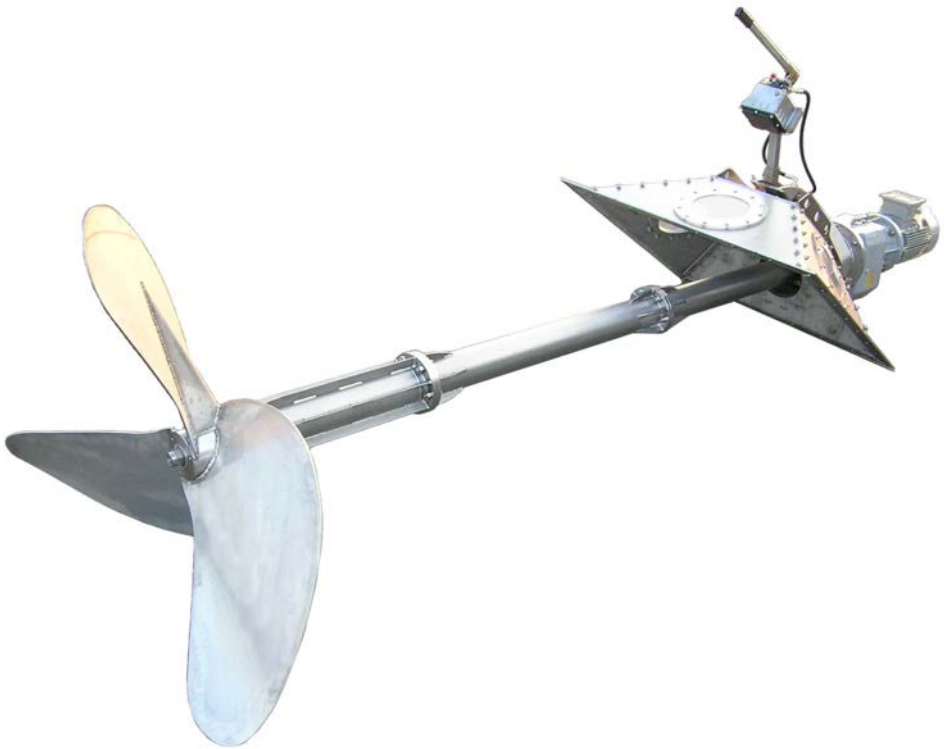
DODA®

COSTRUZIONE MACCHINE AGRICOLE
di
DODA ALDO & C SNC

USE AND MAINTENANCE MANUAL

MIXER FOR BIOGAS FERMENTERS

SERIES BG80



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1 EC DECLARATION OF CONFORMITY

IN CONFORMITY WITH THE DIRECTIVE 89/392 EC

We

DODA di Doda Aldo & c. s.n.c.

Via Contrargine sud, 3/5
46010 Canicossa (Mantova)

hereby declare under our own responsibility that the equipment, mentioned below,

MIXER SERIE BG

conforms to the requirements of the EC Directives 98/37/CE (replacing the previous one 89/392/CE) and 94/9/CE concerning equipment intended for use in potentially Explosive Atmospheres (ATEX).

HARMONISED STANDARDS

DIN EN 982
DIN EN 12100-1
DIN EN 50014
DIN EN 13463-1
DIN EN 1127-1
DIN EN 12100-2
DIN EN 50021

The mixer is designed for biomass homogenization, also in the presence of non-homogeneous matter, and as a consequence is suitable for the installation on Biogas fermenters , available with both wall and roof mounting frame .

The here enclosed Declaration of conformity is valid only if all instructions recommended with this manual are carefully followed.

The mixer marking includes the following labels:

EX II3GX CE

CANICOSSA (MANTOVA)

.....
(Name, signature, corresponding)

Notes concerning the declaration of conformity

The present declaration states that the machines are in conformity with the strict provisions of the European Directive 98/37 CE.
However, please take into account that even though the safety rules are carefully followed, the employment of each mixer implies certain risks.
Therefore, besides the general safety and accident prevention rules , we recommend that you should follow the safety instructions indicated in the present manual and the ones suggested by common sense.

2 SAFETY INSTRUCTIONS

2.1 Allowed employment

The BG80 mixer has to be employed only to homogenize biomass present in a digester or in fermentation tanks , such as slurry, non-homogeneous matter and other co-ferments.

With our mixer it is not allowed to mix the following substances:

- Mud obtained by clarification
- Solid bulky matters
- Bodies with sharp corners which could damage the mixer
- Medium mixed with foreign bodies (strings, ropes, plastic tapes, etc.….)

An employment different from that herewith indicated is not allowed.
Therefore the user as well as the mixer owner will be held responsible for any damage caused by an incorrect use.

For a correct employment:
- Follow the instructions of this manual;
- Respect the check and maintenance intervals indicated.

2.2 Safety rules

Follow the safety rules of the local authorities concerning Biogas plants, as well as the general safety provisions and the accident prevention regulations.

We recommend that any repair should be carried out either by an authorized mechanic assistance or by the manufacturer's technical assistance department.

In case, functioning defects arise due to the non-compliance with the hereby given use and maintenance instructions, the manufacturer could not be considered responsible.

2.3 Symbols used in this manual

Warning! Danger!
This sign warns you about a possible danger and suggests the most correct way you should behave in such situation.

Warning! Danger electricity!
This sign warns you about dangers that can cause damages to the mixers and to other present equipments as well as environmental degradation.

Warning! Flammable and explosive atmosphere!
The employment of the mixer in potentially explosive zones 0 and 1 can cause damages to things and injuries to persons with danger of death!

2.4 Stickers

The mixer is provided with the following stickers:

Read the instruction manual!

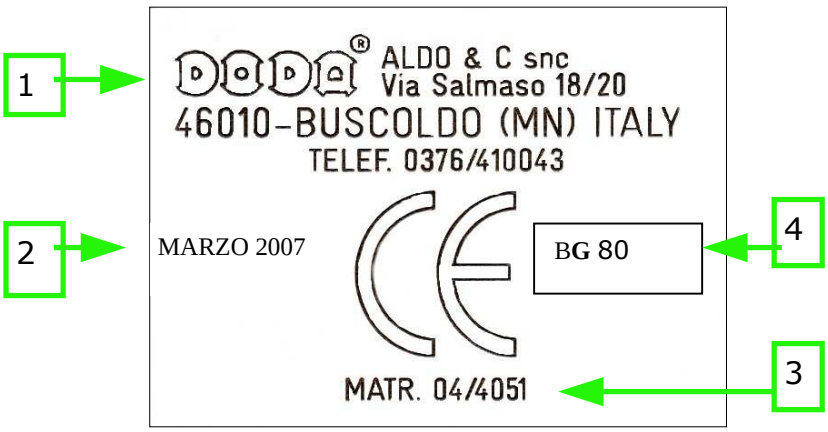
Warning! Danger!

Warning! Flammable and explosive atmosphere!

IMPORTANT: Before setting the machine in motion, fill it up with oil till the indicated level.

Fill up the machine with oil till the indicated level.
Check periodically the oil level.

This sticker reminds you to check the rotation direction of the electric motor before setting the machine in motion.



DATA PLATE INDICATING THE CONFORMITY WITH EC REGULATIONS:

1) NAME OF THE COMPANY
2) MONTH/YEAR OF PRODUCTION
3) SERIAL NUMBER
4) MACHINE TYPE

3 DESCRIPTION

The BG80 mixer is specifically designed for biogas fermentation tanks, characterized by an high dry matter content.

The mixer employment is aimed at preventing the development of settled and floating layers in the tank.

To ensure an excellent mixing efficiency, the BG80 mixer is provided with an hydraulic device for the regulation of the tilt angle of the propeller in the tank.

The medium and gas tightness of the digester is made sure by a strong expansion joint which is firmly fixed both on the mixer drive line and on the wall /or roof mounting plate, by means of a flange coupling.

The surfacing and the consequent emission of gas bubbles, which form in the fermented medium, are made easier by the vigorous and at the same time soft mixing of the bacteria.
That prevents an uncontrolled ferment "swelling".

The mixer functioning time can change according to needs. It is generally recommended that the motor rotation speed (r.p.m.) should be adjusted according to the type of substrate to be treated, by using an inverter. That can avoid the unnecessary functioning and optimize the electric power consumption.

During mainly the loading and starting phases, the user has to set the correct functioning time and the suitable motor rotation speed.
Usually we advise a starting phase with a high rotation speed which has to be gradually reduced during normal operating.
No white spots have to come up to the surface (sulphur deposition) and no substance has to deposit at the bottom of the tank.
Furthermore it is necessary to check the tank maximum level, above all in case of high silage or great manure quantity.
In case of an increase of the tank maximum level or of sulphur deposition, extend the mixer operating time and, if necessary, speed up the motor revolutions per minute.

The BG80 is standard provided with a 1600mm diameter 3 vane propeller and a strong vibration-resistant frame, suitable to support the gear box and designed for both roof or wall mounting.

4 FUNCTIONING

According to the requested installation, the mixer is provided with a roof or wall mounting frame.
Usually the mixer arm inclines towards the left with regards to the tank wall, but on request the mixer can be supplied with arm leaning towards the right.
The machine is equipped with a hydraulic device for the mixing propeller tilt regulation.

The propeller turns clockwise.
With full tank, the rotation direction is recognizable only through the thrust effect generated by the fluid present in the tank, which should move towards its middle.
The functioning of the mixer in the opposite direction to the recommended one could cause strong vibrations, as well as serious damages to both the mixer and the tank.

On account of the different composition of the substrate to be mixed, it is necessary to adjust the mixing propeller of immersion depth and to check that the propeller vanes are completely covered by fluid during mixing.
During functioning no vortex or splashes have to be noticed in the fermenting medium.

The mixer has to work always in a enough full tank and with the propeller vane covered at least 0,5m by the fluid; otherwise, a strong side vibration above all around the Motor-Drive line unit will be noticed, which could damage the mixer.

Even during normal operating the mixer could swing sideways. Anyway, if the vibration does not exceed 2 cm, that is not dangerous in consideration of the provided vibration-resistant frame. Besides, this vibration can be prevented by increasing the revolutions per minute by means of an inverter.

On the contrary, by too low rotation speed, strong side vibrations could occur, therefore if necessary raise the revolutions per minute in order to avoid possible damages to the mixer and the tank.

If, in spite of the compliance with the above-mentioned instructions, you do not obtain a satisfactory mixing performance (e.g. because of a large tank diameter o a high content of dry matter) , contact promptly the dealer or the manufacturer .

The dealer or the manufacture can not be considered responsible for damages due to incorrect employment of the mixer.

If the tank is filled with already fermented substrate coming from other Biogas containers, there could be material floating on the surface, due to a high dry matter content. That could also occur in case of a fault in the Biogas plant and the consequent unforeseen mixer stopping.

In case a great quantity of floating wastes is present, before starting the mixer, take the necessary steps, which of course have to be previously agreed with the dealer or the manufacturer of the machine.

Attention! The mixer drive line can be damaged by extreme side thrust caused by excess floating materials.
The propeller vane can undergo excessive stress which could affect negatively the tank stability.

5 TECHNICAL FEATURES

The data indicated refer to a standard supply.

The manufacturer reserves the right to introduce changes without prior notice.

1. All components touching the fluid , as well as all parts situated in the tank, are made of stainless steel.

2. Mixer drive shaft in oil bath.

3. Al Widia mechanical seal on the drive shaft

4. Control of the drive line lubrication oil level through a sight glass, set on the joining point between the drive line and the gearbox.

5. Strong Bonfiglioli gearbox (Type C 80 2 con P180), 80 propeller rotation speed r.p.m. , with 1450 r.p.m. motor, at 50 Hz.

6. Self-cleaning three vane propeller, fixed on the shaft by means of a rotor hub.

7. Hydraulic regulation of the mixing depth through a hand pump and connection pipings, standard supplied.

8. Roof or wall mounting frame.

5.1 Technical data

The data indicated refer to a standard supply.

The manufacturer reserves the right to introduce changes without prior notice.

Mixer type	**BG80 22kW**	**BG80 18,5kW**
Power /Motor type	22kW/4 poles	18,5kW/4 poles
Rated power	22 kW	18,5 kW
Rated voltage	400 V	400 V
Frequency	50 Hz	50 Hz
Revolutions per minute	1450 r.p.m.	1450 r.p.m.
Electric motor noise level	70dB	70dB
Voltage	43 Amp.	37 Amp.
Starting current cos φ	7	6,2
Power factor	0,85	0,84
Temperature probe	PTC 160°	PTC 160°
Substrate temperature	70°	70°
Gear ratio	18,1:1	18,1: 1
Propeller diameter	1600 mm	1500 mm
Drive line oil quantity	42 kg SAE80 – W90	42 kg SAE80 – W90
Gear box oil quantity	18 litres Shell Tivela (or equivalent)	18 litres Shell Tivela (or equivalent)
Hydraulic oil quantity for hand pump	3 litres Nuto 68 (or equivalent)	3 litres Nuto 68 (or equivalent)
Total weight	960 kg	950 kg

6 INSTALLATION

6.1 Mounting instructions

The biogas mixer can be supplied with roof or wall mounting frame.
The different installation types have been specially designed to suit the different tank and digester manufacturing features, as well as the different biogas plant locations and working conditions.

To obtain an optimal mixing besides the suitable homogenization of the fermented substrate, the technical design department or the dealer or the manufacturer have to check the correct positioning of the mixer.
The location choice has to take into account that lift trucks have to access easily to that area.

Before installing the mixer, ask for the written authorisation of the person in charge with the wall static calculations.

Doda is not responsible for possible tank damages caused by an unsuitable installation or use of the mixer.

Explosion danger due to a thunderbolt!
Arrange for a lightning protection system.

Explosion danger due to the Absence of a main equipotential bonding!
The grounding connection has to be executed only by a skilled electrician.

6.1.1 Mixer with roof mounting

To install the mixer, make a hole of 1300 x 1300 mm in the roof. Usually we recommend to place the mixer at least 4-5 m far from the raw material input area, so that the propeller radius of action could generate an uniform homogenization of the solid matters introduced.
The mixer position has to fit any other mixers already present.
The mixer thrust effect has not to be altered.

To ensure the correct mixer functioning, we recommend that it should be installed at least 1 meter far from the roof edge, so that the propeller can work also with fermented substrates characterized by a high dry substance content.

 During the design and the carrying out of the hole in the roof, remove the insulating material (if present).

A resistant sealing between the mounting frame and the concrete surface is ensured only if the surfaces surrounding the installation plate are polished and even.

Danger of explosion due to biogas emissions!
To ensure the mixer frame sealing, the tank cover has to be even enough, i.e. it has not to have hollows or unevenness!
Check the correct grounding connection of the mixer!

6.1.2 Mixer with wall mounting

To install the mixer, make a hole of 1300 x 1300 mm in the wall.
It has to be installed at a such height, so that the distance between the upper corner of the wall opening and the higher corner of the tank wall is 0,5m.
Usually we recommend to place the mixer at least 4-5m far from the raw material input area, so that the propeller radius of action could generate an uniform homogenization of the solid matters introduced.
The mixer position has to fit any other mixers already present.
The mixer thurst effect has not to be altered.
The standard provided mounting frame has a 30° tilt to the left, in order that the flow of the mixed product turns in a clockwise direction.
Normally the vortex generated by the mixing vanes makes the rotary motion of the mixed product easier.

During the design and the carrying out of the hole in the wall, take into account that from the external side of the tank there has to be room enough for the manoeuvres necessary for mixer installation and dismantling.
Furthermore take into account the suitable distance between other possible tanks or equipments.

A resistant sealing between the mounting frame and the concrete surface is ensured only if the surfaces surrounding the installation plate are polished and even.
Remove the insulating material situated on the tank outside side (if present).
In case of unevenness around the tank hole, remove it.

Remove or repair any tank wall defects, which could come out of its dismantling, according to the laws in force concerning building.
An incorrect fixing of the mixer and the consequent vibrations due to mixing could both damage the mixer and cause the leak of fermented substrate as well as environmental damages.
Therefore, in case of doubts, we suggest that an expert should check possible faults to be improved. All that carried out has to documented and attached with photos.

Danger of explosion due to biogas emissions!
To ensure the mixer frame sealing, the tank cover has to be even enough, i.e. it has not to have hollows or unevenness!
Check the correct grounding connection of the mixer!

Near the mixer there have to be no trees, equipments or anything that could endanger its correct functioning.
In case the mixer weight is excessive with regards to the tank wall bearing capacity, the mounting frame can move away from the fixing systems.
The accidental leak of product from the tank can cause environmental damages.

The entry of any motor vehicle to the digester area without authorization is strictly forbidden.

Danger of explosion due to biogas emissions!
To know at which distance the motor vehicles have to stay from the potentially explosive atmospheres, consult the regional government safety rules in force concerning biogas plants.

6.2 Mixer mounting and installation

6.2.1 General instructions

The electric motors installed on our mixers are suitable for an outside installation, therefore humidity and dirt resistant, according to their IP55 protection degree.
Anyway, for a correct motor and gearbox operating, the outside temperature has not to be lower than –10°C and higher than +40°C.
A correct motor ventilation has to ensured.
Prevent suction and discharge openings from blocking up and clogging due to rough dust.

Follow the safety rules of the local authorities concerning Biogas plants, as well as the general safety provisions and the accident prevention regulations.
Hazard of injuries in case of not correctly fixed parts!

Instruction for mixer transport and installation

Attention! Transport the mixer only with suitable motor vehicles.
The loading and unloading of the machine can be carried out by means of:
- a lift truck (fig.1) or
- a hoisting crane (fig.2).

N.B.: the carrying capacity of the sling has to be seven times as much as the machine total weight (if it is made of a textile fibre).

WARNING! Never lift the machine by catching on the weakest parts of the structure (delivery pipes, etc...) or on moving parts, but use the lifting points foreseen on the machine (fig.3)!

Before lifting the machine, check if it is well-balanced.
Never move abruptly or bump the stainless steel parts with the forks of the lift truck.

Stopping under a hanging load during mixer lifting, transport or unloading, is strictly forbidden!

Never leave any hanging load unattended!

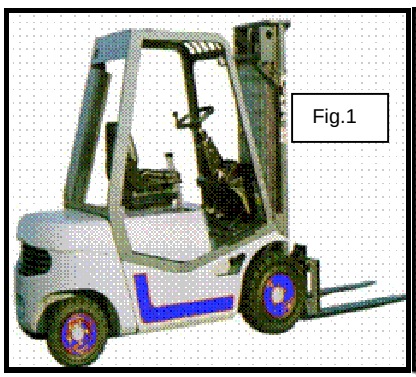


Fig.1

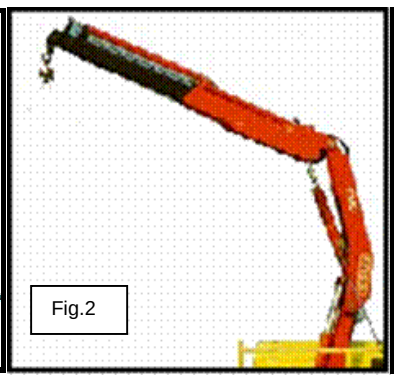


Fig.2

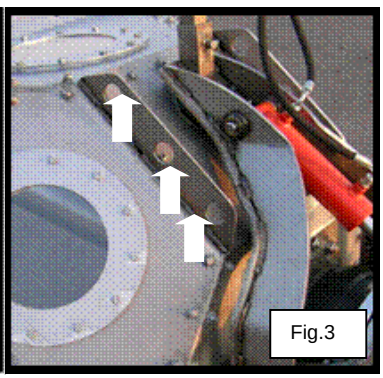


Fig.3

Warning! Flammable and explosive atmosphere!
No mounting or installing operations have to be carried out for any reason in potentially explosive atmosphere!

The mixer can be installed and employed only in the allowed zones!

As concerns the position of the dangerous zones, refer to the Classification of the potentially explosive zones which the user and the designer have to follow strictly!
Notify any change made in potentially explosive areas influenced by the mixer and check if the new arrangement complies with the rules in force.

Hazard of injuries because of the fall of mixer components!
Wear accident prevention shoes and safety helmet!

Hazard of injuries due to mixer components with sharp edges!
Wear gloves!
Both during working and inspection phases, wear always proper clothing (overalls, gloves, helmet, accident prevention shoes, fastened clothes, etc...).

If necessary use safety equipment (safety belt, sling, gas detector, oxygen mask, etc..)

In case mounting and installation in a potentially explosive atmospheres, before starting, apply for the necessary authorization to the person in charge with it, who has to provide you with the corresponding manuals and ask you to fill the necessary forms in compliance with laws.

Employ the machine in a well-lit place.

Since the gases released by liquid manure are poisonous, check that:
- the work area is enough ventilated;
- the machine is not employed close to flames.

Never inspect the slurry pit alone!
If you loose your balance or if you feel faint due to fumes, ask for help immediately!

Only adults can use the machine and absolutely in a place not accessible to children.

Before any operation, check the stability of the whole working unit (machine and tractor).

Do not carry out any repair, adjustment or maintenance operations if the unit is working or supplied.

Cover the tank if you have not to work in it.

We recommend that the machine should be employed with all protections properly positioned, according to the instructions mentioned in the previous paragraphs, in order to avoid any contact with moving parts.
Do not damage or remove these protections.

During operating, maintenance or adjustment, the rubber parts of the machine (gaskets, etc...) have not to come into contact with oil, grease or oil derivatives.

In case you do not use the machine for long time, keep it in a dry place and protected against bad weather.

6.2.2 Mixer with roof mounting

Before mounting the mixer, check the dimensions of the hole made in the roof. Remove any possible impurities present on the surface where you have to install it.
Check the flatness of the mounting and sealing surface and take the necessary improvements.

We recommend that you should use a suitable sealant between the mounting frame and the foreseen installation surface.

To make the 12mm holes, use a drill plate. Before executing the first hole, line the plate with the roof opening, so that the mixer could be correctly fixed with the anchor bolts.

In order not to move the drill plate, set the first fixing anchor bolt immediately after the first hole has been made and press the plate firmly on the tank roof. Then you can go on with all other holes.
To make the fixing operations easier, all other anchor bolts can be set after the mounting frame installation.

In order to insert the anchor bolts easily and in the best way, clean the holes made with compressed air and remove dust present on the hermetic surfaces.

Attention! Follow the installation instructions of the fixing anchor bolts!

Put anti-seize grease on the bolt threads, to prevent the anchor bolts from locking before reaching the torque.

After having built the mixer into the roof, tighten the anchor bolts.

Check the bolt tightening after a few days.

6.2.3 Mixer with wall mounting

Before mounting the mixer, check the dimensions of the hole made in the wall, as well as the correct mixer positioning.

Any changes have to be promptly agreed with the manufacturer absolutely before the mounting.

Remove any possible impurities or insulating material present on the surface where you have to install it.

Check the flatness of the mounting and sealing surface and take the necessary improvements.

We recommend that you should use a suitable sealant between the mounting frame and the foreseen installation surface.

To make the 12mm holes, use a drill plate. Before fixing the drill plate, make a hole.

Attention! Follow the instruction for anchor bolt fixing.

After having fixed the first bolt, position the mounting frame on the tank wall by means of a forklift truck.
Before making the left over holes, check again the exact positioning of the mixer.

For further mounting operations, follow the instructions given in paragraph *6.2. 1 General instructions*.

6.3 Electric connection

Our mixer is standard supplied without electric switchboard.

The motor starting has not to be direct but progressive (i.e. provided with soft starter, inverter, etc..), so that the mixer reaches the nominal rotation speed in about 3-5 sec.
Avoid any sharp starting or stopping!
We recommend the use of an inverter!

Warning! Danger electricity!

The electric connection has to be carried out only by skilled workers and in a place protected agains atmospheric precipitations, following the the directives in laws concerning safety and accident prevention provisions.

Furthermore follow scrupulously the precise pertaining indications concerning electric connections (i.e. cable section, safety rules, connection of a protection conductor, etc.).

Use only components in compliance with the regulations!

In potentially explosive atmospheres it is allowed to carry out electric connections only if authorized!

Danger of explosion due to biogas emissions!
Check if the electric cables are correctly connected and protected!

The cable has to be long enough so that the mixer could tilt without problems!
Risk of crushing!
Do not place any electric cable near the hydraulic device and rotating parts!

Prevent the cable from:
- getting entangled!
- hanging down!
- being damaged!
- loosing or falling!

Protect the motor against excessive overheating by means of a suitable device: e.g. circuit breaker with a phase failure protection.

The motor is equipped with thermistors, so that an additional thermal protection of the machine could be used. (TMS / Thermal management system)

Attention! In case of an installation in compliance with ElexV regulations, employ only TMS trip device (trip device for cold conductors).

The PTC thermistors/probes have a maximum measurement and testing equal to 2,5 V.
Install counters to set the functioning interval.

The supplied motors are protected against dust and water splashes, according to their protection degree.
In case of ice or snow, take all necessary safety steps.

The motor supply line has to be carried out in conformity with the data indicated in the connection box, situated on the motor lower part, and with those indicated on the control panel.

6.3.1 Setting of the mixer operating interval

Hazard of damages to the mixer and injuries to persons in case of employment in the opposite rotation direction to that indicated!

The operating interval has to be programmed on the control panel of the Biogas plant!

The optimal operating period and pause depends on the manufacturing characteristics, as well as on the working conditions and the fluid to be treated.

Only authorized workers have to program the control panel of the Biogas plant.

As indicative value, at the beginning the mixer can be programmed as follows:
- mixing time about 2-5 minutes and
- 20 minute pause.

In case of unsatisfactory mixing it is necessary to extend the operating time and decrease the pause length.
A continous functioning is also allowed.

7 SETTING IN MOTION

7.1 Check at the first setting in motion

Check the motor rotation direction: the motor has to turn **clockwise** as indicated by the arrow on the motor.
Start the motor for any seconds to check if the motor cooling fan turn rightwards.

The mixing propeller has to turn clockwise as well.

If the propeller is not clearly visible, it is necessary to check the rotation direction of the mixing propeller of the activation motor.

Hazard of damages to the mixer and injuries to persons in case of employment in the opposite rotation direction to that indicated!

According to the electric polarization of the 400V connection, the motor rotation could be wrong!

Check if the mixer is correctly fixed on the foreseen installation surface.

Check if all bolts set on the mixer are correctly fastened.

Both moving parts of the hydraulic direction adjusting device and the bearing bushes of the fixing bolts have to be lubricated.

Set the unit in motion only after having checked the oil level in the drive line, in the gearbox and in the hand pump for the hydraulic regulation.

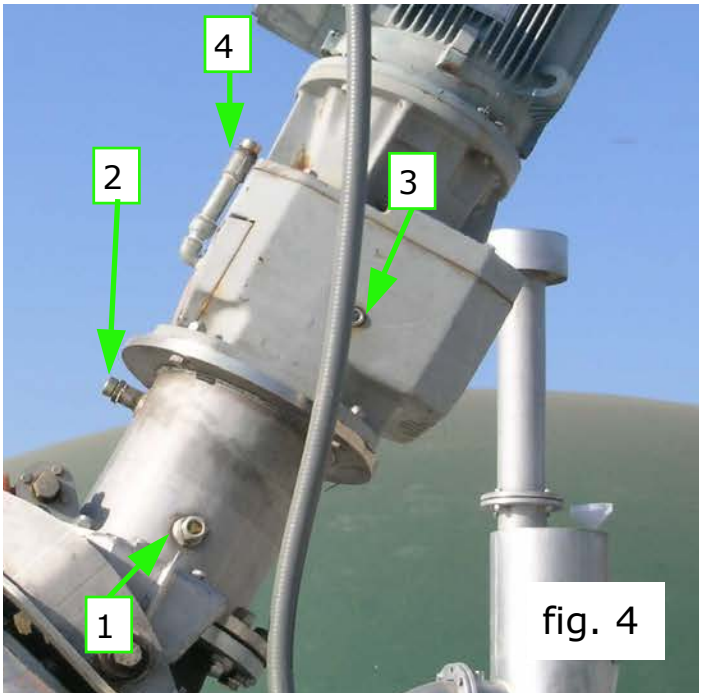
The correct oil quantity is the following:

- 18 litres of Shell Tivela oil (or equivalent) for the gearbox;
- 42 litres of SAE80 – W90 for the drive line;
- 3 litres of Nuto 68 oil (or equivalent) for the hand pump.

In order to check oil, act as follows:

- unscrew inlet and vent caps;
- After having filled the machine up with oil, wait at least 3 hours before setting the unit in motion.
- Screw caps again.
- Check oil level periodically: it has never to be beyond the indicated level.

N.B. During filling up and check, the drive pipe, has to be as vertical as possible.



1) Drive line oil level
2) Drive line oil vent/ inlet
3) Gearbox oil level
4) Gearbox oil vent/level

7.2 Checks before each setting in motion/ daily checkings

Each time you set the unit in motion, check if the network or better the supply line complies with the regulations in law.

Compare the voltage indicated on the motor plate with that supplied by the network.

Check and lubricate periodically all the moving parts(about each 50 operating hours). Remove old and spent lubricant.

Danger of explosion due to biogas emissions!
Check *daily* if the rubber parts of the expansion joint are damaged or torn.

Hazard of damages to the mixer or injuries to persons!
Check *daily* the stability of the fixing bolts put on the direction adjusting device and on the hydraulic jack.
Check if they are damaged or torn.
In case of damages or unsuitable fixing, the mixer has to be stopped immediately to remove the failure found out.

All bolts and nuts have to be fixed firmly as indicated in the table in *Chapter 8* and then *daily* checked. All corresponding operations have to be documented.

7.3 Mixer Functioning

Hazard of damages to the mixer and injuries to persons
Follow the instructions indicated in *Chapter 2.*

For a correct installation of the propeller, take into account the mixer tilt!

Danger of explosion! Due to the overheating of the intermediate and lower bearings, caused by non-lubrication.
Check always the correct oil level in the drive line.

Danger of explosion!
From the digester or the fermented product tank , explosive or flammable gases can come out!
Smoking or using flame or any other flammable substance is strictly forbidden!

Hazard of damages to the mixer!
Check that nothing could block the propeller!
The propeller has to be enough covered by the product to be mixed!
During the mixing, pay attention to possible unusual noises! (which can be caused by the non-lubrification, loosened parts, failures regarding the motors, gearbox, bearing or drive shaft, etc…)
Keep the mixer always free from snow or ice!

Hazard of damages to the mixer!
The presence of foreign bodies such as strings, ropes, plastic tapes can unbalance the mixing propeller, which consequently can damage the bearings as well as the whole unit.
These foreign bodies can also damage the mechanical seal.
Rarely, and only in case of fixed installation of the equipment, the material can be corroded.
Anyway these phenomena are mainly due to stray currents (i.e. potential displacement, faulty grounding connection) or electrochemical reactions (high acidification of co-ferment or of biowaste, usually at a temperature higher than +45°C).

8 MAINTENANCE PROGRAM

Check all bold and nut set on the mixer, the frame and all other components after the first 2 working hours and then after 100 operating hours (at the latest after 1 working month).

Control the fixing anchor bolts on the mixer mounting frame and if necessary tighten them further on!

SCREW TORQUE in Nm						
Bolt	M8	M10	M12	M16	M20	M24
Class A2/ A4-70	16	32	56	135	280	450
8.8 grade galvanized Class A2/ A4 - 80	20	41	70	170	330	570
Anchor bolt M12-15/110 A4	50					

Condensate forming in the motor terminal board!
Condensate can form in the terminal board of the flameproof electric motors. For this reason, we suggest that at regular intervals (at least once a year) you should stop the mixer and remove the condensing water with a suitable absorbent cloth.
Before carrying out the above mentioned operations, read carefully the instructions in *paragraph 8.2.*

8.1 Maintenance depending on wear level

All moving parts are subjected to wear, whose level depends on working time, operating conditions and on the shocks they undergo.

The drive line oil has to be changed, the first time, after the first 200 operating hours and then each 2000 working hours (at least every 2 years).
Remove the old oil , possibly still warm, only when the machine and the gearbox are not working.
To fill the machine up with oil: 18 litres of Shell Tivela oil (or equivalent) are needed.

Both the mechanical seal as well as the drive shaft bearing have to be replaced each 20.000 operating hours.

The average service life of the expansion joint rubber part is about 8 years.

8.2 Current maintenance

The propeller waste depends on the working time and on the qualiity of the product to be mixed.
If the power absorption is clearly lower than the highest nominal charge, you have to replace the worn-out propeller, as well as the self-locking M30 fixing bolts.
During the replacement, check if the installation surfaces are clean.

All maintenance operations carried out have to wholly documented (see the documentation concerning the maintenance and repair operations).

Before maintenance, disconnect the ON/OFF main switch and make sure it can not be connected again accidentally.
Affix a danger signal!

Follow scrupulously the safety rules indicated in *Chapter 2* and the instructions concerning mixer installation in *Chapter 6.*

Danger of explosion!
During repair or maintenance, lower the tank filling level according to needs.
(above all in case of maintenance to a wall mounting mixer).

Warning! In potentially explosive atmospheres, **it is strictly forbidden to:**

- carry out any repair, maintenance operations, i.e. any work that can generate flames or sparks.
- Bring any flammable source (es. Free flames, thermal sources, not flameproof equipments, etc..)

Employ **absolutely ONLY NON-SPARKING TOOLS** (that is valid also for drills, hollow drill bits, chisels, etc….)

Before carrying out any operation, apply for the authorization of the person in charge with safety and fill correctly the permission request form to operate in potentially explosive atmospheres, which has to be duly signed by the person responsible.

AUTHORIZATION TO OPERATE IN POTENTIALLY EXPLOSIVE ATMOSPHERES

Fill in only the parts that concern you. Delete the parts that don't concern you.

Authorization to carry out welding, drilling, polishing, hammering and chiselling, and any other operation which can generate flames or sparks.
This document is necessary also in case of employment of not flameproof equipments.

A.
1. Customer…………………………Building site address …………………………………..…………………………………….
Tel. ……………………………….Person in charge with safety……….. ………………………………………………………………….
2. Location and work type …….
…….

3. Permit from …..….. to ……..….. (hours) for the period of time ……………………………………………

4. For workshop / company …………………… ………………………………Address …………………………………….
Person in charge with safety ………………..…………………………………………………………………………………..

B. Dangerous areas in the surroundings

In the working place, in the buildings, of the equipments, etc.	Person in charge	Building site address	Telephone
1			
2			
3			
4			

C. Necessary safety measures ……………………… taken by ……………………..

□ 1 Checking of the pipe and equipment seal used
□ 2 Fire protections and other safety measures
□ a. Water supply and extinguisher to put out the fire
□ b. Fire hose
□ c. Block off the area.

□ Workers □ Employees □ Supervisors □ Firemen
□ d. Remove flammable matters, possible steam, gas or dust
□ e.
□ f.

3. Signals (road, track plant, etc)
□ a. with red flags (20 m on both sides of the work site)
□ b. by means of signs
□ c. barriers for tracked vehicle, detours for tankers, etc…

4. Protection against welding sparks
□ a. Covering of close pipings
□ b. Use of protective walls, a protection for the covering surface (if necessary keep it wet)
□ c. Work Interruption in case of trains traffic
□ d. Keeping a minimum distance of …….. from tank trucks, tanks etc. at the hazard of fire
□ e. Covering of grids, channel pits and lighting
□ f. …….

5. Works to be carried out inside or close to tanks, equipments, pits, pipes, dismantled plant components, in narrow rooms etc. Further precautions.

□ a. Transit permit……No.……..dtd……
□ b. Work permit…….. No.……..dtd……..……
□ c. Safety documentation for electric systems……..No……dtd……
□ d……

6.

□ a. Daily notification of work beginning in case of B1, 2, 3,4 ……
□ b. Daily notification of work end in case of B1, 2, 3, 4 ……..

7.

□ a. Control of the safety measures marked by (name) ……..
□ b. Check of the building site at the work end by (name)……. ……..

D Agreement about responsibility concerning dangerous areas

Work beginning notification…….dtd…….by……..
For B1 safety measure C point ……..
For B2 safety measure C point ……..
For B3 safety measure C point ……..
For B4 safety measure C point ……..

Permit issued on …… …….

Date Company Director Signature

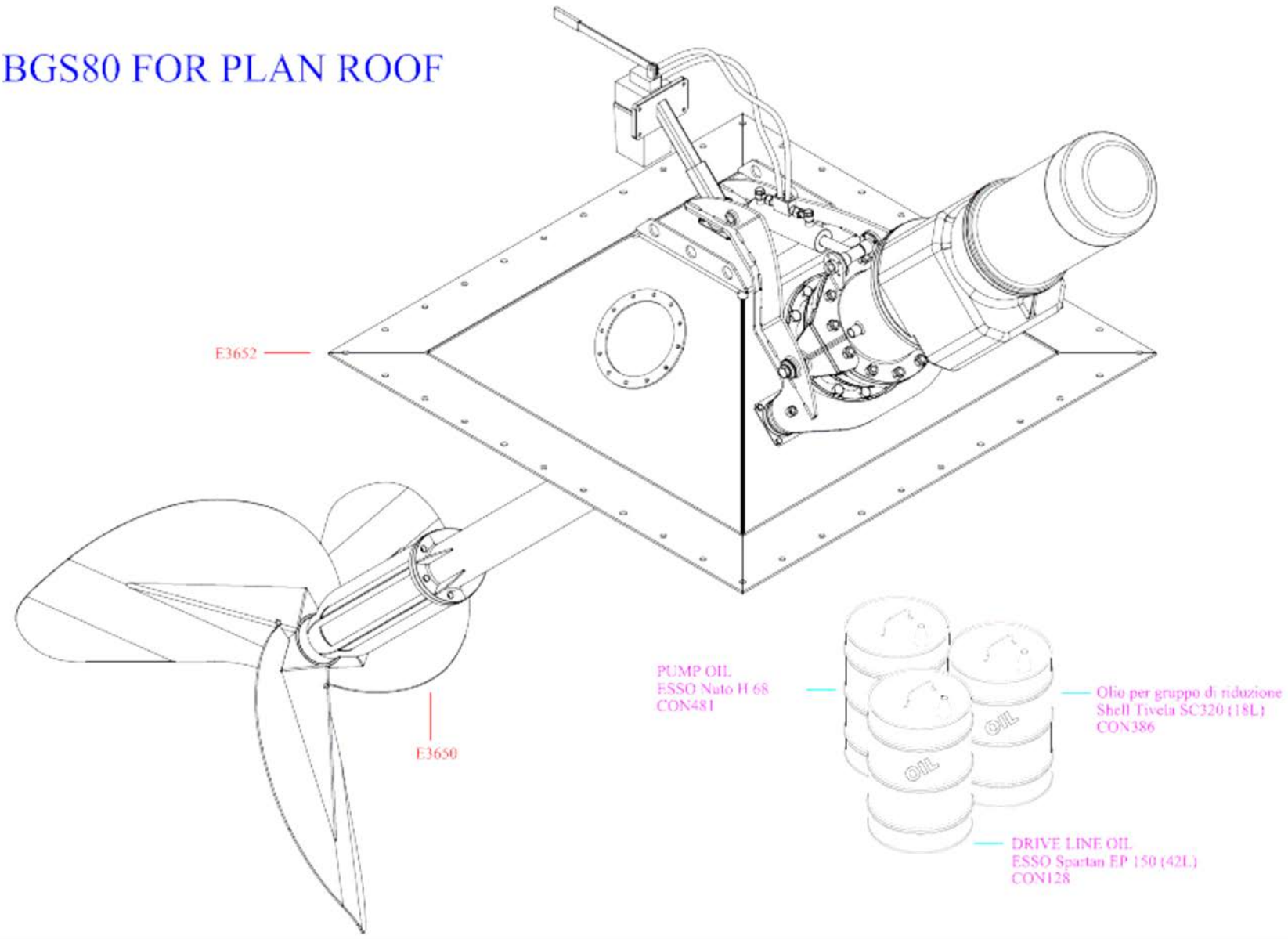
DOCUMENTATION ABOUT REPAIR AND MAINTENANCE

HOUR	ORA	WORK CARRIED OUT	SIGNATURE OR STAMP OF THE PERSON IN CHARGE WITH WORK DONE

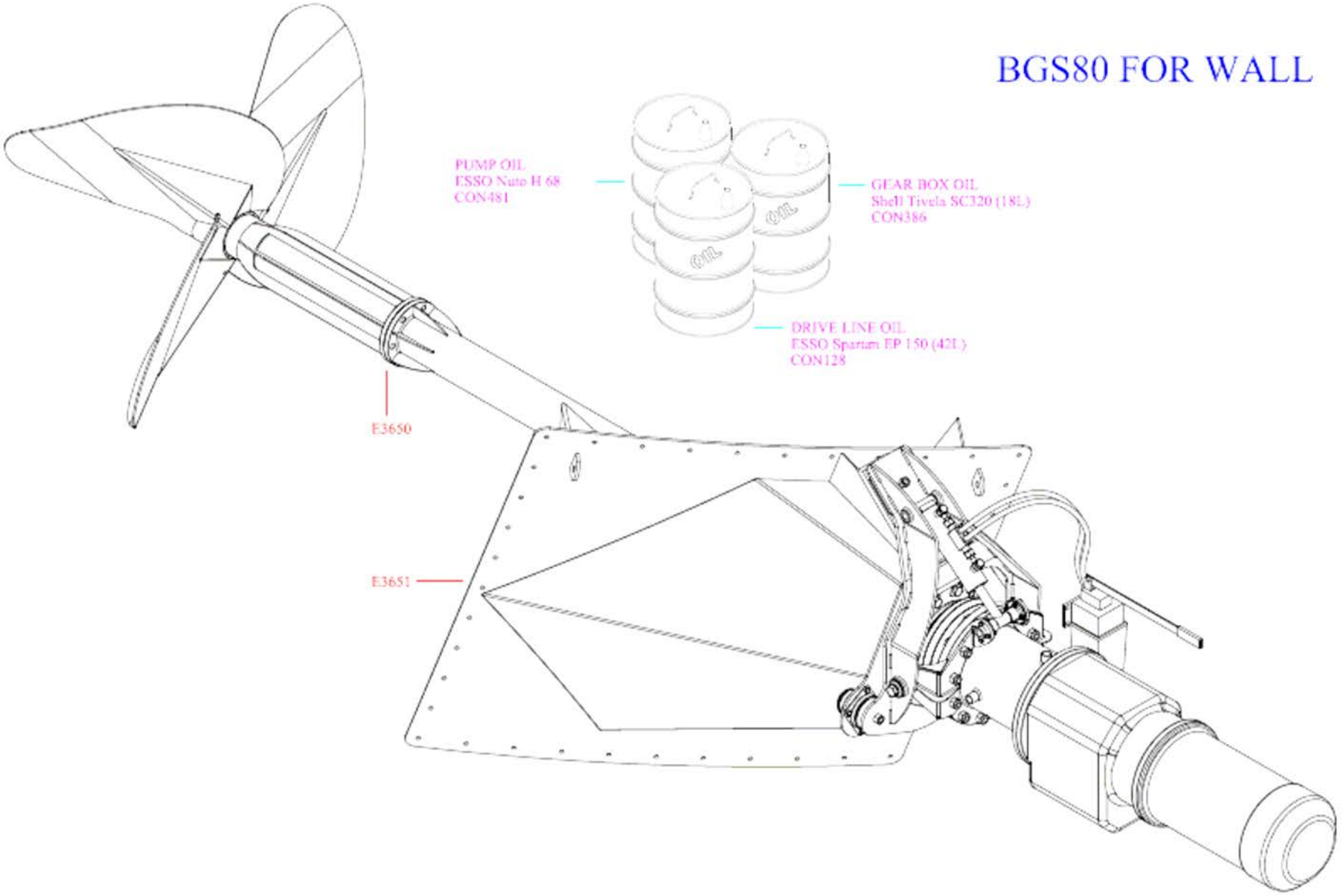
DOCUMENTATION ABOUT REPAIR AND MAINTENANCE

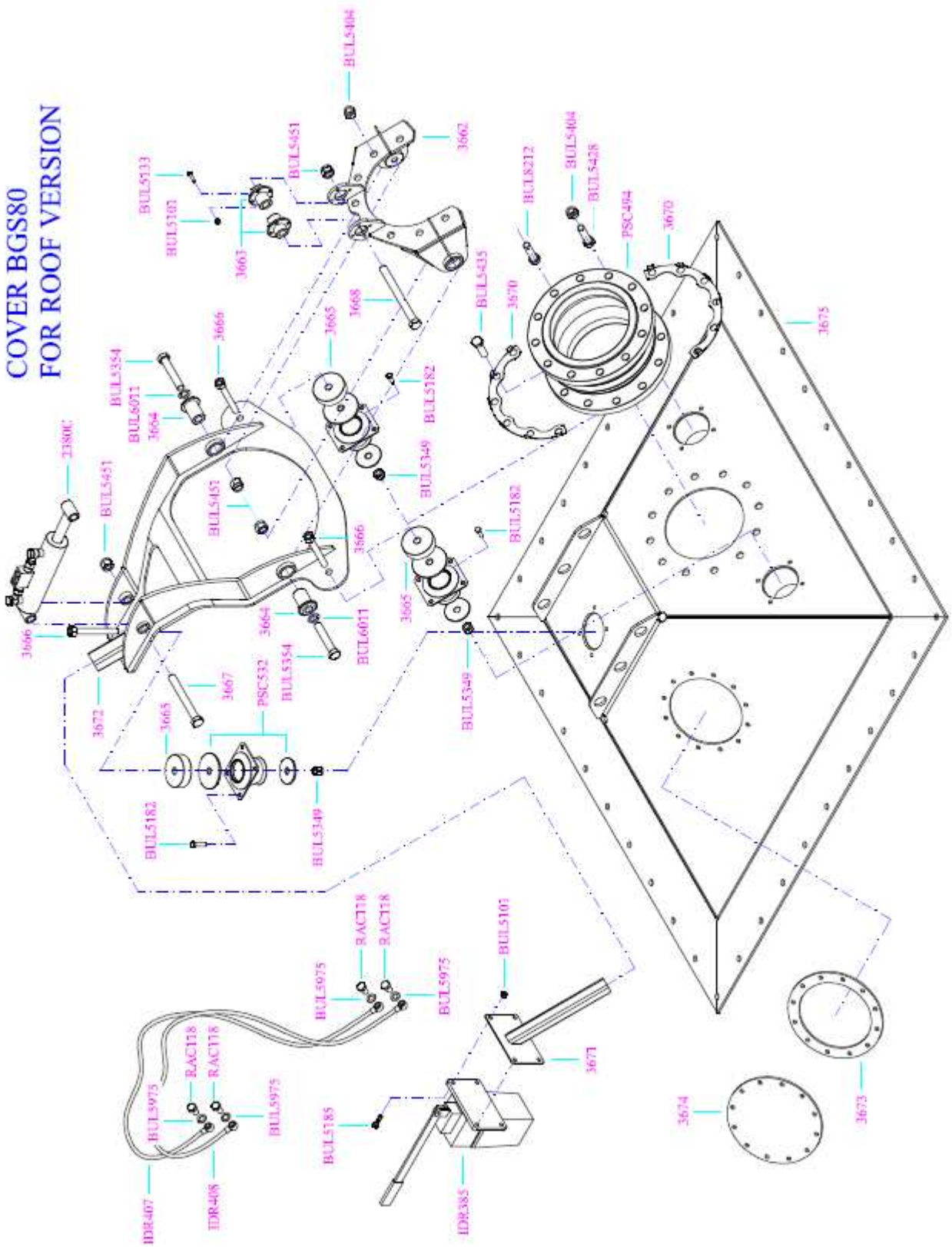
DATE	HOUR	WORK CARRIED OUT	SIGNATURE OR STAMP OF THE PERSON IN CHARGE WITH WORK DONE

BGS80 FOR PLAN ROOF



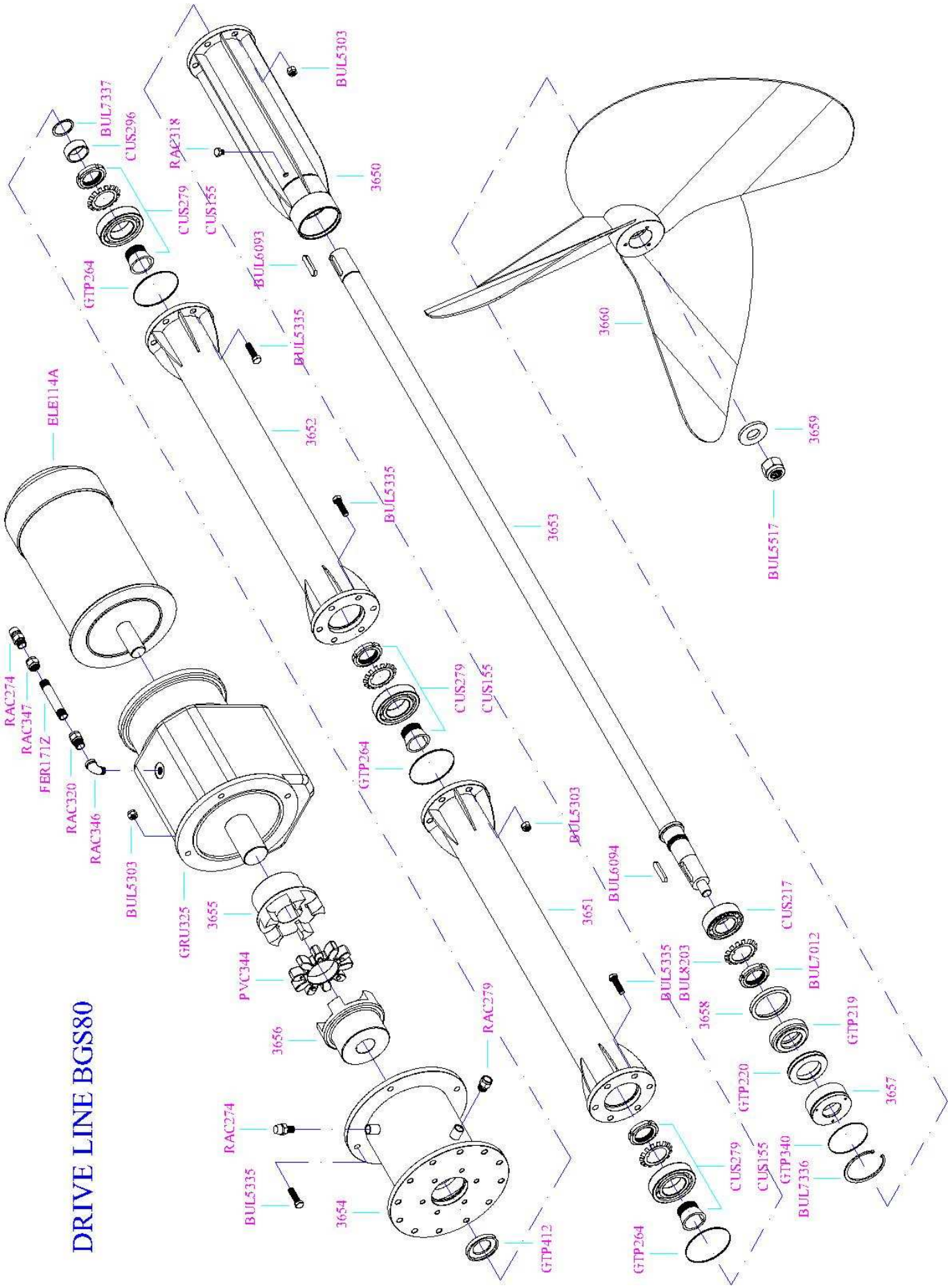
BGS80 FOR WALL




COVER BGS80
FOR ROOF VERSION
BUL5404
3662
BUL5451
BUL5133
BUL5107
3661
BUL8212
BUL5404
BUL5428
PSC494
3670
3668
BUL5435
3670
3675
3666
3665
BUL5354
BUL6011
3664
BUL5182
BUL5349
2380C
BUL5451
BUL5451
3666
3665
BUL5182
3666
3664
BUL6011
BUL5354
PSC532
3667
3672
3665
BUL5349
BUL5182
BUL5349
RAC118
RAC118
BUL5975
BUL5975
BUL5107
BUL5975
RAC118
RAC118
BUL5975
3671
BUL5185
3674
3673
IDR407
IDR408
IDR385

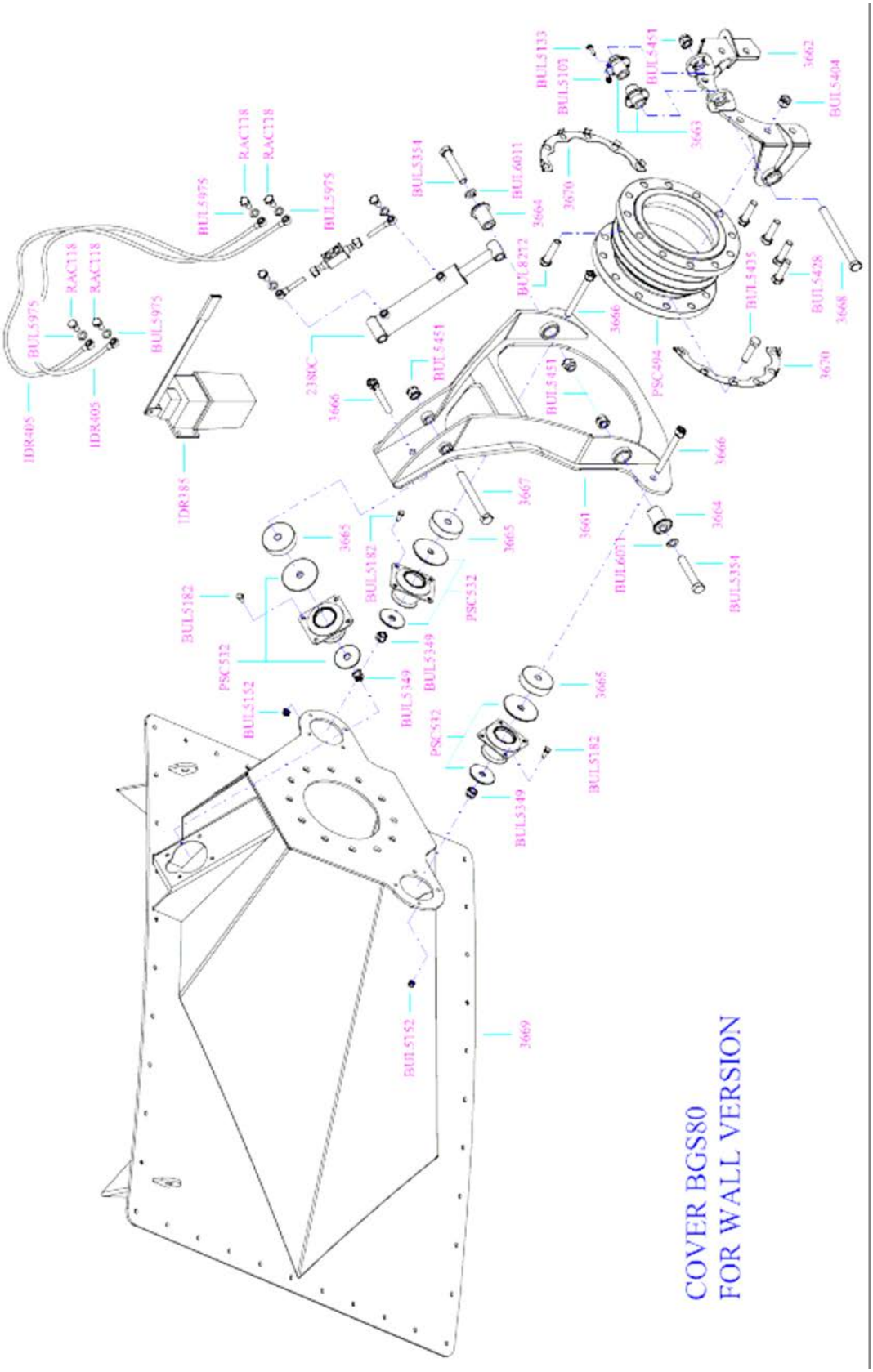
ENGLISH PART DESCRIPTION

U.M.	Quantità	Codice	Descrizione
NR	1,00	E3652	EXPLODED VIEW OF THE BG80 MOUNTING PLATE ON TANK ROOF
NR	1,00	2380C	HYDRAULIC JACK 60/30X150 WITH VALVE
NR	1,00	3662X	DRIVE LINE FORK
NR	2,00	3663X	S.S. REMOVABLE BUSH
NR	2,00	3664X	S.S. FORK PIN
NR	3,00	3665	SPACER
NR	3,00	3666X	S.S. FIXING BOLT
NR	1,00	3667X	S.S. FIXING BOLT
NR	1,00	3668X	S.S. FIXING BOLT
NR	2,00	3670X	S.S. RETAINER
NR	1,00	3671X	S.S. HANDPUMP BRACKET
NR	1,00	3672X	S.S. HOLDER
NR	2,00	3673X	S.S. FLANGE 300/230 MM DIAM.
NR	2,00	3674X	BLIND S.S. FLANGE 300MM DIAM.
NR	1,00	3675X	ROOF MOUNTING S.S. PLATE
NR	8,00	BUL5101	S.S. SELF-LOCKING NUT M8
NR	4,00	BUL5133	S.S. BOLT M8X30 UNI5739
NR	12,00	BUL5182	S.S. BOLT M10X30 UNI5739
NR	4,00	BUL5185	S.S. BOLT M10X45 UNI5739
NR	3,00	BUL5349	S.S. SELF-LOCKING NUT UNI7473
NR	2,00	BUL5354	S.S. BOLT M22X120 UNI5737
NR	14,00	BUL5404	S.S. SELF-LOCKING NUT M20 UNI7473
NR	8,00	BUL5428	S.S. BOLT M20X80 UNI5739
NR	12,00	BUL5435	S.S. BOLT M20X60 UNI5739
NR	4,00	BUL5436	S.S. BOLT M20X70 UNI5739
NR	4,00	BUL5451	S.S. SELF-LOCKING NUT M22 UNI7473
NR	4,00	BUL5975	COPPER WASHER 3/8" D.17X23 1,5MM THICK
NR	2,00	BUL6011	S.S. BUSH M2 UNI1751
NR	1,00	IDR385	HYDRAULIC HAND PUMP PMI25-2
NR	1,00	IDR407	700MM 1/4" HYDRAULIC HOSE WITH 90° ELBOW 3/8" FEMALE BOTH ENDS
NR	1,00	IDR408	850MM 1/4" HYDRAULIC HOSE WITH 90° ELBOW 3/8" FEMALE BOTH ENDS
NR	1,00	PSC494	RUBBER EXPANSION JOINT DN250 PN10
NR	3,00	PSC532	GLV SHOCK ABSORBER
NR	4,00	RAC118	DRILL SCREW MALE 3/8"


DRIVE LINE BGS80
ELE114A
RAC274
RAC347
FER171Z
RAC320
RAC346
BUL5303
GRU325
3655
PVC344
3656
RAC274
BUL5335
3654
RAC279
GTP412
3652
BUL5335
GTP264
CUS279
CUS155
3651
BUL6094
BUL5335
BUL8203
3658
GTP264
CUS279
CUS155
GTP340
BUL7336
3657
GTP220
GTP219
BUL7012
CUS217
3653
BUL5303
3650
RAC318
CUS279
CUS155
BUL6093
GTP264
BUL5335
BUL7337
CUS296
3660
3659
BUL5517

ENGLISH PART DESCRIPTION

U.M.	Quantità	Codice	Descrizione
NR	1,00	E3650	EXPLODED VIEW OF THE STAINLESS STEEL DRIVE LINE OF BG80 MIXER WITH 22KW ELECTRIC MOTOR **********
NR	1,00	3650X	742MM S.S. DRIVE PIPE PROP. SIDE
NR	1,00	3651X	1250MM S.S. CENTRAL DRIVE PIPE
NR	1,00	3652X	1250MM S.S DRIVE PIPE ON MOTOR SIDE
NR	1,00	3653	3573MM DRIVE SHAFT
NR	1,00	3654X	STAINLESS STEEL ADAPTER HOLDER
NR	1,00	3655	ROTOR HUB GRMS 90/100A 80MM DIAM.
NR	1,00	3656	ROTOR HUB GRMS 90/100A 60 MM DIAM.
NR	1,00	3657X	MECHANICAL SEAL S.S. COVER 60MM DIAM.
NR	1,00	3658	BEARING SPACER
NR	1,00	3659X	PROPELLER WASHER
NR	1,00	3660X	3 VANE S.S. PROPELLER 1600MM DIAM.
NR	16,00	BUL5303	S.S. SELF-LOCKING NUT M16 UNI7473
NR	6,00	BUL5332	S.S. BOLT M16X40 UNI5739
NR	16,00	BUL5335	S.S. SCREW M16X60 UNI5739
NR	1,00	BUL5517	SELF-LOCKING BOLT A2 M30X2 UNI7473
NR	1,00	BUL6093	KEY C45K 18X11X80 UNI6604
NR	1,00	BUL6094	KEY C45K 16X10X80 UNI6604
NR	1,00	BUL7012	GLV RING M65X2 KM13
NR	1,00	BUL7336	SEEGER RING J 130 UNI73437 INOX 304
NR	1,00	BUL7337	SEEGER RING AS 60X3 UNI7436- 75
NR	1,00	BUL8203	SAFETY WASHER MB13-65
NR	3,00	CUS155	BUSH H 313 SKF
NR	1,00	CUS217	BEARING 3213A SKF
NR	3,00	CUS279	BEARING 2213 EKTN9 C3 SKF
NR	1,00	CUS296	BUSH IR 60X70X28 SKF
NR	1,00	ELE114A	FLAMEPROOF 22KW 4 POLE ELECTRIC MOTOR 50HZ VOLT 380/660
NR	1,00	FER171Z	3/4" MALE/MALE NIPPLE
NR	1,00	GRU325	GEARBOX C802F15, 1P1808B5
NR	1,00	GTP219	ROTATING MECHANICAL SEAL 60MM DIAM.
NR	1,00	GTP220	STATIC MECHANICAL SEAL 60MM DIAM.
NR	3,00	GTP264	O RING 247 GB4462 DIAM. 117, 07MM DIAM. 3,53MM THICK
NR	1,00	GTP340	O RING GB4487 123,42MM DIAM. 3,53MM THICK
NR	1,00	GTP412	OIL SEAL 70.110.12 NBR
NR	1,00	PVC344	FLEXIBLE COUPLING 90/100
NR	2,00	RAC274	OIL VENT CAP KMU M3/4"
NR	1,00	RAC279	ALUMINIUM SIGHT GLASS CAP
NR	1,00	RAC318	CAP M3/8" INOX316
NR	1,00	RAC320	ADAPTER FEMALE 3/4" -MALE 1/2"
NR	1,00	RAC346	GLV 90°ELBOW MALE 1/2"-FEMALE 3/4"
NR	1,00	RAC347	ADAPTER FEMALE 3/4"-FEMALE 3/4"


COVER BGS80
FOR WALL VERSION

ENGLISH PART DESCRIPTION

U.M.	Quantità	Codice	Descrizione
NR		E3651	EXPLODED VIEW OF THE BG80 MOUNTING PLATE FOR INSTALLATION ON TANK SIDE WALL
NR	1,00	2380C	HYDRAULIC JACK 60/30X150 WITH VALVE
NR	1,00	3661X	S.S. DRIVE LINE HOLDER
NR	1,00	3662X	DRIVE LINE FORK
NR	2,00	3663X	S.S. REMOVABLE BUSH
NR	2,00	3664X	S.S. FORK PIN
NR	3,00	3665	SPACER
NR	3,00	3666X	S.S. FIXING BOLT
NR	1,00	3667X	S.S. FIXING BOLT
NR	1,00	3668X	S.S. FIXING BOLT
NR	1,00	3669X	S.S. MOUNTING PLATE
NR	2,00	3670X	S.S. RETAINER
NR	4,00	BUL5101	S.S. SELF-LOCKING NUT M8
NR	4,00	BUL5133	S.S. BOLT M8X30 UNI5739
NR	8,00	BUL5152	M10 S.S. NUT UNI7473
NR	12,00	BUL5182	S.S. BOLT M10X30 UNI5739
NR	1,00	BUL5334	S.S. BOLT M16X50 UNI5739
NR	3,00	BUL5349	S.S. SELF-LOCKING NUT UNI7473
NR	2,00	BUL5354	S.S. BOLT M22X120 UNI5737
NR	8,00	BUL5404	S.S. SELF-LOCKING NUT M20 UNI7473
NR	8,00	BUL5428	S.S. BOLT M20X80 UNI5739
NR	12,00	BUL5435	S.S. BOLT M20X60 UNI5739
NR	4,00	BUL5436	S.S. BOLT M20X70 UNI5739
NR	4,00	BUL5451	S.S. SELF-LOCKING NUT M22 UNI7473
NR	4,00	BUL5975	COPPER WASHER 3/8" D.17X23 1,5MM THICK
NR	2,00	BUL6011	S.S. BUSH M2 UNI1751
NR	1,00	IDR385	HYDRAULIC HAND PUMP PMI25-2
NR	2,00	IDR405	40000MM 1/4" HYDRAULIC HOSE WITH 90°
NR	1,00	PSC494	RUBBER EXPANSION JOINT DN250 PN10
NR	6,00	PSC532	GLV SHOCK ABSORBER
NR	4,00	RAC139	NIPPLE MALE 3/8"/MALE 3/8"

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