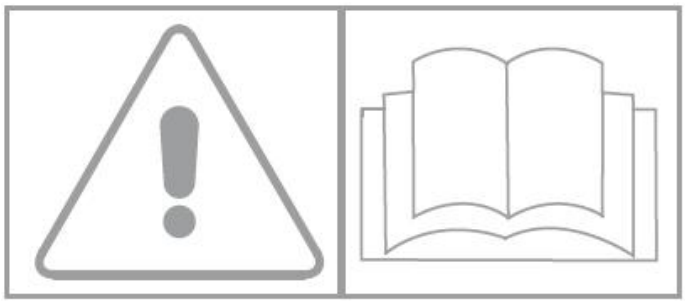
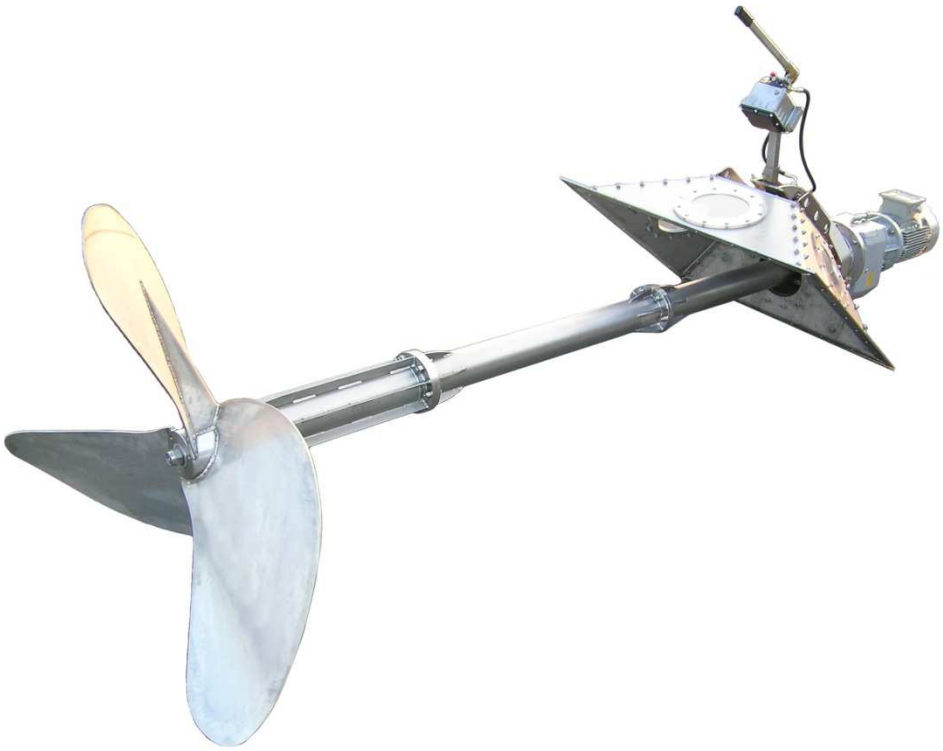
COSTRUZIONE MACCHINE AGRICOLE di
DODA ALDO & C SNC

USE AND MAINTENANCE BOOKLET



BG80 SERIES MIXER FOR BIOGAS DIGESTERS



COSTRUZIONE MACCHINE AGRICOLE di DODA ALDO & C. s.n.c.

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BG80 USE AND MAINTENANCE BOOKLET

TABLE OF CONTENTS

BG80 USE AND MAINTENANCE BOOKLET

1 GENERAL INFORMATION

1.1. HOW TO USE THIS MANUAL

The inclusion of a general table of contents on page two enables the reader to locate the relevant topic immediately, making it easier to consult the manual.

The chapters are organised sequentially based on topic, making it easier for the reader to find the desired information.

1.2. PURPOSE OF THE MANUAL

This manual was compiled by the manufacturer to provide the necessary information to all parties authorised to safely carry out transport, handling, installation, maintenance, repair, dismantling, disposal or storage operations in relation to the mixer.

Information relating to the electric motor and the reducer can be found in the Use and Maintenance Booklets for the motor and the reducer respectively.

Failure to comply with this information may pose a risk to the health and safety of persons and may also cause economic damage. This information must be stored carefully by the person in charge so that it can be retrieved and consulted at any given moment, and must be kept in perfect condition.

In the event of loss of, or damage to, the documentation, a replacement copy must be requested directly from DODA COSTRUZIONE MACCHINE AGRICOLE by Doda Aldo & c. s.n.c.

DODA COSTRUZIONE MACCHINE AGRICOLE by Doda Aldo & c. s.n.c. reserves the right to change, supplement or improve this manual; such changes shall not, however, constitute a reason to consider this copy inadequate.

The manual drafted to comply with the ATEX directive forms an integral part of this use and maintenance manual

1.3. WARRANTY GUIDELINES

Doda provides a 12 month warranty on its products which is valid from the moment of commissioning but limited to an 18 month-period from the date of shipping.

The warranty shall not apply if the problem or fault results from the incorrect or unsuitable use of the product, or if the aforementioned use does not correspond to that for which it was commissioned.

- The warranty provisions offered by DODA are limited to the repair or replacement of products reported as faulty, following an assessment by DODA to ascertain the actual state of the product.
- DODA shall not, therefore, be held liable for any material or economic damage arising from the faulty product, only for the repair or replacement of the product itself.
- The Mixer must be used in environments and for uses that correspond to those provided for during the design phase.
- Any improper use of the Mixer is prohibited.
- Any modification to or replacement of machine parts, without prior authorisation by DODA, may constitute a risk factor for accidents and, in this case, the manufacturer shall be absolved of all civil and criminal liability, and the warranty shall be deemed void.

1.4. MANUFACTURER DETAILS

DODA COSTRUZIONE MACCHINE AGRICOLE di Doda Aldo & c. s.n.c.

Strada Sante Salmaso, 18/20 - Loc. Serraglio

– 46010 – Buscoldo di Curtatone (Mantua)

1.5. PRODUCT DETAILS

1.5.1. LABEL

Each mixer is equipped with an identification plate and a declaration of conformity (as per annex VIII) in accordance with standard 94/4/EC.

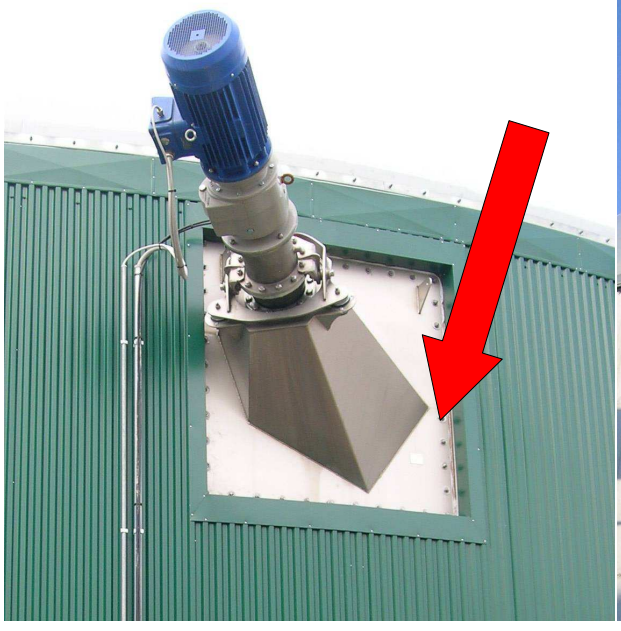
The identification plate contains the main technical information relating to the operating and manufacturing specifications of the mixer; it must therefore be maintained in full and in a visible location.

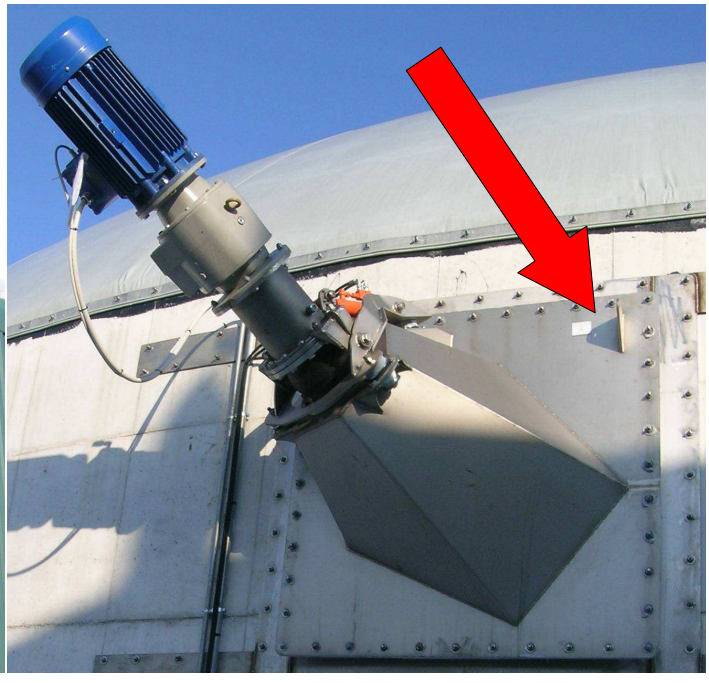
A sticker is provided with this manual which reproduces the information of the plate affixed to the mixer unit, and lists the product specification data.

It is recommended that you place this sticker in the dedicated space on this manual, and refer to it when information or clarifications are required.

1)	1) Manufacturer name and address
2)	Type: article part of the product code
3)	Vers: variable part of the product code
4)	S.N.: serial number
5)	Year of manufacture
6)	kW: motor output
7)	Supply voltage frequency
8)	Supply voltage and current
9)	Number of phases
10)	Number of revs/minute on output
11)	-EX Marking
12)	Mass
13)	The propeller must be fully submerged when the mixer is operating

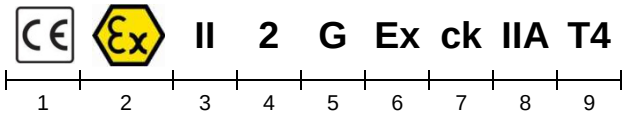
SAMPLE LABEL





1.5.2. ATEX MARKING

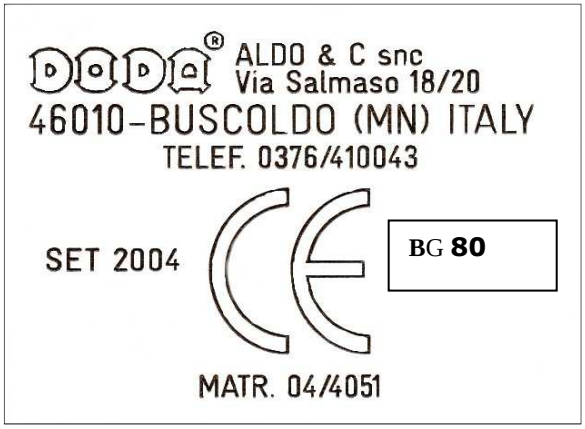
EXPLANATION OF ATEX MARKINGS (potentially explosive atmosphere)



The following summary is provided in accordance with EN 60079-0:

1	CE	This symbol complies with annex X of directive 94/9/EC and indicates that the product complies with the mandatory health and safety requirements of the aforementioned directive
2	Ex	This symbol is specific to the ATEX 94/9/EC directive and is included in annex II of the directive itself
3	**II**	Group to which the relevant piece of equipment belongs. This group refers to equipment that can be used in all locations with the EXCEPTION of MINES.
4	**2**	Category of the equipment to which the certification relates (products designed to operate in zone 1
5	**G**	Explosive atmospheres in the form of gas, vapour or mist may permissibly occur in the vicinity of the equipment.
6	**Ex**	Ex Symbol for electrical equipment intended for use in potentially explosive atmospheres required by the technical guidelines.
7	**ck**	Mechanical protection method used for the equipment corresponds to both protection by constructional safety and protection by liquid immersion
8	**IIA**	Group to which the flammable substances / category of gas for which the equipment is suitable belongs
9	**T4**	Maximum surface temperature of the equipment (T4=135°C)

1.5.3. MIXER IDENTIFICATION LABEL



1.5.4. CE DECLARATION OF CONFORMITY

ATTESTATO DI CONFORMITÀ
CERTIFICATE OF CONFORMITY

DODA COSTRUZIONE MACCHINE AGRICOLE di Doda Aldo & C. s.n.c. Strada Sante Salmaso, 18/20 - Serraglio – 46010 – Buscoldo di Curtatone (Mantua)	Dichiara sotto la propria responsabilità che il prodotto: Declares under its sole responsibility that the product	**Mixer** **Series BG80**
	Al quale questa dichiarazione si riferisce, è conforme alla seguente direttiva: To which this declaration relates, complies with the following directive:	**94/9/EC**
	La conformità è stata verificata sulla base dei requisiti delle norme o dei seguenti documenti normativi Conformity has been verified on the basis of the requirements set forth in the following standards or regulatory documents	**EN 13463-1** **EN 13463-5** **UNI EN ISO 4413: 2012** **UNI EN 1127-1: 2008** **UNI EN ISO 12100: 2010** **IEC EN 60079-(IEC 31-70)** **EN 60079-15** **EN 1127-1**
	Tipo di protezione ATEX ATEX Protection type	**II 2G Ex ck IIA T4**
	I file tecnici The technical files sono stati depositati presso l'Organismo Notificato accreditato per il deposito del fascicolo tecnico have been deposited with the accredited Notified Body for the deposit of technical documents	
	DODA COSTRUZIONE MACCHINE AGRICOLE di Doda Aldo & c. s.n.c.	
Firma Autorizzata (Funzione: Legale Rappresentante) Authorized Signature (Function: Legal Representative)	.....	**(Doda Aldo)**
Persona autorizzata a costituire il fascicolo tecnico Person authorised to compile the technical file	**Doda Ada**	
Indirizzo della persona autorizzata a costituire il fascicolo tecnico Address of the person authorised to compile the technical file	Strada Sante Salmaso, 18/20 - Serraglio – 46010 – Buscoldo di Curtatone (Mantua)	
Luogo e data dell'emissione Place and date of issue	Buscoldo, 24-04-2013	

2 GENERAL SAFETY INSTRUCTIONS

2.1. LABELS AFFIXED TO THE MIXER

	Read the use and maintenance manual instructions
	Danger warning.
	IMPORTANT: prior to use, fill with oil up to the required level.
LIVELLO OLIO	Fill with oil up to the level indicated. Check the level regularly.
	This sticker reminds you to check the rotation direction of the electric motor before starting it up.

2.2. SYMBOLS USED IN THE MANUAL

The following symbols are used in the manual to highlight particularly important instructions and warnings:

MEANING	*NOTE*	*SYMBOL*
PROHIBITION	This symbol indicates that it is prohibited to perform manoeuvres and operations with the machine which may, under certain conditions, pose a risk to the safety of the operator, to the machine itself, or to adjacent parts/structures.	
DANGER	This symbol draws attention to important warning messages that are fundamental to the safety of the operator and of the machine.	
ELECTRICAL DANGER	This symbol indicates the existence of danger caused by electric energy.	
EX WARNING	This symbol draws attention to a particularly important warning regarding potentially explosive atmospheres	
WARNING	This symbol draws attention to a particularly important warning	

2.3. SAFETY GUIDELINES

Local authorities' safety regulations in relation to biogas plants must be observed.
Generally accepted regulations, as well as legislative provisions regarding the prevention of accidents, must also be observed.
Important: repairs must be performed by an authorised workshop or by the manufacturer's technical assistance staff.

If the use and maintenance instructions provided in this manual are not adhered to, the manufacturer shall not be held liable for operating faults.

2.4. PERMITTED USES

The mixer is suitable for installation on Biogas digesters; it can be mounted on the wall or the ceiling of the tank, and is designed to homogenise the biomass, even in the presence of non-homogeneous material.

The BG80 mixer must be used exclusively for the homogenisation of biomass in digesters and in fermentation containers with fermentation substrates, such as sewage, non-homogeneous material and other co-ferments.

This mixer cannot be used to homogenise and mix the following substances:

- Mud residue from clarification
- Solid, voluminous substances
- Materials with sharp edges that may damage the mixer
- Materials mixed with foreign bodies (cords, ropes, plastic ribbons,...)

All uses other than that specified herein are prohibited.

The user and owner of the mixer shall therefore be held directly responsible for any damage resulting from incorrect use of the product.

To ensure correct use:

- Adhere to the instructions contained in this booklet;
- Observe the specified intervals for checks and maintenance operations.

In order to comply with the product classification in accordance with ATEX directive 94/9/EC, users must respect the technical data specified on the information plate and the documentation; the latter must be stored near the equipment, or somewhere known and easily accessible to the user and the maintenance technician.

Transport, storage, maintenance, and commissioning operations, etc., must be performed by specialised staff in areas free from explosive atmospheres. It is mandatory that the electric power supply to the mixer is deactivated during such operations so that the mixer out of service, and the operator must take all possible precautions against any conditions which may cause the involuntary start-up of the mixer, or any movement of the unit parts.

The BG80 mixer is intended for use in atmospheres at risk of explosions due to the presence of gas-air mixtures.

Equipment pertaining to group II and category 2 can be used in zones 1 and 2 where explosive atmospheres, in the form of gas clouds in the air, may occasionally occur during operation; only use the mixing unit with other equipment if the latter equipment is authorized to operate in the same zones.

The instructions provided in this manual are only applicable to biogas digesters that are used in areas with potentially explosive atmospheres.

Failure to observe the safety instructions may cause explosions!

The ATEX mixer, identified by the Ex mark, is certified - in accordance with the explosion-proof protection method specified on the plate - for operation in the presence of Explosive Gas in environments classified as zones 1 or 2

To ensure Atex conformity as declared, the mixer propeller must be immersed in the biomass at all times during operation.

The biomass level must never fall below the body of the propeller; to this end, implement a level gauge system using floats, level probes or, alternatively, introduce supervised operation (person present)

Any intervention that modifies the mixer parts may result in the Risk of Explosion.

The mixer must only be used in environments compatible with the specifications shown on the plate

	Smoking, and the use of naked flames, mobile phones or portable radio transceivers are prohibited in areas at risk of explosion

3 DESCRIPTION OF THE MACHINE

The BG80 mixer has been designed primarily to operate in fermentation tanks, where a high degree of dry matter is present (co-ferments, ...)

The purpose of the mixer is to prevent the formation of floating layers of sediment in the fermentation tank and to ensure that the ferments are properly mixed.

The BG80 machine is equipped with a hydraulic cylinder to enable the angle of inclination of the propeller in the tank to be adjusted, thus ensuring optimal mixing efficiency. A manual oil pump is usually supplied to operate the cylinder; this is fixed to the frame of the mixer, or located near the machine. Upon request it is possible to fit the machine with a kit to operate the cylinder using an electric hydraulic pump.

The ferments and the digester gas are securely hermetically-sealed thanks to a robust expansion joint with a flange; this is firmly secured to the transmission and to the mixer frame.

As the bacteria is mixed with a stroke that is both vigorous and gentle, the gas bubbles that form in the fermented matter are encouraged to rise to the surface and are consequently released.

This is in contrast to the alternative uncontrolled "growth" of the ferment.

The operating time of the mixer can be varied to meet specific requirements; it is generally advisable to use an inverter to adjust the number of motor revolutions to suit the type of substrate being treated. This prevents unnecessary operations, and optimises electric energy consumption.

It is important to set the correct operating time and the number of revolutions of the mixer motor, particularly during the filling and start-up phases.

It is generally recommended that the motor is set to a high number of revolutions initially; this should then be gradually reduced when normal the operating cycle begins.

There should be no white patches on the surface of the fermentation material (sulphur deposits) and no material of any kind should be deposited in the tank.

Furthermore, attention must be paid to the maximum refill level in the tank, particularly in the case of high walls or large quantities of manure.

In the event that either an amount of product is introduced into the tank which leads to an unexpected increase in the mass, or an increase in sulphur deposits occurs, the mixer operating time should be increased, and the number of motor revolutions should also potentially be increased.

Optimal mixing is obtained using a three blade propeller and the correct inclination of the propeller.

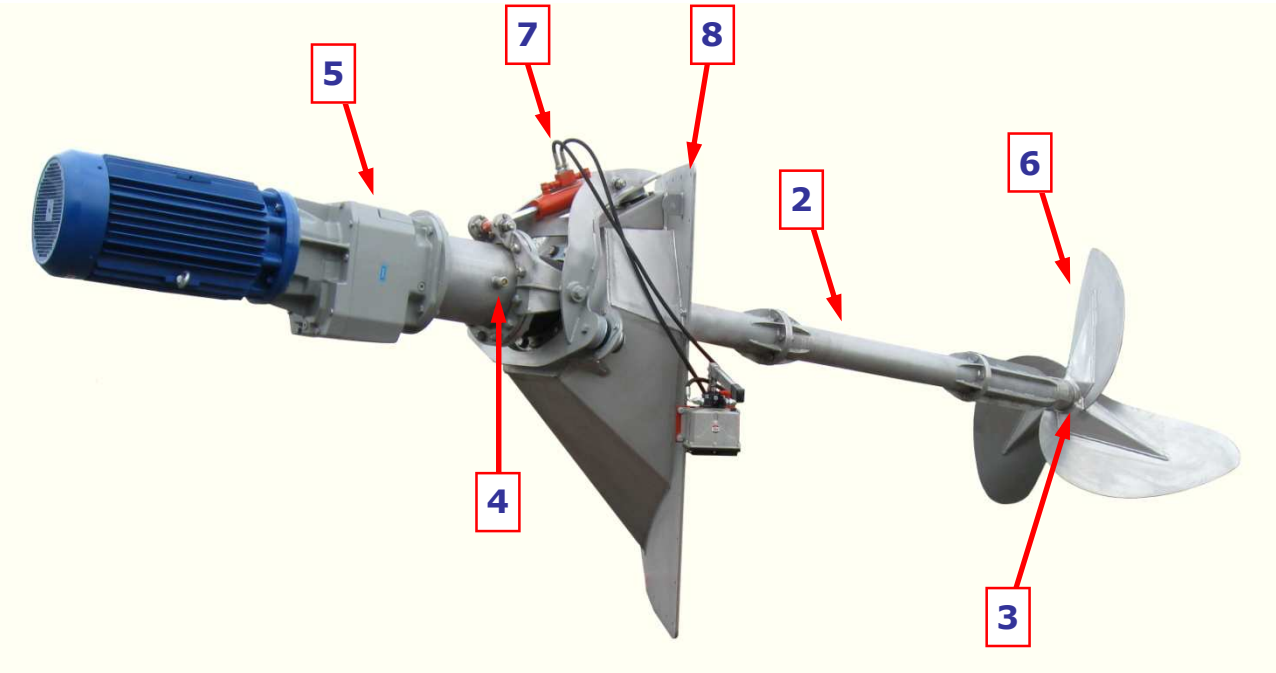
The mixer is equipped with a robust vibration-resistant frame; this is designed for installation either on the wall or on the ceiling, and is capable of supporting the gearbox.

3.1. TECHNICAL SPECIFICATIONS

The information provided refers to a standard delivery.

The manufacturer reserves the right to carry out technical modifications, without being required to communicate these to the users.

1. All parts of the mixer that come into contact with the fluid, as well as all components incorporated into the tank, are made from stainless steel;
2. The mixer shaft sits in an oil bath;
3. Widia mechanical seal with sliding ring on the transmission shaft;
4. Transmission lubricant oil level check using an indicator, positioned at the point of connection between the reducer and the transmission;
5. Reducer unit with 80 revs/min of the propeller, motor with 1450 revs/min at 50 Hz;
6. Three-blade self-cleaning propeller, secured to the shaft of the transmission using a hub;
7. Hydraulic adjustment of the mixer depth using a hand pump and connection tubing, supplied as standard with the equipment;
8. Assembly frame for installation on ceiling or wall;



3.2. TECHNICAL DATA

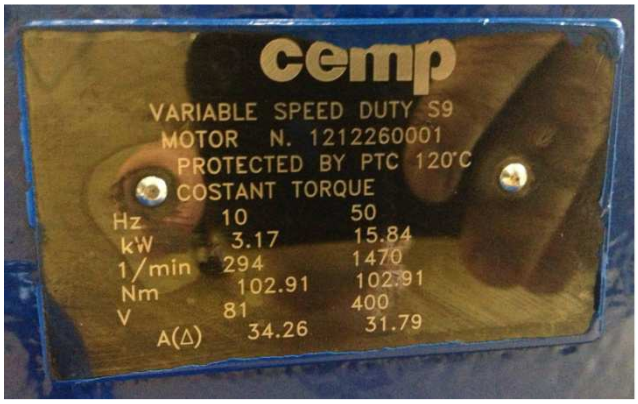
The information provided refers to a standard delivery.

The manufacturer reserves the right to carry out technical modifications, without being required to communicate these to the users.

INFORMATION	MODEL		BG80 22 kW	BG80 18.5 kW
Electric Motor	Electric motor nominal power		22 kW	18.5 kW
	Electric motor - no. of poles		4	4
	Nominal voltage at Δ / λ		400 V / 690 V	380 V / 660 V
	Nominal current at Δ / λ		44 A / 25.40 A	39.55 / 22.83 A.
	Frequency		50 Hz	50 Hz
	Cos phi power factor		0.79	0.79
	No. of revs		1470 revs / min	1465 revs / min
	Electric motor noise level		70 dB	70 dB
	ATEX Classification		II 2G Ex-d	II 2G Ex-d
S9 Service variable speed	Frequency at 10 Hz	Power	3.17	2.66
		No. of revs	294	293
		Nominal current at Δ	34.26	30.7
		Torque	102.91	86.8
	Frequency at 50 Hz	Power	15.84	13.32
		No. of revs	1470	1466
		Nominal current at Δ	31.79	28.5
		Torque	102.91	86.8
	Temperature probe		PTC 120°	PTC 120°
Coaxial reducer	Transmission ratio		1 / 19.3	1 / 22.1
	Maximum applicable power		24	24
	Max no. of revolutions on input		2,850	2,850
	Reducer oil quantity		16.5 18 litres SHELL **OMALA S4 WE** 320 (or equivalent)	16.5 18 litres SHELL **OMALA S4 WE** 320 (or equivalent)
	Assembly position		M3	M3
	Type		STM AMF3 120/2	STM AMF3 120/2
	ATEX Classification		II 2G ck T4	II 2G ck T4
Mixer	Propeller diameter		1600 mm	1500 mm
	Transmission oil quantity		42 kg SAE80 – W90	42 kg SAE80 – W90
	Hand pump hydraulic oil quantity		3 litres Nuto 68 (or equivalent)	3 litres Nuto 68 (or equivalent)
	Total Weight		960 kg	950 kg
N.B.:	***Should the motor, the coaxial reducer or the frame of the machine require additional painting, the overall thickness must not exceed 170 µm. This is fundamental in order to prevent the potential formation of electrostatic charges.***			

3.3. PARTS PLATES

The plates listed here below relate to the electric motor for the standard BG80 18.5 kW and BG80 22 kW models.

<table>
<tr><th colspan="2">Electric motor</th></tr>
<tr><td>Specific plate with technical data for use with variable speed of the 18.5 kW electric motor</td><td>Specific plate with technical data for use with variable speed of the 22 kW electric motor</td></tr>
<tr><td> 
</td><td> 
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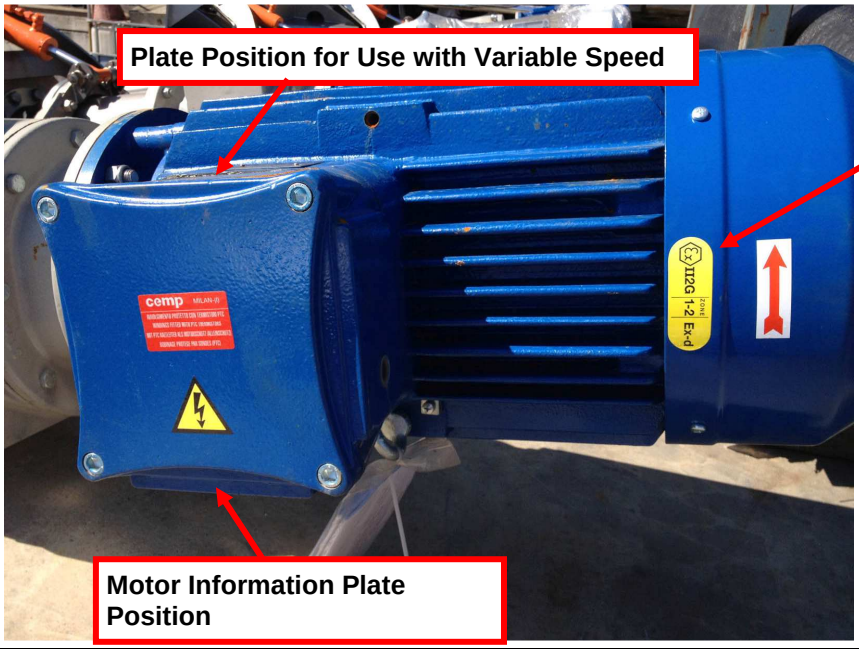
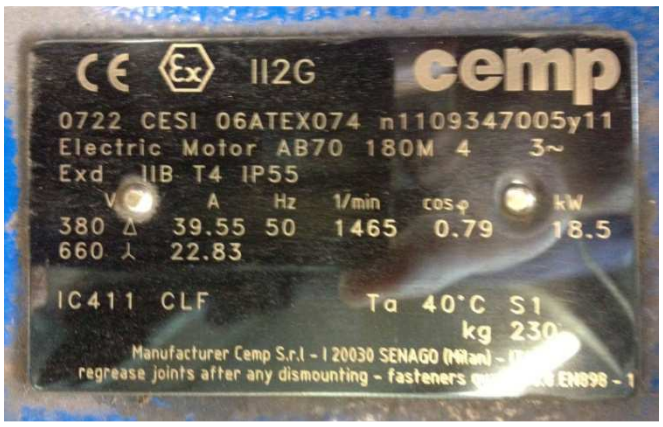
<tr><td colspan="2"> 

Atex Labelling</td></tr>
<tr><td>Specific plate for 18.5 kW electric motor</td><td>Specific plate for 22 kW electric motor</td></tr>
<tr><td> 
</td><td> 
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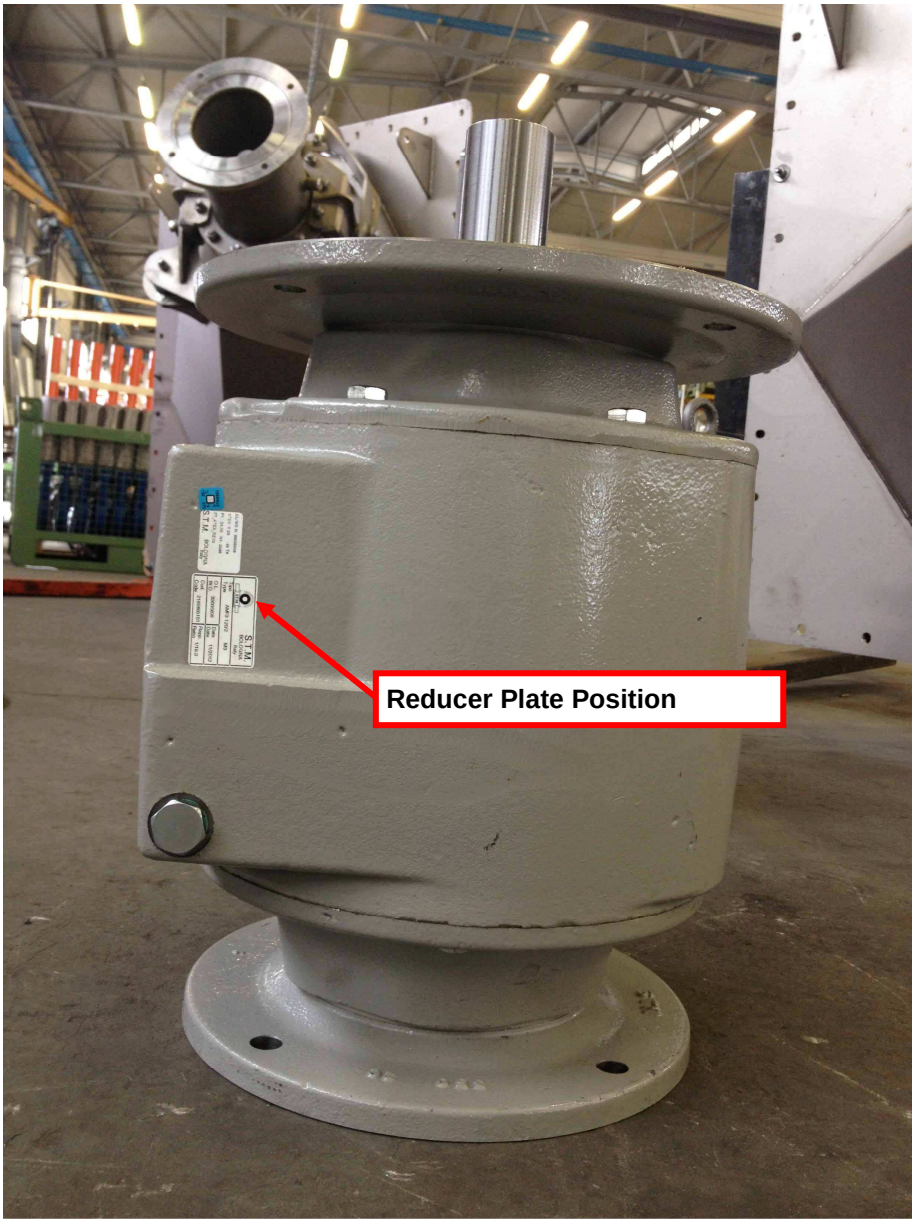
</table>

The plates listed here below relate to the electric motor for the standard BG80 18.5 kW and BG80 22 kW models.

Reducer



Reducer plates for the 18.5 kW BG80 mixer

Atex Plate

Reducer plates for the 22 kW BG80 mixer

Atex Plate

4 COMMISSIONING

4.1. CHECKS TO BE PERFORMED UPON INITIAL START-UP

Ensure that the motor rotates in a clockwise direction (as shown by the arrow located on the motor), run the motor for a number of seconds, ensure that the motor's cooling fan, and therefore the propeller, rotate in a clockwise direction.

If the propeller is not clearly visible when close to the mixer, check the rotation direction on the mixing blade of the drive motor.

	There is a risk of damage to the mixer, to objects and to people if the machine is used in the opposite rotation direction to that specified.

Check that the mixer is correctly secured to the chosen installation surface.

Check that all screws that come into contact with the mixer are correctly tightened.

Both the moving parts of the orientation device and the support bearings for the fixing screws must be sufficiently lubricated.

Check that the oil levels in the transmission, the gearbox and the hand pump for hydraulic adjustment, and then start the machine up.

The correct quantity of oil is as follows:

⇒ 18 litres of SHELL **OMALA S4 WE** 320 (or equivalent) for the reducer;

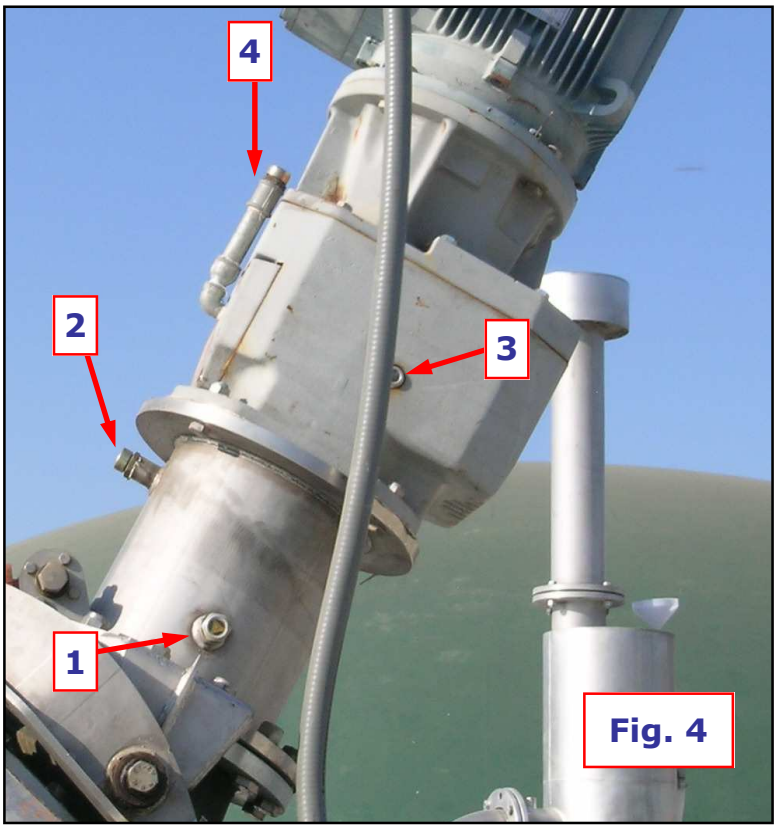
⇒ 42 litres of SAE80 oil – W90 for the transmission;

⇒ 3 litres of Nuto 68 oil (or equivalent) for the hand pump.

To check the oil, proceed as follows:

- Unscrew the inlet cap and the breather cap if present;
- If the oil has been refilled, wait at least 3 hours before turning on the machine;
- Close the caps.
- Check the levels periodically, the oil must never fall below the specified level.

N.B.: N.B. During filling and inspection, the transmission pipe should be in the vertical position.



1) Transmission oil level
2) Oil Breather/ Transmission Oil fill
3) Reducer Oil Level
4) Oil Breather/ Transmission Oil fill

4.2. PERIODIC CHECKS/ DAILY CHECKS

Check all moving parts and lubricate regularly (approx. every 50 operating hours) Remove the old, used lubricant.

Check the stability of the fixing screws on the mixing frame orientation device daily, and those of the hydraulic cylinder.

	If these are damaged or not properly secure, the mixer must be shut down promptly to address the fault which has been identified. All screws and nuts must be firmly tightened as indicated in Table in Chapter 8, and must be checked daily. Any interventions in this regard must be documented.

	Carry out daily checks to ensure that none of the rubber parts of the expansion joint are damaged or torn.

	Before starting the mixer each time, check that the electrical network, or rather the power line, meets the requirements of the provisions in force. Check that the voltage indicated on the motor label corresponds to the voltage supplied by the electrical network.

4.3. CHECKS TO BE PERFORMED DURING MIXER OPERATION

Check that:

⇒ There are no solid substances blocking the propeller;
⇒ The propeller must always be sufficiently immersed in the product being mixed;

⇒ The mixer must be kept free from snow and ice.

	There is a risk of explosion caused by overheating of the intermediate and lower bearings, resulting from insufficient lubrication.

	During mixing, beware of any unusual noises; these may be caused by insufficient lubrication, loose parts or faults in the motor, the gearbox, the bearings or the crankshaft, etc.

	The presence of foreign bodies such as cords, ropes and plastic ribbons may cause the mixing propeller to become unbalanced and, consequently, may cause damage to the bearings and to the entire machine. Such foreign bodies may also damage to the mechanical seal.

On rare occasions, if the equipment is installed in a fixed location, it is possible that local corrosion of the material may occur.

This phenomenon is generally caused by stray currents (displacement of potential, improper grounding) or electrochemical reactions (significant acidification of the co-ferments and wet waste, often at temperatures exceeding +45°C).

5 USE

5.1. INTENDED USE

The equipment is to be used exclusively for mixing in Biogas digesters, in the locations specified in this manual: wall and/or ceiling application.

All other uses are prohibited.

Any other use must be authorised and certified by the manufacturer.

5.2. VARIATIONS OF INTENDED USE

There are no present variations of intended use.

5.3. STANDARD OPERATION

Depending on the type of application chosen, the mixer is equipped with a frame for installation on the ceiling or on the wall.

Normally, the arm inclines horizontally to the left in relation to the wall of the tank, upon request a version with the arm inclined to the right can be provided.

The machine is equipped with a hydraulic device for the inclination of the mixing propeller.

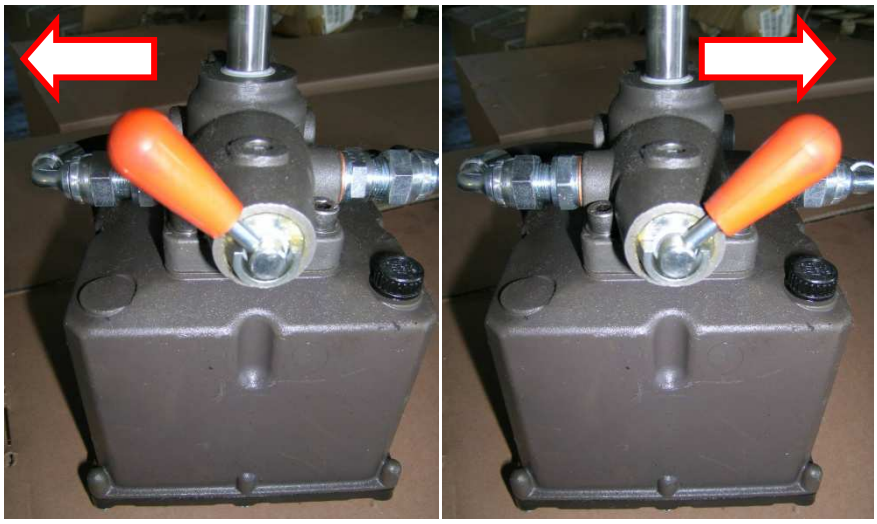
A manual oil pump is usually supplied to operate the cylinder; this is fixed to the frame of the mixer, or located near the machine. Upon request it is possible to fit the machine with a kit to operate the cylinder using an electric hydraulic pump.

To change the inclination of the mixer using a hand pump, follow the following procedure:

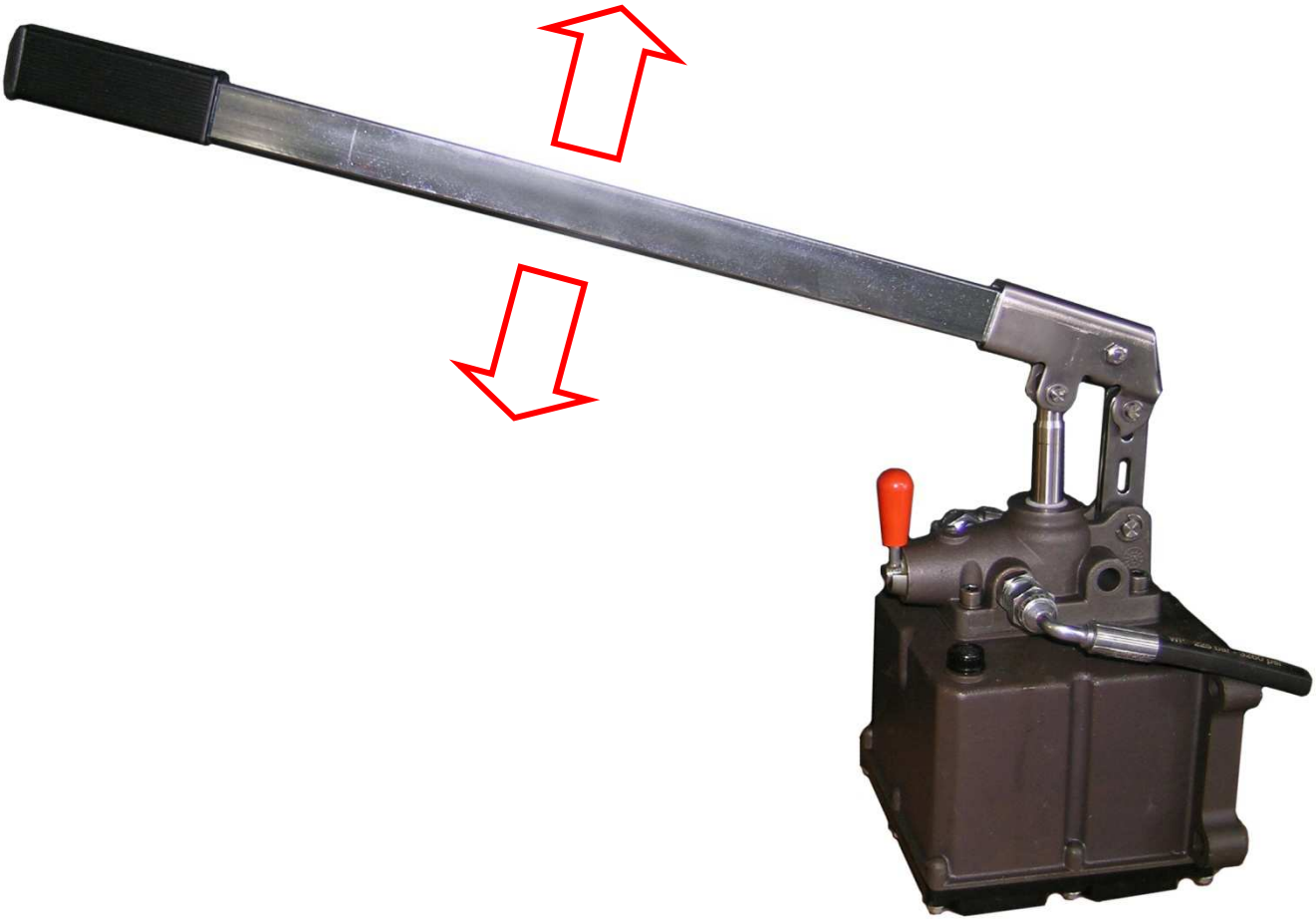
- move the flow change lever to the left or to the right (see image below)

- engage the lever and perform an alternating vertical movement until the desired inclination of the mixer has been obtained

- return the flow change lever to the central position



Step 1



Step2

Step3

.

The propeller must rotate in a clockwise direction.

When the tank is full, the rotation direction can only be identified based on the propulsion of the fluid in the container: this should move towards the centre of the tank.

	Operating the mixer in the opposite direction to the specified rotation direction may cause strong vibrations and may result in serious damage to both the mixer and the tank.

Because the composition of the substrate to be mixed may vary, the immersion depth of the mixing propeller should be adjusted and the complete immersion of the blade of the propeller during mixing should be verified.

Whirlpools or sprays of fermentation material must not occur during operation.

The mixer must only be used in a tank that is sufficiently full and with propeller blade cover of at least 0.5 m.

	If the propeller is partly uncovered, a strong degree of lateral oscillation will be evident, particularly in the motor-transmission unit. Such oscillation could cause damage to the mixer and to the tank.

The mixer transmission may be damaged by excessive lateral thrust caused by excessive floating material; the propeller blade may also be subject to excessive stress which may have negative consequences on the stability of the tank.

During normal operation it is possible that the mixer may oscillate laterally; if this vibration occurs within a range of a couple of centimetres, it should not be considered dangerous. This low level of oscillation is due in part to the significant robustness of the machine frame.

It may be necessary to increase the number of motor revolutions to counteract more significant oscillations; this operation may only be performed by fitting an inverter, following prior authorisation by the manufacturer.

If the number of motor revolutions is too low when an inverter is used, strong vibrations and lateral oscillations may occur; in this case the number of revolutions should be increased to avoid damage to the mixer and to the tank

If satisfactory mixing performance is not achieved despite having observed the above-listed instructions, (as a result of the large diameter of the tank or the high proportion of dry content), the mixer dealer or manufacturer should be promptly informed.

The dealer or the manufacturer shall not be held responsible for damage resulting from incorrect use of the mixer.

Potential formation of floating material on the surface may be due to:

- Digester tank filling with an already fermented substrate from other tanks of the Biogas plant:
- A high proportion of dry material content;
- A fault in the Biogas system and consequent unexpected mixer run-down time;
- A fault in the mixer.

If large quantities of floating material are present, the necessary counter-measures should be taken before starting the mixer. These measures must be agreed upon with the dealer or manufacturer of the mixer.

5.4. OPERATION WITH INVERTER

To enable inverter-powered operations, the motors are equipped with a temperature control system using PTC or PT 100 thermistors inserted in the coil that ensure that the temperature range limits are maintained.

The user must connect the terminals of the PRC or PT 100 to a trip relay that will cause the electrical supply to disconnect if dangerous temperatures are reached.

This trip system must only ever be reset manually, never automatically.

In order to comply with regulations the user must:

- Use a trip system that complies with the principles of standard IEC 61508 (must be Fail Safe);
- Use a double protection circuit.

The motors for inverters are equipped with a supplementary plate. Before starting the motor, check that it meets the performance requirements (kW, Hz and torque) indicated on the supplementary plate; in the absence of these indications, the user should contact the manufacturer.

If powered by an inverter, the power may be slightly reduced to maintain the specified temperature range and prevent potential damage from overheating.

When choosing an inverter, the user must consider that the motor must not be subjected to voltage peaks greater than 1.4 times the nominal voltage; otherwise, the lifespan of the coil insulation will be slightly reduced.

It should be borne in mind that if an inverter is used, the installer is responsible for carrying out the checks and taking any necessary precautions in relation to emission and immunity limits as per the "Electromagnetic Compatibility (EMC)" directive 2004/108/EC and subsequent modifications.

6 PACKAGING, HANDLING, RECEIPT AND STORAGE

6.1. PACKAGING

The shape and size of DODA mixers means that it is not possible to fully package the machine. As such, they are transported directly on the truck-beds or inside containers, with only the electric motor fully protected.

6.2. HANDLING

To move the items, using lifting devices that are compatible with the type of packaging and that indicate a sufficient lifting capacity.

Do not tilt or overturn during lifting and transport.

If the packages are unloaded using a forklift truck, ensure that the weight is also balanced on the forks.

If the packages are unloaded using a hoist or using a hook of any kind, ensure that the load is balanced and that the harness consists of lifting accessories that meet legal requirements.

If necessary, place a sufficient number of wooden blocks under the package to facilitate the lifting process.

ATTENZIONE !!!

If packages are shipped on pallets, ensure that the lifting accessories do not damage the machine.

ATTENZIONE !!!

Be careful to avoid violent impacts when lifting and positioning the package.

Machine lifting and handling operations may only be carried out using:

- forklift truck *(fig. 1)*;

- mobile crane (fig. 2).

ATTENZIONE !!!

The machine must never be lifted by gripping the weakest parts of the structure, or by gripping moving parts; it must only be lifted using the dedicated lifting points with which the machine is equipped (fig. 3) !

	Before lifting, ensure that the structure is balanced
	Never stand under the suspended load when lifting, transporting or unloading the mixer!
	Do not make sudden manoeuvres, or knock the steel parts with the forks of the lift truck.
	Never leave a suspended load unsupervised!

Figure 1

Figure 2

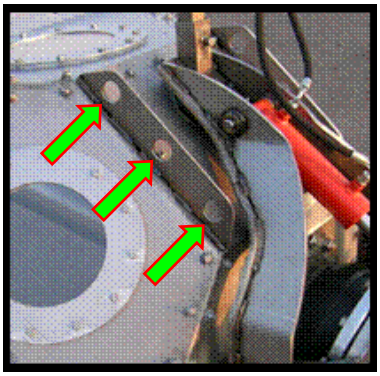


Figure 3

6.3. HANDLING WITHOUT PACKAGING

Before removing the machine from its packaging, secure it using the lifting accessories so that it cannot slip or tip over.

The wooden chocks must be removed before handling the machine, and inserted into the packaging to ensure stability during shipping.

Lift the machine, taking care not to unbalance the load during the manoeuvre.

6.4. RECEIPT

Upon receiving the Machine, check that the delivery corresponds to the order specifications and that the package and its contents have not been damaged during transport.

The packaging should be removed as follows:

⇒ Cut the packaging from around the sides (if using cutters make sure not to cut directly onto the machine so as not to damage the parts underneath the packaging)

⇒ Remove the packaging from around the sides.

If you notice damage, faults or missing contents, notify the following centre immediately:

DODA Assistance Centre Tel. ++390376410043 Fax ++390376410032.

6.5. STORAGE

If the product needs to be put into storage for a period greater than 2 months, observe the following procedures:

⇒ Protect the shafts and centering mechanisms using a film of lubricant and/or a protective anti-corrosion liquid;

⇒ Store in a dry place at a temperature of between -5°C e +30°C;

⇒ Protect the packages from dirt, dust and humidity;

⇒ Do not stack the pieces one on top of another;

⇒ Do not walk on the package, and do not place items on top of it;

⇒ Do not place the package near passageways;

⇒ If possible, position chocks of wood between the package and the pavement.

NOTE: The performance of the rotating seals is negatively impacted if the product is stored for extended periods of more than 6 months. Periodic checks should be carried out by rotating the internal gears by hand to rotate the inlet shaft. The gaskets should be replaced if necessary at the time of commissioning the machine.

7 ORDINARY / EXTRAORDINARY MAINTENANCE

Check all screws and bolts on the mixer, the frame and the parts after the first 2 operating hours and again after 100 operating hours (or else after 1 month of operating!).

Check the fixing plugs on the assembly frame of the mixer and if necessary tighten them further.

MOMENT OF TORSION OF THE SPRINGS IN Nm						
Screw	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Category A2/ A4-70	16	32	56	135	280	450
Category 8.8 galvanised	20	41	70	170	330	570
Category A2/ A4 - 80						
Plug M12-15/110 A4	50					

It is possible that condensation may form on the terminal strip of the explosion-proof motors; for this reason, the mixer should be stopped at regular intervals (at least once a month) and any condensation water should be removed from the terminal strip using an appropriate absorbent cloth.

Read the warnings in Paragraph 8.3 before performing these operations.

7.1. MAINTENANCE WORKS BASED ON DEGREE OF USAGE

All moving parts of the mixer are subject to wear, the degree of which depends on the operating time, the operating conditions and the degree of stress to which they are subjected.

The reducers have been treated using a so-called "long life" lubricant meaning that they will not require an oil change

during their life span. If topping up, use **SHELL OMALA S4 WE 320** or equivalent.

The mechanical seal, together with the motor shaft bearing and the transmission oil (42 litres of SAE80-W90 oil) must be replaced every 40,000 operating hours.

The lifespan of the rubber parts of the expansion joint is variable and depends on the workload of the machine and its exposure to atmospheric agents.

7.2. ORDINARY MAINTENANCE

The propeller wear depends on the operating time and the quality of the product being mixed.

If the absorbed current is clearly less than the maximum nominal load, then the worn propeller should be replaced. The M30 self-locking fixing nuts should also be replaced. When performing replacement operations, check that the assembly surfaces are clean.

All maintenance operations performed must be properly documented.

(see the documentation relating to maintenance and repair operations).

	Before carrying out any maintenance on the mixer and its component parts, disconnect the dedicated switches (to the mixer and any other parts) and ensure that these cannot be accidentally reconnected. Put up a warning sign!

Follow the instructions relating to the safety regulations in Chapter 2, as well those relating to installing the mixer in Chapter 8, extremely carefully.

	There is a risk of explosion caused by overheating of the intermediate and lower bearings, resulting from insufficient lubrication.

	When performing repair or maintenance operations, reduce the level of contents in the tank as necessary (particularly when carrying out maintenance on wall-mounted mixers).

Warning! In areas with potentially explosive atmospheres, **it is absolutely prohibited to:**

- Perform any repair or maintenance operations,
- Introduce any flammable source (e.g. naked flames, heat sources, equipment without arc flash protection, non-explosion-proof electrical devices).
- Carry out welding operations, or machining operations that may generate flames or sparks.

	ONLY use spark-proof tools

	Authorisation must be requested from the Health and Safety (RSPP) Manager before performing any operation, and the required documentation must be filled out correctly to obtain authorisation to work in potentially explosive areas; this authorisation must be duly signed by the authorised personnel.

8 INSTALLATION

The mixers must be installed carefully and in accordance with professional standards by appropriately trained and technically proficient staff.

The staff should be informed on the following topics relating to the safe use of the

machine:

⇒ General accident-prevention guidelines or those provided for by international directives or the legislation of the country where the machine will be used.

⇒ Specific accident-prevention guidelines:

1. European directive 94/4/EC relates to prevention systems to be put in place in relation to equipment and, therefore, in this specific case, it is the directive that relates to the mixer;
2. European directive 1999/92/EC relates to personal safety while installing, operating and performing maintenance operations on potentially explosive systems.

⇒ Risk of accidents.

⇒ P.P.E. devices in place to ensure the safety of the operator (personal protective equipment: glasses, gloves, helmet, etc.).

All technical instructions contained in the dedicated Dimensional Drawing must be observed in full when preparing for to operate the machine.

All installation operations must be carried out with maximum regard for safety in relation to:

1. The safety of the operators and of third parties;
2. Correct operation of the mixer;
3. The safety of the operation.

It is absolutely prohibited to use the mixer or any accessories relating to it without authorisation.

	Before beginning the installation process, ensure that the information provided on the mixer identification plate is compatible with the environment in which it is to be installed. The motor and the reducer should not be repainted. If the application of a further layer of paint is deemed absolutely necessary, do not exceed an overall thickness of 170 µm in order to prevent the potential formation of electrostatic charges. Use an appropriate paint to ensure that the surface resistivity of the casing does not exceed 1 GΩ. (See UNI EN 13463-1)

	All installation and maintenance works must be carried out with the mixer switched off, it is therefore good practice to ensure that no accidental reconnection of the driving force can occur.

Mixer assembly and installation operations must under no circumstances be performed in potentially explosive atmospheres.

The mixer must only be used and installed in the authorised areas.

Make a note of any changes that occur in the at-risk areas that can be attributed to the mixer, and check that the new configuration complies with the relevant regulations.

	Wear accident-prevention gear with the relevant PPE. Only prepare the mixer in sufficiently well-lit conditions.

If assembly and installation operations are carried out in potentially explosive atmospheres, authorisation to operate in areas at risk of explosion must first be requested from the officer in charge.

	Do not enter, or approach the edge of, the digester tank if not sufficiently equipped to deal with the fumes, and never do so alone

	Do not perform repair, adjustment or maintenance operations when the machine is operating or when it is connected to the power supply.

	Do not damage or remove the protective equipment. 13) During use, adjustment or maintenance operations, avoid rubber parts of the machine (gaskets, etc.) coming into contact with oil, grease or oil derivatives.

8) The machine should only be used when all protection is in place, following the instructions identified in the above paragraphs in order to avoid contact with moving parts.

8.1. GENERAL INSTRUCTIONS TO PREPARE THE SITE

The biogas mixer can be supplied with a frame for ceiling or wall mounted installation.

The different types of mixer installation have been specially designed to suit the range of location and work conditions of the various Biogas plants, as well as the manufacturing characteristics of the digester and of the tanks.

The technical design office, or the dealer or manufacturer, must check that the mixer is correctly positioned to ensure optimal mixing and a suitable degree of homogenisation of the fermented substrate.

The potential need to access the site using mechanical lifting equipment must be taken into account when choosing the location.

When installing the mixer, written authorisation must be obtained from the body responsible for carrying out static load calculations in relation to the wall of the tank.

Doda is not responsible for any damage caused to tanks resulting from incorrect installation or use of the mixer.

8.1.1. INSTRUCTIONS TO PREPARE THE SITE FOR CEILING-MOUNTING

To mount the mixer, a 1,300 mm x 1,300 mm hole must be made in the ceiling.

This should generally be positioned 4 - 5 m from the point through which the raw materials are introduced, so that the propeller range can uniformly homogenise the solid substances that have been introduced.

The position of the mixer must be chosen in light of the position of any other pre-existing mixers.

The thrust of the mixer does not usually need to be altered.

To ensure that the mixer functions correctly, it should ideally be mounted at least 1 metre from the edge of the ceiling, so that the propeller can also function in the presence of fermented substrates with high levels of dry substance.

When planning and drilling the hole in the ceiling, a sufficient degree of distance must be maintained from the outside edge of the tank, to enable the manoeuvres necessary to install and dismantle the mixer; a sufficient degree of distance should also be maintained from any other tanks and equipment.

When planning and drilling the hole in the wall, remember that it is necessary to remove any insulation material that may be present.

In order to obtain a resistant seal between the frame and the cement surface, the surfaces around the structure must be smooth and consistent; there should be no rough edges around the hole in the tank, any rough edges should be smoothed down.

Remove any insulation material from the outside of the tank. There should be no rough edges around the hole in the tank, any rough edges should be smoothed down.

	**Risk of explosion in the event of a biogas leak!** In order to ensure correct sealing of the mixer frame, the cover of the tank must be sufficiently level. There should be no cavities or irregularities!

8.1.2. GENERAL INSTRUCTIONS TO PREPARE THE SITE FOR WALL-MOUNTING

To mount the mixer, a 1,300 mm x 1,300 mm hole must be made in the wall.

The equipment should be installed so that the distance between the upper edge of the opening in the wall and the upper edge of the wall of the tank is 0.5 m.

It should generally be positioned 4 - 5 m from the point through which the raw materials are introduced, so that the propeller range can uniformly homogenise the solid substances that have been introduced.

The position of the mixer must be chosen in light of the position of any other pre-existing mixers.

The thrust of the mixer does not usually need to be altered.

The standard frame supplied by the manufacturer is inclined 30° to the left. In this way the flow of the mixed product rotates in a clockwise direction; normally the swirl created by the mixing blade facilitates the rotary motion of the mixed product.

When planning and drilling the hole in the ceiling, a sufficient degree of distance must be maintained from the outside edge of the tank, to enable the manoeuvres necessary to install and dismantle the mixer; a sufficient degree of distance should also be maintained from any other tanks and equipment.

In order to obtain a resistant seal between the frame and the cement surface, the surfaces around the structure must be smooth and consistent; there should be no rough edges around the hole in the tank, any rough edges should be smoothed down.

Remove any insulation material from the outside of the tank.

Any defects in the wall, which become evident after having uncovered the wall of the tank, must be eliminated or repaired in accordance with the legislation in force in relation to the construction industry, and in keeping with good practice.

Failure to correctly secure the mixer, and the consequent stress produced during mixing, may cause both damage and leakages of fermented substrate, which in turn can cause major environmental damage.

Therefore, if in doubt, we recommend that you engage an expert to check any deficiencies that may require improvement and document the findings using images.

	Incorrect sealing can cause gas leaks from the digester which in turn can cause risk of explosions.

There should be no trees, equipment or other risk factors in the vicinity of the mixer which may compromise the correct operation of the machine.

If the mixer is heavier than the load capacity of the wall of the tank, the installation frame may become detached from the fixing system (plugs).
An accidental leak of the product, in the event of damage to the tank, would result in environmental damage.

8.2. INSTRUCTIONS FOR SECURING THE MIXER IN PLACE

The instructions provided here below are only valid if the mixer is being installed on a tank which has never been filled with biomass and/or liquids, gas or vapours which could give rise to risk of explosion

Before mounting the mixer you should:

- Check the dimensions of the hole created in the ceiling;
- Remove any impurities on the surface onto which the machine is to be mounted;
- Check that the mounting surface and the seal surface are both flat;
- Make any necessary improvements.

Any modifications must be agreed upon with the manufacturer immediately, and certainly prior to mounting.

Before applying the seal between the frame and the surface on which it is to be mounted, check that the mixer is correctly positioned.

Use a drilling template to make 12 mm diameter holes. Before drilling the first hole, align the template with the hole made in the ceiling, so that the mixer can be properly secured using plugs.

To prevent the drilling template from moving away from the position of the holes to be drilled, you should apply a plug as soon as the first hole has been drilled and press the template firmly against the ceiling of the tank. It will then be possible to drill the remaining holes. To facilitate the operation, the remaining plugs may be positioned after mounting the installation frame.

	Before installing the plugs, clean the holes with compressed air and remove any dust from the hermetic surfaces, so as to ensure that the plugs penetrate properly.

	Warning! Follow the instructions for inserting the plugs!

	Apply anti-grip solution to the threads of the plugs to prevent the nut from getting stuck before it is completely tightened.

After mounting the mixer, tighten the plugs.

The procedure to check the tightness of the plugs should be repeated after a few days.

For further mounting operations, follow the instructions given in paragraph 8.1 on general instructions.

8.3. ELECTRICAL CONNECTION

The mixer is supplied without an electrical panel.

	The motor should be started progressively rather than directly (using a soft starter, inverter, etc.), or using a star delta system. This should allow the mixer to reach the nominal number of revolutions in approximately 3-5 seconds. Avoid abrupt starts and stops.

Use of an inverter is recommended!

The electrical connection should be carried out in a location free from atmospheric precipitation by qualified staff in accordance with the directives in force on the subject of safety and accident prevention.

Any specific instructions regarding electrical systems (e.g. sections of cables, safety, connecting a safety conductor) should also be fully adhered to.

Only use parts which meet regulatory requirements.

Only authorised connections can be made in potentially explosive atmospheres.

	The cable must be sufficiently long so as to enable the mixer to tilt; this is because there is a potential risk of tearing. The electrical cable must not be placed near the hydraulic directional device or the rotating parts, because there is the potential for it to get crushed.

The motor must be protected against all circumstances that may cause it to overheat excessively. A dedicated device should be used for this purpose: e.g. an automatic switch with protection against loss of phase.

The motor is equipped with thermistors (PTC) so that thermal protection from a supplementary machine (TMS) can be used if necessary.

The motors are protected against dust and water spray depending on their grade of protection. In the event of ice or snow, further safety precautions must be taken.

The power line to the motor must comply with the information provided on the connection box at the base of the motor and with the details on the control panel.

	In order to safely work on the mixer, an on-load switch capable of disconnecting power to the mixer itself must be positioned in the vicinity of the mixer (within reach of the maintenance technician). Alternatively, the automatic switch should be located on the electrical panel in the equipment room (which safeguards the line connected to the mixer) and it should be possible to lock this in an open position using a lock, so that the maintenance technician can keep it nearby during maintenance operations.

8.4. INSTRUCTIONS FOR DISMANTLING THE MIXER

Before proceeding to partially or totally dismantle the machine, the regulations regarding safe preparation of the machine and the work area must be strictly adhered to.

	In order to safely work on the mixer, an on-load switch capable of disconnecting power to the mixer itself must be positioned in the vicinity of the mixer (within reach of the maintenance technician). Alternatively, the automatic switch should be located on the electrical panel in the equipment room (which safeguards the line connected to the mixer) and it should be possible to lock this in an open position using a lock, so that the maintenance technician can keep it nearby during maintenance operations.

	Before carrying out any maintenance on the mixer and its component parts, disconnect the dedicated switches (to the mixer and any other parts) and ensure that these cannot be accidentally reconnected. Put up a warning sign!

Follow the instructions relating to the safety regulations in Chapter 2, as well those relating to installing the mixer in Chapter 8, extremely carefully.

	When performing repair or maintenance operations, reduce the level of contents in the tank as necessary (particularly when carrying out maintenance on wall-mounted mixers).

Warning! In areas with potentially explosive atmospheres, **it is absolutely prohibited to:**

- Perform any repair or maintenance operations,
- Introduce any flammable source (e.g. naked flames, heat sources, equipment without arc flash protection, non-explosion-proof electrical devices).
- Carry out welding operations, or machining operations that may generate flames or sparks.

	ONLY use spark-proof tools

	Authorisation must be requested from the Health and Safety (RSPP) Manager before performing any operation, and the required documentation must be filled out correctly to obtain authorisation to work in potentially explosive areas; this authorisation must be duly signed by the authorised personnel.

When the safety conditions have been established, you may proceed to dismantle the parts.

COMPLETE REMOVAL:

- prepare the machine for lifting using a crane, by hooking chains or straps onto the dedicated points of the frame of the machine.
- unhook the electrical cables and the hydraulic pipes on the mixer side.
- completely remove the nuts or fixing screws of the frame from the wall or the counter-frame.
- remove the machine from its fixed position.
- remove the internal part of the machine, taking care not to bring it into contact with the walls of the tank or other internal parts of the tank.
- place the mixer in an area outside of the atex zones in order to proceed with maintenance operations.

PARTIAL REMOVAL:

Some parts, such as the electric motor and the reducer, may be dismantled and replaced without having to completely remove the mixer from the tank.

- if the part if heavy, prepare it for lifting using a crane, by attaching chains or straps.
- unscrew the screws and remove any electric cables or hydraulic pipes that connect the part to the rest of the machine.
- remove the part and place it in an area outside of the atex zone.

9 MIXER ADJUSTMENT INTERVALS

Using the machine in the opposite rotary direction to that specified may pose a risk to the mixer, to objects or to people!

The mixer operating interval can be set using the Biogas plant control panel.

The optimal operating period and down-time depends on the manufacturing specifications, as well as on the conditions of use and the fluid to be treated.

The Biogas plant control panel must only be set by authorised personnel.

As an example, the initial mixer operating period could be set as follows:

1) Standard operation Variable operating time from 2 to 5 min. and idle time 20 min. (in the event of insufficient mixing the operating time should be increased and the idle time decreased;
2) Continuous operation.

10 INFORMATION ON DANGEROUS AREAS

In its standard configuration, there are no dangerous areas of the mixer.

11 WORK EQUIPMENT

If gases/vapours/mists and/or dust are present in the workplace, protective measures are designed to address the maximum possible level of danger.

	Before using any equipment in the work place, use the pocket explosimeter to check for the presence of dangerous levels of gas.

The equipment may only be used if the relevant CE certificates state that they can be used without risk in explosive atmospheres; all equipment must bear a symbol	

Necessary measures must be adopted to ensure that the equipment has been designed, built, assembled and kept efficiently, and used in such a way as to reduce the risk of explosion, as well as the scope of any potential explosion, to a minimum.

11.1. PERSONAL EQUIPMENT

Each operator should be equipped with:

1) Antistatic garments and shoes (which do not produce electrostatic discharge);

2) Spark-proof manual tools (or "cold sparks") or non-metal tools (wood, leather and plastic);
3) A pocket explosimeter to check for the presence of dangerous levels of gas.

The personal equipment that can be used in areas classified as being at risk of explosion must be CE certified and must bear permanent CE and Ex marks; all equipment must bear a symbol	

	All personal equipment such as, for example: welding units, hoses, oxyacetylene torch with a naked flame, etc., can only be used in areas not classified as being at risk of explosion.

The use of these tools does not exempt the user from adopting normal practices for making the equipment safe before proceeding with the operation.

11.2. COLLECTIVE EQUIPMENT

The tools for collective use such as: drilling machines, screwdrivers, etc., must only be used if the CE certificate states that they can be used without risk in explosive atmospheres; all equipment for collective use must bear a symbol	

	All equipment for collective use such as, for example: welding units, hoses, oxyacetylene torch with a naked flame, etc. must only be used in areas not classified as being at risk of explosion.

The use of these tools does not exempt the user from adopting normal practices for making the equipment safe before proceeding with the operation.

12 STAFF TRAINING

12.1. **STAFF** QUALIFICATIONS

Checks and maintenance operations on the mixer must be carried out by experienced staff, whose training programme has included instruction on various types of protection, on installation practices, on the relevant legislative standards and provisions and on the general principles regarding classification of danger areas.

Staff must undergo continuous education and training, by way of regular refresher courses.

Proof of experience and training must be provided.

12.2. OPERATORS (checks and maintenance)

12.2.1. KNOWLEDGE AND CAPABILITIES

In order to fulfil their role, the operators must meet the following requirements:

a) Have knowledge of the general principles of protection against explosions;
b) Have knowledge of the general principles of protection methods and markings;
c) Have knowledge of the aspects of design of the equipment that could compromise their protection;

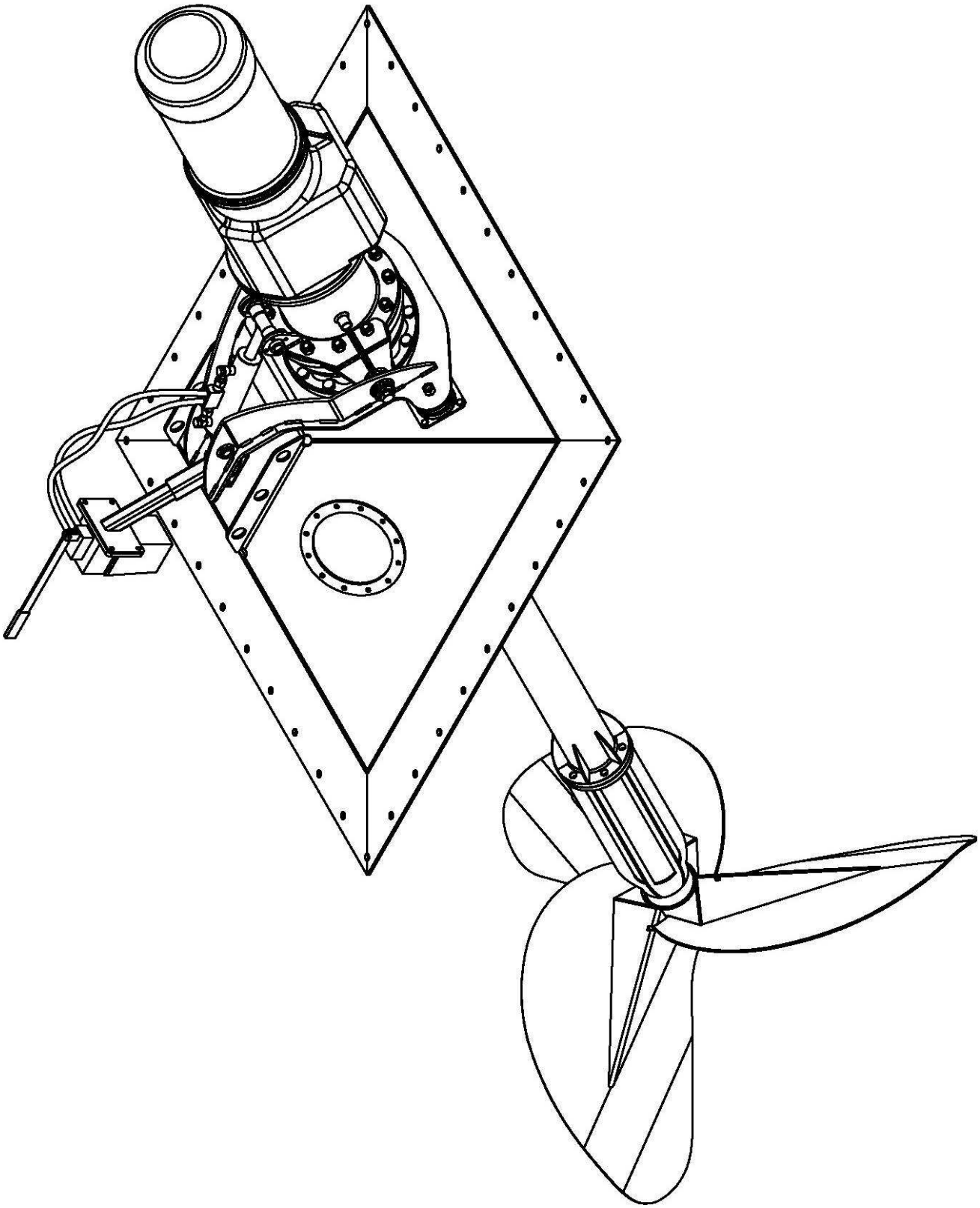
d) Have knowledge of the added importance of the Work Permit system and the Safe Work system in relation to protection from explosions;
e) Have familiarity with the technical specifications to be used when carrying out checks and maintenance operations on the equipment, bearing in mind the context and the work area;
f) Have a holistic knowledge of the requirements for selecting, mounting, repairing and restoring the machine.

12.2.2. SKILLS

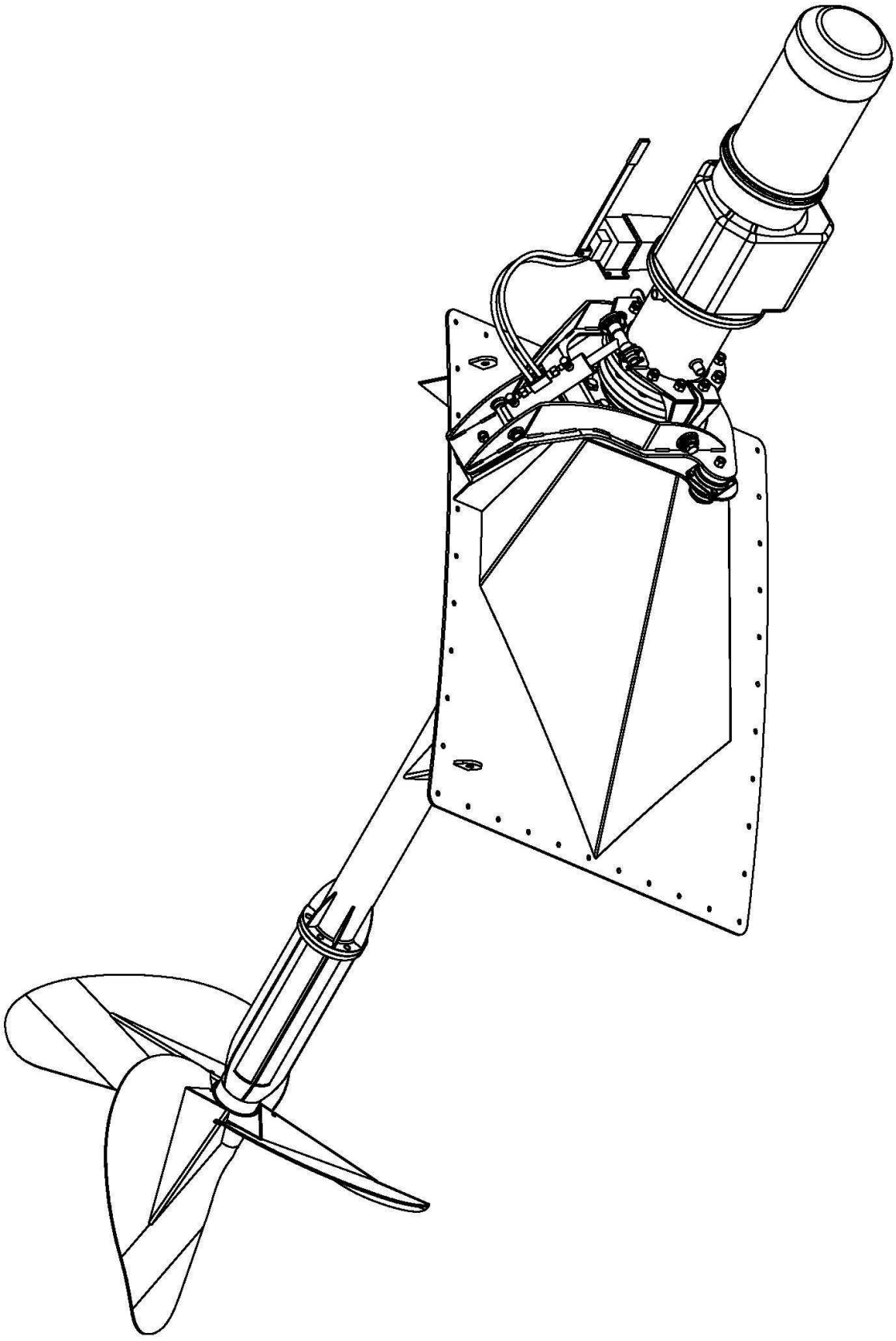
The operators must be capable of demonstrating their skill, and have the necessary practical skills to ascertain and uphold protective measures relating to and deriving from the type of work to be undertaken. The operators must be adequately well educated and trained; in the event of repair, conversion or maintenance operations, the workers in question must be qualified to carry out those specific tasks. (Italian Legislative Decree 81/2008 art. 71).

13 SPARE PARTS

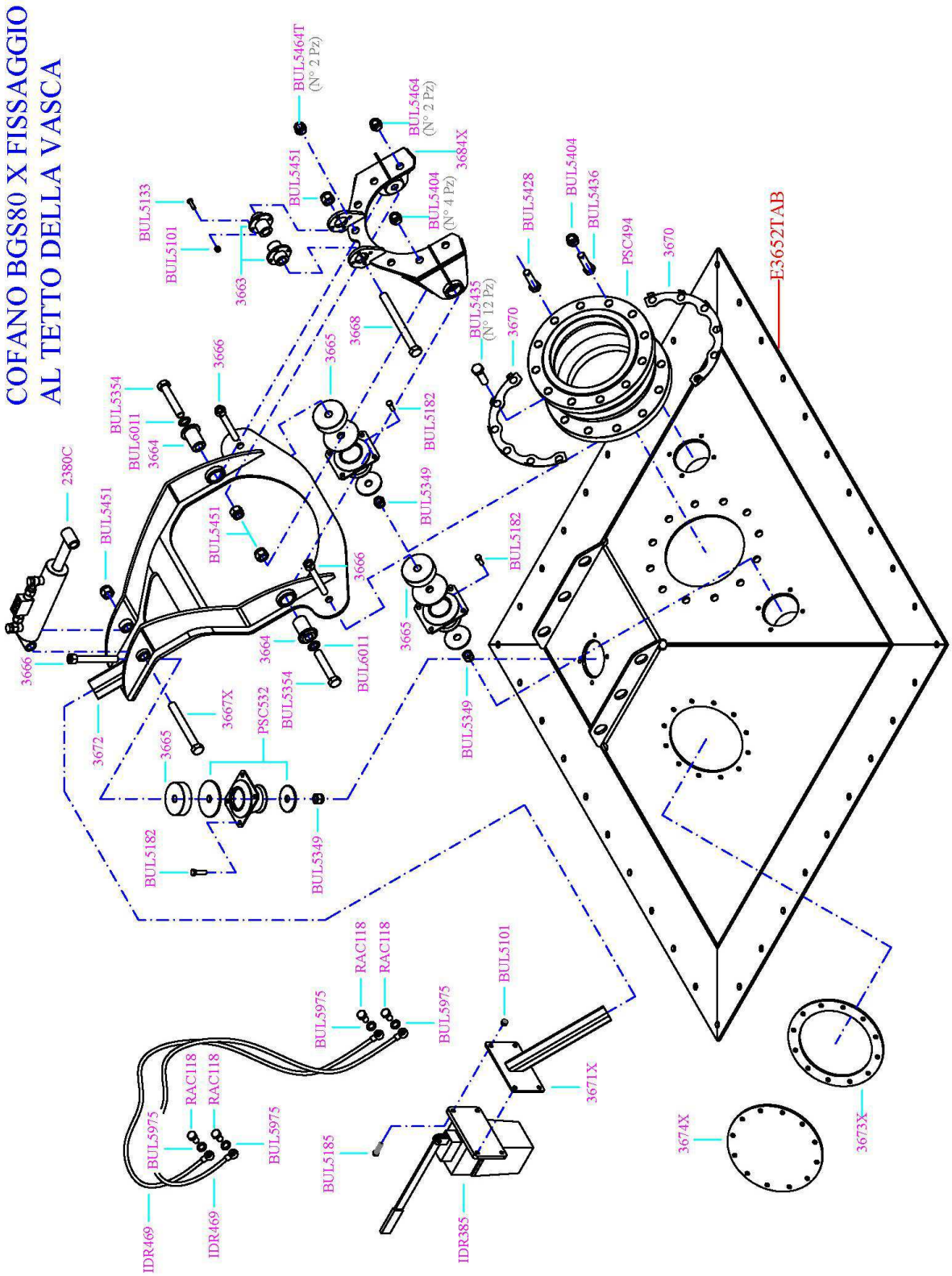
13.1. CEILING-MOUNTED ASSEMBLY



13.2 WALL-MOUNTED ASSEMBLY



13.3 EXPLODED VIEW DRAWING OF CEILING-MOUNTED CASING

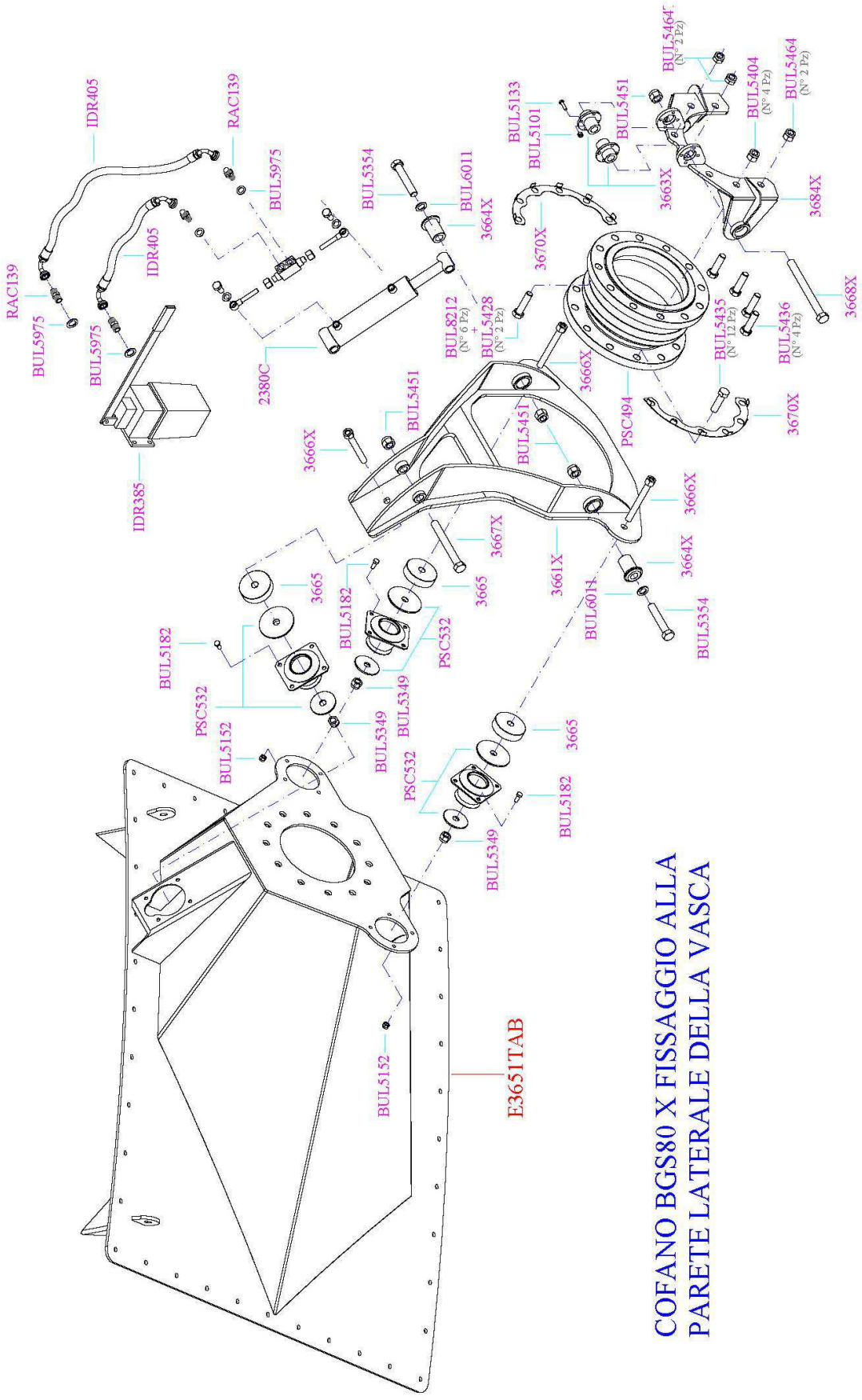


LIST OF PIECES OF CEILING-MOUNTED CASING

Distinta : E3652 - ESPLOSO COFANO FISS.TETTO VASCA BGS80

Codice	Descrizione	Quantità	Um	Lv	T	Q.tà Prod
E3652	ESPLOSO COFANO FISS.TETTO VASCA BGS80	1,000	NR	0		1,000
2380C	PISTONE IDR.D.E.60/30X150 BGS80 CON VALV	1,000	NR	1		1,000
3663X	BOCCOLA ESTRAIB.ATT.PISTONE BGS80 INOX	2,000	NR	1		2,000
3664X	PERNO FORCELLA INOX304 BGS80	2,000	NR	1		2,000
3665	SPESSORE TAMP.ANTIVIBR.BGS80 FE	3,000	NR	1		3,000
3666X	VITE SERRAGGIO ANTIVIB.INOX304 BGS80	3,000	NR	1		3,000
3667X	VITE FISSAGGIO PIST.INOX304 BGS80	1,000	NR	1		1,000
3668X	VITE FISSAGGIO PIST.INOX304 BGS80	1,000	NR	1		1,000
3670X	FERMO INOX304 S.1,5 GIUNTO EX BGM044	2,000	NR	1		2,000
3671X	ATTACCO POMPA MAN.INOX COF. BGS80 STANDA	1,000	NR	1		1,000
3672X	CULLA SUPP.GUARN.BGS80 INOX	1,000	NR	1		1,000
3673X	FLANGIA INOX304 D.300/230 S.8 OBLO'BGS80	2,000	NR	1		2,000
3674X	FLANGIA INOX304 CIECA D.300 S.8 12F	2,000	NR	1		2,000
3675X	COFANO SOFF. 1700X1700 INOX BGS80	1,000	NR	1		1,000
3684X	FORCELLA MOV.TRASM.BGS80 INOX	1,000	NR	1		1,000
BUL5101	DADO A2 M8 AUTOBL.UNI7473 ALTO	8,000	NR	1		8,000
BUL5133	VITE A2 TE M8X30 UNI5739 TUTT.FIL	4,000	NR	1		4,000
BUL5182	VITE A2 TE M10X30 UNI5739 TUTT.FIL	12,000	NR	1		12,000
BUL5185	VITE A2 TE M10X45 UNI5739 TUTT.FIL	4,000	NR	1		4,000
BUL5349	DADO A2 M18 AUTOBL.UNI7473 ALTO 21	3,000	NR	1		3,000
BUL5354	VITE A2 TE M22X120 UNI5737 PARZ.FIL	2,000	NR	1		2,000
BUL5404	DADO A2 M20 AUTOBL.UNI7473 ALTO	10,000	NR	1		10,000
BUL5464	DADO A2 M20 AUTOBL.UNI7474 BASSO	2,000	NR	1		2,000
BUL5464T	DADO A2 M20 AUTOBL.UNI7474 tornito H15	2,000	NR	1		2,000
BUL5428	VITE A2 TE M20X80 UNI5739 TUTT.FIL	8,000	NR	1		8,000
BUL5435	VITE A2 TE M20X60 UNI5739 TUTT.FIL	12,000	NR	1		12,000
BUL5436	VITE A2 TE M20X70 UNI5739 TUTT.FIL	4,000	NR	1		4,000
BUL5451	DADO A2 M22 AUTOBL.UNI7473 ALTO	4,000	NR	1		4,000
BUL5975	RONDELLA RAME PIA.3/8"D.17X23 S.1,5	4,000	NR	1		4,000
BUL6011	RONDELLA A2 GROWER M22 UNI1751	2,000	NR	1		2,000
IDR385	POMPA A MANO PMI25-2 LEVA 2EFFE.BG80	1,000	NR	1		1,000
IDR469	TUBO 1/4" R1 L.850 F90° 3/8"+ F3/8"	2,000	NR	1		2,000
PSC494	GIUNTO DILAT.DN250 PN10 GOMMA FL.ZNT	1,000	NR	1		1,000
PSC532	ANTIVIBRANTE SUPPORTI CABINA CONICA ZNT	3,000	NR	1		3,000
RAC139	NIPPLO M3/8"-M3/8" OLEOD.	4,000	NR	1		4,000

13.4 EXPLODED VIEW DRAWING OF WALL-MOUNTED CASING

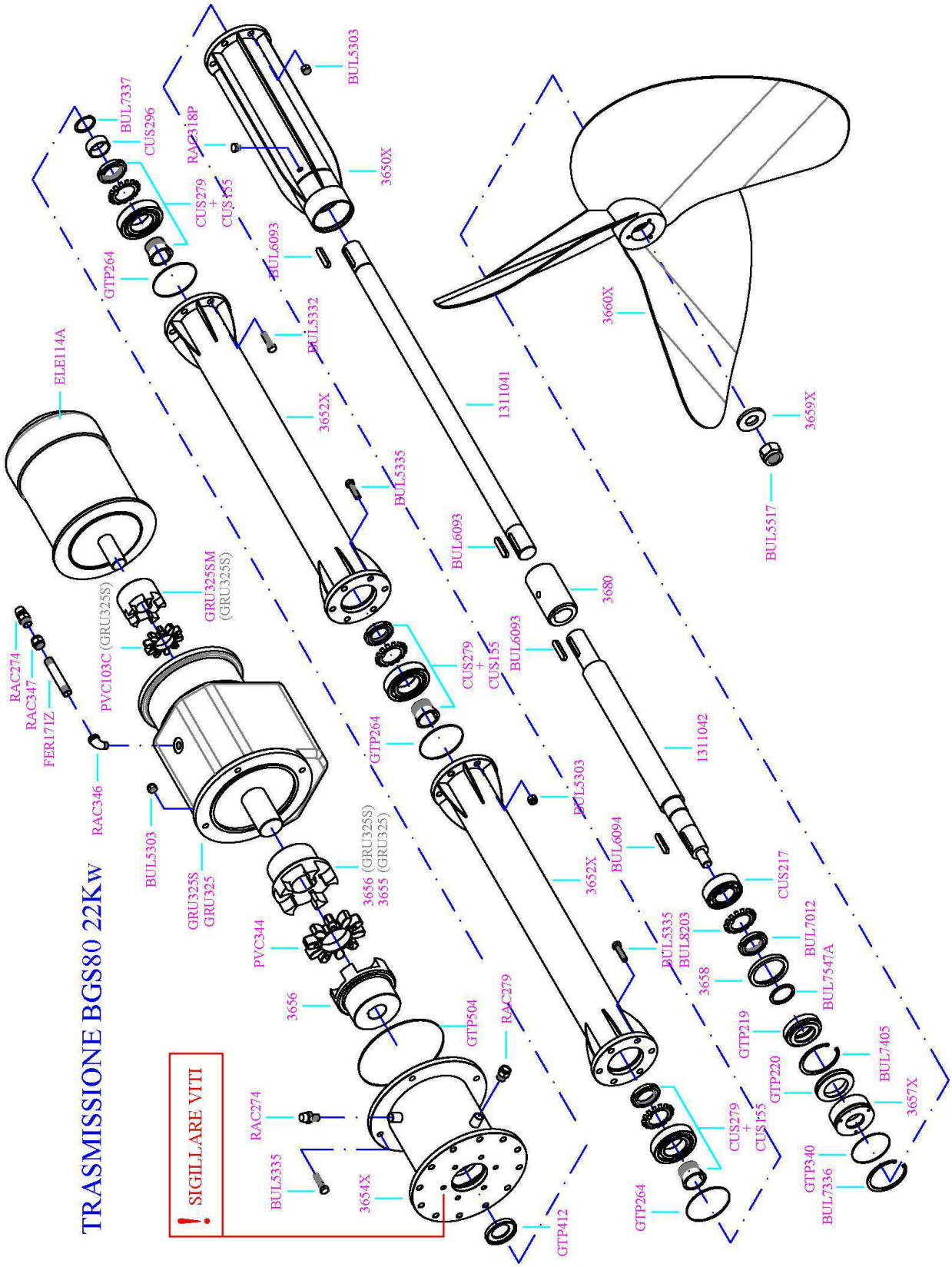


LIST OF PIECES OF WALL-MOUNTED CASING

Distinta : E3651 - ESPLOSO COFANO LAT.VASCA BGS80 INOX

Codice	Descrizione	Quantità	Um	Lv	T	Q.tà Prod
E3651	ESPLOSO COFANO LAT.VASCA BGS80 INOX	1,000	NR	0		1,000
2380C	PISTONE IDR.D.E.60/30X150 BGS80 CON VALV	1,000	NR	1		1,000
3661X	CULLA SUPP.TRASM.BGS80 INOX	1,000	NR	1		1,000
3663X	BOCCOLA ESTRAIB.ATT.PISTONE BGS80 INOX	2,000	NR	1		2,000
3664X	PERNO FORCELLA INOX304 BGS80	2,000	NR	1		2,000
3665	SPESSORE TAMP.ANTIVIBR.BGS80 FE	3,000	NR	1		3,000
3666X	VITE SERRAGGIO ANTIVIB.INOX304 BGS80	3,000	NR	1		3,000
3667X	VITE FISSAGGIO PIST.INOX304 BGS80	1,000	NR	1		1,000
3668X	VITE FISSAGGIO PIST.INOX304 BGS80	1,000	NR	1		1,000
3669X	COFANO POS.VERT.INOX BGS80 SX TV	1,000	NR	1		1,000
3670X	FERMO INOX304 S.1,5 GIUNTO EX BGM044	2,000	NR	1		2,000
3684X	FORCELLA MOV.TRASM.BGS80 INOX	1,000	NR	1		1,000
BUL5101	DADO A2 M8 AUTOBL.UNI7473 ALTO	4,000	NR	1		4,000
BUL5133	VITE A2 TE M8X30 UNI5739 TUTT.FIL	4,000	NR	1		4,000
BUL5152	DADO A2 M10 AUTOBL.UNI7473 ALTO	8,000	NR	1		8,000
BUL5182	VITE A2 TE M10X30 UNI5739 TUTT.FIL	12,000	NR	1		12,000
BUL5334	VITE A2 TE M16X50 UNI5739 TUTT.FIL	1,000	NR	1		1,000
BUL5349	DADO A2 M18 AUTOBL.UNI7473 ALTO 21	3,000	NR	1		3,000
BUL5354	VITE A2 TE M22X120 UNI5737 PARZ.FIL	2,000	NR	1		2,000
BUL5404	DADO A2 M20 AUTOBL.UNI7473 ALTO	4,000	NR	1		4,000
BUL5428	VITE A2 TE M20X80 UNI5739 TUTT.FIL	2,000	NR	1		2,000
BUL5435	VITE A2 TE M20X60 UNI5739 TUTT.FIL	12,000	NR	1		12,000
BUL5436	VITE A2 TE M20X70 UNI5739 TUTT.FIL	4,000	NR	1		4,000
BUL5451	DADO A2 M22 AUTOBL.UNI7473 ALTO	4,000	NR	1		4,000
BUL5464	DADO A2 M20 AUTOBL.UNI7474 BASSO	2,000	NR	1		2,000
BUL5464T	DADO A2 M20 AUTOBL.UNI7474 tornito H15	2,000	NR	1		2,000
BUL5975	RONDELLA RAME PIA.3/8"D.17X23 S.1,5	2,000	NR	1		2,000
BUL6011	RONDELLA A2 GROWER M22 UNI1751	2,000	NR	1		2,000
BUL6012	RONDELLA RAME PIA.1/4"D.13,5X19 S.1,5STD	2,000	NR	1		2,000
BUL8212	VITE A2 TE M20X90 UNI5739 TUTT.FIL	6,000	NR	1		6,000
IDR385	POMPA A MANO PMI25-2 LEVA 2EFFE.BG80	1,000	NR	1		1,000
IDR405	TUBO 1/4" R1 L.4000 F90° 3/8"+F90°3/8"	2,000	NR	1		2,000
PSC494	GIUNTO DILAT.DN250 PN10 GOMMA FL.ZNT	1,000	NR	1		1,000
PSC532	ANTIVIBRANTE SUPPORTI CABINA CONICA ZNT	3,000	NR	1		3,000
RAC139	NIPPLO M3/8"-M3/8" OLEOD.	4,000	NR	1		4,000

13.5 EXPLODED VIEW OF BG80 TRANSMISSION



LIST OF PIECES OF BG80 TRANSMISSION

Distinta : E3650 - TRASM.BGS80 KW22 326 INOX EL/RID/ME

Codice	Descrizione	Quantità	Um	Lv	T	Q.tà Prod
E3650	TRASM.BGS80 KW22 326 INOX EL/RID/ME	1,000	NR	0		1,000
1311041	ALBERO FE60 D.60 L.2560 X BGS80	1,000	NR	1		1,000
1311042	ALBERO INOX304 D.80 L.1017 X BGS80	1,000	NR	1		1,000
3650X	TUBO TRASM.L.742 LATO ELICA BGS80 INOX	1,000	NR	1		1,000
3652X	TUBO TRASM.L.1250 MOT.BGS80 INOX	2,000	NR	1		2,000
3654X	SUPP.RID.BONF.C801 18.1 P180 BGS80 INOX3	1,000	NR	1		1,000
3656	MOZZO TRASCO GRMS 90/100A D.60 BGS80	2,000	NR	1		2,000
3657X	COPERCHIO TENUTA MECC.D.60 BGS80 INOX304	1,000	NR	1		1,000
3658	SPESSORE CUSCINETTO BGS80 FE	1,000	NR	1		1,000
3659X	RONDELLA ELICA BGS80 INOX304	1,000	NR	1		1,000
3660X	ELICA BG80 3 PALE KW22 4P D.1600 SPINGE	1,000	NR	1		1,000
3680	BOCCOLA FE D.100/60 L.185 X CONG.BG80	1,000	NR	1		1,000
BUL5303	DADO A2 M16 AUTOBL.UNI7473 ALTO	20,000	NR	1		20,000
BUL5332	VITE A2 TE M16X40 UNI5739 TUTT.FIL	6,000	NR	1		6,000
BUL5335	VITE A2 TE M16X60 UNI5739 TUTT.FIL	16,000	NR	1		16,000
BUL5517	DADO A2 M30X2 AUTOBL.UNI7473 ALTO	1,000	NR	1		1,000
BUL6093	CHIAVETTA C45K 18X11X80 UNI6604	3,000	NR	1		3,000
BUL6094	CHIAVETTA C45K 16X10X80 UNI6604	1,000	NR	1		1,000
BUL7012	GHIERA M65X2 ZNT KM13	1,000	NR	1		1,000
BUL7336	SEEGER INTERNO J 130 UNI7437 INOX304	1,000	NR	1		1,000
BUL7337	SEEGER ESTERNO AS 60X3 RINF.UNI7436-75	1,000	NR	1		1,000
BUL7405	SEEGER INTERNO J 110 UNI7437	1,000	NR	1		1,000
BUL7547A	SPESSORE FE D.60X75 S.1	1,000	NR	1		1,000
BUL8203	ROSETTA SICUREZZA MB13-65	1,000	NR	1		1,000
CUS155	BUSSOLA H 313 SKF	3,000	NR	1		3,000
CUS217	CUSCINETTO 3213A SKF	1,000	NR	1		1,000
CUS279	CUSCINETTO 2213 EKTN9 C3 SKF	3,000	NR	1		3,000
CUS296	BOCCOLA IR 60X70X28 SKF D.INT.60 CEMENTA	1,000	NR	1		1,000
ELE114A	MOT.EL.T KW22 B5 50HZ 4P V400/690 ADPE	1,000	NR	1		1,000
FER171Z	BARILOTTO FIL.ZNT MAS/MAS D.3/4" L.90	1,000	NR	1		1,000
GTP219	TENUTA MECC.ROT.D.60 70200795 BG80+TZN	1,000	NR	1		1,000
GTP220	TENUTA MECC.ST.D.60 84500600 BG80+TZN	1,000	NR	1		1,000
GTP264	OR 4462 BS247 D.117,07 S.3,53 NBR TZN700	3,000	NR	1		3,000
GTP340	OR 4487 BS249 D.123,42 S.3,53 NBR PEV-N	1,000	NR	1		1,000
GTP412	PARAOLIO 70.110.12 NBR	1,000	NR	1		1,000
GTP504	OR 41200 BS278 D.304,39 S.3,53 NBR	1,000	NR	1		1,000
PVC344	PARASTRAPPI AR 90/100 BIOMIX 15/22 KW	1,000	NR	1		1,000
RAC274	TAPPO SFIATO OLIO KMU M3/4" OLEOD.	2,000	NR	1		2,000
RAC279	TAPPO SPIA M3/4" ALLUMINIO (BALLAST)	1,000	NR	1		1,000
RAC318P	TAPPO M3/8" INOX316 TE CONICO PIENO	1,000	NR	1		1,000
RAC320	RIDUZIONE F3/4"-M1/2" GHISA ZNT IDRAUL.	1,000	NR	1		1,000
RAC346	GOMITO ZNT 90° M1/2"-F3/4" IDRAUL.	1,000	NR	1		1,000
RAC347	MANICOTTO F3/4"-F3/4" GHISA ZNT IDRAUL.	1,000	NR	1		1,000
GRU325SN	RID.STM AMF3 120/2 1/18,4 180B5 AS5182	1,000	NR	1		1,000