



PEECON

Biga bio cut mix tub



USER MANUAL

2026

Biga Bio cut mix tub

The main function of this document is to ensure a safe and efficient interaction between man and machine. Save this document for future reference.

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The contents of this user manual may also be modified without prior notice. warning. For information regarding setting up, maintenance work or repairs in which this user manual not provided, please contact the technical service of your supplier.

This user manual has been compiled with all possible care, but Peeters Group B.V. cannot assume responsibility for any errors in this user manual or for the consequences of which.

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2. Introduction

2.1. Preface

Congratulations on purchasing your new Peecon Biga Bio cutting mixer. With this machine you are assured of quality and solidity.

The Peecon Biga series has been developed on the basis of an extensive research and testing program. One of the main objectives was the design of machines that fully comply with the European guidelines and international standards that apply to cutting mixers in terms of use, operation, safety, maintenance and service life.

Before you start using the machine, read this manual carefully and make sure you understand all the information. This is essential for safe operation, optimal performance and a long service life of the machine. Always keep the manual with the machine so that it can be easily consulted.

You can request the most recent version of this manual from your dealer. A digital version is also available at <https://peecon.com/downloads>.

Do you have questions or problems that this manual does not answer? Please contact your dealer or Peeters Landbouwmachines B.V.

Warranty does not cover damage resulting from incorrect operation or improper use. Are you unsure about a service, maintenance or repair operation? Always consult your dealer of Peeters Landbouwmachines B.V.

The manufacturer reserves the right to make changes to the machine without prior notice. The images, dimensions and weights mentioned in this manual can also change and are not binding.

Competent persons are persons who:

- Have built up a certain level of knowledge through education / training (internal course specific to the Biga feed mixer) and who have certain skills to operate the machine.

Technically competent persons are persons who:

- Be competent and have built up a certain technical level of knowledge (minimum MBO level diploma) through education/training, and who are familiar with the technology of the machine and are aware of the possible dangers and risks.
- Be competent to set up, operate, clean and maintain the machine (for example, a service technician of Peeters Landbouwmachines B.V.).

2.2. Warranty and liability

In order to avoid misunderstandings, please read this manual in full. We have paid a lot of attention to the safety and functionality of your machine. Below you will find the most important information about warranty and liability.

Every machine is carefully checked at the factory to rule out material and manufacturing defects. Peeters Landbouwmachines B.V. will replace defective parts under warranty free of charge for a period of 12 months or the first 750 operating hours after delivery (whichever is reached first), with the exception of components subject to wear under normal use.

The following cases will void the warranty:

- If you deviate from the operating and maintenance instructions in this manual, without written permission from the manufacturer.
- When maintenance is not carried out according to the prescribed maintenance schedule. All maintenance work must be documented.
- When non-original parts are used in maintenance or repairs. Original parts are listed in the parts list, downloadable via <https://peecon.com/downloads>.
- If the user statement below is not fully completed, signed, scanned and submitted by the customer.
- If changes are made to the machine without explicit permission of Peeters Landbouwmachines B.V.
- When the machine is resold.

The warranty is limited to the supply of replacement parts and **does not** cover:

- Loss of revenue due to machine downtime.
- Transport costs to and from a workshop.
- Costs for special tools.
- Costs for mechanics.

For warranty claims, please contact your dealer. The costs of parts might initially be charged and will be reimbursed after inspection by an authorised dealer or by Peeters Landbouwmachines B.V.

User statement

Write down the following information about your machine to help you report problems and order parts.

1. Model: Biga _____ 2. Delivery date: _____

3. Machine serial number: _____

By signing, the user confirms that the manual has been fully read and understood:

Name: _____

Signature: _____

2.3. EG Declaration of Conformity



PEETERS GROUP
The Dutch innovators
Munnikenheiweg 47 | 4879 NE Etten-Leur | NL



Technical documentation available on site aforementioned manufacturer.

EG DECLARATION OF CONFORMITY




The undersigned hereby certifies that the machine:

Brand: Biga
Models: Peecon Biga (VMW/VME/VML/VMS/VMP/VMT)
Building year:
Series nr: 510
Category: Industrial biogas mixer (Intended for mixing biogas components)

Complies with the following European directives:

- (EU) 2023/1230 Machinery directive

Location: Etten-Leur
Date:



D.P.M. Peeters
Managing director



2.4. Safety instructions


Improper or careless operation can lead to accidents. Therefore, read all instructions carefully, follow the safety instructions and make sure all instructions are understood. Also make sure the manuals of other machine components, such as the PTO shaft, are fully read and understood by the user of the machine.



WARNING! The terms 'left', 'right', 'front' and 'rear' are always considered from the length of the machine, in which the platform is considered to be the front of the machine.

In this manual, different symbols are used:

Symbol	Meaning
	WARNING FOR DANGER OR DESCRIPTION Warnings and additional information.
	TIPS AND OPINIONS Suggestions and advice to make your work easier.



Tip! Based on the information on the VIN plate, the dealer and/or Peeters Landbouwmachines B.V. can better identify the machine. Be sure to always add this information with requests for warranty or replacement parts.

2.5. Type designation

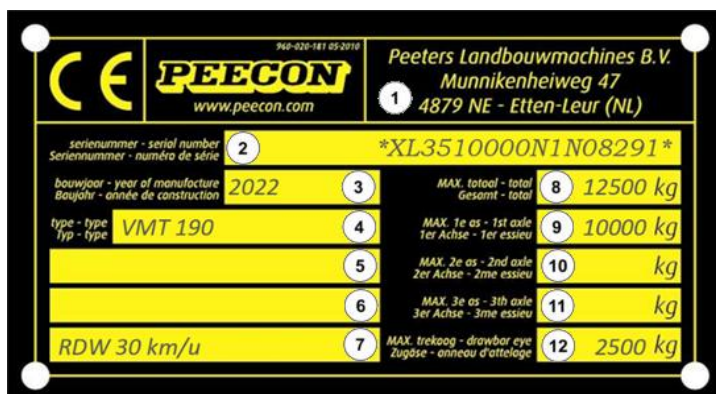


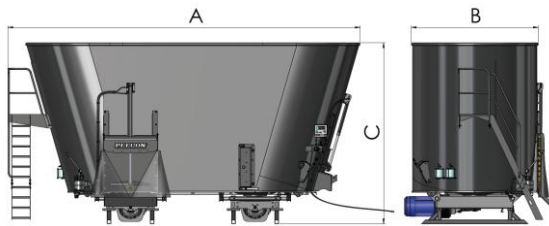
Figure 2-1 VIN plate

1	Manufacturer's contact details	7	Reserved for additional data
2	Serial number (identification number)	8	The maximum total weight of the machine
3	Year of manufacture of the machine	9	N/A for Biga bio cutting mixer
4	Execution of the machine	10	N/A for Biga bio cutting mixer
5	Reserved for additional data (e.g. homologation number)	11	N/A for Biga bio cutting mixer
6	Reserved for additional data	12	N/A for Biga bio cutting mixer

3. Technical specifications

Peeters Landbouwmachines B.V. has a standard product line for Bio cutting mixers. The dimensions of the standard machine can be found in Figure 3-1.

Because Peecon Biga Bio cut mix tubs are often designed for specific biogas processes, it is possible that the dimensions of the machine do not match those of the standard machines. The different dimensions have been included in the original sales documentation of the machine. The original sales documentation, as well as the dimensions and specifications of the specific machine can always be requested these from your dealer, or Peeters Landbouwmachines B.V.



Biga Bio		12-230s	15-245s	20-230s	24-230s	30-245s	40-245s	60-245s	80-245s
Capacity	m ³	12	15	20	24	30	40	60	80
Length	mm	4030	4235	6120	6230	6720	7000	9490	11970
Width	mm	2350	2500	3430	3430	3500	3500	3500	3500
Height	mm	2840	3780	2550	2840	3090	3600	3600	3600
Diameter bottom	mm	2300	2450	2300	2300	2450	2450	2450	2450
Weight	kg	5000	5900	8250	8500	10200	10800	16800	22800
Loading capacity	kg	4800	6000	8600	9600	12000	20000	30000	40000
Required horsepower	kW	22,5*	30*	45*	50*	60*	60*	90*	120*

* required power with reductor

Figure 3-1 Standard models Bio cutting mixer

4. Application of the machine

This machine is intended for the following applications only:

- Mixing, cutting and dosing biomass product.

When using the machine, you should always follow the instructions in this manual. This applies to both the operating instructions, maintenance instructions and safety instructions.

The electrical installation to which the Biga Bio cutting mixer is connected must comply with the specifications prescribed by Peeters Landbouwmachines B.V. and must be installed by an approved and certified installer in accordance with local guidelines, standards and laws.

Executing constructive modifications or extensions without the manufacturer's permission is not permitted. Such changes can lead to unsafe situations, resulting in serious or fatal injury.

The machine may only be used when no persons or animals are in the hazard zone.

5. Important security measures



WARNING! Please read this manual carefully before using the machine. Consult the manual if you have any questions or problems. Check that the factory settings are unchanged and that no parts have been detached during transport. Make sure that all warning signs are present and in the right place.

5.1. General

The operator is always responsible for damage and/or accidents caused by improper use or non-compliance with safety regulations.

The Bio cut mix tub may only be used for mixing, cutting and dosing biomass. Use for other purposes is not permitted.

Before each use, check the following points:

- Carefully inspect the machine for visible damage and loose parts.
- Make sure the side doors are completely closed.
- If present, check the operation of the safety installation. Peeters Landbouwmachines B.V. is not responsible for the safety installation on the machine.
- Make sure that no loaded product can fall out or get blown out of the machine.
- Check that no one is in the hazard zone of the machine.
- Never exceed the maximum load and load volume (as indicated on the VIN plate).
- Study the safety instructions.



WARNING! We draw your attention to a number of situations where extra caution is required, to ensure your own safety and that of others in the area.

The following situations require extra caution:

- Always look around the machine before turning it on.
- Pay extra attention to people, animals and especially children that could enter the hazard zone.
- Ensure good visibility while working.
- It is forbidden to enter or reside on the platform of the machine when the augers are driven.
- Do not enter the hazard zone of the machine when the machine is switched on.
- Do not enter the bio cut mix tub. The augers have razor-sharp blades that can cause serious injury.

In addition to the instructions in this manual, please adhere to the generally applicable safety and accident prevention regulations. Get familiar with all systems, controls and their functions before using the machine.

- Check the state of the safety features on the machine before each use, both before loading and before mixing.
- If your machine is equipped with a PTO shaft, please read the PTO shaft manual carefully before using the machine.
- Always wear tight-fitting clothing and avoid loose-fitting garments, as these can get caught on the rotating components of the machine.
- Keep in mind that the augers may continue to spin for some time after turning off the machine.
- The machine may only be operated by one person at a time.
- Secure the machine before leaving the operating position: turn off the main switch and lock it with a (pad) lock.
- Do not come near rotating parts when the machine is in operation.
- Only work with machines whose protective shieling is complete and intact.
- Repair any damage or wear to the paint immediately before working with the machine. If the machine is still covered by the warranty, please contact your dealer or the manufacturer first before repairs are carried out.
- Regularly check the condition of the hydraulic hoses. Replace damaged hoses directly with ones that are SAE 100 R2A or DIN 20022/2 certified.
- Never attempt to seal leaks in a working hydraulic system by hand. Oil can penetrate through the skin and cause blood poisoning.
- Clean, lubricate or maintain the machine only when it is completely switched off and locked. To make the machine safe to work on the main switch should be turned off and locked in the off position.
- The operating position must always be occupied during operation.
- Turn off the electric motors as soon as the mixing tub is completely turned off, to avoid unnecessary wear and energy consumption.
- Check the knives and bolts of the auger weekly for excessive wear. Loose blades that end up in the biomass product can cause dangerous situations.

5.2. Hazard zone

No one should be in the hazard zone while the machine is in use.

- Sides: maintain a minimum distance of 5 meters
- Front and rear: maintain a minimum distance of 5 meters

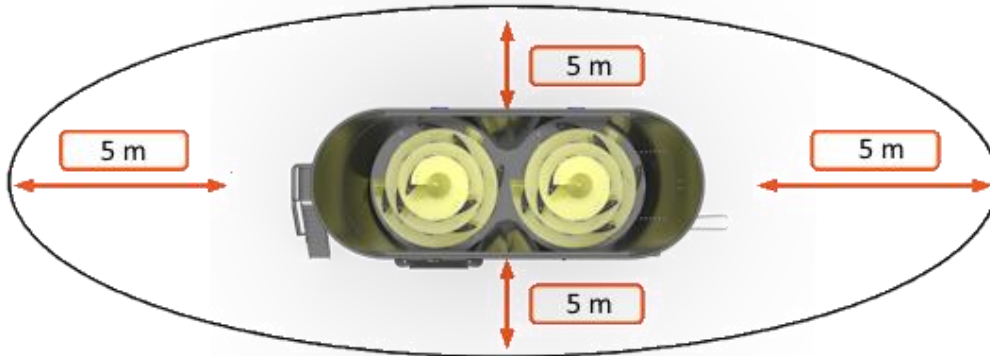


Figure 5-1 Hazard zone

WARNING! It is forbidden to enter the platform during loading and unloading of the mixing bowl.

The machine produces less than **80 dB(A)**. Hearing protection is not mandatory, but may be recommended depending on ambient noise. Make sure hearing protection is always available.

5.3. Requirements of the foundation

The required foundation depends on the specific soil on which it will be placed. The foundation requirements mentioned below serve only as an example. Peeters Landbouwmachines B.V. is not responsible for the foundation of the machine, always consult a licensed and competent contractor or installer.

5.3.1. Stable soil

Stable soil, such as compacted sand, is considered a good surface to build on. As a result, the foundation requirements are lower than for other soil types.

	MINIMUM REQUIRED
THICKNESS	300 mm
QUALITY	C30/37
SUBSTANTIATION	300 mm mixing granulate
REBAR	Double Ø10-Ø14 mm top and bottom, with areas thickened under the legs with Ø16 mm reinforcement
ANCHORING	M16x250 8.8 Chemical or collapsed

5.3.2. Unstable soil

Unstable soil, such as (soft) clay soil, is considered a poor surface to build on. As a result, the foundation requirements are higher than with other soil types.

	MINIMUM REQUIRED
THICKNESS	350-400 mm
QUALITY	C30/37
SUBSTANTIATION	300 mm mixing granulate
REBAR	Double Ø12-Ø16 mm top and bottom, with areas thickened under the legs with Ø16 mm reinforcement
ANCHORING	M16x300 8.8 Chemical or collapsed

5.4. Installing the machine

Important safety requirements regarding the installation of the machine:

- When lifting the machine, only lifting equipment suitable for the machine weight should be used. The weight of the machine is stamped on the VIN plate of the machine.
- Only Lift the machine at the indicated lifting points.
- The anchoring of the machine may only be carried out with the prescribed fastening materials.
- The foundation on which the machine will be placed must meet the foundation requirements for the application and soil type.



WARNING! The prescribed lifting points are the only points at which the machine can be lifted safely. When other lifting points are used, dangerous situations can arise. The machine can also be seriously damaged when using the wrong lifting points.

5.5. Lifting and lashing points

Depending on the specific cutting mixer, the lifting and lashing points can be found at different positions. Suitable points are always marked with a sticker, as seen in Figure 5-2. Inappropriate lifting points are marked with the stickers like Figure 5-3. The machine can be severely damaged when these points are used as lifting or tie down points. An overview of the possible locations for the lifting and tie down points can be seen in Figure 5-4. The chassis can be used to tie down the machine during transport.



Figure 5-2 Suitable lifting point



Figure 5-3 Unsuitable lifting point



Figure 5-4 Possible locations of lifting points

5.6. Connecting the machine

Important safety requirements regarding the connection of the machine:

- Connect the electrical installation of the machine according to the locally applicable regulations and standards.
- The Peecon Biga bio cut mix tub is not equipped with electrical connections or motor control. The control system should be designed and installed by an approved and certified installer. Peeters Landbouwmachines B.V. is not responsible for the electrical installation on the machine.
- The electrical installation must meet the requirements stated in the supplied manual of the electric motor.

5.7. Use of machine

- Wear tight-fitting clothing. Loose clothing can get caught in rotating components of the machine.
- Familiarize yourself with all the parts and controls before working with the machine.
- Only use the machine if all protective shields and safety devices are correctly fitted and closed.
- Make sure people cannot enter the hazard zone of the machine when in use.
- Never exceed:
 - The maximum permissible loading volume.
 - The maximum permissible load weight.
 - The maximum permissible electric power of the electric motor.



WARNING! Always check the hazard zone for persons before turning on and using the machine.

5.8. Safety symbols

Stickers with safety and warning signs are affixed to the mixing tub. These indicate where risks are present, despite the safe design of the machine.

Make sure the user manual is read and understood before using the machine. Regularly verify the presence and readability of the warning stickers. Do not use the machine when the stickers are damaged or illegible and contact your dealer or Peeters Landbouwmachines B.V. for replacement stickers.



WARNING! The stickers must always be clean and clearly legible, in order for every (new) user to work safely. In the event of damage, these should always be replaced. New stickers are available through your dealer.

5.8.1. Declaration of safety symbols



Read and comply with the user manual and safety regulations before using the machine.



The hydraulic lines can cause physical injury and environmental damage. Only work on the hydraulic system when it is completely pressure-free.



Hazards of entrapment and cutting in the mixing chamber. Stay away from the unloading doors. When working, always remove the ignition key and disconnect the power take-off.



It is forbidden to stand on or under the machine while the machine is turned on. When loading, no one shall be behind the mixer.



It is forbidden to climb on the platform or to enter it. Do not allow people to manually load the machine from the platform (danger of incursions).



Check the lubrication points every 10 operating hours to prevent wear and high costs. Use the prescribed type of lubricant. If in doubt, contact your dealer.



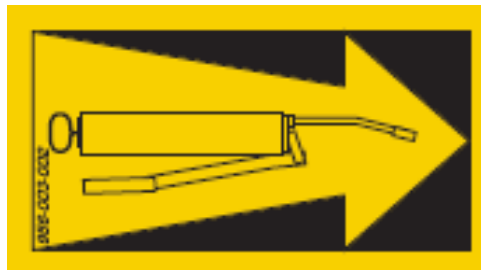
It is not recommended to force the load in the mixing chamber. This can cause damage or malfunction to the tractor or machine.



Keep away from rotating parts. Always turn off the machine during maintenance lock the main switch in the off position.



Forward driving with rotating PTO is allowed. Reversing is only permitted with stationary PTO, unless a reversing PTO is used (note the direction of rotation).



Here is one or more lubrication points. Lubricate according to the maintenance schedule.



Loose-fitting clothing can get caught in the rotating component of the machine.



Make sure that the oil level of the planetary gearbox is visible in the top gauge glass (applicable only to models with a steel oil tank).



Make sure that the oil level of the planetary gearbox is above the minimum and below the maximum level (only applicable to models with a transparent plastic oil tank).



This is a lifting point. Only use these points to lift the machine.



No lifting point. Do not attach cables, chains and / or other lifting equipment here. This can cause damage to the machine.



The position of the (front) unloading door(s) can be read on the side of the cockpit via the indicator and the corresponding sticker. In position '0' the door is closed, in position '9' it is fully open.



The position of the rear unloading door(s) can be read at the front of the cockpit via the indicator and the corresponding sticker. In position '0' the door is closed, in position '9' it is fully open.

5.8.2. Safety symbols on the machine



Figure 5-5 All possible safety symbols



Figure 5-6 Safety symbols Biga Bio cutting mixer

5.9. Extreme conditions

This section describes extreme situations. The machine may not function as expected under these circumstances.

The recommended operating and ambient temperatures are between **-30 °C and +40 °C**. Use at lower temperatures:

- Accelerates the wear hydraulic gaskets.
- Increase the risk of damaged hydraulic lines and fractures in the steel structure.
- To prevent damage to the machine in low temperatures it is advisable to not load the machine to its maximum capacity. This reduces the structural and mechanical stress on the machine.

Before you start working at low temperatures:

- Allow the oil to circulate through the system for a few minutes.
- Slowly perform all operations several times, before they come under full pressure. This allows hydraulic seals to become flexible before they are exposed to the normal working conditions.

When working in extremely hot conditions:

- Keep in mind that the hydraulic oil can get very hot.
- When the oil temperature rises above **+80 °C**, the oil can evaporate and the gaskets become damaged.
- The electric motors that drive the augers can get very hot. As a result of this they may thermally shut down or produce less power. Also make sure that the electric motors are not touched during or shortly after use, as this can cause burns.

6. Operation of the machine

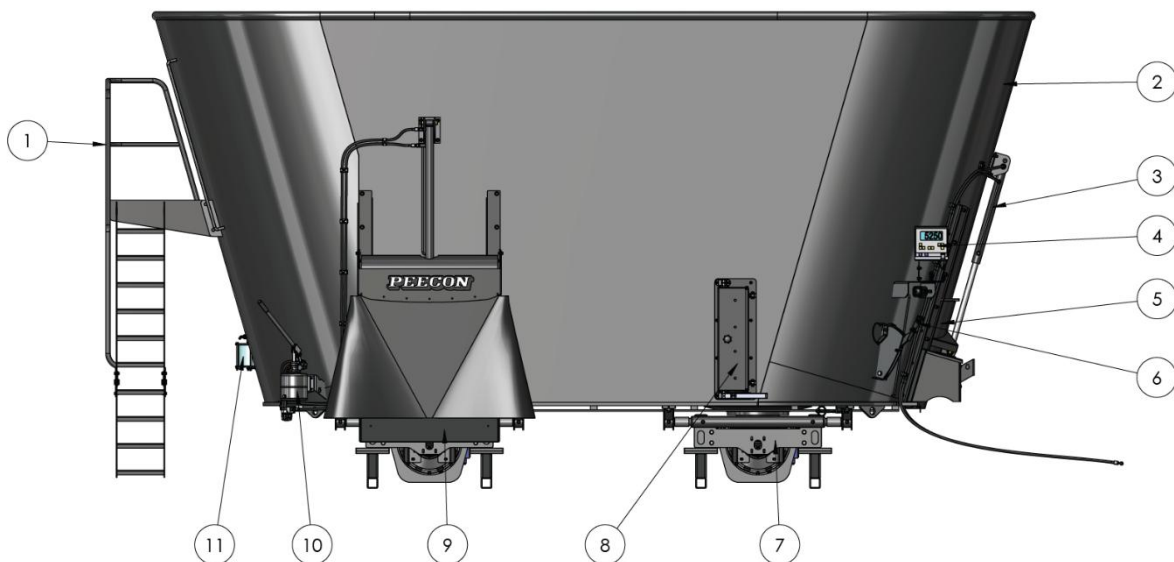
The various biomass components are loaded into the mixing tub. The order and speed of loading are essential for a good mixing process.

In the mixing chamber, the biomass is processed by the cutting action of the blades on the rotary auger. Depending on the structure of the components, additional counter knives on the outside of the mixing chamber can be switched on to speed up cutting.

Due to the shape and rotation of the auger, the biomass is pushed up and guided down the wall of the mixing chamber. Filling the mixing tub up to about 90% of the maximum capacity yields the most efficient mixing result.

When the mixing process is complete and a homogeneous mixture has been formed, the biomass can be discharged by opening the discharge doors. The amount of dispersed mixture can be controlled by moving the discharge doors up or down until the desired output quantity is reached.

Depending on the options chosen, the machine can be equipped with an output belt system, with which the cut and mixed biomass product can be transported further in the biogas plant.



1 Platform	7 Individual chassis per jack
2 Mixing bowl	8 (Option) tub magnet
3 Hydraulic cylinder discharge door	9 Discharge door
4 Display and control panel weighing system	10 Hand pump hydraulic functions
5 Rear discharge door	11 Oil reservoir jack transmission
6 Control lever counter-knife	

7. First use

7.1. Chassis

Depending on the version of your machine, the number of augers, the type of chassis, the drive and the way of unloading the biomass mixture may differ.

A Biga bio cutting mixer can be equipped with one, two or three augers. There are two different types of augers (see chapter 9-4 augers). Only the type 2 auger is used for Bio cut mix tubs.

The chassis versions are divided into two groups

7.1.1. Self-supporting chassis

A self-supporting tube chassis on which the cut mix tub is mounted. The full cut mix tub, including the auger driveline, rests on 4 to 10 loadcells. The specific amount of loadcells depends on the size of the cut mix tub.

Characteristics self-supporting chassis

- One or two electric motors.
- Adjustable or fixed legs at different lengths.
- Always with indirectly driven augers.

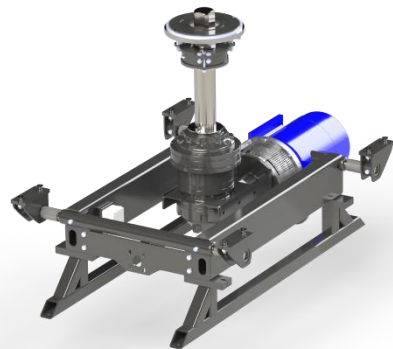


7.1.2. Individual chassis per jack

Each auger is supported by its own chassis. The full cut mix tub rests on 4 loadcells per auger. Each auger is driven by its own electric motor. The compact individual chassis simplifies transport and installation.

Characteristics individual chassis per auger

- Four loadcells per auger.
- Each auger is powered by its own electric motor.
- The augers can be directly or indirectly driven.



7.2. Power Take-Off (PTO) shaft



WARNING! Only use a PTO shaft with a complete, intact and properly secured protective cover. Always check that the PTO shaft is installed correctly.

The auger drive of the Biga cutting mixer can be driven directly or indirectly. **Only the indirect drive** uses a PTO to connect the electric motor to the planetary auger drive.

It is important that the PTO shaft length is checked while installing the PTO shaft in the indirect auger driveline. This is also important the PTO shaft is replaced. The following steps must be followed to check and correct the length of the PTO shaft:

1. After connecting, check the length of the power take-off. The outer pipe must still have at least **15 cm of glide space**. If necessary, shorten the power take-off as follows:
2. Pull the axle halves apart and place them side by side in the shortest operating position of tractor and implement.
3. Draw the outer protective tube at the correct length.
4. Disassemble the protective tubes and cut off the registered part.
5. Shorten the inner tube to the same length.
6. Shorten the outer and inner profile tube to the same length as the sawn-off protective tube. Make sure they are cut perpendicular to the length of the shaft, then burr them off and clean any remaining metal shavings.
7. Lubricate the inner profile.

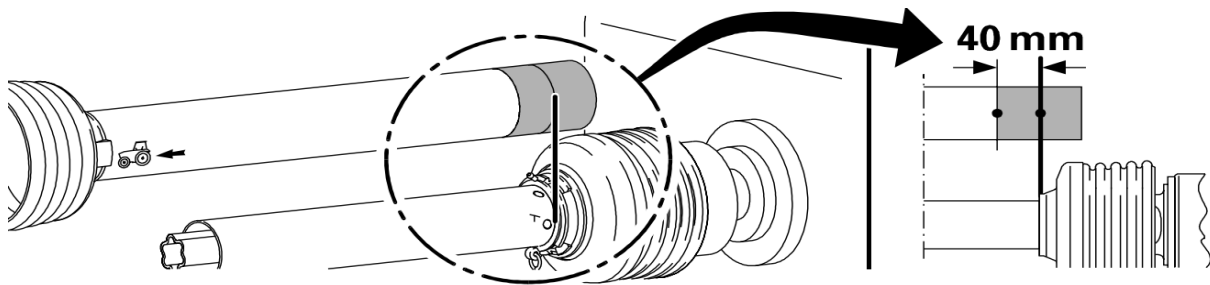


Figure 7-1 PTO shaft

In case the PTO shaft is equipped with a shear bolt, it has to be installed on the end that connects to the machine. Clean all parts and apply grease, before assembly.

7.3. Hydraulic hoses

The Bio cut mix tub is equipped with one hydraulic cylinder per unloading door. The control system for this cylinder must be designed and connected by an approved and certified installer. Peeters Landbouwmachines B.V. is not responsible for the hydraulic system on the Bio cut mix tub.

7.4. Electric motor

The stationary cutting mixer comes standard with one or more electric motors. The power and number of these electric motors depends on the specific version of the bio cut mix tub. The manual of the electric motor is supplied with the machine. Consult this manual for the motor and connection specifically.

7.5. Fluid coupling

The bio cut mix tub can optionally be equipped with a fluid coupling. If it is present, this must be taken into account when setting up the electrical installation.

The engine speed shall be 1500 rpm during normal operation. When the speed is lower, the fluid coupling will not be able to transfer the full power. As a result, the liquid in the clutch can get too hot. This can activate the thermal protection system of the fluid coupling.

To start the electric motor, a soft start function is required. However, it is important that this soft start ramp-up time does not take too long. The fluid coupling will not be able to transfer the required power when the soft start takes too long. A soft start ramp-up time of **5 to 10 seconds** should be applied.

7.6. Weighing system

The bio cut mix tub is equipped with an i.FeedGood M 3030 weighing computer as standard. This computer is connected to the loadcells, so that it can accurately measure the load in the mix tub. This weighing computer is equipped with an analogue signal, ranging from 4 mA to 20mA. This signal corresponds to the measured weight in the cut mix tub.



Figure 7-2 Peecon control panel i.FeedGood weighing computer (left)

The connection to this signal is provided by means of an M12 5p female connector. The pin layout can be seen in the table below. More information can be found in the supplied manual of the i.FeedGood system.

4-20 mA signal	
Pin	Function
1	+12/24 V (max 200 mA)
2	Signal output 4-20 mA
3	0 (12/24 V)
4	Not connected
5	Not connected

7.7. Long-term storage of machine

In case the machine is decommissioned for more than 1 month, special preparations should be carried out.

- Clean the machine well, including the inside of the cut mix tub. Please note the regulations that apply when cleaning the machine.
- Carry out the complete lubrication procedure of the machine, with the prescribed lubricants.
- Blank pieces of metal must be greased.
- Grease piston rods of hydraulic cylinders to prevent corrosion.

8. Using the machine

Always check that the machine is in good condition before using it. Check that all hydraulic hoses and the electrical connection are properly connected and functioning. Also check the oil level of the planetary drive, the optional fluid coupling and pay attention to any damage to parts. Once you have checked this, you can turn on the machine.

For safe operation, you should pay extra attention to the following points:

- Inspect the entire machine for visible cracks or deformations.
- Inspect the foundation of the machine for cracking and damage and check that the anchor bolts are tightened to specification.
- Check if the discharge door opens and shuts.
- Test the machine functions, including the hydraulic functions, for any defects.
- Check the hydraulic hoses and lines for signs of leaks or damage. Make sure that the flexible hydraulic lines are not getting caught or stuck in parts of the machine, as this can damage the hydraulic lines.
- Check the hydraulic cylinders for signs of leaks.
- Inspect the rubber flaps at the discharge door for cracks and tears. The discharge door is only safe to use when the rubber flap is present and intact.
- Make sure there is enough oil for the hydraulic system.
- Check the oil level of the planetary drive. The minimum and maximum level is indicated on the corresponding oil tank.
- If applicable, check whether the conveyor belt functions correctly.
- Inspect the bolt connections on the auger. Pay extra attention to the bolt that connect the knives to the auger.



WARNING! The auger knives are razor sharp. It is possible that the bolts that connect the knives to the auger can loosen up. These knives can cause dangerous situations when they end up in the biomass!



WARNING! Never use the machine when people or animals are in the hazard zone. The machine may only be operated by one qualified person at a time.

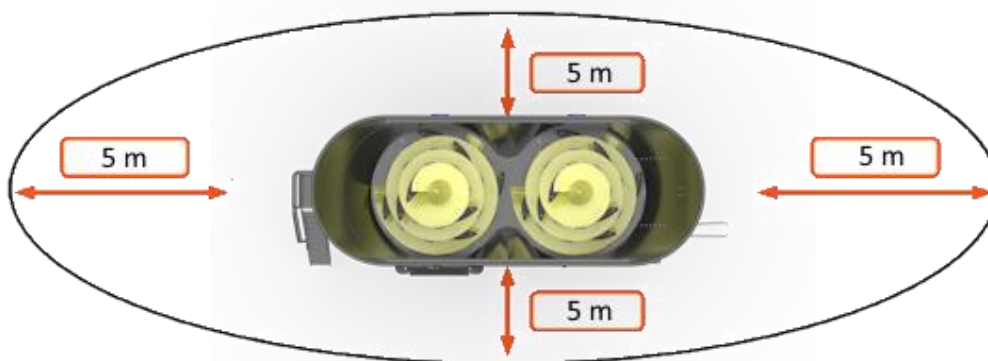


Figure 8-1 Hazard zone

8.1. Control system

The Peecon Biga Bio cut mix tub does not come with a control system. This must be designed and installed on the machine by an approved and certified installer. Peeters Landbouwmachines B.V. is not responsible for the control system or installation of the machine.

8.2. Loading

Make sure that there are no people in the immediate vicinity and that there is enough space to safely manoeuvre the machine with which the biomass components are loaded.

Never fully load the mix tub to the edge. This causes an excessive stress on the driveline and reduces the quality of the mixed product. The exact filling height of the mixing chamber depends on the specific model bio cut mix tub. Make sure that the attachment does not touch the augers or mix tub while loading the mix tub, as this will damage the machine.

1. Verify that the discharge doors are fully closed.
2. Load the machine from the side of the mix tub. Continue filling until the desired fill level is reached, but make sure the machine is not overfilled. Turn on the augers and try to load the mix tub gradually and slowly. This helps protect the augers and driveline from being overloaded.
3. Try to lower the biomass as low as possible into the cut mix tub during the loading process. A high drop distances increase the stress on the augers and shorten the lifespan of the machine.

8.2.1. Load order

For the most efficient mixing process, the lightest components should be loaded first and the heaviest components last. This way the heavy components can sink through the mixture faster. Depending on the specific biogas process it might be necessary to load the components in a different order.

The following component loading sequence serves as a general guideline:

1. Start the loading process with product that are longer, lighter and structurally rich.
2. Then add the granular structure products.
3. Finish off by loading the heavier products or products with a high moisture content.
4. Liquids should be added in the last step of the mixing process.

8.3. Mixing

The duration of the mixing process is highly dependent on the composition of the biogas mixture. The following guideline can be altered based on experience in order to achieve the best mixing result:

1. **Mixing time:** After loading the biomass components, allow the machine **to mix for another 5 to 10 minutes** until a homogeneous mixture is obtained.
2. **Counter-knives:** If necessary, extend the counter-knives to achieve a higher cutting intensity.
3. **Speed:** The desired speed of the augers during mixing is highly dependent on the specific biogas process and will therefore have to be determined experimentally.

8.4. Unloading

1. Verify that the auger drivelines are powered on and turn on if necessary. Also check and verify that the discharge processing system is turned on.
2. Open the discharge door(s). By varying the opening height of the door you determine the discharge speed. The opening height is shown on the indicator sticker.
3. When the mixing chamber is almost empty, the speed of the augers can be increased to remove the remaining biomass.
4. Close the discharge door(s).
5. Turn off the auger driveline.



WARNING! After disabling the auger drive, the augers and the corresponding driveline can continue to rotate for some time.

9. Maintenance of machinery and personal protective equipment (PPE)



Maintenance is essential for efficient functioning of the cut mix tub and extends the service life of the machine. Always use the prescribed personal protective equipment (PPE) when working with or on the machine.

Before performing any maintenance, cleaning or repair work, ensure that the following safety measures and PPE are met:


- The main switch of the machine is switched off and locked in the off position.
- The residual pressure in the hydraulic system has been released.
- A safe working environment has been created.
- You are wearing the required personal protective equipment: working gloves, safety glasses and safety shoes.

Work may only be carried out by qualified personnel who have read and understood all operating and safety instructions in this manual.

9.1. Maintenance intervals

	For every use	Every week	First 10 hours	First 150 hours	Every 8 hours	Every 25 hours	Every 50 hours	Every 100 hours	Every 250 hours	Every 1000 hours	Every year
○ = check/lubricate/refill											
● = replace											
1: Check for damage or excessive wear	○										
2: Lubricate universal joints PTO shaft(s)								○			
3: Inspect hydraulic hoses and lines		○									○
4: Check and tighten bolts and nuts			○						○		
5: Lubricate the PTO shaft							○				
6: Oil planetary reductor auger	○		○	●			○			●	●
7: Regrease the machine					○						
8: Visually check auger knives		○							○		
9: Hydraulic oil			○							●	●
10: Cleaning discharge belt (optional)		○									
11: Clean hydraulic cylinders							○				
12: Oil fluid coupling										●	●
13: Oil electric motor reductor				●						●	●
14: Check and regrease electric motor											○

9.2. Specifications liquids

 **WARNING!** Use of unspecified oil may void the warranty of the affected components.

	Type	Quantity	Article number
Oil planetary reductor auger	ISO VG 220	± 20 Liters	959-181-025

9.3. Auger drivelines

9.3.1. Indirect drive

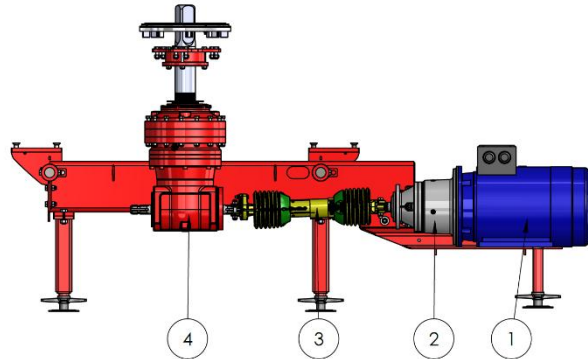


Figure 9-1 Indirect auger drive

1	Electric motor	3	Short PTO shaft
2	Reductor gearbox electric motor	4	Planetary auger reductor

9.3.2. Direct drive

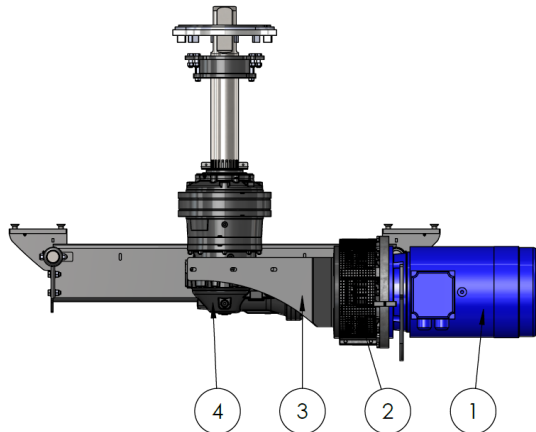


Figure 9-2 Direct auger drive

1	Electric motor	3	Direct drive support bracket
2	Fluid coupling	4	Planetary auger reductor

9.3.3. Planetary auger reductor

Type of oil	Synthetic oil EP220
Amount of oil per auger reductor	± 20 Liters
Service interval	Refer to the maintenance intervals mentioned in chapter 9.1

The planetary reductor gearbox, on which the augers are mounted, is filled with synthetic oil. This oil ensures the lubrication of the gears and bearings inside of the gearbox.

According to the maintenance interval, the oil must be replaced at least **once every 2 years** or after a maximum of **1,000 operating hours**. Regularly check the oil level: the level should never fall below the minimum indicated on the reservoir. Add oil as soon as the level in the reservoir starts to approach this line.

Type 2 augers (see Chapter 9.4.2 Auger type 2) use a plain bearing at the top of the gearbox. This plain bearing needs to be lubricated with grease. This is done at the centralized grease nipple mount.

Both types of planetary reductor gearbox are equipped with an oil drain plug (1) at the bottom, as can be seen in Figure 9-5 and Figure 9-4. The old oil can be drained out through these plugs.

To change the oil, firstly all the old oil needs to be completely drained out of the reductor gearbox. Blow any remaining old oil out of the lines using compressed air. Be sure to collect and dispose of the waste oil in accordance with applicable local laws and regulations.



Figure 9-3 Oil reservoir planetary reductor gearbox

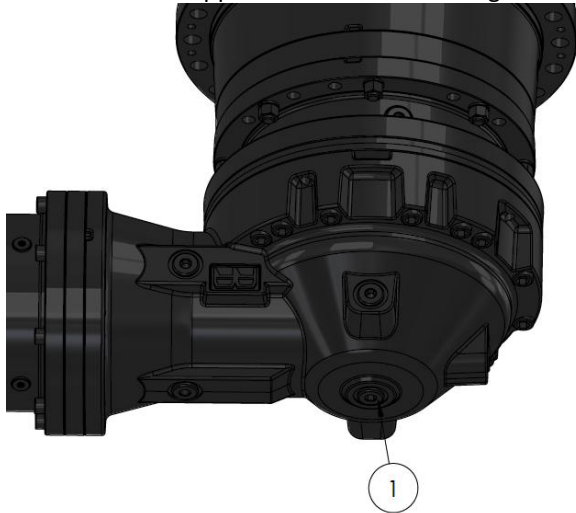


Figure 9-5 Reductor gearbox RR3200

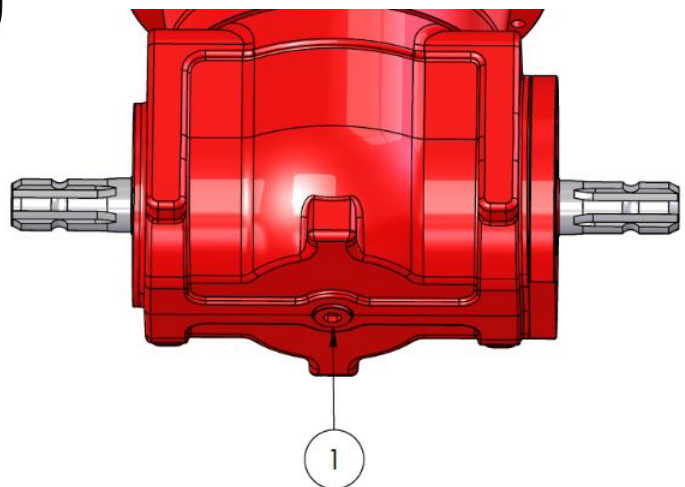


Figure 9-4 Reductor gearbox EC3320/FE

When the gearbox is fully drained, reinstall the drainplug and refill with the prescribed type and amount of oil. Make sure that the gearbox is fully filled and no air gap is left in the top of the housing. You can check this by connecting a vacuum pump to the vent hose on top of the gearbox. As soon as oil comes through the hose, the housing is fully filled and the gearbox oil is successfully changed.



WARNING! Deviating from the prescribed oil type may void the warranty on the affected components.

9.3.4. Fluid coupling

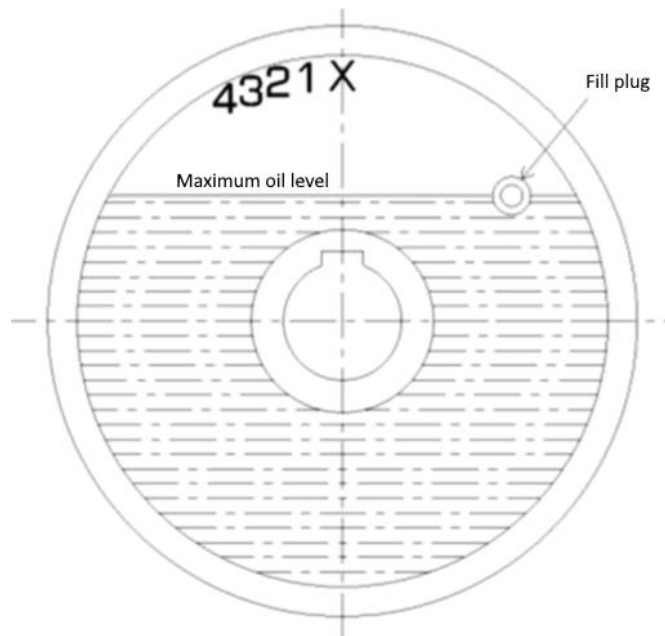
The fluid coupling can be filled with oil at different levels. The filling level corresponds to the start-up speed of the fluid coupling. At a higher filling level, the coupling will allow less slip and transfer more power. A lower filling level may be desired to protect the powertrain from overloading. For further technical details, please refer to the supplied manual of Transfluid.

Type of oil	ISO HM 32 / SAE 10W
Service interval	Refer to the maintenance intervals mentioned in chapter 9.1

FILLING LEVEL	AMOUNT OF OIL
X	5,20 litres
1	4,85 litres
2	4,45 litres
3	4,05 litres
4	3,60 litres

Table 1 Oil quantity filling levels

Filling fluid coupling



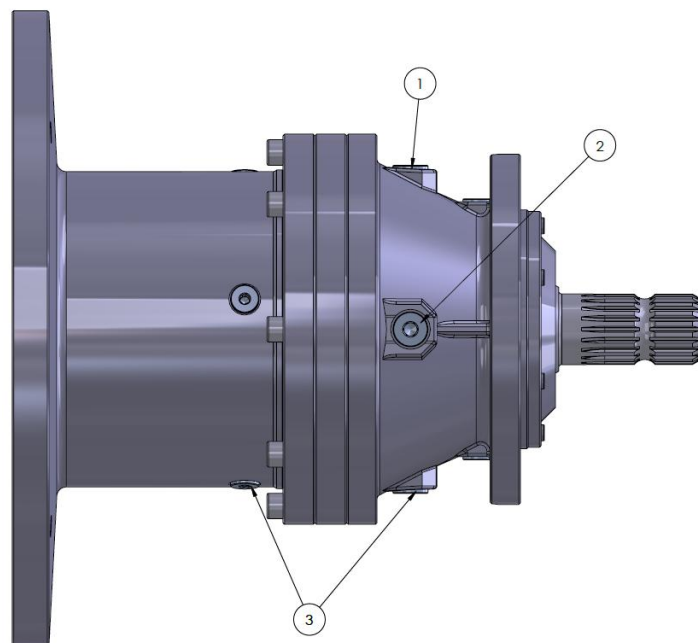
1. Position the shaft horizontally until the X mark is at the very top. This position corresponds to the highest filling level of the fluid coupling. See image above.
2. Fill the coupling until oil comes out of the oil fill plug. While filling, try rocking the clutch slightly to remove internal air bubbles. To do this, turn the outgoing shaft of the fluid coupling a little ($\pm 10^\circ$) to the left and right.
3. After filling, screw the fill plug back on, with a tightening torque of 29Nm. Check for any leaks. If one or more leaks have occurred, these can be remedied by applying a sealant.
4. The fill markers X-1-2-3-4 correspond to a certain start-up and operating speed. The X marks the highest filling level, allowing for the least amount of slip and delivering the highest performance. Filling to level 1,2,3 or 4 moves the fill plug down, which results in an increase in startup time and reduction in performance, but can help protect the driveline.

5. High amounts of slip will cause the oil to heat up quickly. This has an adverse effects on the performance of the clutch. When the oil in the coupling gets too hot, the built-in thermal protection will be activated. This helps protect the coupling against damage as a result of overheating. The thermal protection is a plug that melts when the oil reaches a certain temperature. This will cause the oil to drain out of the coupling and prevents further damage to the powertrain. The melt plug will have to be replaced when the thermal proception has been activated. For a replacement melt plug, please contact your dealer or Peeters Landbouwmachines B.V.
6. Form factory the fluid coupling will be filled with a biodegradable oil (total biohydran SE32) to prevent damage to the environment in the event of the activation of the thermal protection. However, it is possible to replace this oil with a non-biodegradable variant, as long as it complies with ISO HM 32 or SAE 10W and the (legally) necessary precautions to prevent environmental damage have been taken. When used in low ambient temperatures (around 0°C), it is recommended to use ISO FD 10 (or an equivalent of SAE 5W). For extremely low ambient temperatures (below -10°C) it is recommended to contact Peeters Agricultural Machinery so that an appropriate oil viscosity can be prescribed.

9.3.5. Planetary reductor electric motor

In the case of an **indirectly driven auger**, the gearbox at the front of the electric motor is lubricated with oil. The prescribed oil is the same as that for the planetary auger drive. For further technical information, please refer to the supplied RR manual.

Type of oil	ISO VG 220
Amount of oil	0,9 Liters
Service interval	Refer to the maintenance intervals mentioned in chapter 9.1



- | | |
|---|------------|
| 1 | Fill plug |
| 2 | Level plug |
| 3 | Drain plug |

Oil change

Start by opening the fill plug (1) and the drain plug (3) and let all of the oil drain out of the housing. When all the oil has drained out, retighten the drain plug (3). To start refilling the planetary gearbox the level plug (2) needs to be opened. Start filling the gearbox by adding oil to the fill plug (1) opening, until oil starts to come out of the level plug (2). First retighten the level plug (2) and then the fill plug (1). The oil in the gearbox has now been changed correctly and the reductor is now ready to use again.

9.3.6. PTO shafts

The gearboxes of the **indirectly driven** auger driveline are interconnected with a PTO shaft. The number of drive shafts on the machine depends on the number of augers the machine is equipped with. The universal joints at both ends of the axles needs to be regreased after every 100 operating hours.

PTO shafts and their components must meet specific requirements, in order to guarantee a safe and optimal working order. Please contact your dealer or Peeters Landbouwmachines B.V. directly for replacement PTO shafts and components.

Type of grease	Texaco Multifak Premium 3
Service interval	Refer to the maintenance intervals mentioned in chapter 9.1

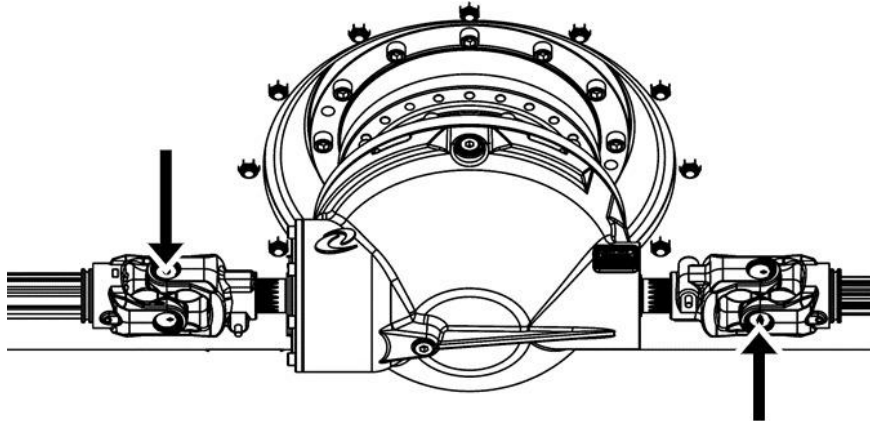


Figure 9-6 Grease points on the PTO shaft

9.4. Wear rim

The machine can optionally be equipped with a sacrificial wear rim. This is an additional metal surface on the inside of the mixing chamber, which protects the mixing tub from wear and tear. This wear rim can be made of different materials and can therefore have a wide ranging lifespan, depending on the specific process of which the machine is part.

If the wear rim is worn down too far, it can come loose and cause serious damage inside the mixing tub. It is therefore important to inspect the condition of the wear rim on a weekly basis. Pay particular attention to the parts of the wear rim closest to the bottom of the mixing tub and near bends, as these locations are subject to the heaviest wear and tear.

Also pay close attention to the fasteners of the wear rim. The wear rim can be bolted or welded in place. When these connections experience excessive wear, the wear rim can come detached. This can cause serious damage to the bio cut mix tub and the augers.

9.5. Augers



WARNING! Always verify that the machine is turned off and that the main switch is locked in the off position before entering the mixing chamber. Secure the machine and make sure that no one can turn on the machine.

The auger knives are sharp and can cause serious injury. Always wear appropriate personal protective equipment. Cover the cutting edges of the blades before performing any work in the mixing chamber. Please note: when the machine is equipped with magnets, tools and other metal objects are also attracted to these magnets. Electronics can also be damaged by the magnetic field.

Once the machine is made safe to work on, work can take place inside the mixing chamber. To enter the mixing chamber, open one of the dosing doors completely. This door must then be secured or blocked so that it cannot close unexpectedly. Make sure there is always a second person outside the machine to help and provide assistance in case of emergency.

Peeters Landbouwmachines B.V. utilizes two different types of auger, of which only type 2 is used for bio cutting mixer applications. Only type 2 auger will be explained in this manual.

9.5.1. Type 2 auger

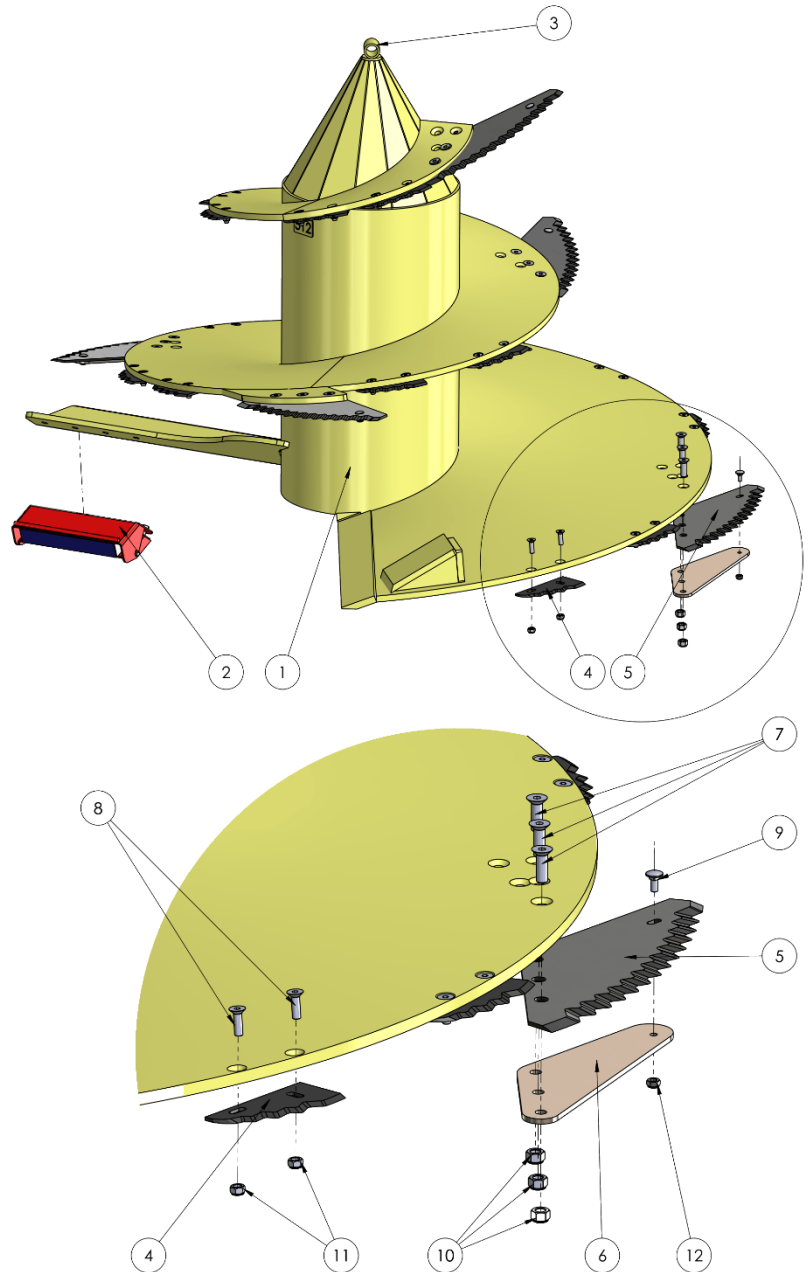
Lubrication

The augers are equipped with plain bearings that are lubricated with grease. This is done via grease lines, whose grease nipples are located at the front of the machine. In order to simplify greasing the machine, a centralized grease nipple block with one or more lubrication points is mounted on one central location on the machines. Always apply grease according to the maintenance schedule. The grease points on the machine are marked by the stickers below.



Auger construction

The type 2 auger can be easily be lifted from the machine for maintenance or repair. This is done by lifting the auger on the lifting eye (4), without the need to disassemble parts. This allows maintenance work to be carried out outside the machine, instead of inside the mixing chamber.



DETAIL B
SCALE 1 : 5

1	Auger construction	7	Hex bolt M16x50 10.9
2	Auger magnet (optional)	8	Hex bolt M12x40 10.9
3	Lifting eye	9	Stainless steel carriage bolt M10x25 8.8
4	Small knife	10	Nyloc nut M16 8.8
5	Large knife	11	Nyloc nut M12 8.8
6	Knife Reinforcer 8 mm HD 450	12	Gl.verz.nyloc nut M10 8.8

9.5.2. Replacing auger knives



WARNING! Be careful when using tools or other metal objects in the vicinity of magnets. Please note that when (dis)assembling auger knives, they are also attracted by the magnets in the auger, the mixing tub and the discharge guide plate.

Sharp knives are essential for a good quality of the biomass mixture and an efficient mixing process. When the blades are worn, larger mixing components are no longer cut as fine and more power is needed for the mixing process, leading to higher energy consumption. New auger knives are available at Peeters Landbouwmachines B.V. via <https://peecon.com/contact/>.

9.6. Magnets



WARNING! Users of pacemakers or other medical devices should keep a good distance from the machine. Magnetic fields can cause interference or damage to these devices.



WARNING! Magnetic fields can damage electronics. Keep equipment such as computers, measuring tools, debit cards and other electronic components away from the machine.

Optionally, the output slides can be equipped with magnets to remove any metal particles from the biogas mixture. In addition, it is possible to place a magnet in the mixing tub wall.

If material remains on the magnets, it must be removed to prevent it from entering the biogas mixture again. First, make sure that all safety measures have been taken. Then carefully remove all metal parts and grit from the magnets.

9.7. Discharge door

The discharge guide plates under the discharge door ensure that the processed biogas product is spread further away from the machine.

Optionally, these discharge guide plates can be equipped with hydraulic cylinders, making them movably. In addition, it is possible to equip the discharge guide plates with magnets.

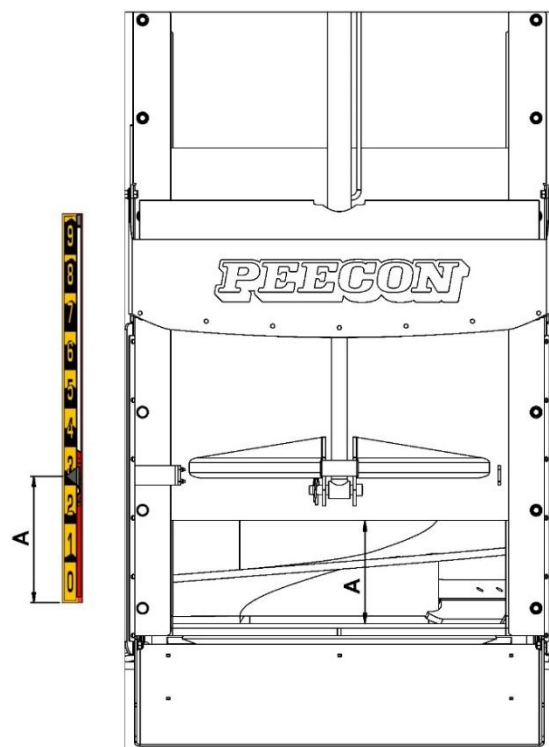




Figure 9-7 Loose door

9.8. Hydraulic hoses

	WARNING! Never look for a hydraulic leak by hand. High-pressure oil can penetrate the skin and cause blood poisoning. Immediately consult a medical expert if skin contact with High-pressure oil has occurred.
	WARNING! Before working on the hydraulic system and its components, check that the hydraulic system is completely pressure-free. Dismantling a component that is still under pressure can cause serious injury.

Hydraulic hoses and lines must be checked by an expert for damage and wear at least **once a year**. If damage or wear is detected, the relevant part must be replaced or repaired immediately before the machinery is put back into service.

New hoses must meet the minimum required quality: **SAE 100 R2A according to DIN 20022/2**.

Always avoid contact with leaking liquids under pressure. If work on the hydraulic system takes place, the system must be completely pressure-free.



9.9. Tightening torque bolted connections

After the first 8 hours of operation, all bolt joints and wheel nuts must be checked and tightened at the correct tightening moment.

Dimension	Spanner width (mm)	Tightening torque (Nm)
M8	13	27
M10	17	57
M12	19	101
M14	22	148
M16	24	230
M18	27	348
M20	30	464
M22	32	634
M24	36	798
M27	41	1176
M30	46	1597

9.10. Electric motor

The electric motor can optionally be equipped with service-free bearing. This means that the bearing in the electric motor do not need to be regreased. The remaining periodic maintenance on the electric motor still has to be carried out.

9.10.1. Lubricating electric motor

If the electric motor is equipped with regreaseable bearings, these must be lubricated at least once every year or after 20,000 operating hours. These motors have a lubricating nipple at the top, on both the front and rear of the rotor. In case of doubt about the need to lubricate the electric motor, contact your dealer or Peeters Landbouwmachines B.V.



WARNING! Use only the prescribed type of grease for regreasing the electric motor. The prescribed grease type differs from the grease type used to regrease the rest of the machine.

Type of grease	Esso Unirex N2 or N3 Mobil Mobilith SHC 100 Shell Albida EMS2 Klüber Klüberplex BEM 41-132 FAG Arcanol TEMP110 Lubcon Turmogrease L802 EP PLUS Total Multiplex S 2 A
Service interval	Every year or 20,000 operating hours

Lubricating electric motor:

1. Ensure the machine is safe to work on. Start by turning off the main switch and locking it in the off position.
2. Depending on the machine type, it may be necessary to remove the protective cover above the electric motor.
3. Open the caps of the individual grease nipples at the top of the engine and clean the grease nipples. Contaminants can be introduced in the grease if the grease nipples are not cleaned beforehand. These contaminants can cause damage to the bearings or blockages in the internal lubrication system, which significantly shortens the lifespan of the electric motor.
4. Lubricate the bearings with the first **half** of the prescribed amount of grease.
5. Turn on the main switch and let run the engine for a few minutes (5-10 minutes) at 1500 rpm.
6. Turn off the motor and main current, remember to make the machine safe to work on by locking the main switch, before working on the machine.
7. Lubricate the bearings with the second **half** of the prescribed amount of grease. The bearings are now properly regreased with the total prescribed amount of grease.
8. The machine can now be used normally again, so the main switch can be turned back on again.
9. After 1 to 2 hours of operation, the caps of the grease nipples at the top of the electric motor can be closed. Make sure that the machine is safe to work on before closing the grease nipple caps!

BUILD SIZE ELECTRIC MOTOR	AMOUNT OF GREASE PER BEARING
180	30 g per bearing
200	40 g per bearing
225	50 g per bearing
250	60 g per bearing
280	60 g per bearing

Table 2 Amount of grease for different motor sizes

9.10.2. Cleaning electric motor

The electric motor is cooled by means of a fan attached to the end of the rotor shaft. This fan is shielded, which means that the supply of fresh cooling air can be hindered by dirt and debris. Clean the cooling fan shielding at least once a year. This extends the life of the electric motor and allows it to function optimally.

9.11. Cleaning the machine

The machine should be cleaned on a regular basis. Cleaning the machine extends the lifespan of the machine and prevents corrosion from forming on the machine. The exact cleaning interval depends on the specific application of the Peecon Biga Bio cut mix tub.

The electrical equipment on the machine is IP55 rated. This means that these are only weatherproof and should not be sprayed down with a pressure washer. If cleaning is carried out with a pressure washer, a number of additional precautionary steps must be followed:

- Avoid spraying on electronic equipment, such as weighing computers and loadcells.
- Maintain a minimum distance of 300 mm from the painted components, preferably with a minimum angle of 30 ° to the surface of the machine.
- Avoid the safety stickers. These stickers can be damaged by the use of a pressure washer.

General cleaning conditions

- Do not use aggressive cleaning agents. In particular gasoline, petroleum and mineral oils. These agents can damage the paintwork and hydraulic pipes.
- Inspect all safety stickers on the machine for damage after cleaning. The safety stickers have to be replaced if they have been damaged.
- Check the hydraulic system for leaks.
- Regrease the entire machine after clearing.

10. Troubleshooting

For more information about troubleshooting the machine, please consult the table below or surf to <https://peecon.com/troubleshooting/>.

Malfunction	Cause	Measure/Solution
Breaking bolt of PTO shaft breaks (indirect drive only)	Loading speed too high	Gradually add biomass to the mixing bowl.
	Loading capacity exceeded	Load machine up to 90% of the total volumetric capacity.
	Restart of mixing process after standstill	Change loading order of biomass components.
	Knives no longer sharp enough	Mount sharp knives.
	Incorrect auger speed	Check the incoming speed of the planetary auger drive. Check the outgoing speed of the electric motor
	Mixing tub overloaded	Load the machine up to 90% of the volumetric capacity.
	The auger is blocked.	Check why the auger is giving too much resistance. And remove any blocking.
	Electric motor switched on too abruptly	Contact the installer who connected the machine and have the electric motor start-up time lengthened.
Quality of biomass mixture insufficient	Load order of biomass components	Load the coarse and heavy biomass components first and load finer and lighter component last.
	Machine overloading	Load machine up to 90% of the volumetric capacity.
	Way of loading	Wait until the previously loaded batch has had time to be processed, before adding a new batch.
	Knives no longer sharp enough	Mount sharp knives.
	Machine is at an angle	Place machine on flat surface.
	Speed of augers incorrect	Check auger speed. The correct speed will have to be determined experimentally.
	Counter knife not pulled out	Pull out the counter-knife.
	Too many knives	Remove lower blades.
Processed Biogas mixture is not cut sufficiently	Processed Biogas mixture is not cut sufficiently	Check sharpness knives. Allow machine longer mixing time.
	Auger knife broken	When mounting, check that the knife is flat on the auger and can be mounted without bending.
Gearbox makes noise	Heavy material tipped on top of auger	Gradually inject biomass into the machine. Give the blades time to process coarse material.
	Oil level	Check oil levels and refill if necessary.
Uneven discharge	Defect in gearbox	Check if metal grinding or small pieces of metal are present in the gearbox.
	discharge door opened too far	Reduce the opening for an even output.

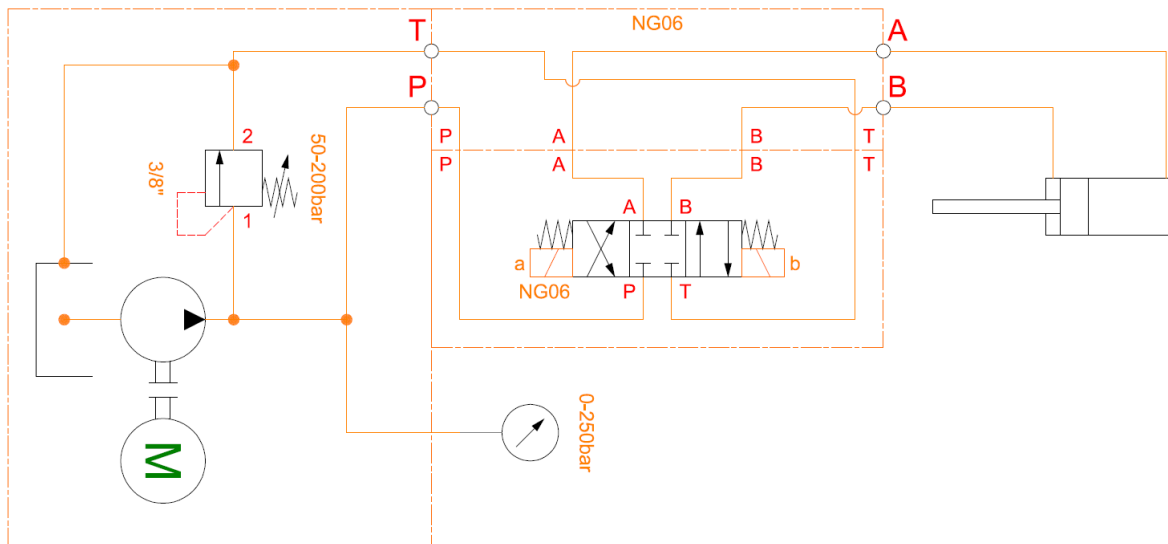
The machine does not mix well	Adjust the incoming speed	Increase or decrease auger speed. Please contact the installer.
	Change the loading order to optimize the mixing process	Check the loading order.
	The auger knives are not properly adjusted	The large knives on the augers can be placed in two different positions. Move the blades to the unused position.
Biomass is cut too finely	The counter blades have not been pushed in	Operate the counter knives and slide them in.
	Mixing/cutting time is too long	Reduce the mixing/cutting time.
The fluid coupling has been drained	Contra knife is set too aggressively	Set the counter-knife less aggressively .
	The melt plug is melted as a part of the thermal protection system	Check for a possible blockage of the auger. Contact Peeters Landbouwmachines B.V. for a replacement melting plug and refill the fluid coupling.
The thermal protection of the fluid coupling is repeatedly activated.	The oil in the fluid coupling becomes too hot	The start-up time of the engine is too slow. Contact the installer to shorten the start-up time. Please contact Peeters Landbouwmachines B.V. if this does not solve the problem.

11. System diagrams

Only the weighing system on the Peecon Biga cut mix tub will be pre-installed on the machine. The other systems need to have a control system designed and installed by an approved and certified installer.

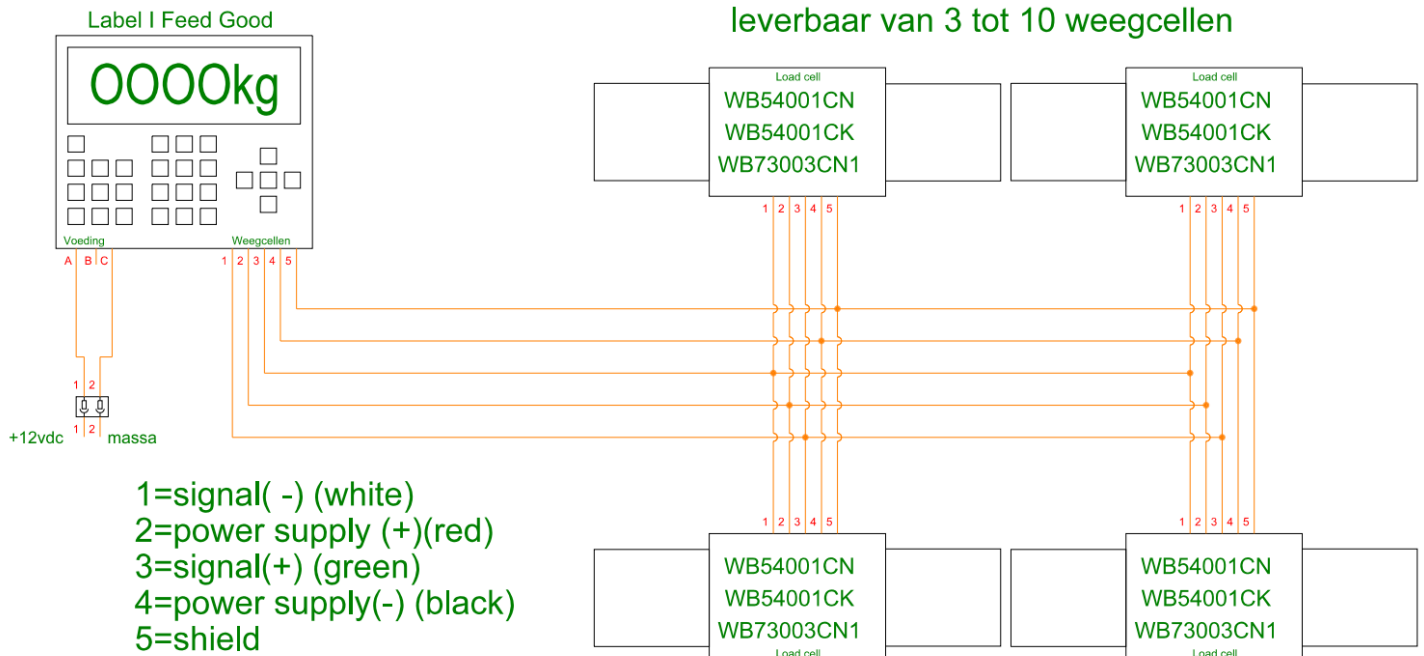
Peeters Landbouwmachines B.V. is not responsible for these system. However, a number of example diagrams are given below indicating how the machine can be connected.

11.1. Hydraulic diagram (Example)



11.2. Weighing system diagram - Biga (Connected by Peeters Landbouwmachines B.V.)

leverbaar van 3 tot 10 weegcellen



12. Safety Data Sheets liquids

This chapter contains the safety data sheets of the fluids and lubricant that might be present in the machine from factory. The use of these fluids and lubricants is recommended, but it is also possible to use alternative fluids and lubricants, provided they meet the same standards.



WARNING! Never mix different fluids or lubricants unless expressly authorized by the lubricant manufacturer. Mixing lubricants can result in unwanted chemical reactions, causing the machine components to become severely damaged.

12.1. Planetary gearboxes

STANDARD	APPLIED LUBRICANT
ISO VG 220	Q8 El Greco 220 synthetic https://www.q8oils.com/product/q8-el-greco-220/
ISO VG 320	Shell Omala S4 WE 320 https://www.epc.shell.com/DocumentManagement/blobDocumentDownload?DocId=112457452

12.2. General purpose grease

STANDARD	APPLIED GREASE
ISO 6743-09	Texaco Multifak Premium 3 https://cglapps.chevron.com/sdspds/SDSDetailPage.aspx?docDataId=443804&docFormat=PDF

12.3. Fluid coupling

STANDARD	APPLIED FLUID
ISO HM32 OR SAE 10W	Total Biohydran SE32 https://ms-sds.totalenergies.com/totalpullwebsite/ (search SDS code 38112 → Choose the right country → select the desired language → click search)

12.4. Electric motor grease

PRODUCT	OFFICIAL SDS DOWNLOAD SOURCE
ESSO / MOBIL UNIREX N2	https://www.msds.exxonmobil.com/psims/psims.aspx
ESSO / MOBIL UNIREX N3	https://www.msds.exxonmobil.com/psims/psims.aspx
MOBILITH SHC 100	https://www.msds.exxonmobil.com/psims/psims.aspx
SHELL ALBIDA EMS2	https://www.epc.shell.com/home/HomeSetup?inLang=EN
KLÜBERPLEX BEM 41-132	https://www.klueber.com/global/en/downloads/
ARCANOL TEMP110	https://www.schaeffler.com/en/products-and-solutions/industrial-lubrication/arcanol/
TURMOGREASE L802 EP PLUS	https://www.lubcon.com/service/safety-data-sheets/
TOTAL MULTIPLEX S 2 A	https://mysds.totalenergies.com