	hard surfaces/ PTFE	<b>SWT</b>	hard surfaces/ PTFE	<b>DWT</b>	hard surfaces/ PTFE



Mechanical seal within the process, without stool



Short stool for cartridge seal



Tall stool for double seal

Further possibilities:

**F:** removal of seal without removing the reduction gear

**H:** Shut off system to maintain pressure in the system while replacing the seal

## 2 – POSITIONING ON VESSEL

### WHEN LIQUID LEVEL IS GREATER THAN DIAMETER

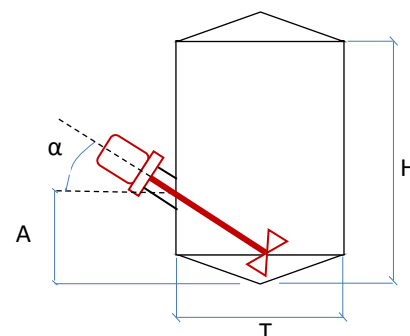
**Direction:** radial

**Elevation:**  $A = \min H/8$

**Slope:** downward with  $\alpha$  from table, function of vessel diameter

$\alpha$	16	20	25	30	35	40
T/A	7,0 ÷ 5,6	5,5 ÷ 4,4	4,3 ÷ 3,4	3,3 ÷ 2,8	2,7 ÷ 2,4	2,3 ÷ 1,9

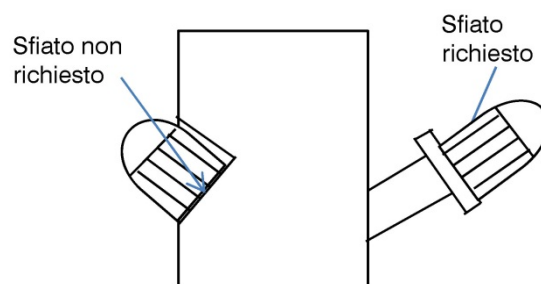
**Multiple mixers:** Not foreseen



### MECHANICAL SEAL VENTING

When connection to vessel is by nozzle and not directly on wall, during vessel filling it is recommended to vent mechanical seal with suitable plug obtained in the top part of connecting flange, or directly on the seal, when it is cartridge type.

If mixer is down sloped, this is mandatory to avoid seal dry running and quick failure.



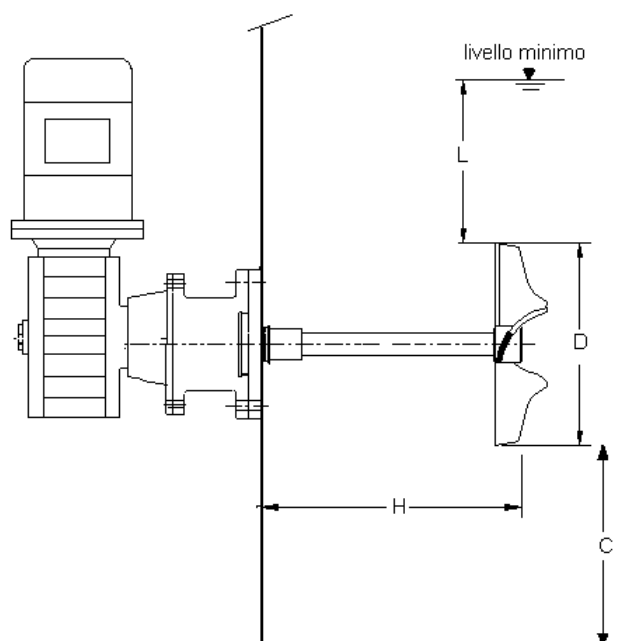
### DISTANCE FROM WALLS

For best performances, impeller shall not be too close to walls:

**H:** Distance from vertical wall (has influence on shaft length):  $\text{Min} = 0,6 D$

**C:** Distance of impeller lower part from bottom:  $\text{Min} = 150\text{mm}$ , never below welding line for dished bottom

**L:** Liquid level above impeller upper part  $\text{min} = 1,5 \times D$



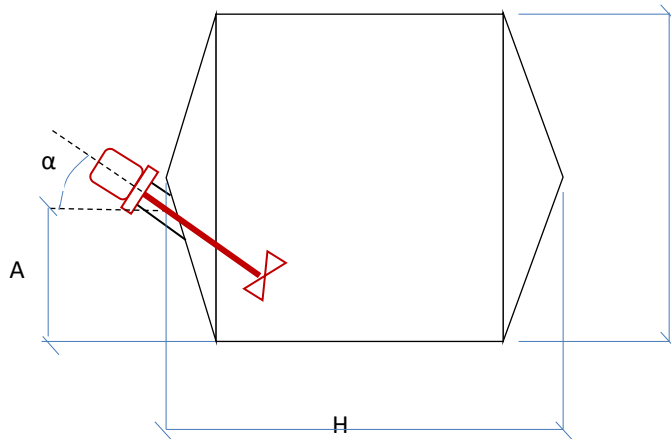
## HORIZONTAL VESSELS

**Mounting:** fixed on one bottom, as close as possible to vessel axis, in the lower part,  $\alpha$

**Orientation:** Downward, with  $\alpha$  as per table, function of H/A

$\alpha$	11	12,5	14	16	18,5	22
H/A	10	9	8	7	6	5

**Multiple agitators:** Not recommended



## VERTICAL VESSEL WITH DIAMETER BIGGER THAN HEIGHT

**Direction:** left sloped  $\alpha$

$\alpha = 7^\circ$  for vessel diameter less than 15m

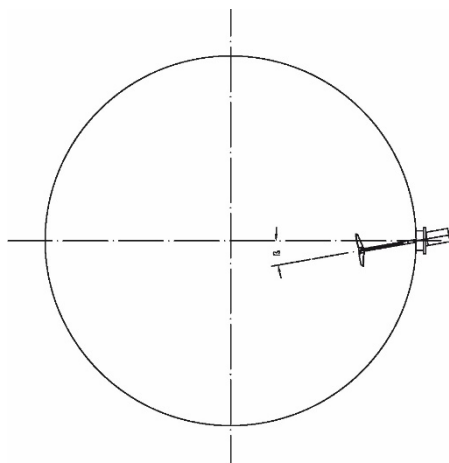
$\alpha = 10^\circ$  for vessel diameter greater than 15m

$\alpha = 20^\circ$  for solid suspension applications

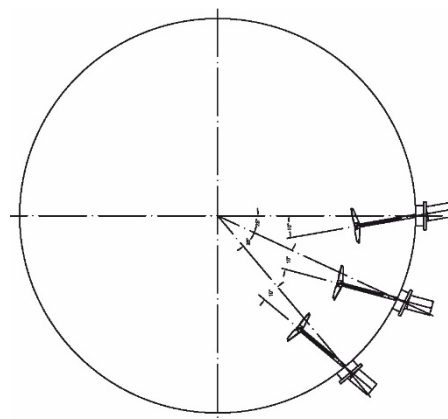
**Elevation:** For dished bottom, minimum 0,5 D from weld line,  
for flat bottom, minimum 0,5 D + 150mm

**Slope:** Horizontal

**Multiple mixers:** To be positioned in the same region, with same inclination.  
Distance between them about  $25^\circ$



Single mixer  
inclination =  $\alpha$



Multiple mixers  
 $25^\circ$  distance on wall, same quarter  
inclination =  $\alpha$

## 3 - WARNINGS AND WARRANTY

### 3.1 - Introduction

The purpose of this manual is to provide the necessary information for the safe installation, use and maintenance of the mixer.

The mixer is designed and built for industrial use and therefore must only be installed and used by qualified personnel who are familiar with applicable directives and standards of practice generally recognised.

The user should read this entire manual before using the mixer.

Improper use may damage the mixer and invalidate the warranty.



**The mixer is NOT a “ready-to-use machine”, but is a component of a POTENTIALLY HAZARDOUS system, as it is equipped with unprotected rotating parts which, in case of contact, can cause serious harm to people and objects. All uncovered rotating parts of the mixer must be segregated or protected so that it is impossible to make contact with people or objects when the motor is powered. The responsibility for the safety of the finished machine and compliance with all applicable laws and directives belongs to the manufacturer or assembler incorporating the mixer as a component. It is strictly forbidden to put the mixer into service before the machine into which it will be incorporated is declared compliant with applicable safety regulations.**

When requesting technical support or spare parts from our offices, always communicate the model and serial number indicated on the mixer data plate.

The following instructions and warnings refer to our standard mixer models with three-phase electric motor. For any special variant or version, pay particular reference to the annexes and the documents of sale.

For questions or situations not described in this manual or other documents of sale, please contact our office.

### 3.2 - Warranty

With effect from the date of delivery, GREC S.r.l. guarantees the mechanical parts of the machine, in normal conditions of use and service, for a period of 12 MONTHS.

**THIS WARRANTY DOES NOT COVER PARTS SUBJECT TO WEAR**

The warranty is understood as replacement of the faulty part ex GREC Srl works.  
The costs of transporting and installing the new piece are charged to the customer.  
Any commercial terms agreed in the order have precedence over this declaration.

### 3.3 - Liability

The manufacturer declines all responsibility in the following cases:

- mixer use which does not comply with national safety and accident prevention laws
- incorrect installation, failure to follow the instructions in this manual correctly
- power supply faults
- modifications or tampering
- operations carried out by untrained or unsuitable personnel.

The safety of the machine also depends on careful observation of the requirements listed in the manual, and in particular it is necessary to:

- always operate within the envisaged limits of use
- always ensure diligent regular maintenance
- assign operators who are trained for the purpose to inspection and maintenance
- use original spare parts only

The instructions in this manual do not replace but supplement the requirements of the applicable legislation regarding safety standards.

The mixer is designed to operate with fluids with the characteristics (density, viscosity, temperature etc.) specified in the contract documents (e.g. order confirmation). In the absence of such specifications, it is the responsibility of the installer to check the compatibility of the mixer and its components (e.g. mechanical seals, gaskets etc.) with the fluids and operational characteristics to which it is subjected.



**Working with fluids other than those specified in the contract documents or in operating conditions other than those listed in the contract documents or in the next paragraph can cause harm to the mixer and/or people and/or surrounding property.**



## 4 - GENERAL SAFETY RECOMMENDATIONS

READ THIS SECTION CAREFULLY BEFORE STARTING TO USE THE MIXER. FAILURE TO OBSERVE THESE RECOMMENDATIONS MAY CAUSE HARM TO PEOPLE OR OBJECTS.  
IF YOU DO NOT UNDERSTAND ANY PART OF THESE INSTRUCTIONS, DO NOT ATTEMPT TO INSTALL OR OPERATE THIS MIXER. CONTACT GREC SRL FOR ANY PROBLEM.

### 4.1 - Moving and Lifting

- Use suitable lifting devices only. Do NOT attempt to lift the mixer by hand if it weighs more than 20 kg.

### 4.2 - Connecting the power supply

- Do not connect the motor to the power supply until all components have been assembled, the mixer has been installed and all the bolts have been tightened to the values specified in the manual.
- Do not touch the mixer or the power cable if you have wet hands or feet or if you are in contact with a wet or damp surface.
- Before performing any maintenance, unplug the power supply.

### 4.3 - Use

- Always check that lubricant is present in the gearbox, bearings and mechanical seal where necessary according to the manual.
- Assemble all protections that ensure that it is not possible to touch moving parts of the mixer (shaft, motor, impellers, seal, gaskets etc.) with hands or any part of the body.
- Do not use the mixer for purposes other than those envisaged. Do not operate the sealing system at temperatures or pressures higher than those specified.
- BEFORE operating the mixer, it is very important to check the following:
  - ensure that the mixer is connected to the earthing network
  - ensure that all safety devices (butt straps etc.) are installed.
  - ensure that all removable parts are firmly secured.
  - read the instructions provided with the mixer carefully.
  - ensure that the rotating parts are free of obstacles, by rotating the mixer by hand.
  - ensure that all external connections (electrical, hydraulic, pneumatic etc.) have been made according to current regulations.
  - DO NOT ENTER the tank unless the motor is disconnected and the mixing shaft is firmly secured to the mixer or supported from below.

### 4.4 - Maintenance

- Do not make any change to the mixer (installed power, rotation speed, shaft length, impellers etc.) without consulting GREC SRL.
- Unplug the motor from the power supply before performing any maintenance.
- When repairing the mixer or replacing parts, use only procedures and components approved by GREC SRL.
- Do not touch the mixer motor or the top of the mixing shaft unless they have been left to cool for at least an hour.

To perform maintenance in areas that are not easily accessible or hazardous, ensure adequate safety for those performing maintenance and others in compliance with applicable laws regarding safety in the workplace.

Maintenance, inspection and repairs may only be performed by experienced maintenance technicians, aware of dangerous conditions. It is therefore necessary to provide operating procedures

for the complete machine aimed at managing the dangerous situations that could arise and methods for preventing them. The experienced maintenance technician should always work very carefully, paying close attention and carefully following the safety rules.


During operation wear only clothes and/or individual safety equipment indicated in the instructions for use provided by the Manufacturer and by applicable laws on safety at work.


Replace worn components using original spare parts. Use oils and greases recommended by the Manufacturer. Do not dispose of polluting materials into the environment. Dispose of these materials in compliance with applicable laws on this matter.


After replacing the lubricants, clean the surfaces of the gearbox and the floor around to the working area.


## 4.5 - Electric motor


Low voltage motors are intended for industrial plants and comply with harmonised standards EN 60034/IEC34. If not expressly indicated, use is prohibited in classified areas due to danger of explosion and fire. The motors are suitable for room temperatures ranging between -20°C and +40°C and places with altitude up to 1,000 m a.s.l.

 Carefully check the data indicated on the plate before commissioning the motor. Low voltage motors are considered as components to be installed in other machines according to Machinery Directive 2006/42/EC. Their commission is prohibited until conformity to this directive is demonstrated. The rotating electrical machines, powered from the mains, comply with standards EN 50081 and EN 50082 regarding electromagnetic compatibility phenomena - Directive 2004/108/EC. No special shielding measures are required. In the event of intermittent operation, any interference generated by the insertion devices must be limited using suitable wiring.

 Operations on the electrical machine must be carried out with the machine stopped and disconnected from the mains (including the auxiliary equipment). In the presence of electrical protection devices, prevent sudden restarts, complying with the specific recommendations on the use of the various devices.

 Electrical connection operations must be carried out by qualified personnel, with motor stopped and disconnected, and with no chance this can be restarted. The rotor is balanced dynamically with half key. The coupling components must be balanced with half key on smooth spindle. Joints and pulleys must be mounted with specific equipment in order to not damage the motor bearings. After assembly check that the coupling components are fixed on the shaft end and pushed against the stop. If the hub of the coupling component is shorter than the end of the shaft, the difference can be compensated by a spacer bushing. Too small or too large pulleys compromise the proper operation of the bearings. The motors must be installed to allow the cooling air to enter and exit easily. Ventilation must not be prevented and the exhaust air, also the adjacent units, must not be re-suctioned by the fan. Prevent heat sources from affecting the air and motor temperature. In the event of indoor installation, protect the motor from solar radiation and bad weather with suitable devices. We recommend protecting the motor with motor protection devices and torque electronic limiters if the motor is not equipped with thermistors. In the presence of extreme temperature changes and condensation, the motor must be equipped with condensation heaters and drain holes made according to the installation position.

 The electrical connection must always be carried out by qualified personnel, in compliance with the applicable EEI, EN 60204 and possible local regulations.

 Always refer to the data on the voltage and frequency plate, in order to ensure a correct connection with the power supply network. If not specified, tolerance can be of  $\pm 5\%$  on the voltage and  $\pm 1\%$  on the frequency values indicated in the plate. The connection diagrams are normally provided with the motor or are printed in the terminal box. Should they be missing, refer to those provided in the manual.

## 5 - INSTRUCTIONS FOR STORAGE

**FAILURE TO COMPLY WITH THE FOLLOWING RECOMMENDATIONS FOR STORAGE AND PROTECTION MAY INVALIDATE ANY IMPLICIT OR EXPLICIT WARRANTIES.**

### 5.1 – General Instructions

- Upon receipt of your mixer, check for any damage caused by shipping and report any problems to the carrier and to our factory.
- All unpainted steel parts are coated with a protective layer which can be easily removed using kerosene or another solvent.
- Do not remove any protection if the mixer is to be placed in storage before being installed. Store the mixer in a clean, dry place, with air circulation which is not subject to rapid, considerable changes in temperature.
- If storage continues for more than a year, check the condition of the gearbox lubricant before putting the mixer into service.

### 5.2 – Recommendations for prolonged storage

GREC SRL mixers must be protected against corrosion during prolonged periods of inactivity. The main cause of corrosion is the condensation formed due to high humidity and/or temperature changes.

The machines therefore have to be stored properly in a clean, dry place.

Electric motors must never be stored outdoors. In the event of prolonged inactivity, refer to the manufacturer's recommendations and check for condensation, removing it if necessary.

The mechanical seal (if fitted) is not filled with lubricant (if necessary). Refer to the seal maintenance section for instructions.

For storage over 6 months, it is necessary to fill the gearbox to the top with oil to protect internal parts and seals against corrosion.

#### 5.2.1 - STORING EQUIPMENT WITH RUBBER OR EBONITE-COATED SHAFTS AND IMPELLERS

The following instructions must be complied with for all coated mixers that remain in storage prior to installation and commissioning for a period exceeding three months.

Proper storage of coated components should take place in closed storerooms where the temperature never drops below 0 °C.

Where coated shafts and impellers must remain in storage for longer than three months, it is advisable to protect the coating from solar radiation (light and UV rays).

If storage must last for over a year, components with cavities must be filled periodically with water and it should be ensured that they remain full.

If it is impossible to store coated shafts and impellers in closed storerooms, it is possible to use outdoor storage, carefully following the recommendations depending on environmental temperatures.

##### Storage in cold climates

Equipment must be packed in wooden crates with a minimum thickness of 30 mm and a layer of waterproof paper inside them.

Crates must be placed directly in close contact with the ground, making sure not to leave spaces below in order to exclude air infiltration. They must be close together so as not to leave spaces between them. The crates must then be fully covered with waterproof sheets without slits or tears. The sheets must be properly anchored to the ground and sealed. When sizing the crates, it is advisable to bear in mind the extra weight caused by any snowfall. It is advisable not to handle coated equipment or stress it mechanically in any way when the ambient temperature is below 0 °C.

##### Storage in temperate or hot climate countries

The components of the mixers that are coated with rubber or ebonite and which have cavities must be capped, completely filled with water, checking periodically that they remain full. All equipment must be covered with sheets, making sure, for the parts normally exposed to sunlight, that an air chamber is created between the sheet and the equipment itself to limit the rising heat. This chamber can be made with wooden frames or with metal scaffolding.

## 6 - INSTALLATION

### 6.1 - Identification

Upon receipt of the mixer, check that the package is intact.

After unpacking, make sure that there is no transport damage (check the linearity of the shafts in particular).

If the mixer is damaged, draw up a report countersigned by the carrier or at least write "conditional acceptance" on the shipping document. DO NOT install the mixer and notify GREC Srl within three working days.

Note data from the machine identification plate, present on the machine itself, and check that this coincides with that given on the drawings. Remember to always quote the serial number located on the plate for any communication with the manufacturer.

It must always be possible to read all the data shown on the identification plate, and the plate must be cleaned periodically.

If the plate deteriorates and/or is no longer legible, even as regards a single set of data elements, it is recommended to request a new one from the manufacturer, quoting the data contained in this manual, and replace it.

<b>GREC</b>	GREC S.r.l. - Piazza della Conciliazione, 2 I 20123 Milano - Italy <a href="http://www.grec.it">www.grec.it</a>	<b>CE</b>
Agitatore / Mixer		
Tipo / Type	<input type="text"/>	
Matr. / Serial n.	<input type="text"/>	
Anno <input type="text"/>	Item	<input type="text"/>

## 6.2 - Handling

The mixer should be handled with care using appropriate lifting systems.

Do not lift the mixer by its fragile components (terminal boxes, knobs etc.) and **do not use any eye bolts installed on the motor, gearbox, variator etc.** These eyebolts are only to be used for lifting the component to which they are connected when this is separated from the rest of the machine. Do not use the mixer shaft either. If this bends, it could cause vibration and damage to the mixer itself and to the tank.

The best way to lift the mixer is to sling the motor, or even better the spider, if any, properly.

**Be careful not to bump or handle any mechanical shaft seal.**

If the shaft or other parts are coated with rubber, PTFE, PVC or similar, due to the high fragility of these materials, we recommend only removing the protective cover when installation is completed.

Place the machine in position following these rules for moving:

- ◇ Secure all parts that could come loose or fall out of the machine.
- ◇ Remove any accessories affixed to the machine.
- ◇ Make sure there is enough space for moving the machine and the lifting system.
- ◇ Lift the machine carefully
- ◇ The transport operation must be performed by specialised personnel.

### **Some important rules to be followed:**

1 - Ensure that the mixer support plate is level: an angle of the support that does not exceed a maximum offset of 1 mm from the vertical geometry is tolerated for every metre of shaft length.

2 - Another important aspect of installation is that the support should be as rigid as possible to prevent any degree of freedom of the structure from causing unwanted stresses on the rotating machine, amplifying the stress of the shaft and bearings.

A SUPPORT THAT IS TOO WEAK MAY LEAD TO THE BREAKAGE OF THE SHAFT OR ANY OTHER MECHANICAL PART OF THE MACHINE IN A SHORT SPACE OF TIME.

**All stages of installation must be considered, from the creation of the general design. The person authorised to perform such work must, if necessary, implement a “safety plan” to ensure the safety of the people involved and apply all existing laws to the letter.**

3 - Clean any packaging residues and any protective products from the gearbox. Pay particular attention to the coupling surfaces.

4 - Check correct shaft/shaft or shaft/hole alignment.

5 - Provide adequate safety protections devices for the rotating parts outside the gearbox.

## 6.3 – Assembly and Disassembly for Maintenance



### 6.3.1 Preliminary checks

- Check that the data on the identification plate matches that in the technical specification
- Check the oil level in the gearbox and that there are no visible leaks
- Check that the rated voltage and current are compatible with those available
- Position any safety guards
- Check for and remove any moisture on the motors after prolonged storage
- Check to see if the mixer is designed to operate at constant or variable level, and if breakwaters are required
- Ensure that the mixer cannot start up accidentally

### 6.3.2 Positioning

Before installing the mixer, it is necessary to verify the following:

- The space available around and above the tank/container, taking into account the length of the shaft and the space required for cooling the motor.
- The rigidity and appropriate size of the mixer support structure, considering the static and dynamic loads. The mixer must not vibrate or oscillate during operation.
- If being installed outdoors, the motor must be protected from rain and direct sunlight.
- The size of the openings in the tank for the introduction of the impellers, drains etc.

### 6.3.3 Securing

The mixer must be securely attached to its support by bolts, clamps or other suitable devices. The bolts must always be the maximum size allowed by the attachment point provided on the mixer.

The mixer consists of a control unit and a mixing unit.

The **control unit** consists of motor, gearbox or spider, and seal system.

If there are no special reasons agreed upon with the Customer, the control unit is shipped already assembled, ready to be erected and placed on the tank or container plate.

The interfaces available are the tank fixing flange and connection joint between control unit and mixing unit.

For AVL, AVF, AVC models, no joint is available if the gearbox is with hollow shaft and the seal system is with lip or missing. The mixing unit shaft is inserted automatically in the gearbox hollow and it is fixed with the attached screws.

For models with or without mechanical retainer but with protruding shaft (AVS, AVSh, AVSm), or in the presence of base guides, use a joint to the shaft, which can be a sleeve (economic for smaller sizes) or flanged (easier to dismantle).

The **mixing unit** is usually composed of two main parts:

shaft (in one or more sections), one or more impellers, base guide (if any).

Different shaft sections are connected by flanged joints.

### 6.3.4 Vertical mixer with Base guide

The base guide is the last component to be installed and its support is made depending on the position of the mixer shaft. It is essential to ensure that the shaft and the bushes are perfectly in line and that, when the shaft is turned by hand, there is no friction between it and the bushes.



**IMPORTANT: THE GUIDE MUST NEVER BE OPERATED DRY, BUT MUST BE LUBRICATED BY THE CONTENTS OF THE TANK OR OTHER LIQUID.**

1.1. The base guide is designed to ensure long service life. The service life of the wear bushing is influenced by many factors and can vary greatly even in installations that are similar.

1.2. Excessive wear can affect the proper operation of the mixer and cause damage to other components, therefore it is important to carry out initial tests to estimate the average life expectancy and consequently the inspection and/or maintenance intervals.

1.3. In any case, we recommend checking the conditions of the guide at least once a year.

THE BASE GUIDE DRAWING WITH THE INSTALLATION INSTRUCTIONS IS ALWAYS SENT DURING THE ORDER STAGE.

### 6.3.5 Maintenance

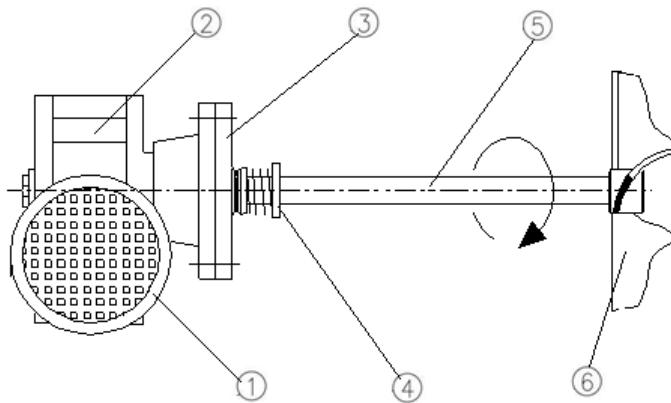
Operations different from the assembly may be required if maintenance of the machine is needed. It can be carried out on the gearbox or on the sealing system

### 6.3.6 Possible configurations of the control unit

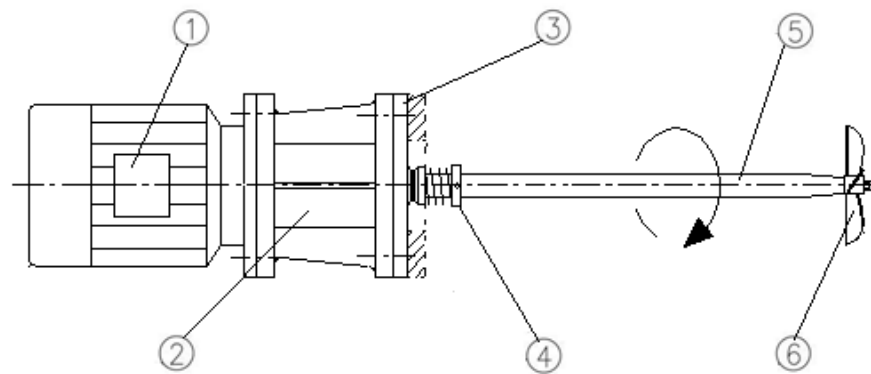
		MODEL	SEAL	STOOL	SHUT OFF	SHAFT JOINT	CHARACTERISTIC
1	SIDE	AL, ALF	Inside the tank	No	No	No	Economic
2		ALF, ALC	With cartridge	Yes	No	No	Possible maintenance without accessing the tank
3		ALC	With cartridge	Yes	Yes	No	Possible maintenance without emptying the tank

# 1

## Side mixer with seal immersed in the product, AL, ALF series



Pos	Description
1	Electric motor
2	Reduction gear/Spider
3	Flange
4	Mechanical seal
5	Shaft
6	Impeller



This is generally shipped fully assembled with the possible exception of the impeller if its diameter exceeds that of the connection flange.

Assembly takes place by simply inserting the shaft in the assembly flange and securing it.

Most side mixers are equipped with the tank fixing flange and on the side with a threaded hole on the side with a cap and/or (on the opposite side at 180°) a small rectangular hole.

- The threaded hole with cap should be placed in the upper part. (replace the cap with a tap for air bleeding and/or mechanical seal washing, if necessary)
- The small rectangular hole should be placed at the bottom (this is used for draining any leaks from the mechanical seal. It should never be closed. In the event of product leakage, check the mechanical seal).

If the impeller (6) is dismantled, access the tank from the manhole and tighten with the dowels supplied in radial position.

The ALF mixer is normally installed with protruding motor on the bottom right to compensate dynamic loads.

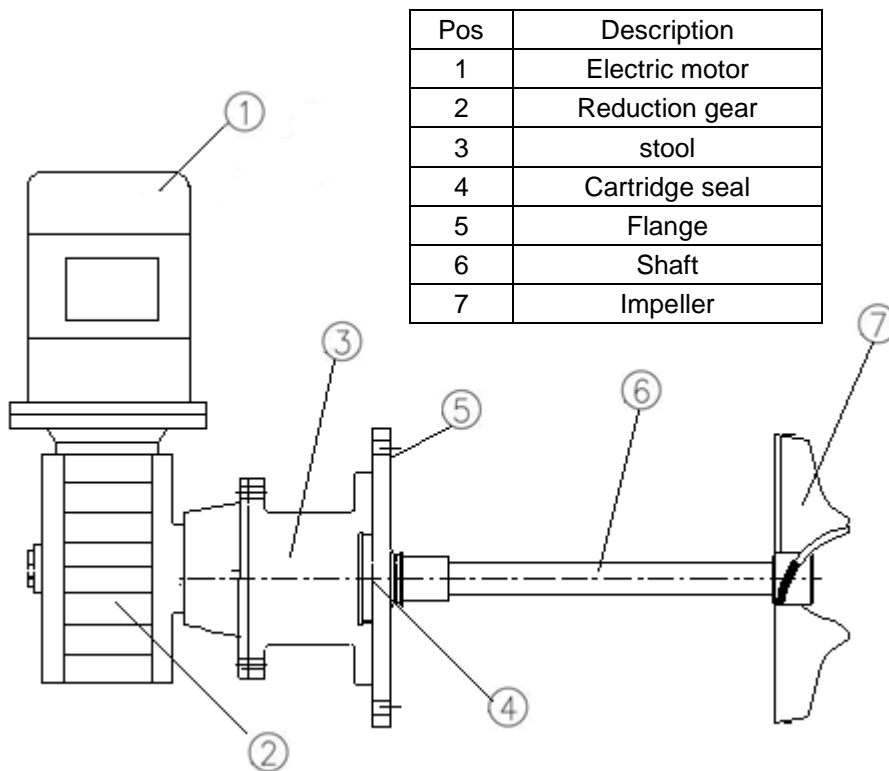
If the tank connection is inside the sleeve, in order to ensure lack of interference with it, configuration with the motor facing downwards and the threaded and rectangular hole in different positions can be made upon request.

ALF5 and ALF6 models must be filled with different amount of oil.



## 2

### Side mixer with stool and cartridge mechanical seal, ALF and ALC series



Generally, it is shipped fully assembled, except for the impeller (7), which will be tightened inside the tank with the supplied dowels in radiant position.

Leave the vent cap of the cartridge seal open when filling the tank and tighten this cap as soon as the first drops leak.

Any leakage from the seal is visible externally from the stool.

In the event double mechanical seal is fitted, flow it with different methods depending on the process conditions.

- Running pressurised water for low pressure cooling or in the presence of solid bodies.
- With pressurised cask for high pressure cooling or in the presence of ATEX environment
- With atmospheric cask for atmospheric pressure cooling

The double seal version can be fitted also in bottom entry version, with the shaft upwards.

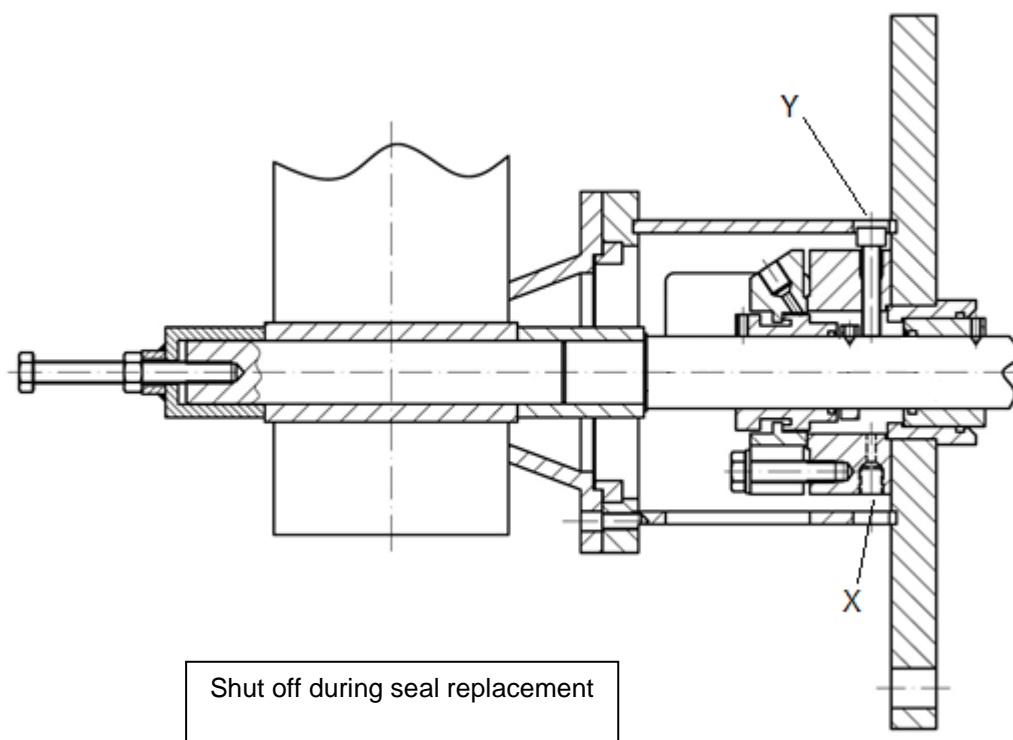
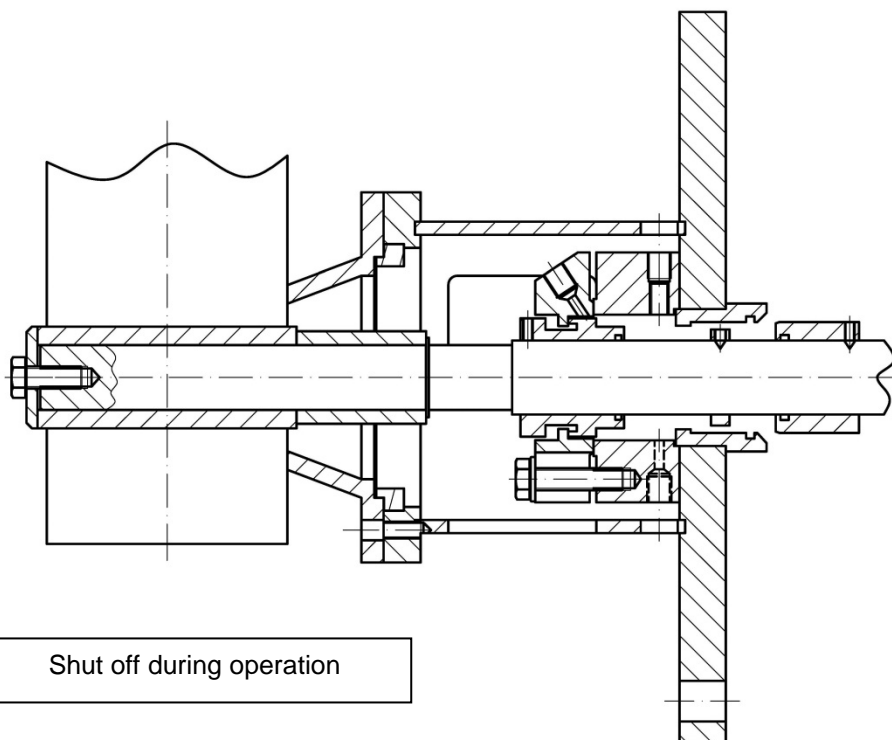
Normally the ALF mixer is installed with high motor.

If the tank connection is inside the sleeve, in order to ensure lack of interference with it, configuration with the motor facing downwards and by introducing the correct amount of oil in the reduction gear.

The replacement of the cartridge seal is described in pos. 3, without the activation of the shut-off valve, which is missing. In this case, empty the tank below the mixer axis.

### 3

Side mixer with stool, cartridge mechanical seal and SHUT OFF, ALC series



## Removal of the mechanical seal with Shut off system

The operations described in the following instructions must be carried out when the tank on which the mixer is installed contains a liquid, whose level exceeds that of the mixer.

In the event the liquid level is lower than that of the mixer, remove the mixer from the tank and perform its maintenance in the workshop.

- 1) Disconnect power supply from the mixer motor and make sure all safety measures have been taken in order to prevent accidental activation during maintenance operations.
- 2) Remove the protection grids from the two windows of the base, where the mechanical seal is found.
- 3) Remove the protection cover of the hollow shaft placed on the reduction gear.
- 4) Apply the axial locking device/s of the mechanical seal rotary part. Upon request, and if deemed useful, to facilitate the operation, rotate the mixer shaft with the screw placed behind the reduction gear at the end of the shaft or manually rotate the electric motor via the cooling fan, after having removed the fan cover cap.
- 5) Loosen (by one turn at least) the dowels that fasten the mechanical seal sleeve to the mixer shaft.
- 6) Loosen (by two turns at least) the screws on the head of the mixer shaft and push the latter inside the tank by about 1-2 mm. In the event the pressure inside the tank pushes the shaft outwards, try to keep it still (generally, the strength of your hand should be enough).
- 7) Remove the seeger ring from its seat via the window of the base where the mechanical seal is found. The seeger ring is placed between the reduction gear and seal; slide it along the shaft until it reaches the end of travel.
- 8) Move the shaft backwards, towards the outside of the tank, until the shut-off device is started, thus braking the shaft movement. One of the following manoeuvres is required in order to perform this operation, according to the pressure of the liquid inside the tank exerted on the shaft.

*Event a) Pressure is sufficient to push the shaft out.*

Brake the shaft displacement until it reaches the end of travel without violent shocks.

*Event b) Pressure is NOT sufficient to push the shaft out.*

Pull the shaft outwards the tank with your hand or use the specific tool supplied, if required, paying attention the shaft key matches the tool slot.

- 9) Loosen cap X until a small amount of liquid leaks.
- 10) Keep moving the shaft backwards, until the seeger ring meets the spacer bushing adjacent to the reduction gear hollow shaft. Now, go to the next step if no liquid leaks from the seat of cap X. *If liquid keeps leaking, it means that the shut-off system is damaged. Therefore, to replace the mechanical seal, empty the tank and remove the entire mixer for complete maintenance.*

- 11) Fully remove cap X in the lower position and tighten screw Y of suitable length in the upper position in order to touch the shaft. Do not tighten excessively the screw to prevent the shaft from damage. This screw prevents the shaft from moving axially.
- 12) Loosen and remove the four screws that fasten the mechanical seal to the base.
- 13) Remove the reduction gear from the base, where the mechanical seal is found, removing the reduction gear from the shaft without exerting radial force on the shaft.
- 14) Remove the key from the shaft, together with the spacer bushing and the seeger ring.
- 15) Accurately clean the shaft where the mechanical seal will slide to be removed.
- 16) Remove the mechanical seal

### Installation of the mechanical seal with Shut-off system

- 1) Accurately clean and grease the shaft where the mechanical seal will slide to be installed.
- 2) Make sure the mechanical seal is equipped with locking devices in the rotary part and that the dowels that fasten the sleeve to the shaft are sufficiently loosen to allow the shaft passage.
- 3) Place the mechanical seal on the shaft paying attention not to damage the seal O-Ring when it meets the step caused by the diameter variation of the shaft. Do not fasten the seal to the base.
- 4) Place the Seeger ring and the spacer bushing on the shaft and then the key on its end, following this sequence.
- 5) Install the reduction gear on the shaft without exerting radial force on the shaft and fasten it to the base, where the mechanical seal is found, with the bolts.
- 6) Fasten the mechanical seal to the base with the four supplied screws, placing it so the locking device can be removed afterwards (NOT now).
- 7) Remove screw Y and replace it with a cap. Tighten this cap so to allow the air to be suctioned in the shut-off chamber, when the shaft is moved inside the tank.
- 8) Close cap "X".
- 9) Slowly push the shaft inside the tank until liquid leaks from the seat of cap "Y".
- 10) Fully tighten cap "Y" until the leak stops.
- 11) Further push the shaft inside the tank until the seeger can be placed in its seat (the shaft edge is now about 2 mm below the beginning of the reduction gear hollow shaft).
- 12) Place the Seeger in its seat.
- 13) Fully tighten the screw on the shaft head with its washer resting on the reduction gear hollow shaft.
- 14) Fully tighten the three dowels that fasten the mechanical seal sleeve to the mixer shaft.
- 15) Remove the axial locking device/s of the mechanical seal rotary part. Upon request, and if deemed useful, to facilitate the operation, rotate the mixer shaft with the screw placed behind the reduction gear at the end of the shaft or manually rotate the electric motor via the cooling fan, after having removed the fan cover cap.
- 16) Install the protection cover of the hollow shaft placed on the reduction gear and install the fan cover cap of the motor if it was previously removed.
- 17) Install the protection grids of the two windows of the base, where the mechanical seal is found.


### 6.3.7 Mixing unit

The shaft is secured to the driving set by following the rules set-out in the previous paragraph.

Shaft-impellers assembly follows the rules set out below:

1. For **uncoated** mixers, shaft/impeller assembly is effected by tightening the screws or dowels provided.
2. If the mixer is coated (or with impellers welded to the shaft), the shaft and the impeller(s) form a single component; therefore, as the physical separation of the components is not possible, it is necessary to insert the whole unit into the tank with extreme care to prevent damage to the coating.
3. Check the minimum opening through which the impeller, or its parts (if removable), can be inserted.
4. Depending on the type of impeller, respect the position direction of the propeller on the shaft, as shown in the mixer drawing.
5. Remove the film that protects against oxidation from the parts machined using the machine tool.
6. It is good practice to make sure that dowels and nuts tightened during the assembly do not come loose during operation, using mechanical or chemical material that is compatible with the process and maintenance.

Below we describe the possible configurations:

	IMPELLER TYPE	HUB BLADE FIXING	SHAFT HUB FIXING	CHARACTERISTIC
1	Single piece, welded to the shaft	No	No	Sanitary/coated. Attention to the possibility to insert the shaft/impeller unit in the tank
2	Single piece Passing hub	No	With dowels in radial position	 Simple
3	Single piece Threaded blind hub	No	Tightened with flat gasket	Sanitary
4	Blades bolted to the hub	Bolts	With dowels in radial position Optional key	For greater diameters, when the manhole cannot be sufficient for insertion of the impeller in single piece
5	Split disc radial	Bolts	With dowels in radial position Optional key	For greater diameters, when the manhole cannot be sufficient for insertion of the impeller in single piece
6	Single piece Threaded blind hub	No	To be tightened to the shaft with bolts Optional key	For tube shafts or impellers with large diameter
7	Special	Special	Special	Assembly instructions provided during the job order phase

#### IMPELLER SECURED TO THE SHAFT USING DOWELS

In the case of impellers attached to the shaft using dowels, it is good practice to mark the shaft at the dowels after positioning the impellers, taking care not to drill the shaft completely when it is expected in the tube.

## IMPELLERS WITH BOLTED BLADES

The impellers are shipped disassembled to facilitate transport and installation of the mixer.

To secure the blades to the hub, rest the three blades under the hub fins and insert the bolts with washers and nuts.

The blades are placed under the hub in the normal configuration with pumping downwards; on the contrary, they must be placed above the hub if pumping is upwards.

Important: before tightening the bolts, make sure that the ends of the blades are well supported on the hub fins. Furthermore, after tightening the bolts, make sure the blades have not moved along the hub fins.

It is essential that the torque of the bolts is suitable. It is equally important to keep the bolts tightened, given that the impellers are often subject to intense and variable stress, due to the reaction to the fluid forces.

To secure the hub to the shaft, cover the shaft with lubricant to facilitate moving the impeller, and then slide it upwards until reaching the holes obtained on the shaft and tighten the dowels.

The GREC three-blade hubs can be mounted in one direction or the other and have been designed to operate with clockwise shaft rotation (seen from the motor).

The concave part of the blades must be in the thrust direction (normally downwards), considering the clockwise rotation direction of the shaft seen from the top.

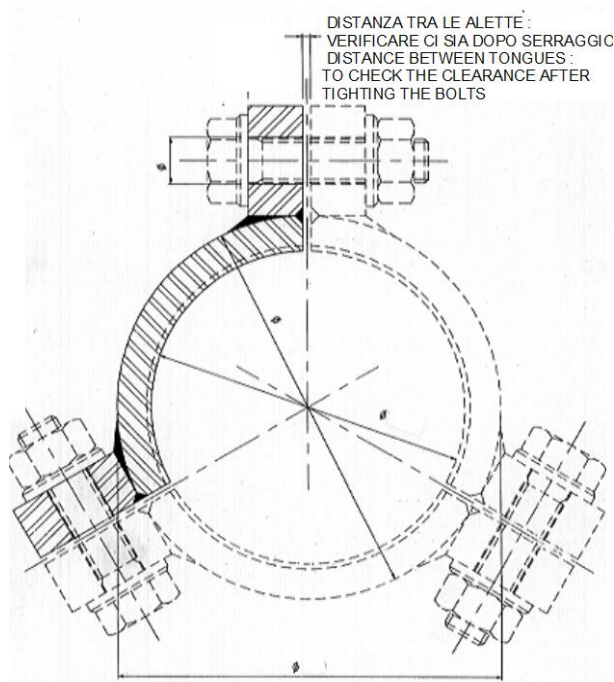
The outriggers, installed only on the bottom impellers, must face downwards.

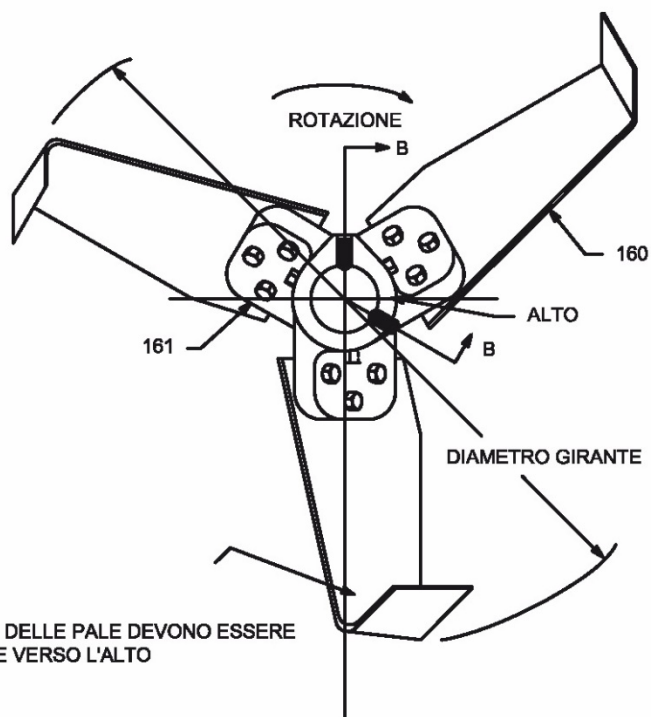
The stabilising fins at the impeller ends (Pag T1) must face the opposite direction of the flow, therefore upwards.

## IMPELLERS WITH THREE PIECES TO TIGHTEN TO THE SHAFT

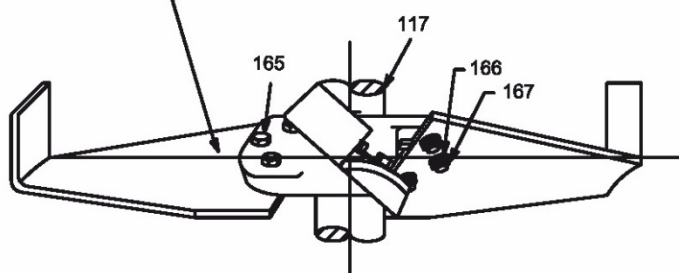
With the three-piece impeller, first assemble the shaft in the correct vertical position, coupled to the geared motor, then assemble the three parts that make up the impeller on the ground. Then lift up the slung impeller and insert it into the shaft from below until reaching the position shown on the drawing and secure the bolts using a torque wrench with suitable calibration for the diameter of the bolts themselves and their material.

When the bolts are being tightened, check the clearance between the fins, so that the bolts are kept tight.



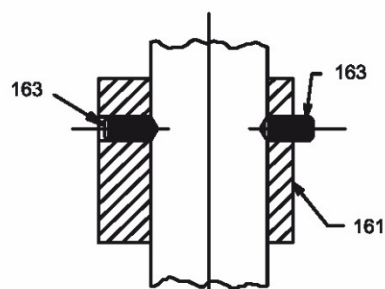
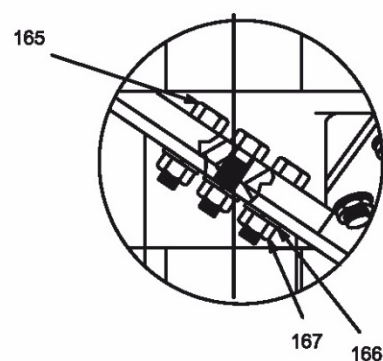


ALETTE DELLE PALE DEVONO ESSERE RIVOLTE VERSO L'ALTO




167	DADO T.E. (9)
166	GROWER (9)
165	VITE A TESTA ESAGONALE (9)
163	VITE (1+3 DIPENDE DAL DIAMETRO)
161	MOZZO
160	PALE (3)
117	ALBERO AGITATORE

POS.	DESCRIZIONE
------	-------------



SEZIONE B-B

Ricavato da .....

Oggetto <b>ASSIEME GIRANTE A FLUSSO ASSIALE MOZZO IN UN PEZZO SOLO PALE IMBULLONATE</b>			Disegno n°		Rev.
			Q.TA' N° <b>1</b>	ARTICOLO N°	
 GREC S.r.l. Via Copernico, 3 20082 Binasco (MI) ITALY Tel.: +39 02 36645050	 SCALA <b>NO</b>	MATERIALE	DISEGNATORE <b>MM</b>	DATA <b>10/10/2011</b>	
		FORMATO FOGLIO <b>A3</b>	COMMESSA N°	CLIENTE	
		A termini di legge questo disegno non può essere riprodotto o mostrato a terzi senza ns. autorizzazione scritta			

A termini di legge questo disegno non può essere riprodotto o mostrato a terzi senza ns. autorizzazione scritta

### 6.3.8 Fixing torque

Inadequately or improperly tightened bolts may become loose due to vibration or stress due to the fluid being mixed. This can shorten the life of the equipment or cause damage or failure.

The recommended fixing torques for the nuts and bolts of the mixers and their supports are listed in the table below. These values should be considered only as a guide and may require changes in special cases.

However, except where otherwise stated, always tighten the nuts and bolts of the mixers and their supports to the values shown in the table.

	stainless steel	Steel 8.8
Bolt - Pitch	Fixing Torque (Nm)	Fixing Torque (Nm)
M10	30	50
M12	50	80
M14	85	130
M16	120	200
M18	180	280
M20	240	400
M22	320	600
M24	400	700
M27	650	1000
M30	800	1400

The above mentioned values are for standard bolts and lubricated threads; for non-lubricated threads, multiply these values by 1.3.

All bolts should be coated with oil, grease or a protective substance whenever possible.

When couplings with locking elements are used, add 15% to the indicated values.

All the bolts should be inspected and tightened again after two weeks of work under load and then at every planned stop.



## 7- START UP

### 7.1. - preliminary checks

- Make sure the shaft turns manually from the motor fan.
- Make sure there are no obstacles to the movement of the shaft and impeller.
- Check the distance between the impellers and between them and the bottom and the walls

### 7.2 - Electrical connections



**Before starting to work on the mixer, make sure that the electrical power supply is disconnected and can not be accidentally reconnected.**

**First connect the earthing cable (yellow/green).**

**It is recommended to install a high sensitivity (30 mA) differential switch, as an auxiliary protection against lethal electric shocks, in case earthing connection is not correctly working. Make sure the power supply voltage corresponds to the rated one**

The electrical connection must always be carried out by qualified personnel, in compliance with the applicable EEI, EN 60204 and possible local regulations.

Always refer to the data on the voltage and frequency plate, in order to ensure a correct connection with the power supply network. If not specified, tolerance can be of  $\pm 5\%$  on the voltage and  $\pm 1\%$  on the frequency values indicated in the plate. The connection diagrams are normally provided with the motor or are printed in the terminal box. Should they be missing, refer to those provided in the manual.

The identification plate shows the following data:

- power supply voltage
- three-phase winding, connection (Y) or ( $\Delta$ )
- current consumption under normal load

The motors are calibrated for voltage with  $1:\sqrt{3}$  ratio; e.g. 380/660 V  $\Delta/Y$ , and can be started in the following ways:

- direct insertion in the network with line voltage equal to the lower voltage value indicated on the identification plate (" $\Delta$ " triangle connection of the winding).
- direct insertion in the network with line voltage equal to the higher voltage value indicated on the identification plate ("Y" star connection of the winding).
- Indirect insertion in the network by means of star-triangle switch (after having removed the connectors from the terminal box), with line voltage equal to the lower voltage value indicated in the identification plate. Make sure that, in the presence of star/triangle start up, the switch from star to triangle is performed only when the start up current corresponds to the star value. This is important to prevent risk of overloads not allowed.

Connect the motor to the mains via a multi-polar switch or other device that ensures multiple disconnection (breaking all the electric wires) from the mains, with a contact gap of at least 3 mm.

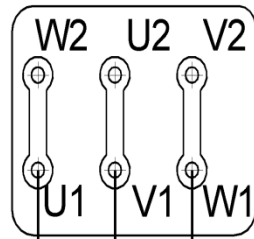
Remove the cover of the motor terminal box.

Make connections as shown in the back of the terminal box cover or as indicated in the following page. – Use certified cable glands for the area in which it the mixer is installed.

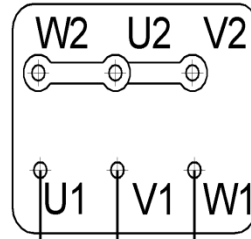
The electric power supply to the motor must be fitted with a thermal-magnetic circuit breaker or magnetic starter with overload and minimum voltage protections, a thermal relay and fuses installed upstream by the installer. The overload relay must be set to the rated motor current.

# Connection of the terminal box to the power supply

## TRIFASE 1 VELOCITA' 2-4-6-8 POLI (6 fili)

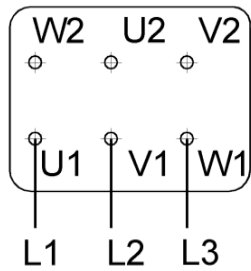


( $\Delta$ ) Collegamento Delta  
Tensione inferiore

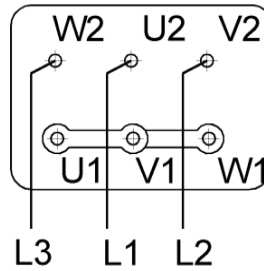


(Y) Collegamento stella  
Tensione superiore

## TRIFASE DOPPIA VELOCITA' 1 AVVOLGIMENTO

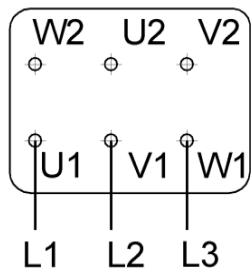


Bassa velocità

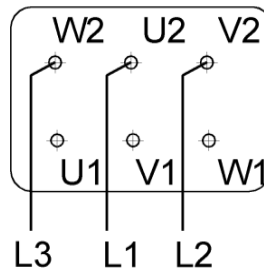


Alta velocità

## TRIFASE DOPPIA VELOCITA' AVVOLGIMENTI SEPARATI

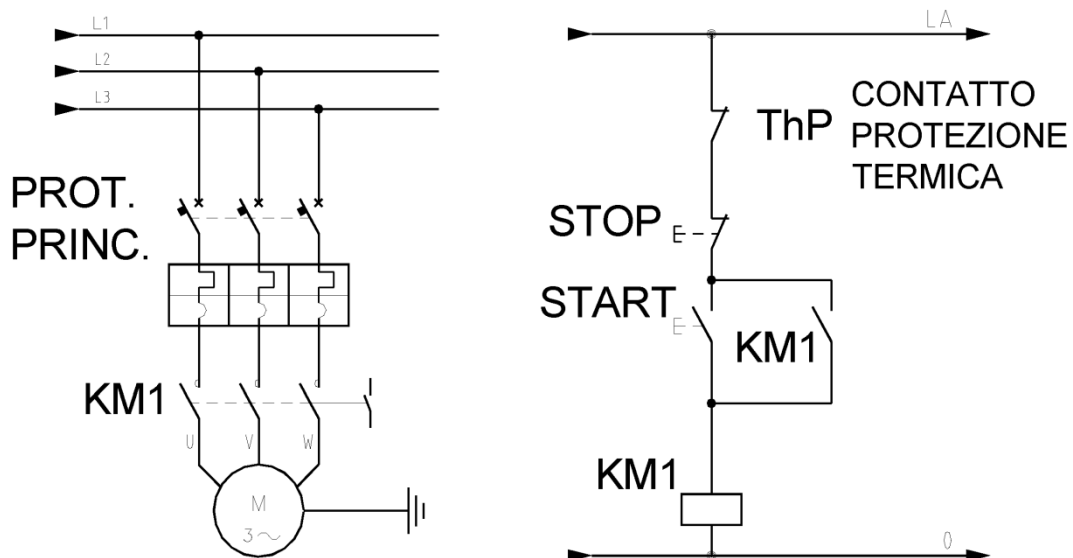


Bassa velocità



Alta velocità

If the motor is fitted with a thermal protector, connect the protector's cables to an auxiliary contact of the contactor on the power supply line



### 7.3 - Checking the direction of rotation

The direction of rotation can also be checked before filling up the tank.

In the presence of a seal dipped in the liquid (AL series mixers) it is only possible to activate the motor for brief moments.



The mixer should not be started (if not specified in the sales documents) if the impeller is immersed in settled solids.

The direction of rotation is usually clockwise if seen from the motor towards the impeller. However, the correct direction of rotation is indicated on the mixer by an arrow.

If necessary, reverse the direction of rotation exchanging the position of any two wires of the power supply (this is true only for three-phase electric motors. Refer to the relevant manuals for the other motor types)

### - 7.4 Operation Checks

Before starting the mixer, it is also necessary to perform the following checks:



- Check that all screws and bolts are tightened.
- Vent the air in the area of the mechanical seal, if necessary.
- Check that all moving parts are inaccessible and all their guards are properly installed.
- For mixers with double mechanical seal: check the connections of tubes and accessories. Start up and, if necessary, check correct the flow of the flushing or cooling system (read the relative manual).

For vertical mixers, it is necessary to carry out an initial empty run in order to verify current consumption, surface temperature (after 30 minutes of operation) and rotation speed), the possible  
Then values can be compared with those resulting from the first water test.

The functional test must be carried out setting the actual operating conditions, including any tank pressurisation

Immediately after the first start up of the mixer, check the following:

- Check that the mixer does not produce "strange" noises. If it does, stop it immediately and discover and prevent the causes before restarting it.
- Check that the mixer does not produce evident vibrations or oscillations. If it does, stop it immediately and discover and prevent the causes before restarting it.

-Check that there are no leaks of oil, grease, water or other fluids. If there are, stop the mixer immediately and discover and prevent the causes before restarting it.  
-Measure the voltage at the motor terminals and check that it is within the limits shown on the data plate.  
-Measure the current consumption on each phase and make sure it is less than the rated value shown on the motor data plate

**. The motor must never be overloaded.**

Immediately stop the motor in case of:

- smoke and flames from the motor or the electrical system,
- motor overheating,
- sharp decrease in the motor speed,
- damaged fan,
- damaged starting device,
- other reasons, when a further operation of the motor or of the starting device causes damages to the environment.

In case of installation of motors with B14 flange, make sure the length of fixing bolts is appropriate for the hole diameter and depth: screws which are too long may cause damage to the motor winding.

## 8 - CONTROL AND PREVENTIVE MAINTENANCE PLAN



Before performing any work on the mixer, ensure that:

- The motor power supply is completely disconnected and cannot be restored accidentally.
- The tank where the mixer is installed is not pressurised or under vacuum.
- The surfaces of the mixer and/or the tank are not hot or iced.
- Any vapours or odours that may escape from the tanks are not dangerous to humans or the environment.

COMPONENT	CONTROL	LUBRICATION	REPLACEMENT
<b>Motor</b>			
Surface cleaning	Eliminate dust every 1,000 hours		
Eliminate condensation	Periodically		
Oil seal	1,000 hours / 2 months		When necessary
Rotation	Start up		
Vibrations	Start up		
Temperature	Regularly		
<b>Gearbox</b>			
Surface cleaning	Eliminate dust every 1,000 hours		
Eliminate condensation	Periodically		
Oil check	1,000 hours / 2 months	When necessary	10,000 hours
Oil seal	1,000 hours / 2 months		When necessary
Temperature	3 hours before starting up + regularly (never 70°C more than ambient temperature)		
Rotation	Start up		
<b>Bearing support spider</b>			
Surface cleaning	Eliminate dust every 1,000 hours		
Bearing replacement	7000 hours		7000 hours
<b>Seal</b>			
Stuffing box	Periodically	Normal leakage 2-3 drops/min	
Temperature	Regularly		
Temperature sensor visual check	1,000 hours / 2 months		
Visual check of the seal lubricant control system	1,000 hours / 2 months		
Seal emission check (if necessary)	100 hours / 1 week		
<b>Mixing unit</b>			
Bolt torque	100 hours after starting up + regularly		

Use this table as a guide, but always refer to the manufacturers' manuals of the individual components

## 8.1 Lubrication

### MOTOR BEARINGS

Pre-lubricated, double coating bearings (type 2Z) are filled with a quantity of grease which is sufficient for the whole operating duration. Once the motor's warranty time has expired, it is advisable to replace the bearings. Motors where the lubricators are fitted on the bearing guards should be periodically lubricated. This table indicates the lubrication intervals, type and quantity of grease needed:

Mechanical size	Quantity of grease for re-lubrication [g]	Lubrication intervals [h]	
		1,500 revs/min.	3,000 revs/min.
90	4	2500	1500
100	5	2500	1500
112	7	2500	1500
132	10	1500	1000
160	12	1500	1000
180	17	1500	1000

### GEARBOXES

Gearboxes are lubricated with Poli-alchil-glicole (PAG)-based synthetic oil, with EP additives, ISO320, for instance SHELL OMALA S4WE320 or equivalent

They allow an excellent performance of the gearbox with ambient temperatures from -20° to 90°C.



**Be careful to use always the same type of oil, since it is not compatible with neither mineral, nor polyolefin-based synthetic oils.**

Oil can be replaced with a lower viscosity one (ISO VG150) only for operation at temperatures under -30°C

Equivalent lubricants can be:

AGIP Blasia S320

ESSO Glicolube 320

Total Carter SY 320

BP Enersyn SG-XP 320

The replacement frequency depends on the actual temperature oil operates at. Higher frequency is recommended for epicycloidal gearboxes, AVS5÷11 and AVSh5÷9 models, where quantities are little and there is a cask

T oil	Operating frequency (hours)	Maximum calendar time
< 65°C	20,000	4 years
< 80°C	15,000	3 years
>90°C	9,000	2 years
Running-in	No replacement	

A more frequent oil change can be necessary also in case of difficult operating conditions, such as:

- wide and fast fluctuations in ambient temperature
- harmful vapours, chemical fumes, dusty or particularly wet atmospheres.

The gearbox is always delivered full of oil; the indicative quantities for oil change are listed in the table.

All the gearboxes whose oil is to be changed are equipped with filling and emptying caps and with visual inspection window. When the mixer has not run for 30 minutes and oil is cold, the oil level should be at the midpoint of the inspection window.



**For the shipping, the filling cap and its breather are never fitted on the machine in order to avoid oil leakage. The blind cap must be replaced before the machine is started for the first time.**

## 9 - CORRECTIVE MAINTENANCE

The machine components subject to wear are the seals and the bearings.

They are designed to last long in time if they are correctly maintained.

However, it is not possible to set a precise life duration for these components, since it depends on actual working hours, temperature and pressure, loads applied, corrosiveness of the environment and rotation speed.

A good preventive maintenance avoids the need for corrective maintenance, but if it becomes necessary, follow the safety procedures

- Switch off the mixer and make sure it cannot turn on for any reason
- Use a signboard to signal the ongoing maintenance
- Mark the current position with a felt-tip pen to be able to restore it when assembling (electrical and mechanical connections)
- Use a mechanical lifting device
- Dismantle the reduction gear and fit a support device to the mixer shaft
- Lift the unit until the shaft is accessible and can be dismantled
- If possible, remove the motor and empty the gearbox from oil
- If possible, remove the mechanical seal.

Follow the instructions given in the manufacturer's manual for the maintenance of mechanical seal, motor and gearbox.

When in doubt, contact GREC S.r.l.

In case of operation in a potentially explosive area, always take the machine needing maintenance to a safe area and, before opening the tank, make sure that the intervention cannot alter the safety conditions of the environment.

It is expedient and advisable to replace bearings and oil seals only. In case other parts are damaged, e.g. shafts or gears, it may be advisable to purchase a new component.

Bearings and oil seals fitted on GREC mixers are listed below



**Always check on the plate that the installed gearbox is that indicated in the previous page, otherwise request the list of parts subject to wear to GREC Srl**

## 10 - TROUBLESHOOTING TABLE

Problem	Probable cause	Possible solution
1) The mixer will not start	a) No electrical power supply	Provide electrical power supply
	b) Inadequate fuses (low rated current)	Replace fuses with other appropriate ones
	c) Blown fuses due to damaged motor or wires	Repair the motor or replace the cables
	d) Overload protection device previously triggered	Reset the protection device (if it is triggered again, see Problem 2)
	e) Broken gears	Replace gearbox
2) Overload protection device triggered	a) Incorrect calibration value	Adjust the calibration value or replace the protection device
	b) Phase missing	Check the power supply and fuses
	c) Deposits on the rotating parts or impellers immersed in solid sediments	Remove deposits and sediments from the impellers
	d) The density or viscosity of the lubricant is higher than recommended	Change oil
	e) The density or viscosity of the product being mixed is higher than expected	Contact the manufacturer for help
	f) Faulty bearings	Grease or change the bearings
3) The motor or gearbox heat up a lot (surface temperature 70° higher than ambient temperature)	a) Incorrect machine sizing	Check the selection and replace the component
	b) Excessive axial force on the shaft of the mixer	Check the pressure in the tank. It must be less than or equal to that indicated in the technical specification.
	c) Excessive temperature of the product to be mixed	Check the temperature of the product to be mixed. It must be less than or equal to that indicated in the technical specification.
	d) Excessive ambient temperature	Check the ambient temperature. It must be less than or equal to that indicated in the technical specification.
	e) Incorrect level or viscosity of the lubricant	Top up or replace the lubricant
	f) Oil too old	Check the lubricant replacement table
	g) Bearing play too high or defective bearings	Replace bearings
	h) Faulty motor fan or relative grille too dirty or insufficient space for the cooling air to pass through	Check the motor fan, clean the grille and make sure that the cooling air can circulate freely.
	i) The motor is overloaded and the overload protection is faulty or incorrectly adjusted	See Problem 2) and check the overload protection



4) Excessive noise. Anomalous operation. Excessive motor vibrations	a)	The impeller(s) rotate in the air or cavitate due to the low level of liquid	Increase the level of the liquid and keep it as constant as possible
	b)	Unbalanced impeller(s) (blades bent, worn or encrusted)	Check the impeller(s) and replace or clean if necessary
	c)	Bent shaft	Check the linearity of the mixer shaft and contact the manufacturer for help if necessary
	d)	Faulty bearings (the machine whistles)	Grease or replace the bearings
	e)	Faulty motor fan	Replace the motor fan
	f)	Gears are dented (cyclic noise)	No practical problems
	g)	Incorrect coupling of the motor with the machine	Adjust the position of the motor
	h)	Loose fixing screws	Tighten all the fixing screws
5)  The motor speed under load decreases (slippage increases)	a)	Rotor or fan seizure	Find and eliminate the faults (rotor, belt pulley, clutch, fan) and carefully balance them.
	b)	Short-circuit in the winding	Find and eliminate the short-circuits, pre-load the motor again
	c)	Fault towards the earth	Find and eliminate the short-circuits, pre-load the motor again
	c)	Connection or winding interruption	Find and eliminate the interruptions
	c)	Single-phase power supply	Check the voltage between the terminals in the terminal box
6)  Oil leakage from the gearbox	a)	Oil level not suitable for the construction form	Check and eliminate the excessive oil if necessary
	b)	Overpressure due to missing air bleeding	Add an air bleeding device for the assembly position set
	c)	Faulty seals or seals which are not suitable for the temperature	Replace seals
7)  Mixing is insufficient or non-existent	a)	The impeller blades are bent, worn or encrusted	Check and clean or replace the impeller if necessary
	b)	The impeller is not installed in the correct way	Check that the impeller is installed in the correct way
	c)	Incorrect direction of rotation	Reverse the direction of rotation
	d)	Liquid characteristics and tank size are different from those indicated in the technical specification	Contact the manufacturer for help
8)  Current asymmetry in power supply cables	a)	Short-circuit in the winding	Find and eliminate the short-circuits, pre-load the motor again
	b)	Fault towards the earth	Find and eliminate the short-circuits, pre-load the motor again
	c)	Connection or winding interruption	Find and eliminate the interruptions
	d)	Single-phase power supply	Check the voltage between the terminals in the terminal box



GREC S.r.l., Viale Lombardia, 16/N  
20081 Cassinetta di Lugagnano (MI) – ITALY  
Tel. +39 02 3664 5050  
Fax +39 02 3664 5054  
info@grec.it; www.grec.it

Tax ID. / VAT n. / Reg. Register  
of Companies of Milan  
06972530965  
R.E.A. of Milan n. 1926397  
Reg. Cap.: 90,000.00€ f.p.

# DECLARATION OF INCORPORATION

(In compliance with Directive 2006/42/EC, annex II, par. 1, sub. B)

## THE MANUFACTURER

GREC SRL	Viale Lombardia, 16/N
Company	Address
Cassinetta di Lugagnano 20081	Milan ITALY
City Post code	Province State

## WITH RELEVANT TECHNICAL DOCUMENTATION AUTHORISED BY

Marco Mariano	Legal Representative
Name	Role
Viale Lombardia 16/N	20081 Milan
Address	Post code Province
Cassinetta di Lugagnano	ITALY
City	State

## DECLARES THAT THE PARTLY COMPLETED MACHINERY

AV... series mixer  
AL... series mixer  
TD.. series turbodisperses

The intended use being: Installation in a container/tank containing liquids to be mixed

### It complies with the following applied essential safety requirements:

1.1 - General considerations; 1.3 - Protection measures against mechanical dangers; 1.4 - Required characteristics for protection devices; 1.5 - Risks due to other dangers; 1.6 - maintenance; 1.7 - Information

### And it complies with the Community directive:

2006/42/EC (Directive for Machineries)  
and with harmonised standards EN ISO 12100:2010 (Machinery safety)

### It is also stated that:

- the relevant technical documentation has been drawn up in compliance with annex VII B
- we commit to send via mail or e-mail, following a duly justified claim by the national authorities, the relevant information about this partly completed machinery

### IT IS FORBIDDEN

to put it into service until the final machine it has to be incorporated to has been declared complying with directive 2006/42/EC and its regulations, where applicable.

Place and date

Cassinetta di Lugagnano, 01/01/19

The legal Representative

Marco Mariano