

Lely Vector

Automatic Feeding System



Operator Manual

EN-US – English Original

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Preface

Manual Contents

This manual contains the technical information, operating instructions, maintenance procedures and the troubleshooting information necessary to operate the Vector system.

The information in this manual is for operators.



Study and understand this information thoroughly before you operate the Vector. Failure to do so could result in damage to equipment or personal injury (see Signal Icons on page 2-1). Please consult your local Lely service provider if you do not understand the information in this manual, or if you need additional information. Store this manual in a safe place for future reference.

All information in this manual has been compiled with care. Lely shall not be liable for errors or faults in this manual. The recommendations are meant to serve as guidelines. All instructions, pictures and specifications in this manual are based on the latest information that was available at the time of publication. Your Vector may comprise improvements, features or options that are not covered in this manual.

Applicability

The table below shows the type numbers of the parts of the Vector for which this manual is applicable

| Model | Type number |
|---|---------------|
| Mixing and Feeding Robot 1 Phase | 5.2011.0054.1 |
| Mixing and Feeding Robot 3 Phase | 5.2011.0055.1 |
| Mixing and Feeding Robot 1 Phase (short feed mixer) | 5.2011.0056.1 |
| Mixing and Feeding Robot 3 Phase (short feed mixer) | 5.2011.0057.1 |
| Feed Grabber Laser | 5.3003.0000.1 |
| Feed Grabber Laser for double fixed rail | 5.3003.0020.1 |
| Fixed Rail (double) | 5.2013.0847.1 |
| Fixed Rail (single) | 5.2013.0800.1 |
| Bridge Crane | 5.2013.0210.1 |
| Power Distribution Box 3 PhN 400/230 VAC | 5.2011.0532.0 |
| Power Distribution Box 2 Ph 240 VAC SP | 5.2011.1174.0 |
| Power Distribution Box 3 Ph 230 VAC | 5.2011.1241.0 |

This manual is applicable for software version 2.4.

Standard Torque Loading of Parts

All the nuts, bolts and screws used on the system are torque tightened to standard torque loadings applicable to the construction materials used.

If a part has a non-standard torque loading, it is specified in the applicable part of the manual.

Registration Vector

A type and serial number plate is attached to the following parts of the Vector:

- Power distribution box: outside the power distribution box, above the switch.
- Mixing and Feeding Robot: on the centre of the rear frame above the battery tray.
- Feed Grabber: on the frame above the control box
- Bridge Crane: on the wheel frame.
- Fixed Rail: on the frame above the bend.
- Additives dispenser (frequency pulse): inside the control box.
- Control box external concentrates (frequency weight): inside the control box.
- Control box automatic door: inside the control box.

Always include the type and serial numbers of the part of the Vector when you contact your local Lely service provider or order spare parts.

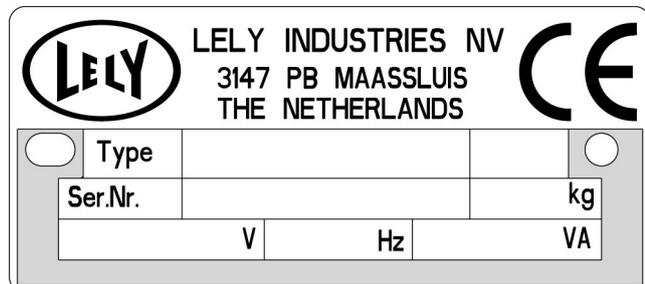


Figure 1. Type and serial number plate

A decal with the serial number and bar code is attached inside every control box.

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- php-5.3.6
- php-cgi

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Personnel Requirements



***Risk of accident from insufficiently qualified personnel.
Unqualified personnel working in the working area of the Mixing and Feeding Robot can be the cause of serious injuries and considerable damage to material.***

- ***All activities must only be carried out by qualified personnel.***
 - ***Keep unqualified personnel away from the working area of the Mixing and Feeding Robot.***
 - ***Only persons who can be expected to carry out their job reliably are authorized as personnel. Persons whose reactions are impaired, e.g. by drugs, alcohol medications are not authorized to work in the area where the Mixing and Feeding Robot operates.***
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1 Lely Vector

1.1 Lely Vector

NOTICE

Only use the automatic feeding system for its intended purpose!

The Vector is an automatic feeding system that:

- Collects roughage from the feed kitchen where the feed is stored.
- Doses feed concentrates and additives.
- Mixes the feed.
- Transport this mixture to a location with animals.
- Doses the feed along the fence.
- Pushes the feed towards the fence.
- Scans the feed height along the fence.

Each location with animals receives its own specific ration. The Vector can operate 24 hours a day every day of the year.

The Vector has one or two Mixing and Feeding Robots that mix, transport and distribute the feed. The Vector has several options:

- A Feed Grabber to collect roughage.
- One of the following transport systems for the Feed Grabber:
 - Bridge Crane.
 - Fixed Rail.
- Additive dispenser(s) (frequency pulse).
- Feed concentrate auger(s) (frequency weight).
- (Tower) silo(s) for concentrates or roughage.
- Safety fence.
- Automatic (barn) door control.
- Access door control to the feed kitchen.
- Kitchen fill door control.

A smartphone with bluetooth and the correct app is used to operate the software on the devices of the Vector.

1.2 Intended Use

The Lely Vector is designed to be used as an automated feeding system for milking cows and beef cattle.



The Vector system is exclusively built to collect, mix and distribute roughage like silage, hay and grain crops. Other types of feed (concentrates, additives, wet mixtures, vegetables, potatoes) may be added and mixed only in small amounts.

The Feed Grabber is built to collect loose roughage from blocks and vegetables from bins.

The Mixing and Feeding Robot was built to mix and distribute the feed in a barn along a feed fence.

Usage going beyond that does not constitute proper use. The manufacturer is not liable for damage resulting from improper use; the operator alone bears the risk.

Intended use also implies that the instructions and rules prescribed by the manufacturer are observed.

2 Safety

2.1 Signal Icons

Note the use of the signal words DANGER, WARNING and CAUTION with the safety messages. The signal word for each message uses the following guidelines:



Danger
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.



Warning
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



Caution
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



Notice
Is used to address practices not related to physical injury e.g. property damage.



Tip
Indicates information that may help the reader, but not hazard related.

2.2 Safety Instructions

YOU are responsible for the SAFE operation and maintenance of your Vector system. YOU must make sure that you and anyone else who is going to operate, maintain or work in the vicinity of the devices know all the related SAFETY information in this manual.

YOU are the key to safety. Good safety practices protect you and the people around you. Make these practices a working part of your safety program. Make sure that EVERYONE who operates, maintains or works near the devices obeys the safety precautions. Do not risk injury or death by ignoring good safety practices.

- Owners must train operators before they operate the Vector system. This training must be repeated at least annually.
- The operator must read, understand and obey all safety and operating instructions in the manual.
- A person who has not read and understood all safety and operating instructions is not permitted to operate the Vector system.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment and persons.
- Only use approved spare parts and make sure that they are only installed by authorized technicians.



The hazards in the danger zone and working area pose a risk of fatal injury to unauthorized persons.

Unauthorized persons who do not satisfy the requirements described herein are not aware of the hazards in the work area. Unauthorized persons are therefore at risk of serious or fatal injury.

- ***Keep unauthorized persons away from the danger zone and work area.***
- ***If in doubt, approach unauthorized persons and ask them to leave the danger zone and work area.***
- ***Stop work as long as unauthorized persons are within the danger zone and work area.***

2.2.1 General Safety

- Read and understand this manual and all safety signs before you operate, maintain or adjust any parts of the Vector system.
- Only a Lely trained technician is allowed to do maintenance on the Vector system that is not described in this manual.
- Only trained persons are permitted to operate the Vector system or parts of the Vector system.
- Review safety related items with all operators frequently (annually).
- Keep unauthorized persons, especially small children away from the feeding system at all times.
- Keep hands, feet, hair and clothing away from all moving parts.
- Make sure all covers are installed before you operate the Vector.



- Always wear safety shoes.
- Prevent damage by vermin.
- Let an authorized person yearly inspect and approve the Vector system for hoisting.
- Contact your nearest Lely service provider if you have any questions.

General electrical safety

- Do not perform any maintenance on the electrical system yourself.
- Keep away from areas with high voltage.
- Have grounding connections regularly checked.
- Have damaged electrical lines, conduits, switches and components immediately replaced by a Lely technician.
- Always disconnect and isolate the electrical power before commencing maintenance.

2.2.2 Mixing and Feeding Robot Safety Instructions

Operating safety

- Only trained persons are permitted to drive the Mixing and Feeding Robot.
- Install all covers before you operate the Mixing and Feeding Robot.
- Do not climb on the Mixing and Feeding Robot to inspect the mixing process. The mixing process can be checked by positioning a mirror in the loading zone above the mixing bin, or by using the Lely step ladder.
- Only operate the Mixing and Feeding Robot in a marked track.
- Never have the mixing bin loaded with more than 600 kg (1323 lb), this causes a longer braking distance and wear on the wheels and other parts.
- Only operate the Mixing and Feeding Robot in a track with a slope less than 5%.
- Keep the marked track free from obstacles and as clean and as dry as possible.

Maintenance safety

- Mixing knives are very sharp.
 - Always switch off the Mixing and Feeding Robot (see Switch off the Mixing and Feeding Robot with the Key on page 5-9) before you do work on the mixing knives.
 - Always wear protective clothing before you do maintenance inside the mixing bin (see Cut Resistant Clothing on page 2-4).
 - Never climb into a loaded mixing bin without knowing where the mixing knives are located under the feed.
 - Always install the knife guards on the knives before you remove or install a knife, or do other work in the mixing bin.
- Metal parts on the magnets can be sharp, always wear protective gloves when you clean the magnets.
- Disconnect and isolate the electrical power supply with the safety key before you do work on the Mixing and Feeding Robot (see Switch off the Mixing and Feeding Robot with the Key on page 5-9), if work is done under the skirt, switch off the main switch on the batteries (see Switch off the Main Switch on the Mixing and Feeding Robot near the Battery on page 5-10).

- Keep tools and metal parts away from the battery.
- Do NOT use a high pressure cleaner when you clean the Mixing and Feeding Robot on the outside.
- Make sure all covers are installed when maintenance work is completed.

2.2.3 Cut Resistant Clothing

The cut resistant clothing must comply with the standards in the table below.

| Symbol | Applies to | Information about level of protection, class and design |
|---|---------------------------------------|--|
|  EN 388 | Gloves EN 388-5 | Cut resistant gloves according to EN 388 level 5 (or ANSI 105 level A7) Level 5 indicates the glove provides the highest level of cut resistance. |
|  EN 388 | Sleeves EN 388-5 | Cut resistant sleeves according to EN 388 level 5 (or ANSI 105 level A7) Level 5 indicates the sleeve provides the highest level of cut resistance. |
|  EN 381 | Trousers EN 381-5 Overall EN 381-5 | Chainsaw trousers according to EN 381-5: <ul style="list-style-type: none"> • All classes are sufficient, class 0 (16 m/s) to 3 (28 m/s). • Design C is mandatory, this design has protection all around. |
|  EN 381 | Jacket EN 381-11 | Chainsaw jacket according to EN 381-11 preferably with belly protection. |

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2.2.4 Cranes and Feed Grabber Safety Instructions

Operating safety

- Do not enter the operating area of the Bridge Crane and Feed Grabber when the system is not in kitchen fill mode.
- Do not bypass/ tamper with the safety systems in any way.
- Do not block the Crane or Feed Grabber. It can move with sufficient force and can cause injury.
- Do not climb the Crane.

Maintenance safety

- Have the crane inspected yearly.
- Do NOT touch the motors until they are cooled down.
- Use the Vector stepladder to work on the Crane and Feed Grabber.
- Do NOT spout water on the body of the Feed Grabber. Use a wet brush to clean the Feed Grabber

2.2.5 Safety Fence Safety Instructions

- The wires of the safety fence are installed under tension, make sure there is no animal or other person near the wire when you unhook or hook a wire and be aware of the elastic force.
- Keep away from the safety fence wires when the feed kitchen is in operation. Danger of a high voltage electrical shock.

2.3 Safety decals

2.3.1 Safety Decals on the Mixing and Feeding Robot

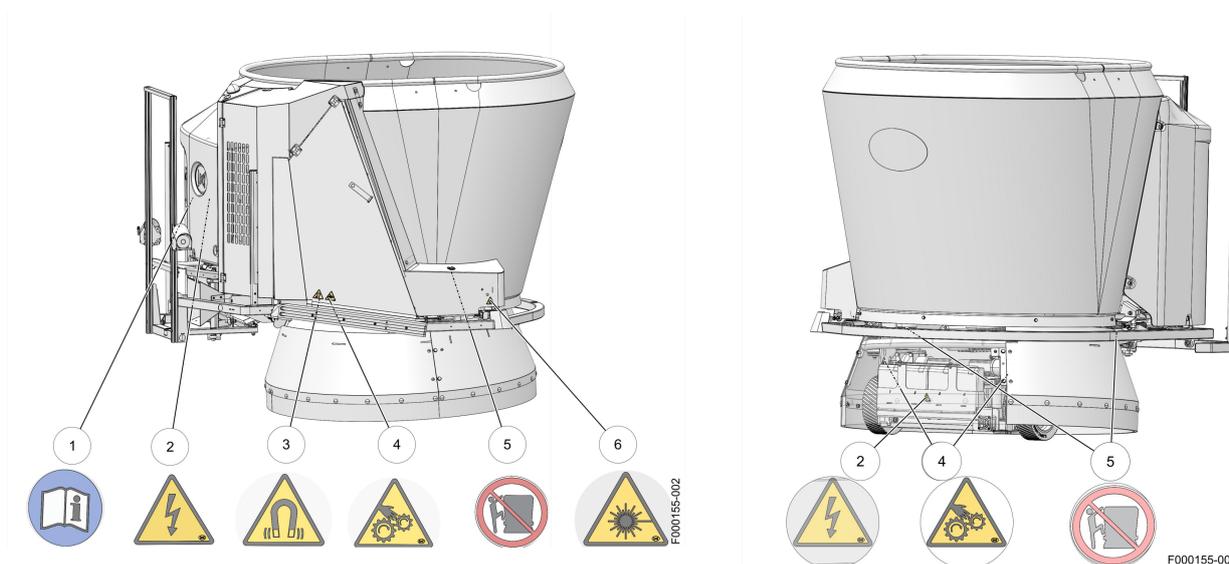
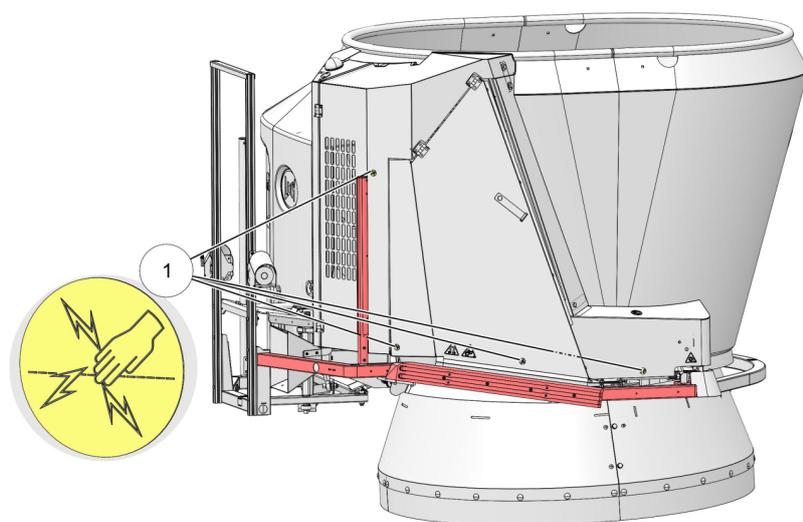


Figure 2. Location of the safety decals

| Key | Decal | Explanation |
|-----|-------|---|
| 1 | | Caution: Read manual Failure to follow operation instructions could result in death or serious injury. Read the manual. |
| 2 | | Caution: Electrocutation hazard Risk of electrocution. Switch off the power before doing maintenance, adjustment or repair. |
| 3 | | Warning: Magnetic fields Do not work near the magnets if you have a cardiac pacemaker or other implant that can be impaired by magnetic fields. |

| Key | Decal | Explanation |
|-----|---|---|
| 4 |  | Danger: Rotating parts Danger of being entangled by rotating parts. Keep hands, loose clothing and long hair away from moving parts during operation of the Mixing and Feeding Robot |
| 5 |  | Caution: Do not climb / Keep off bumper Risk of serious injury and product damage. Do not climb in, or on the vehicle and keep off the bumper. |
| 6 |  | Caution: Laser light hazard Risk of being blinded. Do not stare into the beam. |

Optional

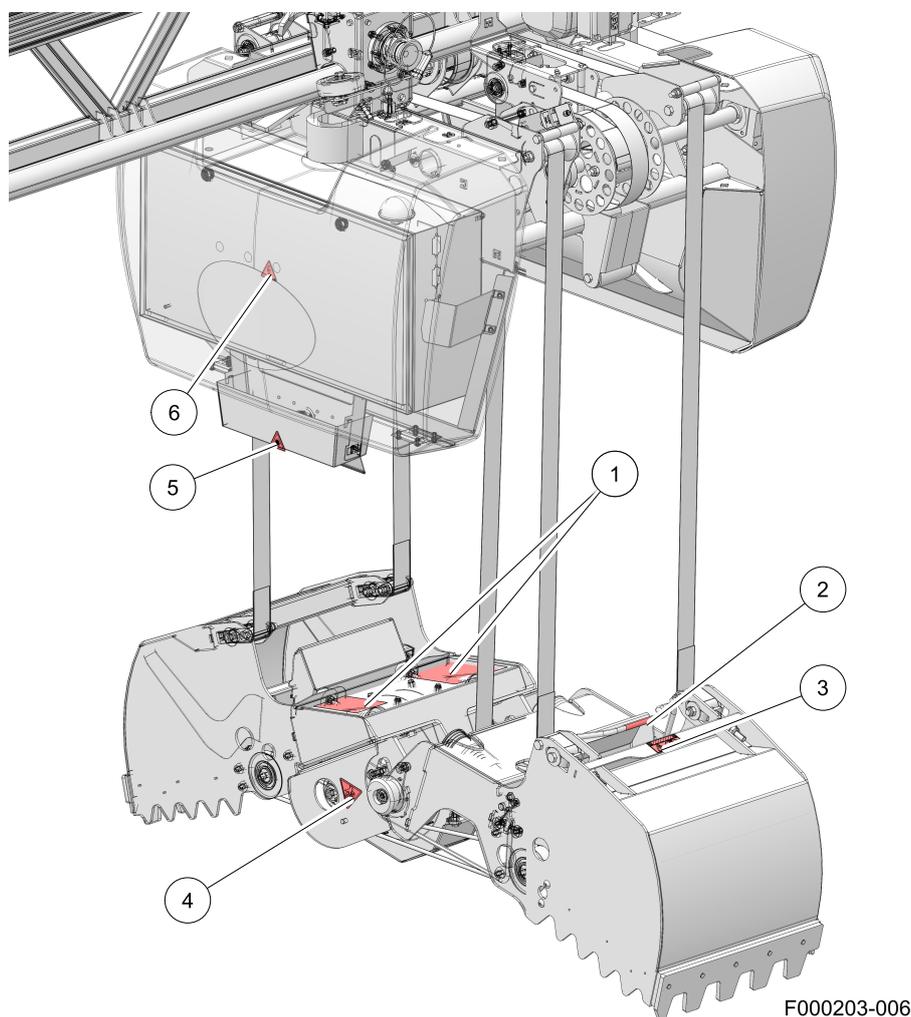


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Figure 3. Electric shock device

| Key | Decal | Explanation |
|-----|---|--|
| 1 |  | Caution: Electric shock Risk of a high voltage electric shock. Keep away from the shock strips on the bumper. |

2.3.2 Safety Decals on the Feed Grabber



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Figure 4. Locations of decals on the Feed Grabber

| Key | Decal | Explanation |
|-----|---|---|
| 1 | | Closing cord instruction (see Closing Cord Instruction on page 2-8). |
| 2 |  | Safety lever stripes This decal indicates the position of the safety lever. |
| 3 |  | Safety lever This decal indicates the function of the safety lever. Pull the lever upwards to release the tension on the grabber. Be aware that the grabber may open with force, do not stand close to the grabber when pulling the lever. |
| 4 |  | Danger: Rotating part Risk of being entangled by rotating parts. Keep hands, loose clothing and long hair away from moving parts during operation of the Feed Grabber. |

| Key | Decal | Explanation |
|-----|-------|--|
| 5 | | Caution: Laser light hazard Risk of being blinded. Do not stare into the beam. |
| 6 | | Caution: Electrocution hazard Risk of electrocution. Switch off the power before doing maintenance, adjustment or repair. |

Closing Cord Instruction

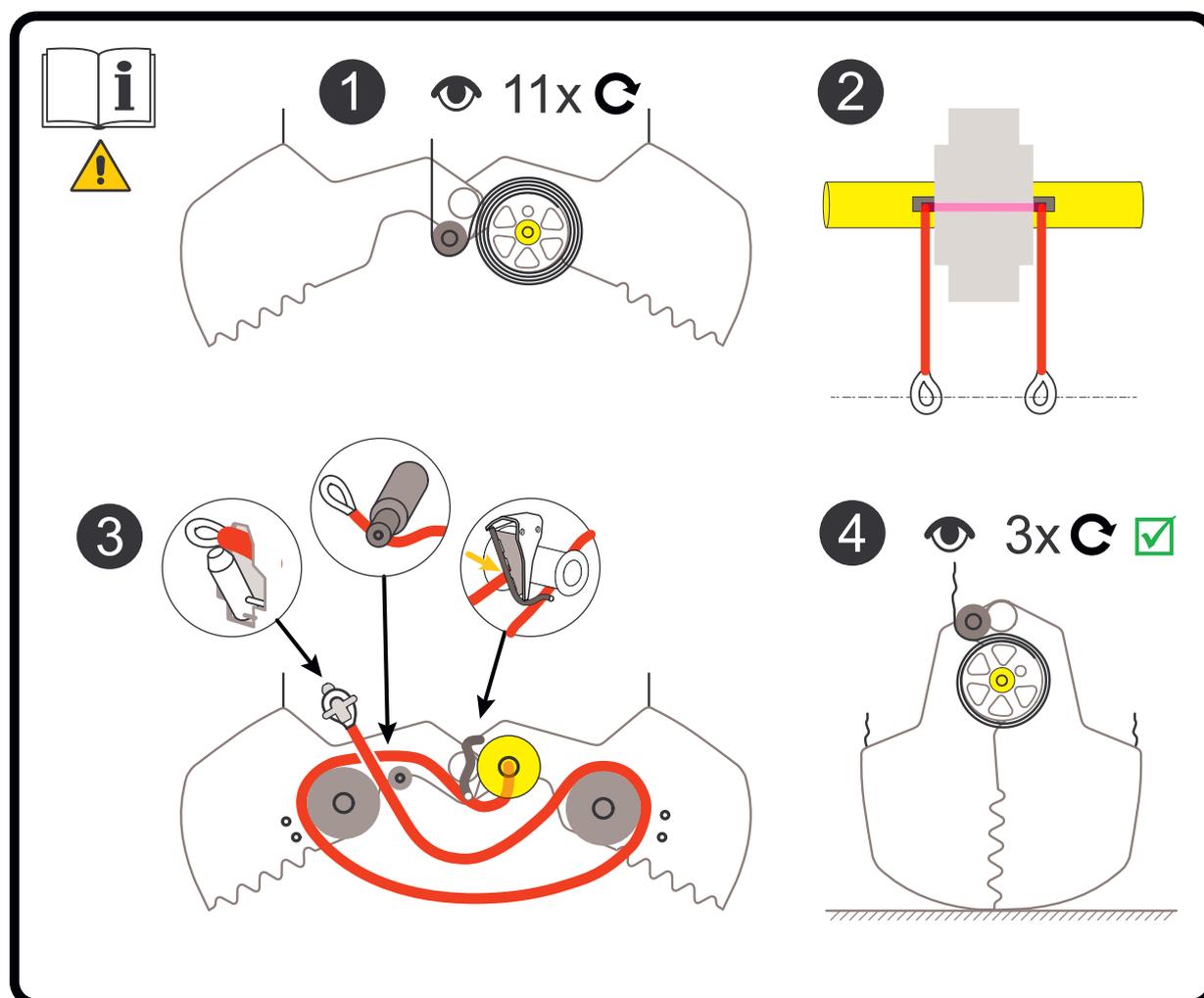


Figure 5. Instruction how to install the closing cord

This instruction shows the steps for installing the closing cord. The closing cord must preferably be installed by a Lely technician.

2.3.3 Safety Decals on the Cranes

| Location | Decal | Explanation |
|---|-------|---|
| On the rail | | WLL 0.15 T The WLL (work load limit) of the Feed Grabber 0.15 T (150 kg (330 lb)). |
| Location of the service point On the IPE profile of a Bridge Crane or a Fixed Rail | | WLL 1.5 T The WLL (work load limit) is 1.5 T (1500 kg (3307 lb)). The Mixing and Feeding Robot can be lifted at this point for maintenance. |

2.3.4 Safety Decals on the Control Boxes

| Location | Decal | Explanation |
|---|-------|--|
| On every door of a control box connected to 230 V | | Caution: Electrocution hazard Risk of electrocution. Switch off the power before doing maintenance, adjustment or repair. |

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2.3.5 Safety Decals in and near the Feed Kitchen and Barn

| Location | Decal | Explanation |
|---|---|--|
| At the entrance of the barn or at the entrance of the farmyard where the Mixing and Feeding Robot moves | <p>CAUTION UNMANNED MOVING VEHICLES Enter at your own risk!</p> | <p>Caution: Unmanned moving vehicles</p> <p>Only persons who are authorized and have been instructed on all applicable safety instructions are permitted to enter the area. Ignoring this warning can interfere with the proper functioning and may cause injuries.</p> |
| At the entrance of the area where the Mixing and Feeding Robot moves | <p>CAUTION RESTRICTED AREA Unmanned moving vehicles! Authorised personnel only.</p> | <p>Caution - Restricted area</p> <p>Only persons who are authorized and have read and understood all applicable safety instructions are permitted to enter the area. Ignoring this warning may cause severe injuries.</p> |
| At the entrance of the Feed Kitchen | <p>DANGER KEEP OUT CONFINED SPACE Unmanned moving vehicles! Do not enter before all systems are shut down.</p> | <p>Danger - No Admittance because of unmanned moving vehicles</p> <p>Persons are only permitted to enter the area when all systems are shut down. Ignoring this warning may cause critical injuries or death.</p> |
| On the poles of the safety fence (optional) | | <p>Caution: Electric fence</p> <p>Risk of a high voltage electrical shock. Keep away from the electric fence.</p> |
| On the knife guard holders near the power distribution box | | <p>Warning</p> <p>Switch off the Mixing and Feeding Robot with the key and remove the key before you do work on the Mixing and Feeding Robot.</p> |

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2.3.6 Safety Decals of the Tower Silo

| Location | Decal | Explanation |
|---|-------|--|
| <p>Near the power switch on every tower silo or other device operated with Digital Output</p> | | <p>Lock instructions tower silo</p> <p>This decal warns the mechanic on the tower silo or other device that it is operated with Digital Output. The mechanic is warned about the fact that the Vector system starts the auger or conveyor belt of the silo. The decal instructs the mechanic to switch the power to the silo off and to lock the switch before doing maintenance.</p> |

2.3.7 Safety Decals on the Route

| Location | Decal | Explanation |
|---|-------|---|
| <p>At the entrance of a narrow alley on the route of the Mixing and Feeding Robot</p> | | <p>Caution: Narrow alley zone</p> <p>Risk of being trapped.</p> <p>In this zone the clearance around the Mixing and Feeding Robot is less than 50 cm (19.7 in). It is not possible for persons to pass the Mixing and Feeding Robot in this area. When the Mixing and Feeding Robot deploys a sound and light signal, move to the nearest exit away from the Mixing and Feeding Robot. The Mixing and Feeding Robot will wait a time period to allow evacuation before continuing the route.</p> |

2.3.8 Installation of Safety Decals

1. Make sure that the installation surface is clean and dry.
2. Make sure that the temperature of the mounting surface is not less than 5 °C (41 °F).
3. Find the correct position for the decal before you remove the backing paper.
4. Remove a small part of the cover paper.
5. Put the decal in the correct position on the installation surface and carefully push the small part of exposed adhesive surface of the decal onto the installation surface.
6. Slowly remove the cover paper and attach the rest of the decal to the installation surface.
7. Puncture small air pockets in the decal with a pin and use the cover paper to smoothen the decal.

2.3.9 Maintenance of Safety Decals

Safety decals show important and useful information that will help you to safely operate and maintain the machine.

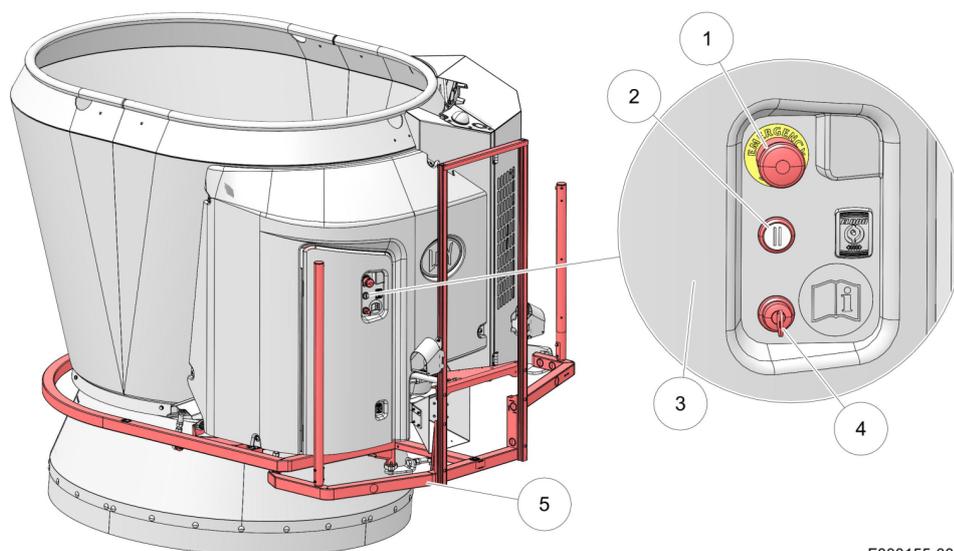
Obey the instructions below to make sure that all the decals stay in the correct position and condition.

- Keep the safety decals clean and legible at all times. Clean the safety decals with soap and water. Do not use mineral spirits, abrasive cleaners or other similar agents that may damage the safety decals.
- Replace safety decals that are missing or that are illegible.
- Safety decals can be purchased from your local Lely service provider.

2.4 Safety Devices

2.4.1 Mixing and Feeding Robot

2.4.1.1 Emergency Stop Button



F000155-005

Figure 6. Location of the safety devices on the Mixing and Feeding Robot

KEY: 1. Emergency stop button - 2. Pause button - 3. Acoustic warning device - 4. Safety key - 5. Bumper with stop function

An emergency stop button (1) is installed on the front of the control box of the Mixing and Feeding Robot.

When the button is pushed, the Feeding Robot immediately stops operation.

To reset the emergency stop button, turn the button clockwise and pull it out until it locks. The generated alarm must be reset on the software and the pause button (2) must be pushed twice.

2.4.1.2 Pause Button

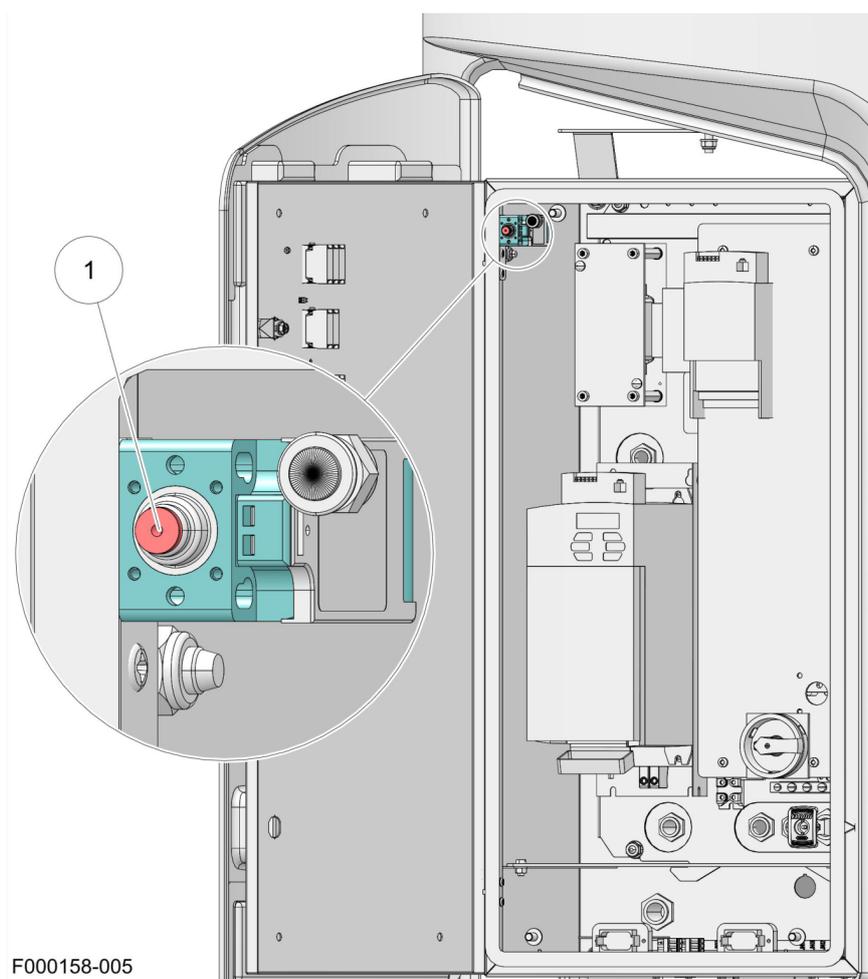
A pause button (2) (see figure 6 on page 2-13) is installed next to the emergency stop button on the front of the control box of the Mixing and Feeding Robot.

When the button is pushed, the Feeding Robot immediately stops operation. This can be used when the route is blocked. After the obstacle is removed, the pause button must be pushed again and the Mixing and Feeding Robot will continue operation.

The pause button must also be used to:

- Reset an alarm on the Mixing and Feeding Robot (see Reset an Alarm on the Mixing and Feeding Robot and Continue Route on page 5-17).
- Confirm that the hazard zone surrounding the Mixing and Feeding Robot is obstacle-free before manual operation in the test menu with the smartphone is possible.

The button (1) (see figure 7 on page 2-14) on the door of the PCB box has the same function as the pause button. When the door is opened, the button is released and the Mixing and Feeding Robot immediately stops operation. This makes sure the Mixing and Feeding Robot can only operate when the door of the PCB box is closed.



F000158-005

Figure 7. Button on the door of the PCB box

KEY: 1. Button

2.4.1.3 Acoustic Warning Device

An acoustic warning device (3) (see figure 6 on page 2-13) alerts persons and animals when the vehicle starts to move or moves.

- Before the Feeding Robot leaves the charging station a long beep is sound.
- During the route short term beeps are sound.

- During driving on a narrow alley.
- During driving backward.

The acoustic warning device is on the back of the PCB box.

2.4.1.4 Safety Bumper

The safety bumper (5) (see figure 6 on page 2-13) makes sure the Mixing and Feeding Robot stops when it hits an object that is at least 45 cm (17.7 in) above floor level. The reaction of the Mixing and Feeding Robot depends on the object type and the route action

- If the Mixing and Feeding Robot hits a solid object (for instance a tractor), it drives back until there is no contact with the obstacle. After a few seconds the Feeding Robot tries to continue its route. If it hits the object again, it drives back again (until there is no contact). This way the Mixing and Feeding Robot will try to continue its route for a few times and then it stops and generates an alarm message.
- If the Mixing and Feeding Robot hits an object that is not solid, or if a person or animal pushes the bumper, the vehicle waits a few seconds and tries to continue its route. During feeding the Feeding Robot will rotate a bit away from the feed fence. If the collision detector is activated a few more times (within 50 cm (19.6 in)), the vehicle stops and generates an alarm message. The alarm message is generated after the collision detector has been activated 5 times when the route action is feeding, during other route action an alarm is generated after 3 times.

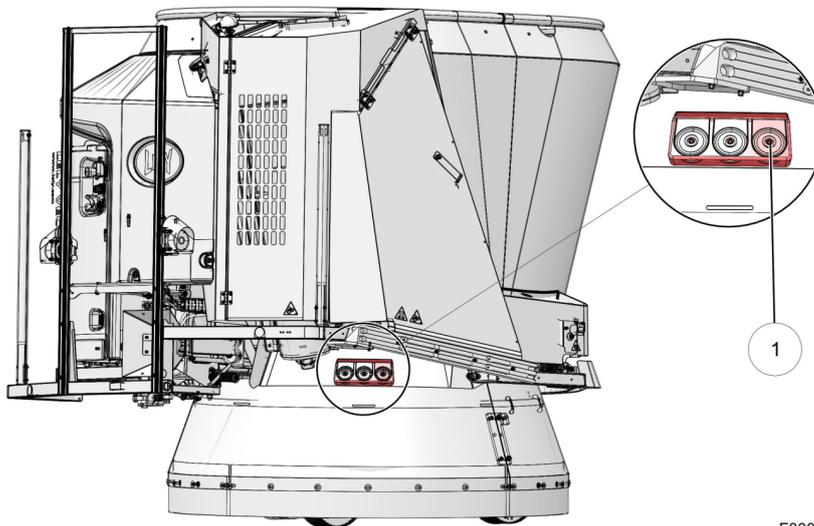
2.4.1.5 Safety Key

A safety key (4) (see figure 6 on page 2-13) is installed on the front of the control box of the Mixing and Feeding Robot.

When the safety key is switched to the OFF position, the Feeding Robot immediately stops operation. The key operates the same circuit as the emergency button, the same alarm will be generated.

The safety key must be removed before maintenance is done.

2.4.1.6 Magnets

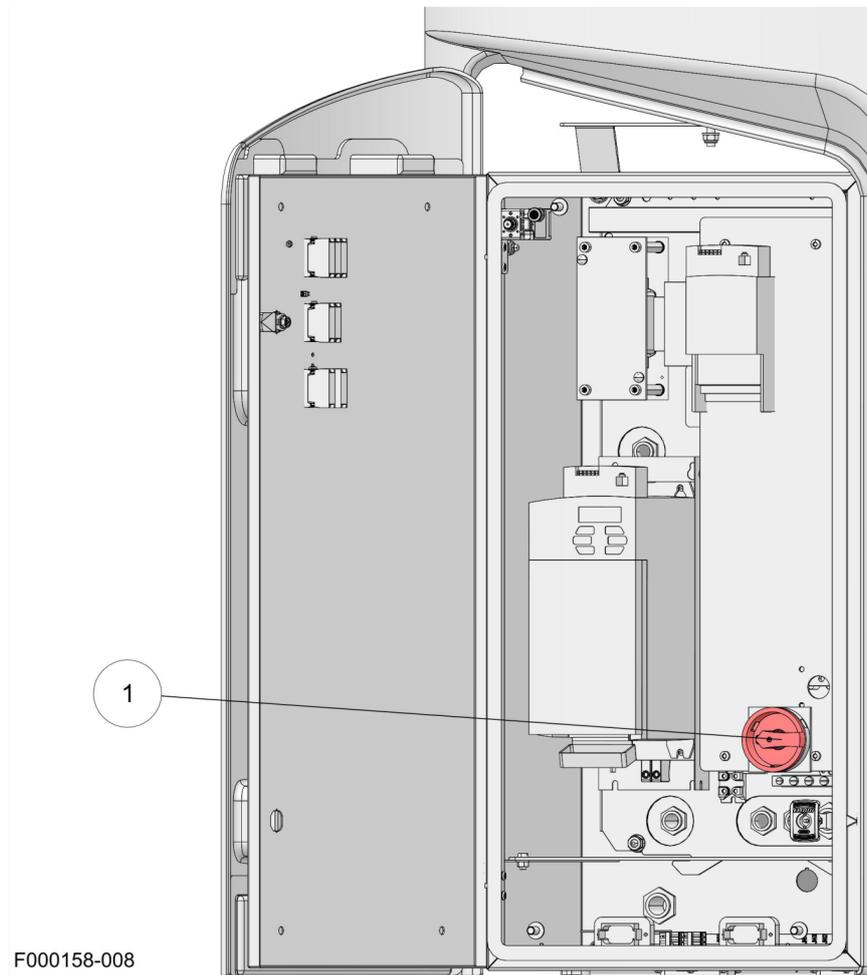


F000190-001

Figure 8. Magnets

Three very strong magnets (1) are installed in a plastic holder below the feed door. If there is metal in the feed, for example from a broken mower knife, it will stick to the magnets. This reduces the risk of animals eating sharp metal parts.

2.4.1.7 High Voltage Switch in the PCB Box



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F000158-008

Figure 9. PCB box

KEY: 1. Isolation switch for high voltage

The isolation switch (1) isolates the 325 VDC from the DC/DC converter to the power box and the connection between the grid and the power box. When the switch is set to off:

- All high voltage is cut off (for filters, diodes etc).
- It is now safe for lely technicians to do maintenance on the high voltage parts.

The PCBs are still on because the battery is not interrupted.

2.4.1.8 Flashing Light (Optional)

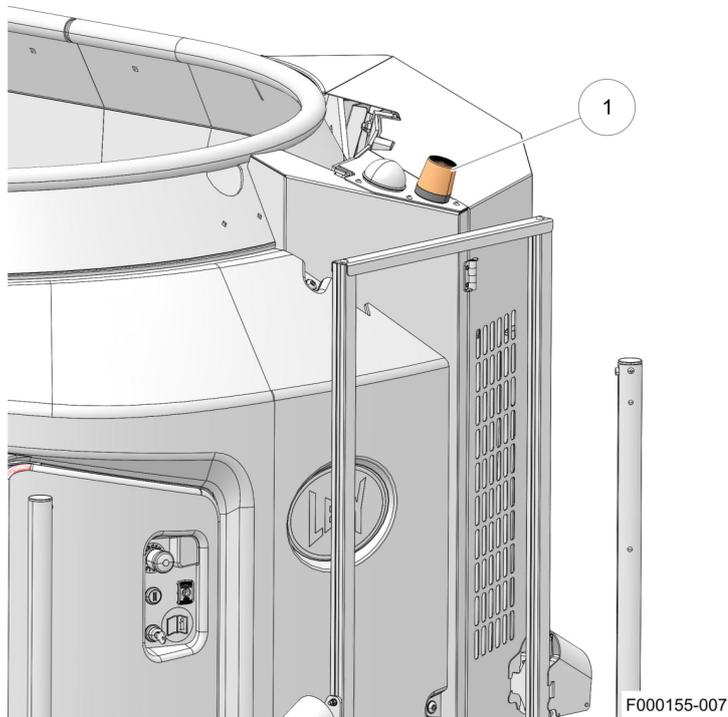
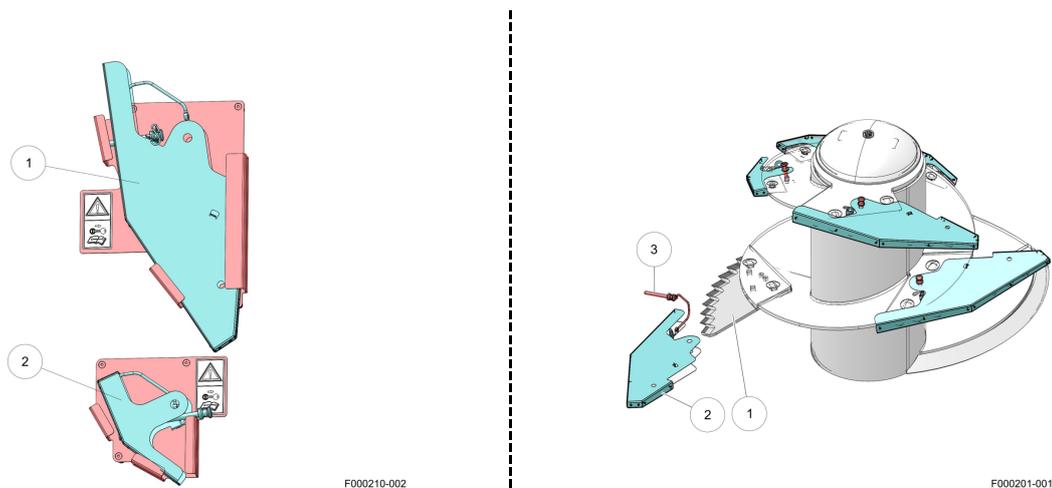


Figure 10. Flashing light

A flashing light (1) on the Mixing and Feeding Robot alerts persons and animals when the Mixing and Feeding Robot drives in narrow alleys.

At the feed loading point the flashing light alerts persons when a digital output is started.

2.4.1.9 Knife Guards



KEY: 1. Large knife guards - 2. Small knife guards

KEY: 1. Mixer knife - 2. Knife guard - 3. Locking pin

The knife guards are kept in the holders on the wall near the power distribution box. During replacement of the mixer knives and other work in the mixing bin, the knife guards must be installed on the mixer knives and must be secured with the locking pins. Start at the highest blade and work your way down.

2.4.1.10 Software Controlled Protection

Driving in Narrow Alleys

On narrow alleys when there is less than 0.50 m (1.6 ft) on one or two sides of the Mixing and Feeding Robot the option is set. On this part of the route the software makes sure:

- The Mixing and Feeding Robot sounds an alarm and sends light signals and waits for a time period before entering the narrow alley. This gives people and animals the chance to go out of the alley.
- Loud beeps sound during driving in the narrow alley.
- A flashing light signals during driving in the narrow alley.

Battery Overcharge Protection

The operational software of the Mixing and Feeding Robot controls the charge system. This allows to keep the Mixing and Feeding Robot connected to the charging station during charging, even if the battery is fully charged. The software prevents overcharging the battery and keeps it fully charged until the next operation.

Distance to Stop After not Finding the Next Reference Point

On the route to the groups and back to the charger, the Mixing and Feeding Robot drives until it finds the next fence, wall or strip. Due to skid or malfunction, there is a small chance the Feeding Robot does not find its next reference point. If the reference point is not found the robot stops after a certain distance. This distance is depending on the type and the length of the route action the Mixing and Feeding Robot was driving.

2.4.2 Feed Grabber

2.4.2.1 Lever to Manually Open the Grabber



***Sudden release of jaws.
Risk of personal injury.
Only use the safety lever in case of an emergency. Stand as far away from the jaws of the grabber as possible to prevent getting hit by a released jaw.***



Only open the grabber in case of an emergency because the cords will fall out and must preferably be repositioned by a Lely technician.

1. If possible, first stop the Feed Grabber from moving and stop the system by pushing an emergency button.
2. Pull the lever (2) upwards.
3. The closing cords (3) will fall and the jaws of the grabber will open.

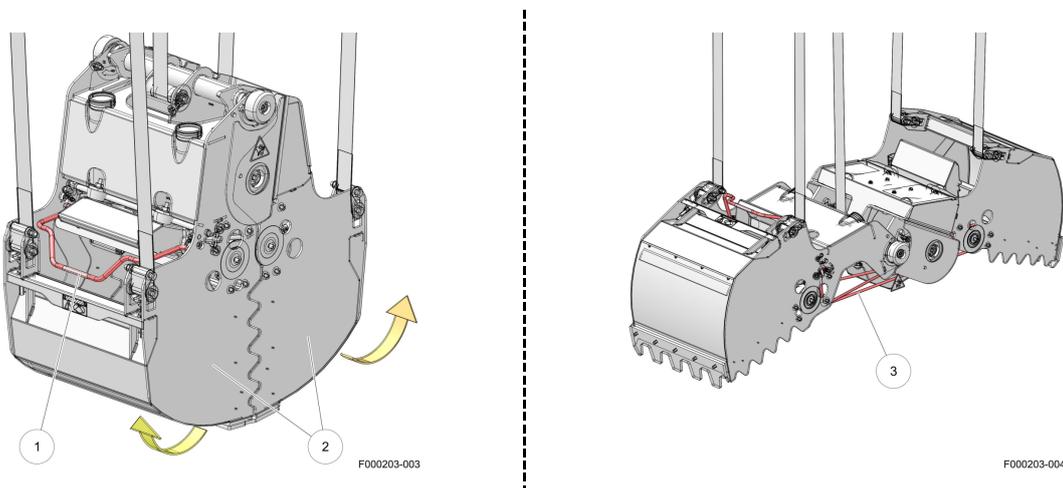
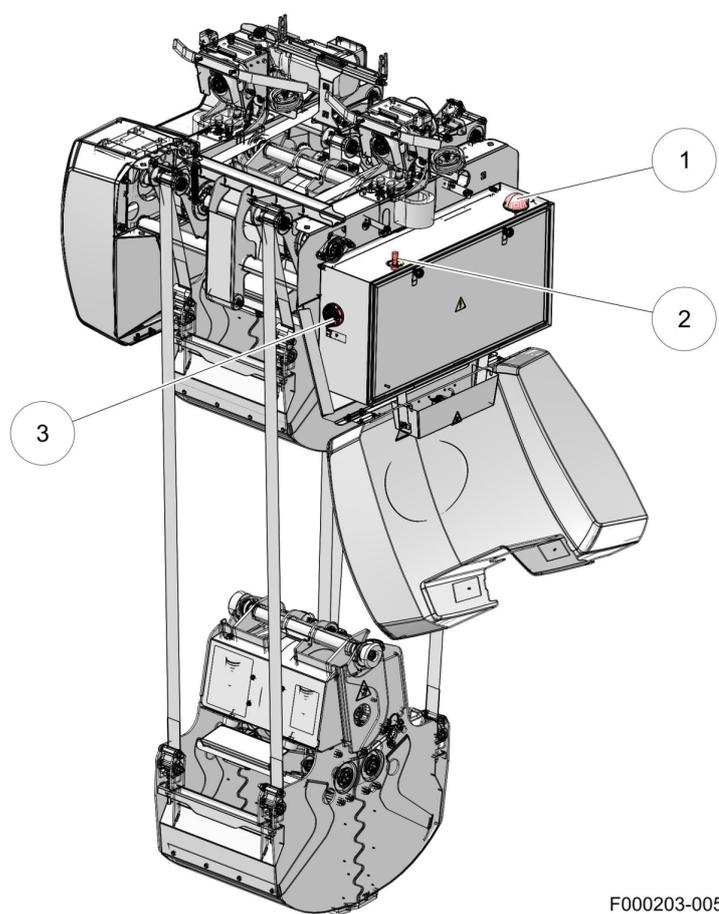


Figure 11. Lever to open the Feed Grabber

KEY: 1. Grabber jaws - 2. Lever to manually open the grabber - 3. Closing cord

2.4.2.2 Emergency Stop Button



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Figure 12. Emergency stop and main switch

KEY: 1. Bluetooth antenna - 2. Emergency stop button - 3. Power supply switch

The Emergency Stop Button (2) is installed on the control box and will only be used during maintenance.

When the button is pushed, the Feed Grabber and Bridge Crane immediately stop.

To reset the emergency stop button, turn the button clockwise and pull it out until it locks.

2.4.3 In and Near the Feed Kitchen

2.4.3.1 Emergency Stop Button

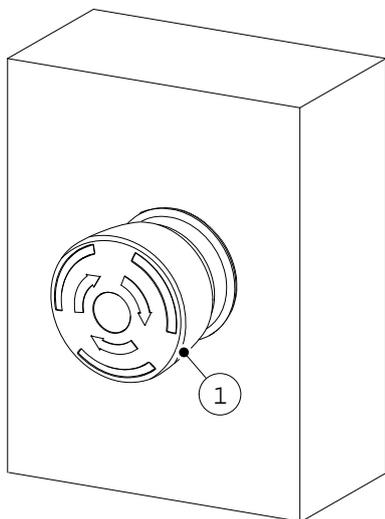


Figure 13. Emergency stop button

KEY: 1. Emergency stop button

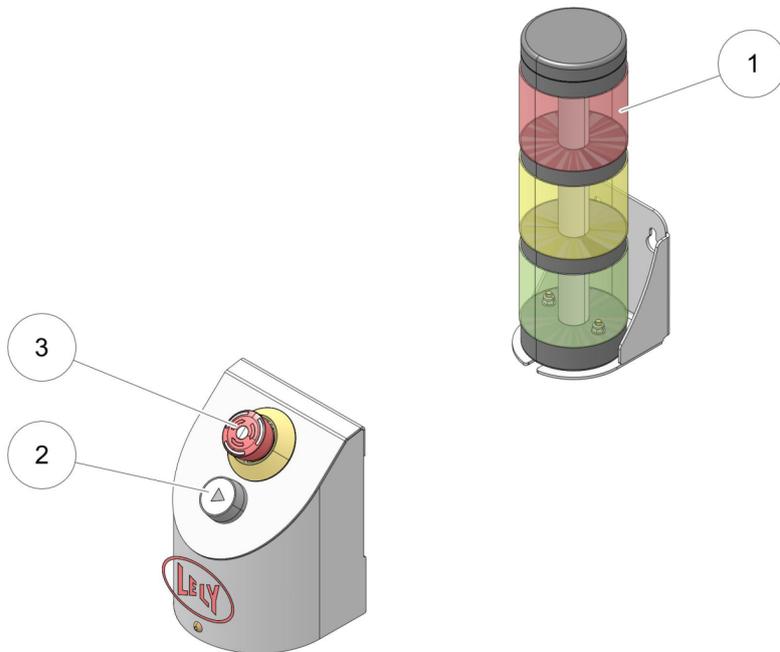
An emergency stop button (1) is installed at the entrance of the feed kitchen and on every side from which the feed kitchen is visible. On long sides on every 12 m (39 ft) an extra emergency stop button must be installed.

When the button is pushed, the Feed Grabber, Bridge Crane and safety fence immediately stop operation.

Be aware that the Mixing and Feeding Robot will not stop operation, it could stop mixing for a few seconds and then start mixing again. If the Mixing and Feeding Robot stops driving depends on if it is in Bluetooth range from the power distribution box and if the route action is in the AGS zone.

To reset the emergency stop button see the operating instructions (see Reset an Emergency Stop Button in or near the Feed Kitchen on page 5-19).

2.4.3.2 Emergency Stop Button on Console



F000138-001

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Figure 14. Console

KEY: 1. Signal lights - 2. Start button - 3. Emergency button

An emergency button (3) is installed on the front of the console. It functions similar to the other emergency stops in the feed kitchen (see Emergency Stop Button on page 2-22).

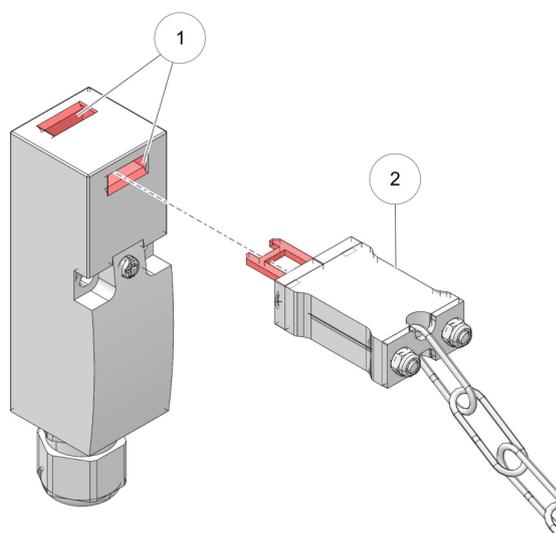
2.4.3.3 Signal Lights

The signal lights (1) (see figure 14 on page 2-23) indicate the following:

| Decal | status | |
|-------|--------|--|
| | 1 | System is switched off |
| | 2 | System starts up |
| | 3 | System is in operation |
| | 4 | One of the devices is out of operation |
| | 5 | Emergency stop or critical alarm |
| | 6 | Non critical alarm |
| | 7 | Kitchen fill mode starts |
| | 8 | Kitchen fill mode active or Service mode active |
| | 9 | Power failure, system in battery mode |

In general the red light indicates there is a critical alarm active. It is also on when the play button still must be pushed after starting up.

2.4.3.4 Safety Switch on Access Doors to the Feed Kitchen



F000208-001

Figure 15. Example of an access key switch

KEY: 1. Lock - 2. Key



***Risk of accident caused by a malfunctioning safety switch.
Serious injury or death.
Do not tamper with the safety switch.***

On all access doors to the feed kitchen an access control switch or an access key switch is installed.

When the access door is opened unauthorized, the control switch switches and the operation of the Feed Grabber, Bridge Crane and safety fence immediately stop.

Be aware that the Mixing and Feeding Robot will not stop operation.

To reset the access control switch, close the access door.

To reset the access key switch, lock the door and insert the key (2) in the lock (1) and put the feed kitchen into operation (see Put the Feed Kitchen in Operation on page 5-1).

2.4.3.5 Safety Gate



Figure 16. Safety gate

KEY: 1. Lock - 2. Gate



***Risk of accident caused by a malfunctioning safety gate.
Serious injury or death.
Do not tamper with the safety gate.***

The safety gate (2) has a lock (1) that operates an access control switch.

During normal operation when the lock is tilted unauthorized, the Feed Grabber, Bridge Crane and safety fence immediately stop operation.

Be aware that the Mixing and Feeding Robot will not stop operation.

To reset the access control switch, close and lock the safety gate and put the feed kitchen into operation (see Put the Feed Kitchen in Operation on page 5-1).

2.4.3.6 Safety Fence



*Risk of high voltage electrical shock.
Risk of personal injury.
Keep away from the electric fence.*

A contact indicator is connected to the safety fence.

If a wire of the safety fence is removed the contact is broken and the Feed Grabber, Bridge Crane and safety fence immediately stop operation.

Be aware that the Mixing and Feeding Robot will not stop operation.

To reset the contact, close the safety fence (see Close the Safety Fence on page 5-23).

2.4.3.7 Safety Switch on Kitchen Fill Door



*Risk of accident caused by a malfunctioning safety switch.
Serious injury or death.
Do not tamper with the safety switch.*

On the kitchen fill door an access control switch is installed.

When the kitchen fill door is opened unauthorized, the control switch switches and the Feed Grabber, Bridge Crane and safety fence immediately stop operation.

Be aware that the Mixing and Feeding Robot will not stop operation.

To reset the access control switch, close the kitchen fill door and put the feed kitchen into operation.

2.5 Safety Zones

The Vector type plate attached on the power distribution box indicates the risk zones on the farm.

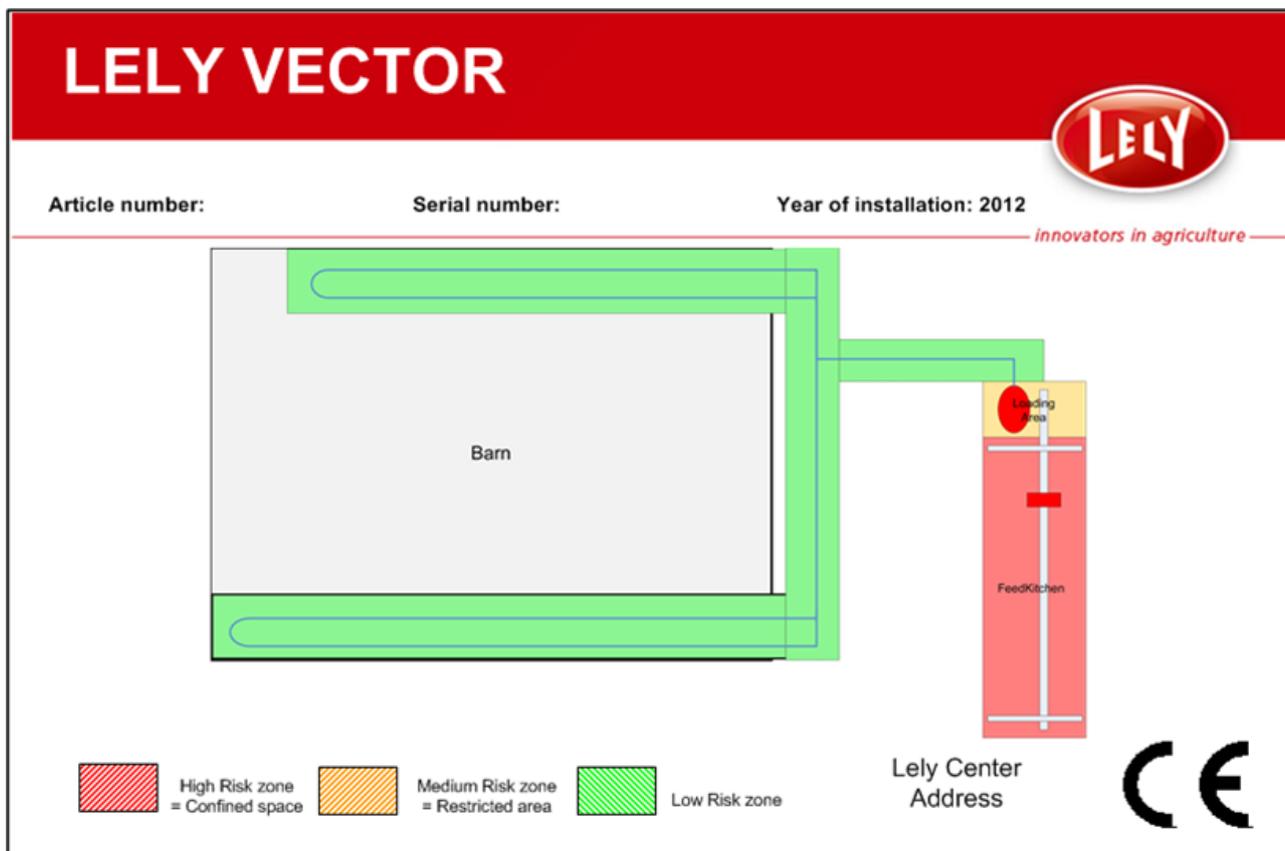


Figure 17. Example of Vector type plate

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2.5.1 Red Zone - High Risk Zone

The feed kitchen is marked on the Vector type plate (see figure 17 on page 2-28) as a red zone. Persons are not admitted in this red zone because of the moving:

- Feed Grabber
- Bridge Crane

To mark the red zone the following decal is attached at the entrance(s) of the feed kitchen:



2.5.2 Yellow Zone - Medium Risk Zone

The feed loading zone and small passages are marked on the Vector type plate (see figure 17 on page 2-28) as a yellow zone. In this zone persons (or animals) risk being trapped by the Mixing and Feeding Robot. In that case the Mixing and Feeding Robot is stopped when:

- The emergency stop is pushed on the Mixing and Feeding Robot.
- The bumper is hit.

To mark the yellow zone the following marking is painted on the floor where the Mixing and Feeding Robot drives:



To mark the yellow zone in the feed loading point area, besides the marking on the floor, the following decal is attached at the entrance of the area:



Unauthorized persons are not admitted in this yellow zone because of the moving Mixing and Feeding Robot.

To mark the yellow zone in a narrow alley, besides the marking on the floor, the following decal is attached at the entrance of the narrow alley:



2.5.3 Green Zone - Low Risk Zone

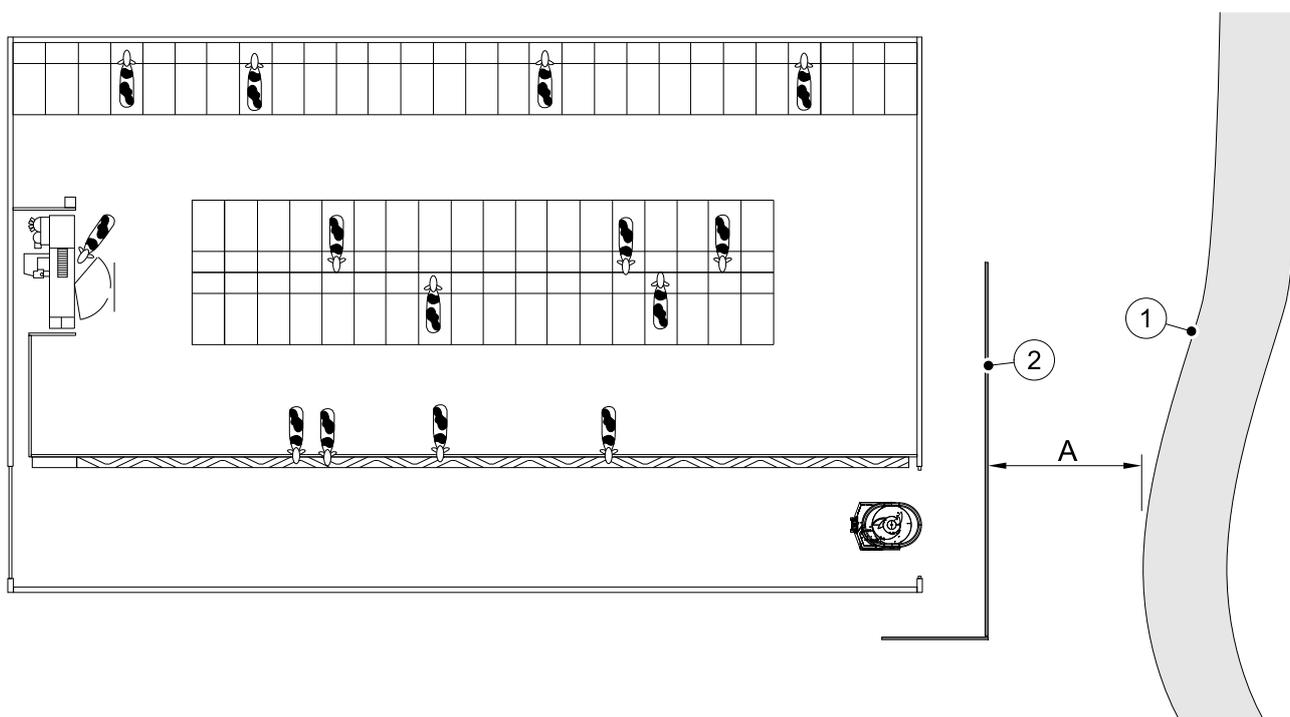
The routes where the Mixing and Feeding Robot drives are marked on the Vector type plate (see figure 17 on page 2-28) as a green zone, except for the small passages see yellow zone (see Yellow Zone - Medium Risk Zone on page 2-28).

To mark the green zone the following decal is attached at the entrance(s) of the area where the Mixing and Feeding Robot drives:

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2.5.4 Safety and Safety Distances on Routes



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Figure 18. Distance outside a barn

KEY: 1. Public road - 2. Metal strip
A: 5 m (16.4 ft)

- The distance between the metal strip outside a barn and a public road or area is at least 5 m (16.4 ft). The distance must be measured in the straight line the Feeding Robot drives from the barn to the strip. This prevents the Mixing and Feeding Robot from ending up on a public road or area when the strip is not found.
A bar at the height of the bumper or a line of poles will prevent the Mixing and Feeding Robot from ending up on a public road or in a ditch. This is mandatory if a distance of 5 m is not possible.
- To avoid damage the distance between the metal strip and a ditch or level difference must be at least 5 m (16.4 ft).
- The route of the Mixing and Feeding Robot outside between the barn(s) and feed loading point must be as short as possible.
- The routes of the Mixing and Feeding Robot outside the barn must have sufficient lighting to avoid collisions in the dark.
- The route of the Mixing and Feeding Robot may not cross or access a public road or area.

- The route of the Mixing and Feeding Robot outside the barn must impede the traffic on the farm as little as possible.
- If the route of the Mixing and Feeding Robot is under an accessible attic or stairway (see figure 19 on page 2-31), these must have a railing (1) installed (according to NEN-EN-ISO 14122). This prevents people from falling into the Mixing and Feeding Robot.

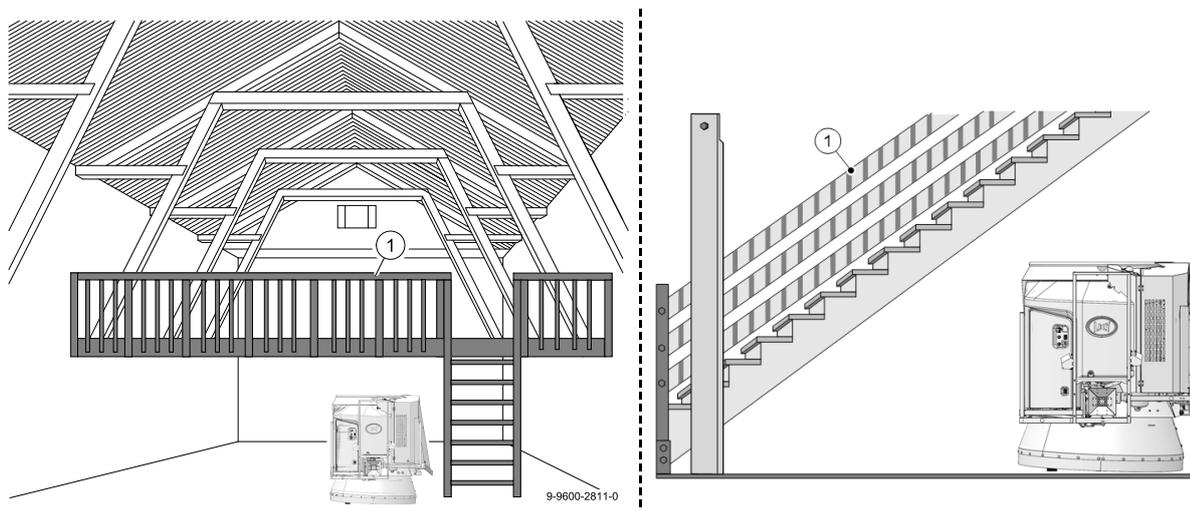


Figure 19. Stairway and attic

KEY: 1. Railing



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3 Specifications

3.1 Specifications Vector

| Specifications and Capacity Vector | |
|--|---|
| Maximum capacity 1 Mixing and Feeding Robot* | Ask your Lely advisor to calculate the capacity on your farm. |
| Maximum capacity 2 Mixing and Feeding Robots* | Ask your Lely advisor to calculate the capacity on your farm. |
| A-weighted emission sound pressure level for the Mixing and Feeding Robot, Bridge Crane and Feed Grabber | < 70 dB(A) |

* Capacity may vary per farm and ration

| Operational conditions | |
|--|--|
| Ambient temperature Mixing and Feeding Robot | -10 - +30 °C (14 - 86 °F) |
| Minimum temperature with a winter set on the Mixing and Feeding Robot | -20 °C (-4 °F) incidental lower temperatures up to -30 °C (-22 °F) are possible but can shorten the lifetime |
| Minimum temperature feed kitchen without heating cable in the rail | 5 °C (41 °F) |
| Ambiant temperature Feed Grabber, Bridge Crane, Dispensers (frequency pulse) | -20 - +40 °C (-4 - 104 °F) |
| Humidity | 5 - 99% non condensing |

| Feed storage capacity | | |
|-----------------------|-------|--|
| Bridge Crane | Depth | 6 - 20 m (19.7 - 65.6 ft) |
| | Width | 10 - 24 m (32.8 - 78.7 ft) (max. effective width 22.1 m (72.5 ft)) |
| Double fixed rail | Depth | 3.5 m (11.5 ft) |
| | Width | 11.5 - 38.5 m (37.7 - 126 ft) |
| Single fixed rail | Depth | 1.60 m (5.25 ft) |
| | Width | 6 - 72 m (19.7 - 236 ft) |

| Requirements roughage | | |
|-----------------------|-------------|--|
| Feed blocks | Max. Height | 200 cm (6.6 ft) (block must be stable) 180 cm (5.9 ft) to use weight estimation |
| | Max. depth | 105 cm (3.4 ft) |



| Requirements roughage | | |
|--|------------|-----------------|
| Loose products from a bin (potatoes, pulp) | Max. depth | 150 cm (4.9 ft) |
| Bales (only when cut) | Max. depth | 120 cm (3.9 ft) |

| Capacity Mixing and Feeding Robot | | |
|---|------------------|--|
| Capacity mixing bin | | 150 - 600 kg (330 - 1323 lb) |
| Volume mixing bin | | 2 m ³ (70 ft ³) |
| Feed pushing capacity at the feed fence | Max. feed height | 60 cm (23.6 in) |
| | Max. feed width | 72 cm (29.5 in) |

| Additives dispenser (frequency pulse) | | |
|---------------------------------------|---------------------------|---|
| Types | Conventional | Additives with low fat (<2%) and large parts (less than 35% smaller than 60 micron) |
| | Dispenser with stir motor | Additives that are: <ul style="list-style-type: none"> • Hygroscopic (like salt that absorbs water) • Fat (2% - 15%) with large or medium size parts (more than 35% is larger than 120 micron) • Chalk based with large or medium size parts (more than 25% is larger than 120 micron) |
| Maximum weight to dose | | 6.5 kg (14.3 lb) |
| Maximum advised weight to dose | | 5 kg (11 lb) |
| Operational conditions | Temperature | 0 - +30 °C (32 to 86 °F) |
| | Humidity | 5 - 70 % |

| External concentrates and digital output | | |
|--|-------------|--------------------------|
| Minimum weight to dose | | 5 kg (11 lb) |
| Operational conditions | Temperature | 0 - +30 °C (32 to 86 °F) |
| | Humidity | 5 - 70 % |

3.2 Requirements Smartphone

Android smartphone or tablet

- Screen resolution 480 x 800 (or higher).
- Android 2.3.x, and higher.
- CPU speed: 1 GHz.
- Bluetooth version 2.1, 3.0, 4.0 dual mode (4.0 single mode is not supported).

- For software updates a WiFi or 3G network must be available.
- Storage: SD card (internal or external).
- Smartphone must have at least 10 MB free storage.

Wireless router

- WiFi access: according to 802.11 a/b/g standard.
- Connection speed (wired connection): minimum 54 Mbits.

Alternative for router

- Connection to 3G/4G network.

3.3 Dimensions and Weight Mixing and Feeding Robot

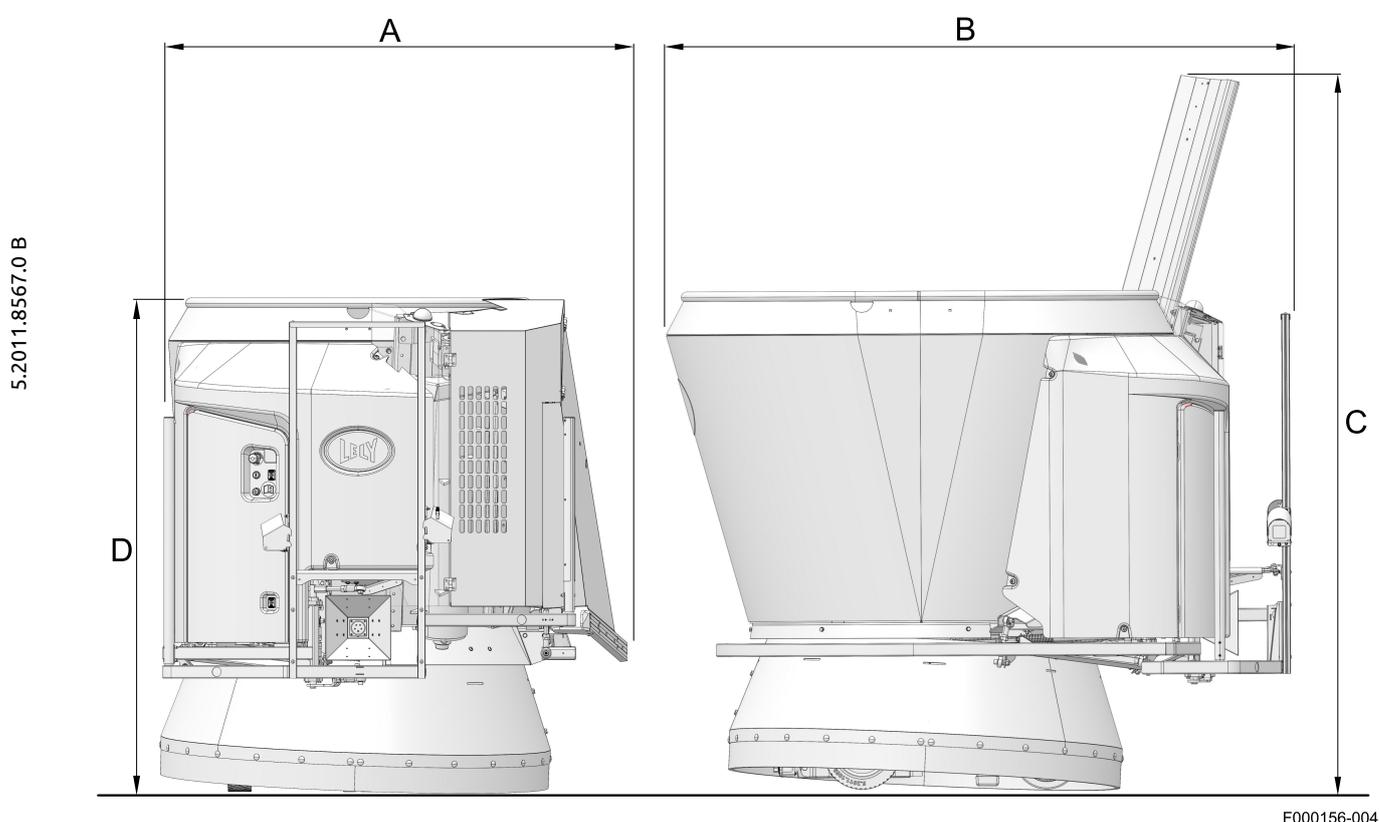


Figure 20. Dimensions Mixing and Feeding Robot

KEY:

- A: 1.650 m (64.96 in)
- B: 2.406 m (94.72 in)
- C: 2.80 m (110 in) (or lower with a limited door*)
- D: 1.930 m (75.98 in)

- Empty weight: 1275 kg (2810 lb)
- Max loaded weight: 1875 kg (4134 lb)

*) A door limitation can be used in barns with low ceilings, but only when special suitable feed must be distributed on all feed locations. For example a ration with a lot of hay can not be distributed when the door height is limited.

A door limitation is also advised when only feed with a very fine structure is fed, for example to beef cattle. In this case the door limitation prevents the feed from dosing too fast.

4 Description

4.1 General Description

Most Vector systems have a feed kitchen. This is an enclosed area where blocks of roughage are stored. The Feed Grabber grabs roughage and loads it into the mixing bin of the Mixing and Feeding Robot. Concentrates and additives can be added. After the feed is mixed, this ration is transported to the group of animals and dosed along the feed fence.

The Vector has three main parts and several options. The main parts are:

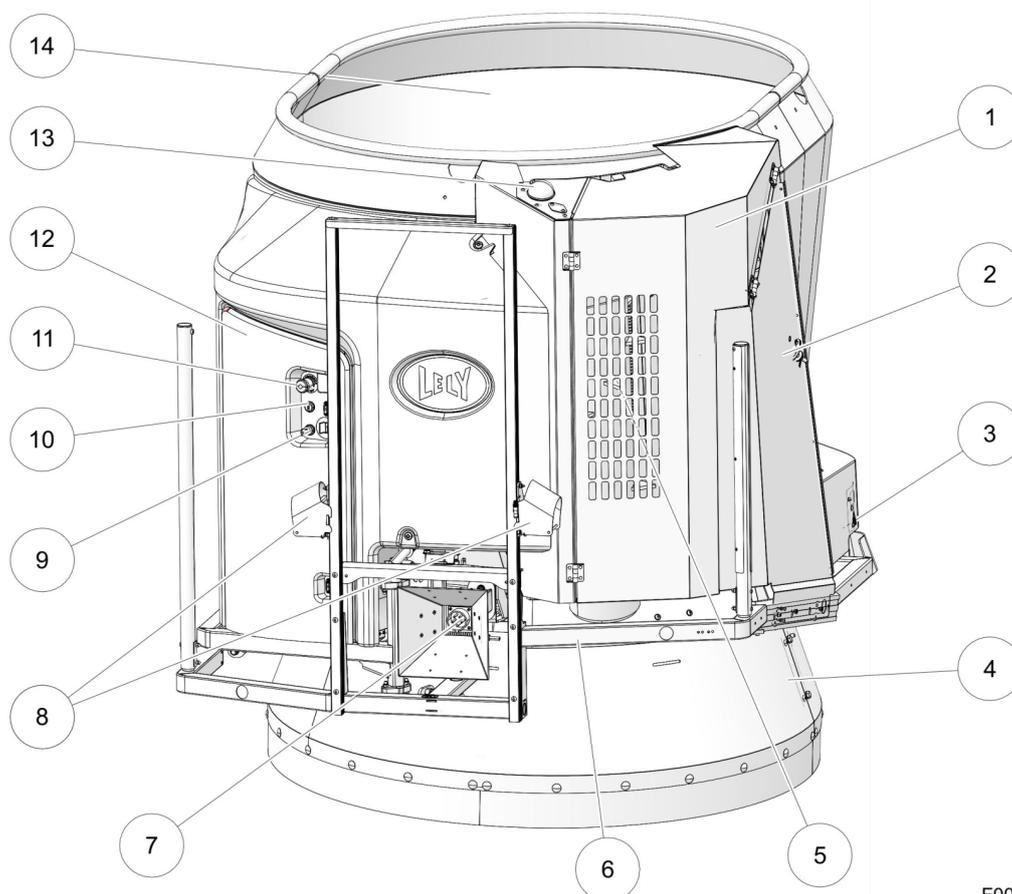
- One or two Mixing and Feeding Robots and chargers.
- Power distribution box.
- Console.
- Signal lights.

Optional parts are:

- Feed Grabber.
- One of the following transport systems for the Feed Grabber:
 - Bridge Crane.
 - Fixed Rail.
- If no Feed Grabber is present, a (tower) silo or conveyor belt that adds roughage (not Lely parts).
- Safety fence.
- Additives dispenser (frequency pulse).
- Concentrate augers (frequency weight).
- Automatic barn door.

4.2 Component Description

4.2.1 Mixing and Feeding Robot



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Figure 21. Mixing and Feeding Robot

KEY: 1. Maintenance door - 2. Inspection cover - 3. Feed height sensor - 4. Skirt - 5. Dosing roll - 6. Bumper - 7. Charge plug - 8. Ultrasonic sensors - 9. Safety key - 10. Pause button - 11. Emergency button - 12. PCB box - 13. Antenna - 14. Mixing bin

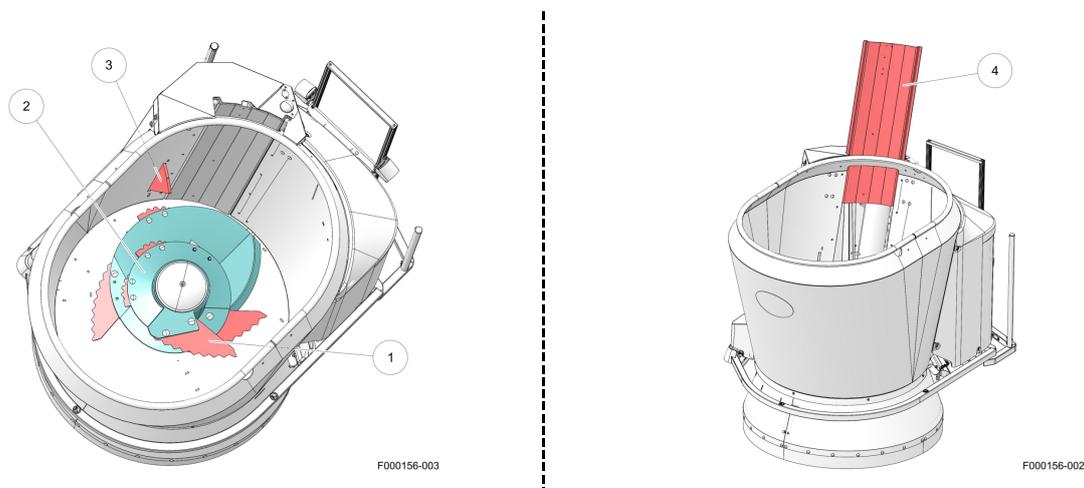


Figure 22. Mixer and feed door

KEY: 1. Mixer knife - 2. Mixer - 3. Counter knife - 4. Feed door

The Mixing and Feeding Robot has the following motors:

- Feed door motor.
- Drive motor left wheel.
- Drive motor right wheel.
- Actuator to lift the skirt.
- Actuator to insert the counter knife inside the mixing bin.
- Mixer motor.
- Dosing roll motor.

The Mixing and Feeding Robot has the following sensors:

- Two inductive sensors at the bottom between the wheels to detect (and follow) metal strips on the floor.
- Ultrasonic sensors to detect the distance to the feed fence or wall.
- Laser measurement to detect the feed height.
- Gyroscope on the PCB to detect the direction of motion.
- Reed contacts to detect the position of the safety bumper (when the bumper hits an objects the bumper is pushed out of its original location).
- Proximity switch (position sensor) to detect the dosing roll standby position.
- Voltage detection to detect the voltage on the charger.
- Three load cells to determine the weight in the mixing bin.
- Encoders on the driving motors to determine the travelled distance and calculate the speed.
- Encoder on the door motor to detect the position of the feed door.
- Encoder on the actuator to lift the skirt to detect the position of the skirt.
- Encoder on the actuator to insert the counter knife to detect the position of the counter knife.

Optional

The following options can be installed on the Mixing and Feeding Robot:

- Winter set, prevents the gears from getting stuck if the charger is in an environment with a temperature below -15° C (5° F).
- Shock device, to prevent the animals from touching the bumper too often and stop the Mixing and Feeding Robot.
- Flashing light (see figure 10 on page 2-18).
- Door push set, to push open a door without activation of the bumper.

4.2.2 Charger

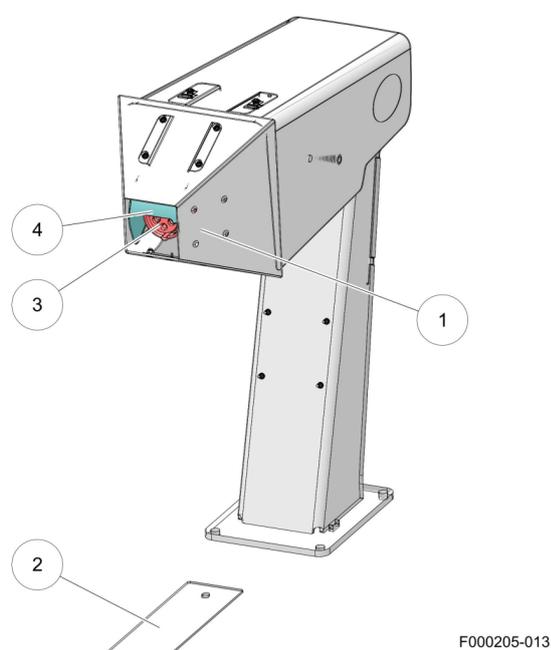


Figure 23. Charger

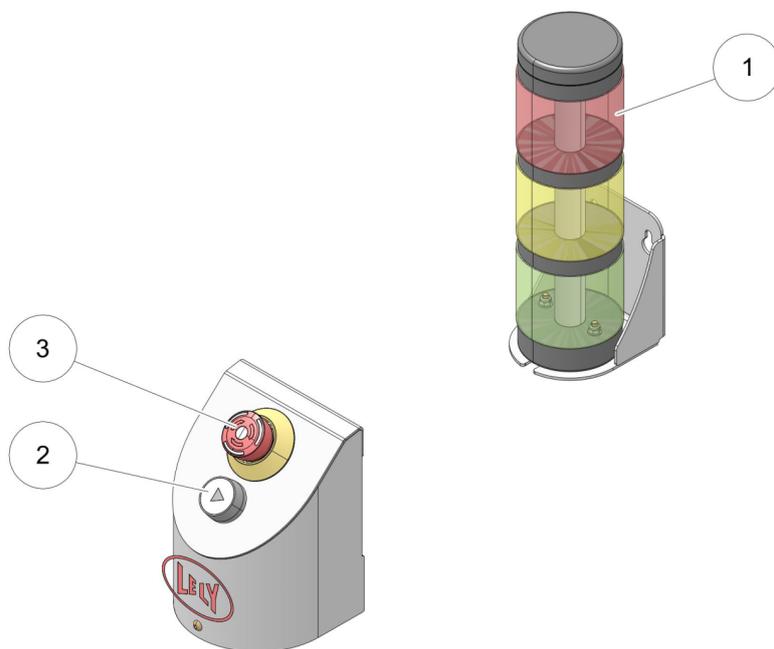
KEY: 1. Socket guide - 2. Metal strip - 3. Rotating cover - 4. Charge socket

The charger is installed under the feed loading point in the feed kitchen. The charger charges the batteries of the Mixing and Feeding Robot.

At approximately 75 cm (29.5 in) from the charger, the Mixing and Feeding Robot drives slowly to the charger. When the Feeding Robot pushes against the socket guide (1), the socket cover (3) is pulled away exposing the socket. The plug from the Feeding Robot connects to the socket (4) and the Feeding Robot stops driving. The batteries are charged until they are fully charged, or until the Mixing and Feeding Robot must do a feed or scan task.

A second charger for a second Mixing and Feeding Robot is installed at the parking position near the feed kitchen. To be able to determine that it is the second charger, there must be no metal strip under the Mixing and Feeding Robot when it is in the second charger.

4.2.3 Console and Signal Lights



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Figure 24. Console and signal lights

KEY: 1. Signal lights - 2. Start button - 3. Emergency button

The start button (2) on the signal console is used to put the feed kitchen in operation. In the paragraphs about the safety devices you can find more information about the emergency stop button and the signal lights.

4.2.4 Power Distribution Box

The power distribution box is a large control box in the feed kitchen. It distributes power to:

- Charger(s).
- Bridge Crane and Feed Grabber (optional).
- Control box Additives dispenser (frequency pulse) (optional).
- Control box External concentrates (frequency weight) (optional).
- Safety fence (optional).

The power distribution box is connected to the T4C PC or the farms network connected to the T4C PC.

The power distribution box can give an on/off signal to a digital output (Optional) to start/stop a (tower) silo or conveyor belt.

On the PCB in the power distribution box runs the Feed Controller software.

4.2.5 Feed Grabber

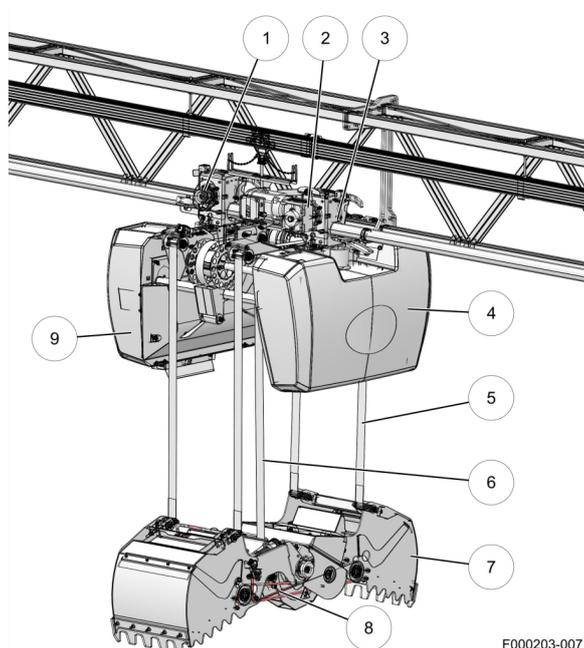


Figure 25. Feed Grabber

KEY: 1. Front wheel - 2. Drive motor - 3. Rear wheel - 4. Rear cover - 5. Lifting belt - 6. Closing belt - 7. Grabber jaw - 8. Closing cord - 9. Front cover

The Feed Grabber has the following motors:

- Drive motor.
- Lifting motor.
- Closing motor.

The Feed Grabber has the following sensors:

- Laser detection to detect the feed height.
- Encoder to determine the travelled distance and to calculate the speed.
- Magnet sensor on the front driving wheel to detect the reset magnets.
- Loose belt detection for the closing belt.
- Loose belt detection for the lifting belt.
- End rail detection.
- Encoders on the axis of the lifting and closing belts.

4.2.6 Cranes and Fixed Rail

The Feed Grabber drives along a rail that can be a part of a Crane. There are several types:

- Bridge Crane.
- Double Fixed Rail.

- Single Fixed Rail.

4.2.6.1 Bridge Crane

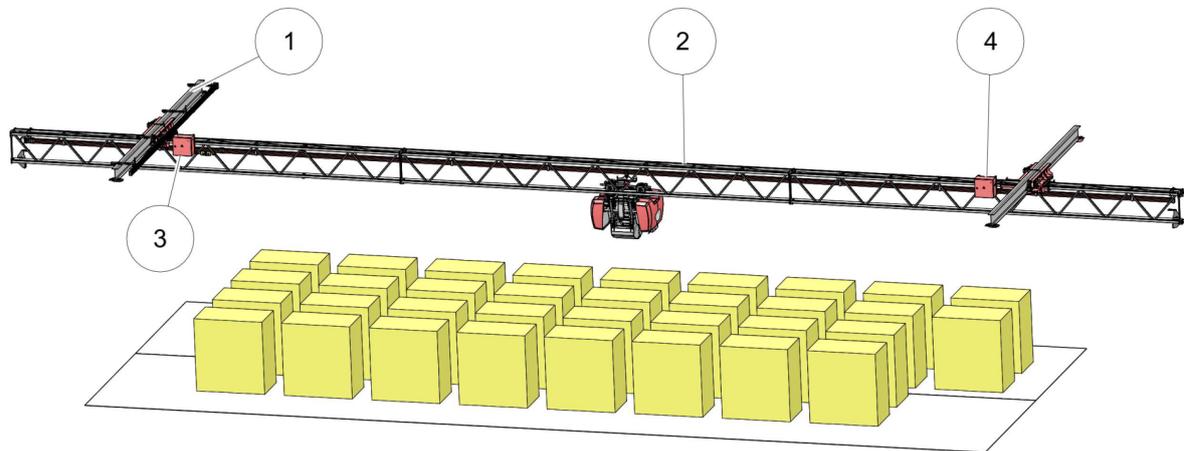


Figure 26. Bridge Crane

KEY: 1. IPE profile - 2. Lattice girder with rail - 3. Control box - 4. Control box

- The Bridge Crane has two drive motors.
- The Bridge Crane has magnet sensors on both wheel sets to detect the reset magnet on the IPE profile. There are two encoders on the drive motors to measure the driven distance and to calculate the speed.
- The bluetooth antenna is located on one of the control boxes.

4.2.6.2 Double Fixed Rail

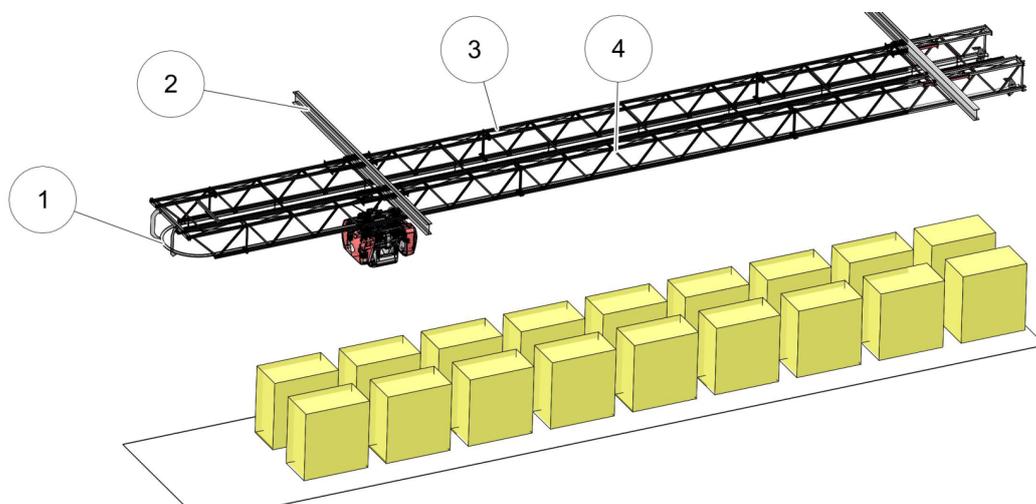


Figure 27. Double Fixed Rail

KEY: 1. Bend of lattice girder with rail - 2. IPE profile - 3. Lattice girder with rail - 4. Lattice girder with rail

4.2.6.3 Single Fixed Rail

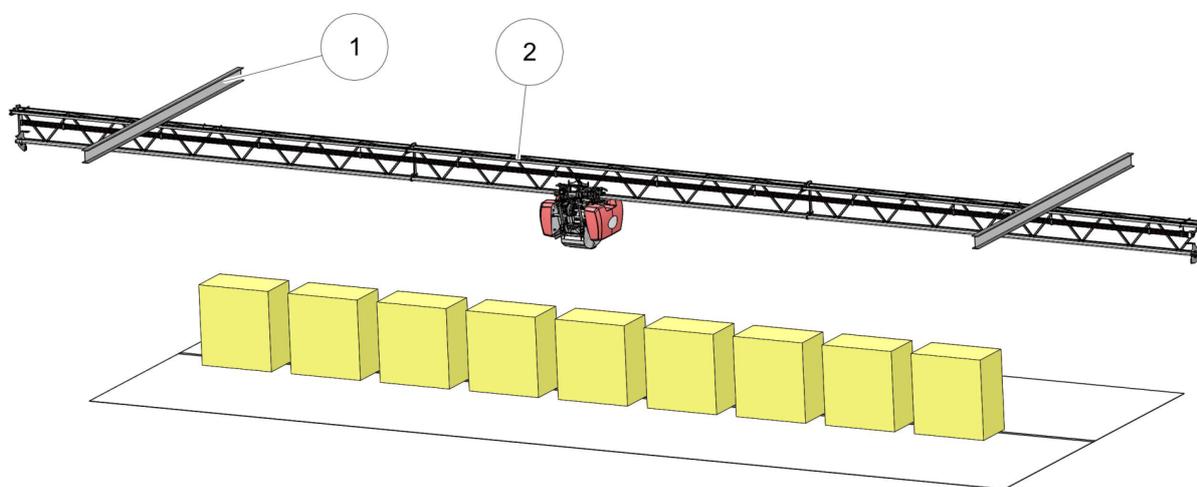


Figure 28. Single fixed rail

KEY: 1. IPE profile - 2. Lattice girder with rail

4.2.7 Additives Dispenser (frequency pulse)

Two types of additives dispensers are available:

- Conventional additives dispenser (a vibrating motor is optional for one dispenser).
- Dispenser with stir motor.

Conventional Additives Dispenser (frequency pulse)

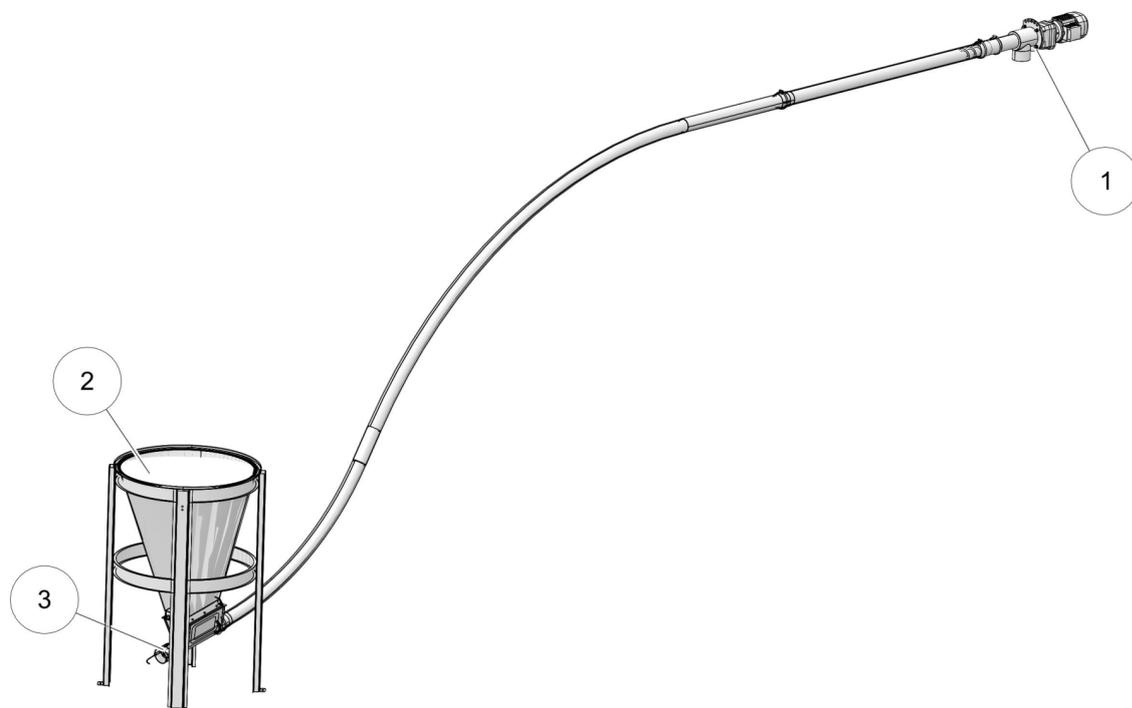


Figure 29. Conventional Dispenser

KEY: 1. Drop pipe and motor - 2. Silo - 3. Sensor for light pulses

- A control box with one or more frequency regulators (one for each additives dispenser) is installed in the feed kitchen.
- The frequency regulator regulates the number of pulses of the motor of the additives dispenser.
- The dispenser doses per pulse, in the software this is called .

Additives Dispenser with Stir Motor (frequency pulse)

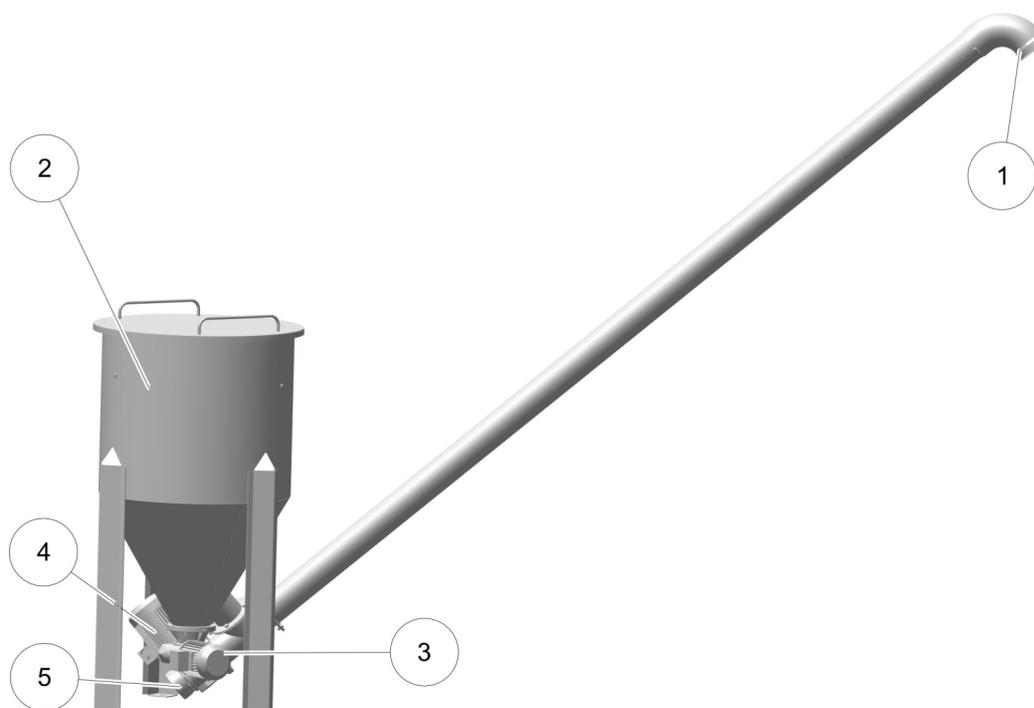


Figure 30. Dispenser with Stir Motor

KEY: 1. Drop pipe - 2. Dispenser silo - 3. Auger motor - 4. Stir motor - 5. Sensor pulse counter

- A control box with two or more frequency regulators is installed in the feed kitchen. One frequency regulator for the auger motor and one for the stir motor.
- The frequency regulator regulates the number of pulses of the motor of the additives dispenser.
- The dispenser doses per pulse, in the software this is called .

4.2.8 External Concentrates (frequency weight)

A control box with one or more frequency regulators (one for each concentrate) regulates the on/off signal for distribution of the concentrate. This signal switches to Off when the Mixing and Feeding Robot has measured the set weight. The runtime is protected by a maximum runtime, this is the expected runtime plus 30%.

The Mixing and Feeding Robot weighs the concentrates during loading. In the software this is called .

4.2.9 Digital Output

The power distribution box can give an on/off signal to a conveyor belt or other device that distributes roughage or another type of feed. This signal is controlled by the Mixing and Feeding Robot. The Mixing and Feeding Robot weighs the amount of feed and when the target weight to stop is reached, the signal is switched off. The dosing is protected with a maximum runtime, based on the history of dosing and some settings.

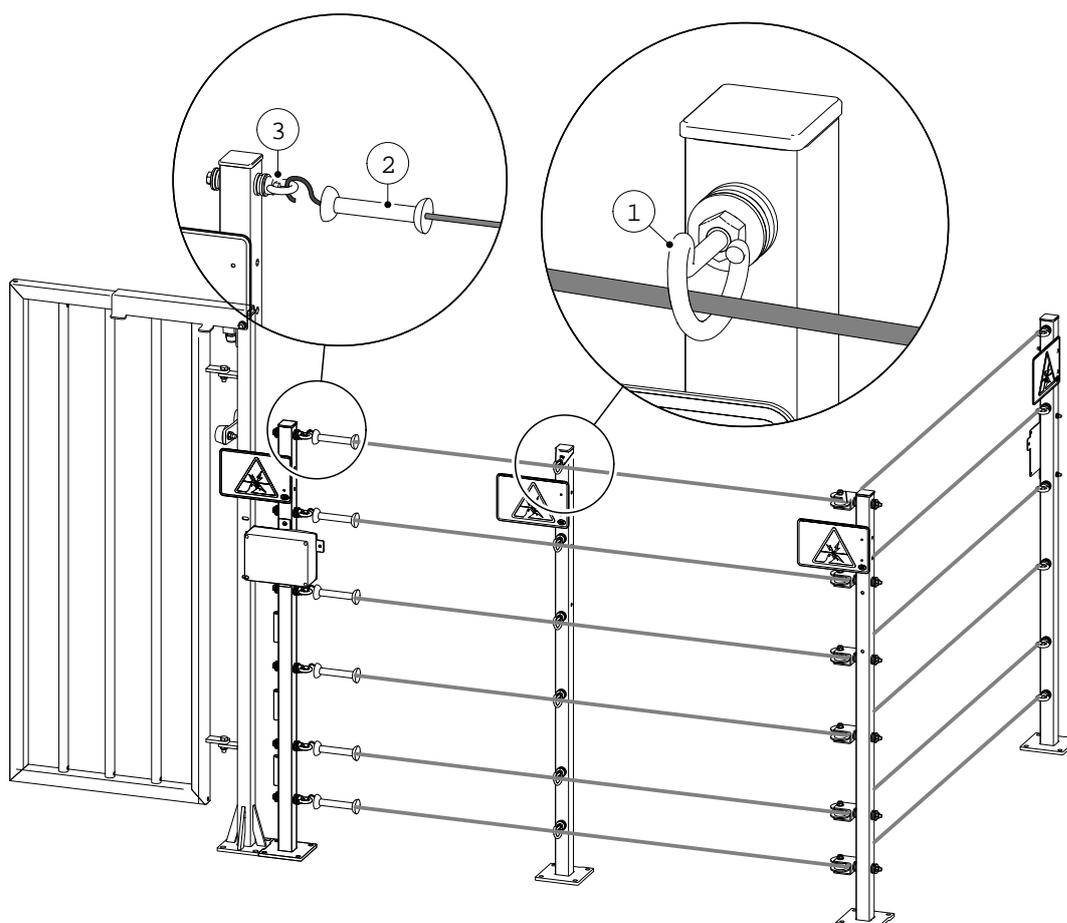
In the software this type of dosing is called .

4.2.10 Safety Fence (Optional)



CAUTION

*Risk of high voltage electrical shock.
Risk of personal injury.
Keep away from the electric fence.*



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Figure 31. Safety fence

The safety fence is installed around the feed kitchen to keep persons and large animals out. The safety fence has removable poles with 6 stretched wires attached to them. When the safety fence is active a shock is felt when a wire is touched.

When a wire is unhooked or when 2 wires make contact an emergency stop is generated. The Feed Grabber, Bridge Crane and safety fence are disconnected from the power and a critical alarm is generated.

4.2.11 Automatic (Barn) Door (optional)

A small control box regulates the opening and closing of an automatic (barn) door when the Mixing and Feeding Robot needs to pass. The control box communicates with the Mixing and Feeding Robot via bluetooth. The control box :

- Is connected to a sensor that detects if the door is open.
- Gives a start and stop signal to a motor that opens and closed the door (this is not a Lely part but a motor from the supplier of the door).

4.2.12 Software

The feeding management of the Vector system is set on the T4C management software that runs on the PC connected to the Vector system. Settings for the Feed Grabber, locations and fences, feeding, rations, routes and kitchen are made in T4C. When a setting is changed, the settings are sent to the Vector. The Feed Controller software that runs on the power distribution box starts feed and scan tasks with these settings. After each feeding task the feed result is sent to T4C.

If the T4C software stops working or when the connection to the Vector is lost, the Vector continues operation with the last received settings. Data for T4C (feed results) is stored and sent as soon as the connection is restored.

Several devices of the Vector have their own specific software running. The devices communicate with each other via bluetooth. The software can be operated with a smartphone with an android operating system. The following software can be operated:

- The Feed Controller.
- The Mixing and Feeding Robot.
- The Feed Grabber (if applicable).
- The Bridge Crane (if applicable).
- The automatic (barn) door software (if applicable).

4.3 Operation

The major processes of the Vector are:

- Feed loading and mixing process.
- Feeding, measuring and feed pushing process.

The Mixing and Feeding Robot has one route (or more routes) in every barn with animals that need to be fed. On this route the feed fence and the location of every group of animals is specified. In T4C rations that specifies the ratio of every feed type that needs to be supplied are linked to locations. To supply the feed at the correct frequency and to determine the priority between groups of animals the minimum feed height must be specified in T4C.

Depending on the setting of the scan time, for example every hour, the Mixing and Feeding Robot drives the route in the barn along the feed fence and measures the feed height on every location in the barn. If the measured height for one location is too low, the feed loading and mixing process starts. If the measured feed height on two or more locations is too low, the Feed Controller determines which feed group must be fed first. If possible when they have the same ration and do not need a full bin the locations are fed during the same feed task.

4.3.1 Feed Loading and Mixing Process

The feed loading and mixing process starts when the Mixing and Feeding Robot is connected to the charger under the feed loading point.

If a Feed Grabber is present

Depending on the ration settings, the Feed Grabber moves to the first feed type of the ration, on the storage location with the highest priority. If the feed kitchen has a Bridge Crane, the Crane starts moving with the Feed Grabber to the first location.

All feed types are stored in the feed kitchen in specific storage locations (blocks). The Feed Grabber measures the height of the feed and grabs the feed. The Feed Grabber estimates the weight of the feed and if the amount is too much, the Feed Grabber grabs again. Then the Feed Grabber moves to the Mixing and Feeding Robot, and if applicable the Bridge Crane moves. The Feed Grabber drives to the feed loading point and the grabber will open and the feed falls in the mixing bin. The mixer starts mixing. The mixer knives and a counter knife help to mix the feed types. The Mixing and Feeding Robot weighs how much feed is loaded. Depending on the filling sequence of the feed types set in T4C, the Feed Grabber will grab a load of the same or the next type of feed in the ration. The feed types will be loaded until the set amount of each feed type is loaded.

An extra mixing time (in between mixing) can be set to improve the mixing during loading.

During this process other types of feed can be added:

- Concentrates when one or more concentrate distributors (frequency weight) are installed.
- Minerals or other additives when one or more additive dispensers (frequency pulse) are installed.
- Concentrates or other feed types using a digital output.

After all feed types and additives are loaded, the mixing continues for a set time (post mixing).

If roughage is loaded from a (Tower) silo

Roughage can be loaded from one or more (tower) silos or conveyor belts using a digital output signal. Also other feed types can be added with additives dispensers (frequency pulse) or concentrate augers (frequency weight). The Mixing and Feeding Robot mixes the feed during loading and after all feed types are loaded.

4.3.2 Feeding, Measuring and Feed Pushing

Drive from the feed loading point to the feed alley in the barn

When the mixing bin is loaded and mixed, the Mixing and Feeding Robot starts the route to the location of the animals on the feed fence. The Feeding Robot first drives backwards from the charger and turns to the direction of the feed alley. Outdoors the Feeding Robot must follow the metal strip on the floor using the inductive sensors. During driving the skirt is usually lifted.

Measuring and feed pushing

Inside the barn the Mixing and Feeding Robot lowers the skirt. The Mixing and Feeding Robot starts to drive and uses the ultrasonic sensor to keep at a fixed distance from the fence. The Mixing and Feeding Robot drives to the location of animals that need to be fed and on the route:

- The skirt rotates and pushes feed toward the fence of all locations with animals.
- The laser measures the height of the feed of other locations with animals.

Feeding

The Mixing and Feeding Robot stops when it arrives at the (first) location on the feed fence of the animals that need to be fed. The feed door opens. When the door is completely open:

- The dosing roll starts to dose the feed.
- The mixer starts turning.
- The Feeding Robot starts to drive.

During dosing the Feeding Robot pushes the feed toward the fence and measures the height of the feed.

At the end of the location the mixing bin is empty and the dosing roll spins fast to dose the last feed remains, after that it stops rotating. The Mixing and Feeding Robot stops driving and the feed door closes. After the feed door is closed, the Mixing and Feeding Robot continues the route in the barn. On the way to finish the route the Mixing and Feeding Robot will again measure and push the feed of other locations with animals.

If more locations need the same ration the distribution can be combined but only if:

- The Mixing and Feeding Robot can drive with an open feed door from one location to the next (fences are in the same feeding section).
- The feed request for one fence is lower than the ration limit (calculations are made to combine feed tasks for two or more fences).

4.3.3 Drive to the Feed Loading Point and Connect to the Charger

When the Feeding Robot drives away from the feed fence the skirt is usually lifted. The Feeding Robot uses the inductive sensors to find the metal strips on the floor and to follow them toward the charger. On the way to the charger there are one or more reset points where the metal strip is interrupted for a short distance.

NOTICE

The AGS zone is a zone near the feed kitchen (on the Vector type plate usually marked yellow), just before the Mixing and Feeding Robot enters the feed kitchen. In the AGS zone the Mixing and Feeding Robot asks permission before it starts to drive the next route action. This makes sure the Feeding Robot only enters and moves in the area near the feed kitchen when it is safe. In the AGS zone the Feeding Robot must be able to communicate via Bluetooth with the power distribution box.

Without AGS settings

When no AGS settings are set (ask your Lely technician), the Mixing and Feeding Robot will drive to the charger and connect.



Unmanned moving vehicle

Risk of being crushed.

Be aware that in case of an emergency stop in the feed kitchen the Mixing and Feeding Robot will still drive to the charger and connect. To avoid this manually push the emergency stop on the Mixing and Feeding Robot.

With AGS settings

The Feeding Robot waits before driving to the feed loading point if:

- It is not safe, because the emergency stop button is activated or the safety fence gate or kitchen door is opened.
- The feed kitchen is being filled.

If all is safe the Mixing and Feeding Robot connects to the charger.

If there are two chargers, the Feed Controller decides where the Mixing and Feeding Robot must go.



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5 Operating Instructions

5.1 Start Up and Stop

5.1.1 Put the Feed Kitchen in Operation

WARNING

*Unexpected movement of machines.
Risk of serious injury.
Make sure the feed kitchen is void of persons, animals, machines or anything other than roughage.*

1. Make sure the feed kitchen is void of persons, animals, machines or anything other than roughage.
 2. Close all feed kitchen doors and the safety fence.
 3. On the console, push start (1) (see figure 32 on page 5-2), the system checks if all gates and doors are closed and the start button blinks quickly.
 4. When the start button no longer blinks, push start (1) again, the system starts.
While the Feed Grabber and Bridge Crane start up the orange light is on.
When the green signal light is continuously on the system is started.
-

NOTICE

If the orange light stays on, at least one of the devices is not in operation yet. Make sure the devices in your Vector system are in operation, for example the Mixing and Feeding Robot(s), Feed Controller, Feed Grabber, Bridge Crane. Connect your smartphone to each device and check.

NOTICE

When the feed kitchen is put in operation after it was in the fill mode, all storage locations in the feed kitchen are marked as filled. The Feed grabber will start grabbing at the same storage location of each feed type that is used before the kitchen was filled. The Feed Grabber will scan the storage location before grabbing.

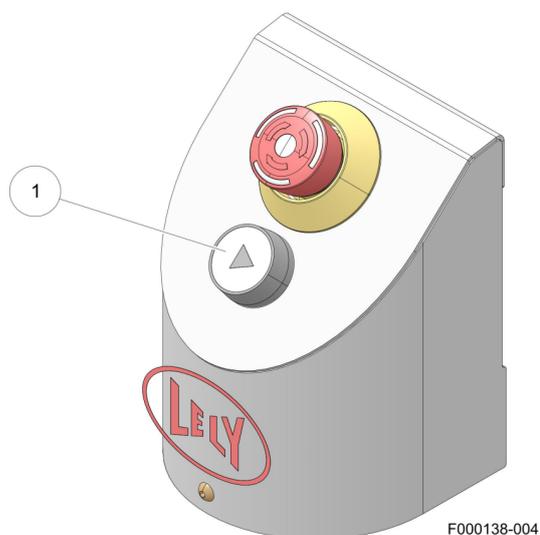


Figure 32. Start button on console

5.1.2 Put the Mixing and Feeding Robot In Operation

WARNING

**Unexpected movement of vehicle.
Risk of personal injury.**
Make sure the Mixing and Feeding Robot and the immediate vicinity is void of persons and animals. Only operate the Mixing and Feeding Robot with the smartphone when it is in your line of sight.

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Using the pause button

1. When the Mixing and Feeding Robot was taken out of operation with the pause button: Push the pause button (2) (see figure 33 on page 5-4).
The Mixing and Feeding Robot will continue operation.

Using the smartphone

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.

2. Connect the Mixing and Feeding Robot manually to the charger:

1. Go to the page **Work**.

| | | | |
|--|--|---|---|
| | | | |
| <p>Tab Work Information about the current state</p> | <p>Tab Work information Information about the feed or scan task</p> | <p>Tab MANUAL DRIVING Buttons for manual driving</p> | <p>Tab MANUAL CHARGER Drive and connect to the charger</p> |

2. Manually drive (see Drive the Mixing and Feeding Robot Manually on page 5-25) the Mixing and Feeding Robot close to the charger and make sure the Feeding Robot is on the strip with the charger plug toward the charger.

1. When the following message appears on your display: **SAFETY WARNING Manual operation is permitted only with a clear overview of the vehicle. Confirm?**

2. Confirm if you have a clear overview of the Mixing and Feeding Robot.

3. Push the button  (one or more times) to go to the tab **MANUAL CHARGER**.

4. Push  to start driving slowly to the charger, the Feeding Robot will stop when a resistance is detected and connect to the charger.

3. Go to the page **Work** on the first tab.

4. Push the button  to:

- Start the Mixing and Feeding Robot when it was out of operation (**Off**).

5.1.3 Take the Feed Kitchen Out of Operation in the Filling Mode

5.1.3.1 Put the Feed Kitchen in the Filling Mode with the Console (Out of Operation)

1. On the console, push the start button (1) (see figure 32 on page 5-2).
The signal lights start blinking green and orange. The Feed Grabber is parked.

2. Wait until the Feed Grabber is parked at the set parking position.
When only the green light is blinking, it is safe to enter and fill the feed kitchen.

5.1.3.2 Put the Feed Kitchen in the Filling Mode with the Smartphone (Out of Operation)

NOTICE

When for example driving on a (silage) block cutter, you can take the feed kitchen out of operation with a smartphone without leaving the vehicle.

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Controller.
2. Go to the page **Feed kitchen**.
3. Push .
The signal lights start blinking green and orange. The Feed Grabber is parked.
4. Wait until the Feed Grabber is parked at the set parking position.
When only the green light is blinking, it is safe to enter and fill the feed kitchen.

5.1.4 Take the Mixing and Feeding Robot Out of Operation

You can take the Mixing and Feeding Robot out of operation with the pause button or with the smartphone.

Using the pause button

1. Push the pause button (2).

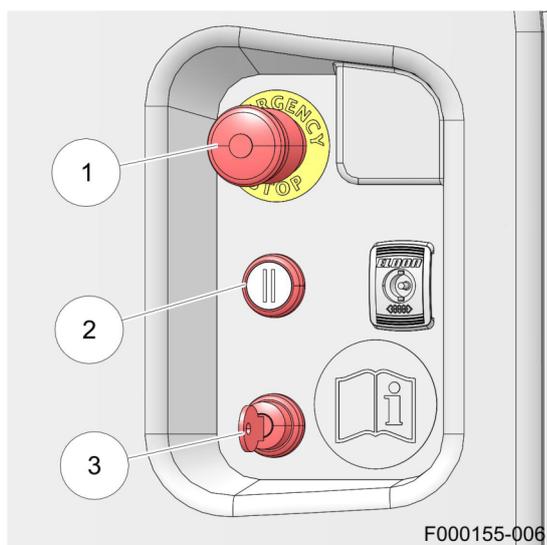


Figure 33. Pause button

KEY: 1. Emergency stop button - 2. Pause button - 3. Safety key

Using the smartphone

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
2. Go to the page **Work**.
3. Push the button  to:
 - Stop the Mixing and Feeding Robot when it was in operation (**On**).

5.1.5 Put Feed Kitchen Devices In and Out of Operation

5.1.5.1 Put the Feed Grabber In Operation

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Grabber.
2. Select the page ,
The page displays the current status.
3. Push the button .
4. If you want to go on with the present task, select and push the button .

It may be necessary to let the Mixing and Feeding Robot send the task to grab again if the Feed Grabber had accepted the task when it went out of operation.
To make the Mixing and Feeding Robot resend the task:

1. Connect the smartphone to the Mixing and Feeding Robot.
2. Take the Mixing and Feeding Robot out of operation using the smartphone (see Take the Mixing and Feeding Robot Out of Operation on page 5-4).
3. Put the Mixing and Feeding Robot in operation and select Yes, to resume the task.

The Feed Grabber will receive the task once more and resume operation.

5. If you want to restart the program, select and push the button .

NOTICE

If the Feed Grabber is powered On, for example after a power failure, it automatically drives until it detects the main reset point. When the Feed Grabber detected the main reset point it is automatically set to In operation.

5.1.5.2 Take the Feed Grabber Out of Operation

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Grabber.

2. Select the page ,
The page displays the current status.
3. Push the button .
4. If you want to stop operation immediately, select and push the button .
5. If you want to stop operation after the current task is finished, select and push the button .

5.1.5.3 Put the Bridge Crane In Operation

NOTICE

When the Bridge Crane starts after the power is put on the Vector system it automatically goes in operation.

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Bridge Crane.
2. Select the page
The page displays the current status.
3. Push the button .

NOTICE

The Bridge Crane will automatically drive to detect the reset magnets after it receives the first task from the Feed Grabber.

5.1.5.4 Take the Bridge Crane Out of Operation

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Bridge Crane.
2. Select the page
The page displays the current status.
3. Push the button ,
The page is displayed.

5.1.6 Shut Down the Vector and Disconnect from the Power

5.1.6.1 Shut Down the Vector and Disconnect from the Power

NOTICE

Only do this procedure when you do not want to use the Vector system for a longer period and want to disconnect it from the power.

1. Set the main switch to Off (see figure 34 on page 5-8) on the power distribution box.
2. Open the power distribution box and disconnect the connector (1) (see figure 35 on page 5-9) to disconnect the backup battery (2).
3. If the Feeding Robot is connected to the charger, manually drive the Feeding Robot backward to disconnect from the charger.
4. If a second Feeding Robot is connected to the additional charger, manually drive the Feeding Robot backward to disconnect from the charger.
5. Switch off the Mixing and Feeding Robot with the key (see figure 36 on page 5-10).
6. Remove the skirt piece and switch off the main switch of the Mixing and Feeding Robot (see figure 37 on page 5-11).
7. To prevent the tires from getting flat, put support blocks under the Mixing and Feeding Robot.

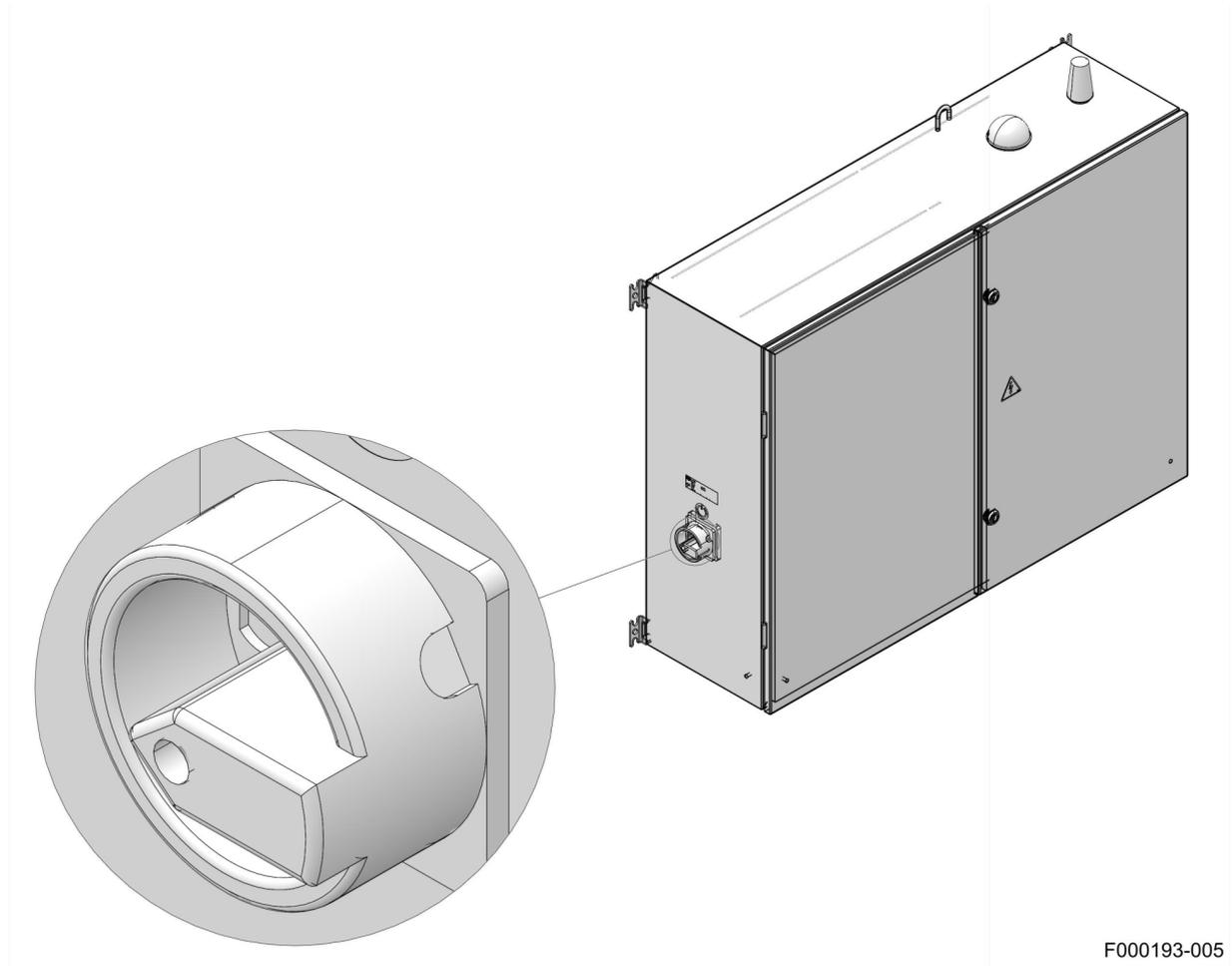


Figure 34. Main switch on the power distribution box

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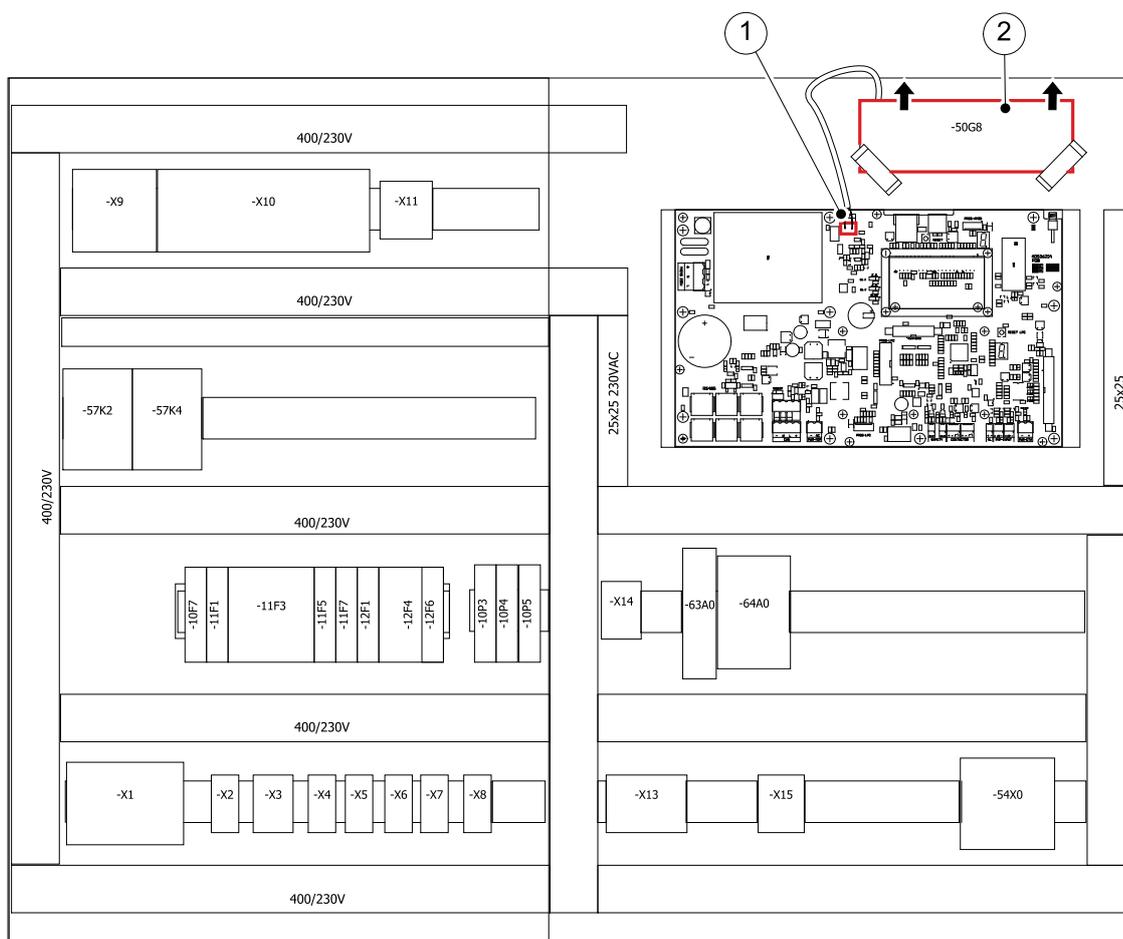


Figure 35. Disconnect the battery in the power distribution box

KEY: 1. Connector - 2. Battery

5.1.6.2 Switch off the Mixing and Feeding Robot with the Key



Risk of electric shock.

Risk of personal injury.

This procedure only switches off the power to the motors. The power on the PCB and the batteries remains. Follow the maintenance instructions in this manual and when indicated, remove the skirt piece and switch off the main switch on the battery of the Mixing and Feeding Robot (see page 5-10) before you start to do maintenance.

1. Turn the safety key (3) (see figure 36 on page 5-10) in the **OFF** position and remove the key. The Mixing and Feeding Robot generates an alarm: **Emergency button**.

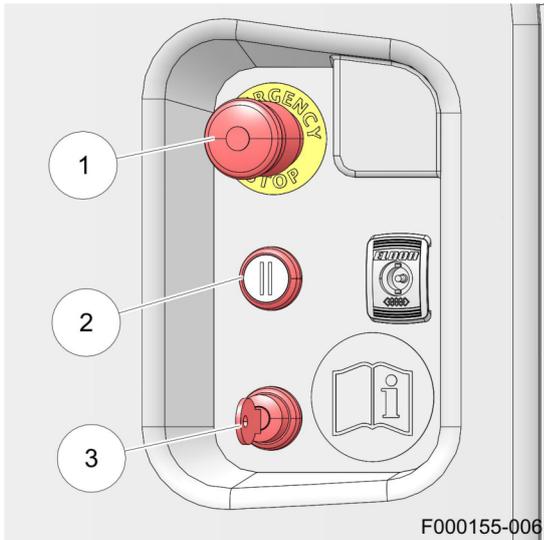


Figure 36. Safety key

KEY: 1. Emergency stop button - 2. Pause button - 3. Safety key



To prevent an alarm message, push the pause button before you turn the safety key.

5.1.6.3 Switch off the Main Switch on the Mixing and Feeding Robot near the Battery



If you have some experience with the main switch, you can set the switch to Off without first removing the skirt piece.

1. Switch off the Mixing and Feeding Robot with the key (3) (see figure 36 on page 5-10).
2. Rotate the skirt until the skirt piece is on the front of the Mixing and Feeding Robot.
3. Remove the bolts (1) (see figure 37 on page 5-11) and the skirt piece (2).
4. Turn the main switch (3) to the OFF position.
5. Install the skirt piece (2) with the bolts (1).

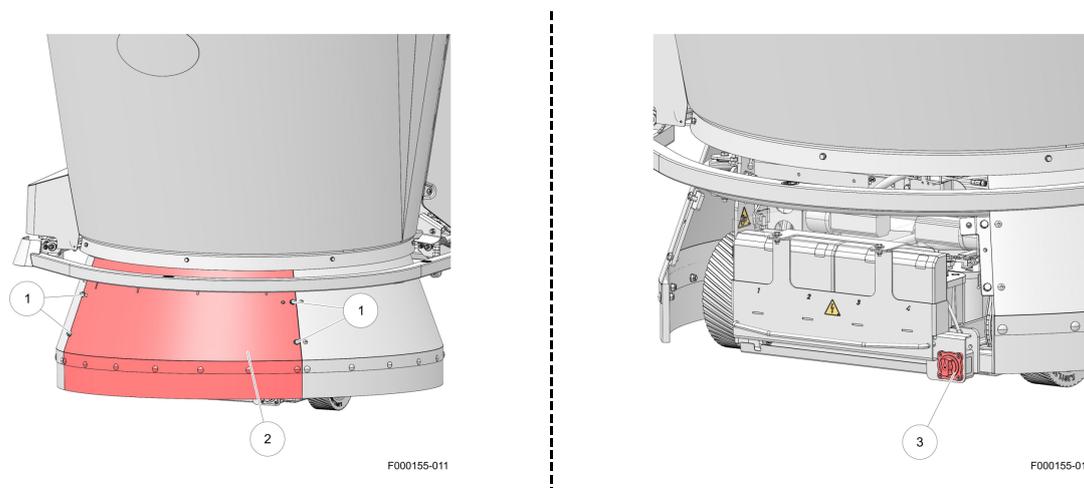


Figure 37. Main switch Mixing and Feeding Robot

KEY: 1. Bolts - 2. Skirt piece - 3. Main switch

5.1.7 Connect the Vector to the Power

5.1.7.1 Connect the Vector to the Power and Start Up

1. Open the power distribution box and make sure the backup battery (2) is connected with connector (1) (see figure 35 on page 5-9).
2. Set the power supply switch (see figure 34 on page 5-8) in the position “1” on the power distribution box.
3. Switch on the main switch near the battery on the Mixing and Feeding Robot (see Switch on the Main Switch on the Mixing and Feeding Robot on page 5-11).
4. Switch on the Mixing and Feeding Robot with the key (see Switch on the Mixing and Feeding Robot with the Key on page 5-12).
5. Put all devices in operation:
 1. Put the Feed Grabber in Operation (see Put the Feed Grabber In Operation on page 5-5).
 2. If present put the Bridge Crane in operation (see Put the Bridge Crane In Operation on page 5-6).
 3. Put the Mixing and Feeding Robot in operation (see Put the Mixing and Feeding Robot In Operation on page 5-2).
6. Put the feed kitchen in operation (see Put the Feed Kitchen in Operation on page 5-1).

5.1.7.2 Switch on the Main Switch on the Mixing and Feeding Robot

1. Rotate the skirt until the skirt piece is on the front of the Mixing and Feeding Robot.
2. Remove the bolts (1) (see figure 37 on page 5-11) and the skirt piece (2).
3. Turn the main switch (3) of the Mixing and Feeding Robot to the **On** position.
4. Install the skirt piece (2) with the bolts (1).

5.1.7.3 Switch on the Mixing and Feeding Robot with the Key

1. Insert the safety key (3) (see figure 36 on page 5-10) and turn it to the **ON** position.
2. Connect the smartphone to the Mixing and Feeding Robot.
3. Read the alarm message.
4. Push  to reset the alarm.
5. If the safety key on Mixing and Feeding Robot was turned during driving a route, the following message appears:
Pausebutton must be pressed and released to accept alarm.
 1. Push the Pause button (2).
 2. Push the Pause button again to release the button.

5.2 Connect to Device Software with a Smartphone

5.2.1 Connect the Smartphone to Device Software



***Unexpected movement of device.
Risk of personal injury.
Only operate the device with the smartphone when it is in your line of sight.***

1. Make sure the App is installed (see Install or Update the App on Your Smartphone on page 5-13) on your smartphone.
2. Make sure you are near the device and you can see the device (power distribution box, Feeding Robot, Feed Grabber, Bridge Crane or control box of the Automatic (barn) door) before you start the software.
3. Start the App.
If Bluetooth was not in operation the following question appears:
The application tries to switch on Bluetooth, continue?
 1. Push **Yes**.
4. Push the line:
The devices near the smartphone will be found,
if one or more devices are not found, repeat this step.
5. Select the device you want to operate.
A connection will be made with the selected software.
The title is displayed in green letters when the connection is made.
If the smartphone loses connection the green title turns red:
 1. Move towards the device to make the connection again.

The smartphone shows a keyboard and a display that can be used to operate the software.

In general the buttons have the following function:

-  Confirms the action on the display above the applicable button.
-  Starts or stops an action.
-  Moves the selector up one item or increases a value by one.
-  Moves the selector down one item or decreases a value by one.
-  Opens the selected function or the next menu screen.
-  Returns to the previous screen and saves the changes.
-  Program button with specific action.

5.2.2 Install or Update the App on Your Smartphone

1. On your smartphone go to the google play store.
2. Download the Lely Control app.



3. Install the app.
4. Wait until the software is correctly installed.
5. Start the Lely Control app.
6. Select  in the left bottom corner.
7. Enter the (usually 160, in rare situations 161 if another Vector system is nearby).
8. Enter the you received from the Lely service technician.
9. Push in the top right corner.

NOTICE

If there is new software available, a notification is displayed on the icon of the Google play store. Usually automatic update is set and updates are done automatically.

5.3 Reset after an Alarm or Emergency Stop

5.3.1 View the Alarm List on the Web Page

1. Start the T4C PC that is connected to the Vector.
2. Start an internet browser, for example Windows Internet Explorer.
3. Type the Web page address: 10.4.1.85.
4. The Web page has two tabs:
 - The tab Version shows the software versions of the software that runs on the power distribution box (PDB) and on all devices of the Vector. In some occasions refresh the page (push F5) to view all software versions.
 - The tab Alarms shows the last 100 alarms.

5.3.2 Reset the System After an Alarm

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Controller.
2. If there is an alarm on the Feed Controller it is shown on the display.
3. Read the alarm message, if necessary see Troubleshooting (see on page 7-1) to see what actions should be taken to remove the cause of the alarm.
4. Push  to confirm the alarm message.
5. If there is an alarm on another device go to the page **Alarms > Active alarms**.
6. Check on which device the alarm is generated.
7. Push . If necessary see Troubleshooting (see on page 7-1) to see what actions should be taken to remove the cause of the alarm.
8. If the alarm is on the Mixing and Feeding Robot, Feed Grabber or Bridge Crane:
 1. Connect the smartphone to the software of the device.
 2. Read the alarm message, if necessary see Troubleshooting to see what actions should be taken to remove the cause of the alarm.
 3. Push  to confirm the alarm message.

9. If the Mixing and Feeding Robot gives the alarm that the automatic (barn) door is in error state:

1. Remove any blockage from the automatic door.
2. Make sure the sensor is still in the correct position and can detect that the door is open or closed.
3. Use the buttons on the controller of the supplier of the door to reset the alarm of the door as follows:
 - Close the door if it was opened
 - Open the door if it was closed

If this does not work, reboot the system by switching the power Off for a few seconds and On again.

4. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
5. Push  to confirm the alarm message.
6. Test the operation of the automatic (barn) door when operated from the Mixing and feeding Robot as follows:
 1. Manually drive the Mixing and Feeding Robot to the automatic door until it is within Bluetooth range.
 2. Go to the page **Test > Auto. door**.
 3. Push the button  ↑ to open the door, or  ↓ to close the door.
If this does not work you can test if it is possible to open and close the door with the barn door software:
 1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Automatic (barn) door
 2. Go to the page **Testing**
 3. Push the buttons Open or Close.
 4. If this does not work ask your Lely service technician for advice.

10. If the alarm is on the additives dispenser (frequency pulse):

1. Make sure the bin is not empty and the transport pipe is not clogged up.
2. Connect the smartphone to the Feed Controller.
3. Go to the page **Alarms > Active alarms**.
4. Push the button  **ACCEPT**.
5. Test the additive dispenser (frequency pulse), go to the page **Service > FreqCon Pulse > Test FreqCon Pulse**

1. Push .

A window appears with the number of the dispenser.

2. Push the white box that displays the number, set the number and push OK.

3. Push  and .

A window appears with the weight.

4. Push the white box that displays the weight, set the weight and push OK.

5. Push .

The set additive dispenser (frequency pulse) will operate and dose the set weight of the additive.

During operation check if the light of the sensor (3) (see figure 29 on page 4-9) or (5) (see figure 30 on page 4-10) blinks with every pulse, if it is off the sensor is broken.

Check if the set weight is dispensed, if not calibrate the additive dispenser (frequency pulse) (see Calibrate the Additives Dispenser (frequency pulse) on page 6-23).

11. If necessary reset the MODalarm (see Reset alarms on the MODalarm on page 5-16) or the alarm on CRS.

5.3.3 Reset alarms on the MODalarm

The MODalarms can be reset on the Feed Controller software (Lely Control app) or on the connected T4C PC.

Reset the MODalarm on the Feed Controller software

1. Connect the smartphone to the Feed Controller.
2. Go to the page **Alarms > Reset ModAlarm**.
3. Push the button , to reset the MODalarm.

Reset the MODalarm on the T4C PC

NOTICE

Do this procedure on the T4C PC or on a PC connected to the farms network that is connected to the MODalarm of the Vector.

1. On the web browser go to the page: <http://10.4.1.210>

2. Wait until the page is found, in the top bar three options are displayed:
 - Login.
 - Connected devices.
 - Active alarms.
3. Click on login and use the username and password you received from your Lely technician to log in.
4. Select the device at **Connected devices**.
5. Click on **Reset alarms** to reset the alarms.

5.3.4 Reset an Alarm on the Mixing and Feeding Robot and Continue Route

NOTICE

When an unfinished task is still present when the Mixing and Feeding Robot is put into operation a question appears if you want to finish the task, which means if you want to continue to do that task.

- Use Yes, if you stopped during a feed task and want the Mixing and Feeding Robot to continue where it stopped. If it was waiting for the Feed Grabber to dump feed in the mixing bin, the Mixing and Feeding Robot will send the task to the Feed Grabber again. If it was driving a route action it will continue with the route action.
- Only use No, if you want all data from the feed task to be deleted and you want the Feed Controller to send a new task to the Mixing and Feeding Robot. Keep in mind that when a task is stopped after feed has been dispensed at the feed location, this data is lost and is not reported to T4C.

WARNING

***Unexpected movement of vehicle.
Risk of personal injury.
Make sure the Mixing and Feeding Robot and the immediate vicinity is void of persons and animals. Only operate the Mixing and Feeding Robot with the smartphone when it is in your line of sight.***

1. Connect the smartphone to the Mixing and Feeding Robot.
2. Read the alarm message, if necessary see Troubleshooting (see on page 7-1) to see what actions should be taken to remove the cause of the alarm.
3. Push  to confirm the alarm message.

4. A question appears: **Continue with**

Select:

- **Yes**, to let the Feeding Robot continue the route.
 - **No**, to stop the route. You must manually drive the Mixing and Feeding Robot to the charger and put it in operation (see Put the Mixing and Feeding Robot In Operation on page 5-2).
 - **MANUAL DRIVING**, to drive the Feeding Robot manually to a location on the route.
 1. The following message appears on your display: **SAFETY WARNING Manual operation is permitted only with a clear overview of the vehicle. Confirm?**
 2. Confirm if you have a clear overview of the Mixing and Feeding Robot.
 3. Drive the robot manually to the location where the Feeding Robot interrupted the route.
 4. Push button .
 5. Select **Yes** to continue the route.
 6. Push pause button (2) (see figure 36 on page 5-10) twice.
 7. If the Feeding Robot now generates an alarm because the reset point or strip can not be found but the reset point or strip is very near by, repeat this procedure.
5. If necessary reset the MODalarm (see Reset alarms on the MODalarm on page 5-16) or the alarm on CRS.

5.3.5 Reset the Emergency Stop Button on the Mixing and Feeding Robot



***Unexpected movement of vehicle.
Risk of personal injury.
Make sure the Mixing and Feeding Robot and the immediate vicinity is void of persons and animals. Only operate the Mixing and Feeding Robot with the smartphone when it is in your line of sight.***

1. Make sure the Mixing and Feeding Robot and the immediate vicinity is void of persons and animals.
2. Turn the emergency stop button (1) (see figure 36 on page 5-10) clockwise and pull it out until it locks.
3. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
4. Read the alarm message.
5. Push  to confirm the alarm message.

6. A question appears: **Continue with current route?**

Select:

- **Yes**, to let the Feeding Robot continue the route
 - **No**, to stop the route. You must manually drive the Mixing and Feeding Robot to the charger and put it in operation (see Put the Mixing and Feeding Robot In Operation on page 5-2)
 - **MANUAL DRIVING**, to drive the Feeding Robot manually to a location on the route.
 1. The following message appears on your display: **SAFETY WARNING Manual operation is permitted only with a clear overview of the vehicle. Confirm?**
 2. Confirm if you have a clear overview of the Mixing and Feeding Robot.
 3. Drive the robot manually to the location where the Feeding Robot interrupted the route.
 4. Push button .
 5. Select **Yes** to continue the route.
 6. Push pause button (2) (see figure 36 on page 5-10) twice.
 7. If the Feeding Robot now generates an alarm because the reset point or strip can not be found but the reset point or strip is very near by, repeat this procedure.
7. If necessary reset the MODalarm (see Reset alarms on the MODalarm on page 5-16) or the alarm on CRS.

5.3.6 Reset an Emergency Stop Button in or near the Feed Kitchen



***Unexpected movement of machines.
Risk of serious injury.
Make sure the feed kitchen is void of persons, animals, machines or anything other than roughage.***

1. Pull the emergency stop button out until it locks.
2. Make sure the feed kitchen is void of persons, animals, machines or anything other than roughage.
3. Make sure the safety fence is closed.
4. Make sure all gates and feed kitchen doors are closed.
5. If necessary reset the MODalarm (see Reset alarms on the MODalarm on page 5-16) or the alarm on CRS.
6. On the console push start (1) (see figure 32 on page 5-2).
The start button starts blinking and the system tests if all gates are closed and emergency stop buttons are in safe position.
7. Wait until the light in the start button is continuously on.
If necessary manually put the feed Grabber and/or Bridge Crane in operation.
8. On the console push start again.

5.4 Fill the Kitchen

5.4.1 Fill the Feed Kitchen

1. Put the Feed Kitchen in the filling mode (see Put the Feed Kitchen in the Filling Mode with the Console (Out of Operation) on page 5-3).
2. Remove the safety fence (if applicable) or open the kitchen door.
3. Clean the feed kitchen and for example sweep all remains of roughage to one location. After filling the feed kitchen you can add the remains on top of the new feed blocks.
4. Make sure you know the feed types of every location.
5. Use a block cutter or a silage block cutter to cut the feed blocks up to 1.05 m (3.44 ft) deep.
6. Position the feed blocks in the center of every feed location.
7. Ask your FMS advisor if your round bales (1) (see figure 38 on page 5-20) need to be cut, and how to cut them.
For example: first cut bales in halves, pile the halves and if necessary cut in quarters (2) push each pile (3) to the center of a separate feed location.
8. Put the feed kitchen in operation (see Put the Feed Kitchen in Operation on page 5-1).
9. Wait until the Feed Grabber is started and has found the reset magnet.

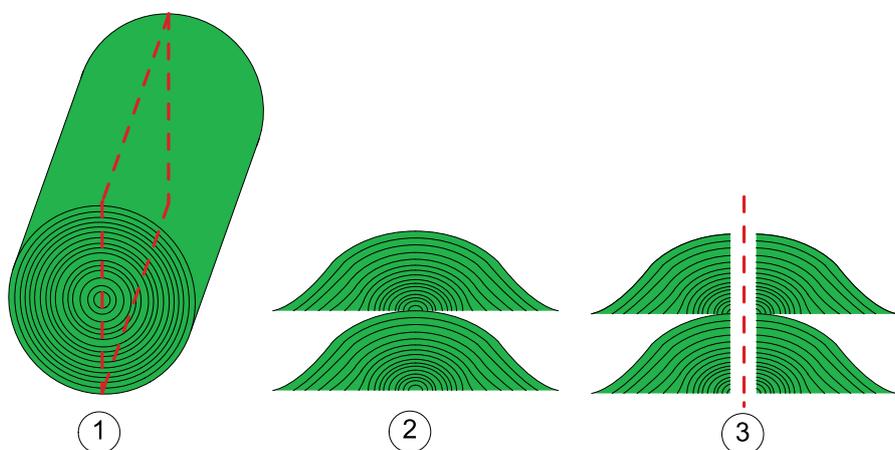
When the Feed Kitchen goes in operation after the filling mode, all storage locations are set to filled.

Move a feed block

If a feed block was moved to another feed storage place and you want this feed block to be used up first.

1. Connect the smartphone to the Feed Controller.
2. Select the page **Feed Kitchen > Storage places**.
3. Select the feed storage place with the moved feed block.
4. Push button .
5. Repeat step 1 - 2 for all feed types with moved feed blocks.

This can also be set in T4C on the tab of the Feed Kitchen.



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Figure 38. Example of cutting round bales

5.4.2 Fill the Additives Dispenser (freq p)

1. Remove the lid from the dispenser.
2. Fill the dispenser with a certain amount of minerals or other additives.
3. Close the lid.
4. If a new type of additive is used Calibrate the additives dispenser (see Calibrate the Additives Dispenser (frequency pulse) on page 6-23). Otherwise calibrate the additives dispenser every month.

Fill the auger

If the auger was empty, fill the auger:

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Controller.
2. Take the Feed Controller out of Operation.
3. Go to the page > >.
4. Push 

A window appears with the number of the dispenser.
5. Push the white box that displays the number, set the number and push OK.
6. Push button  to start the motor and fill the pipe.
7. Wait until additives fall from the drop pipe and the auger is filled.
8. Push button  to stop the motor.
9. Put the Feed Controller in operation.

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5.4.3 Enter the Feed Kitchen

NOTICE

All entrances of the feed kitchen are secured to prevent entrance when the Feed Grabber is in operation. If a feed kitchen door, moving screen, the safety fence gate or the safety fence is opened, the emergency stop is activated. If you want to enter the feed kitchen you must put it in: **filling mode**.

Park the Feed Grabber and deactivate the gate/door(s)

1. Put the Feed Kitchen in the filling mode (see Put the Feed Kitchen in the Filling Mode with the Console (Out of Operation) on page 5-3).
2. Open the door or gate of the feed kitchen.

Activate the Feed Kitchen

1. Close all doors and gates of the feed kitchen.
2. Put the feed kitchen in operation (see Put the Feed Kitchen in Operation on page 5-1).

5.4.4 Deactivate and Open the Safety Fence

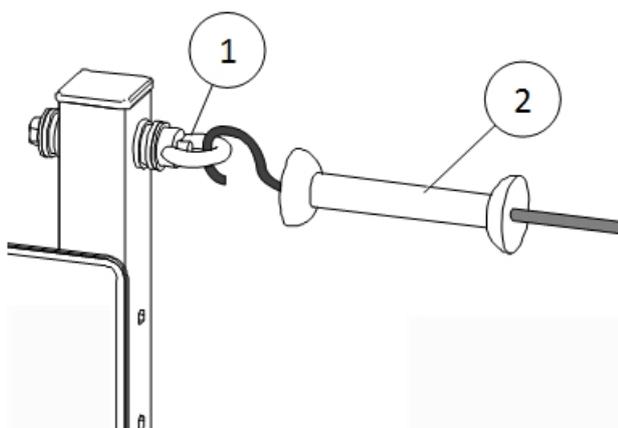


CAUTION

*Risk of high voltage electrical shock.
Risk of personal injury.
Keep away from the electric fence.*

CAUTION

*Elastic force.
Risk of personal injury.
The wires of the safety fence are installed under tension, make sure there is no animal or other person near the wire when you unhook or hook a wire and be aware of the elastic force.*



KEY: 1. Eye - 2. Handle

1. Take the Feed Kitchen out of Operation (see Put the Feed Kitchen in the Filling Mode with the Console (Out of Operation) on page 5-3).
2. Take the plastic handle (2) (see figure 31 on page 4-11) and unhook the first wire from the eye, be aware of the elastic force.
3. Unhook the wire from the open eyes (1) on the (removable) poles.
4. When the wire is no longer under tension let the plastic handle loose near the first pole that does not need to be removed.
5. Repeat step 2- 4 until all 6 wires are removed.
6. Remove the removable poles (1) (see figure 39 on page 5-23) from the plate (2).

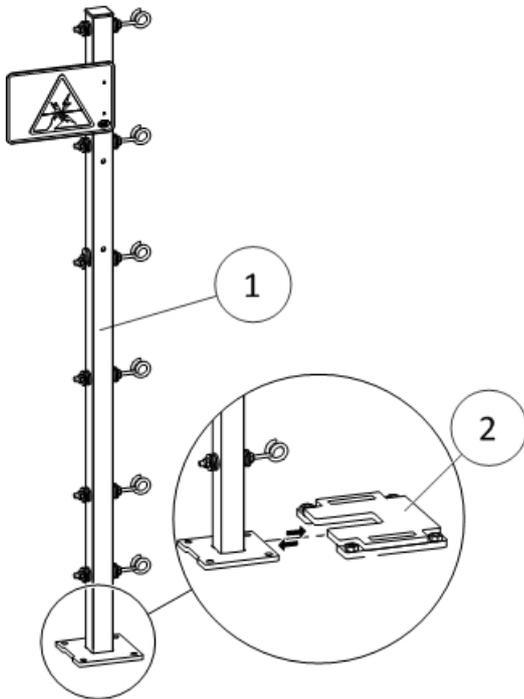


Figure 39. Removable pole

KEY: 1. Removable pole - 2. Plate

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5.4.5 Close the Safety Fence



Elastic force.

Risk of personal injury.

The wires of the safety fence are installed under tension, make sure there is no animal or other person near the wire when you unhook or hook a wire and be aware of the elastic force.

1. Install the removable poles (1) (see figure 39 on page 5-23) under the plates (2).
2. Take the plastic handle (2) (see figure 31 on page 4-11) and hook the wire on the open eyes (1) on the poles, be aware of the elastic force.
3. Hook the plastic handle on the eye (3) of the last pole.
4. Repeat step 2 and 3 until all six wires are installed.
5. Put the feed kitchen in operation (see Put the Feed Kitchen in Operation on page 5-1).

5.5 Start a Feed or Scan Task Manually

After all Vector setting are made in T4C for automatic operation, it is also possible to start manual tasks with the Feed Controller software.

T4C settings necessary for the Vector are:

- Settings for the routes (fences, scan interval).
- Settings for the feed fences (locations with animals, rations, feed height).
- Settings for the feed kitchen (storage location of feed types).
- Settings for the rations (amounts of feed types mixing order, mixing times).
- Library settings for feed types.

5.5.1 Start a Feed Task Manually

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Controller.
2. Go to the page .
3. Push button .
4. If more than 1 route is available:
Use the buttons  and  and push  to select a route.
A page appears with the fences with animals on the route.
5. Use the buttons  and  and push  to add a fence to the task list.
6. If one fence is selected, it is possible to add another fence if there is another fence in the same feedsection on the route with the same ration.
The fences that can not be combined have - - signs behind them.
7. When all fences are added, push .
All tasks are shown in the order of execution.

The tasks start when the Mixing and Feeding Robot is in operation and connected to the charger under the feed loading point and the feed kitchen is in operation.

When all the tasks are done, the system will continue to work automatically.

5.5.2 Start a Scan Task Manually

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Controller.
2. Go to the page .
3. Push button .
4. If more than 1 route is available:
Use the buttons  and  and push  to select a route.
The manual task is shown on the page.
5. Push .
All tasks are shown in the order of execution.

The tasks start when the Mixing and Feeding Robot is in operation and is connected to the charger under the feed loading point and the feed kitchen is in operation.

When all the tasks are done, the system will continue to work automatically.

5.6 Change the Feed Type in a Feed Storage Place

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Controller.
2. Take the Feed Kitchen out of Operation (see Put the Feed Kitchen in the Filling Mode with the Console (Out of Operation) on page 5-3).
3. In the feed kitchen, determine the feed storage places where the new feed type will be set and write down the numbers.
4. Fill the feed storage places, and do not put the feed kitchen in operation yet.
5. Go to the T4C PC (see the T4C manual) and:
 - If necessary add the new feed type to the library
 - On the Feed Kitchen page link the storage ID to the new feed type
 - Remove the old feed type from the rations
 - Add the new feed type to the rations
6. Put the feed kitchen in operation (see Put the Feed Kitchen in Operation on page 5-1).

5.7 Drive the Mixing and Feeding Robot

5.7.1 Drive the Mixing and Feeding Robot Manually

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
2. Go to the page **Work**.
3. Push the button  two times to go to the tab **MANUAL DRIVING**.
4. The following message appears on your display: **SAFETY WARNING Manual operation is permitted only with a clear overview of the vehicle. Confirm?**
5. Confirm if you have a clear overview of the Mixing and Feeding Robot.
6. Activate:
 -  [L] to turn right
 -  [R] to turn left
 - [L] and [R] to go straight on
7. Push   to change the direction, if necessary.
8. Use the buttons  and  to adjust the speed, a percentage of the maximum driving speed is displayed.
9. Push  to start, hold it.

10. Release  to stop.

5.7.2 Connect the Mixing and Feeding Robot Manually to the Charger

To connect the Mixing and Feeding Robot manually to the charger use the page **Work** and see the explanation of the third tab **MANUAL CHARGER** (see Put the Mixing and Feeding Robot In Operation on page 5-2).

5.7.3 Lower the Skirt to Clear the Route of Snow

NOTICE

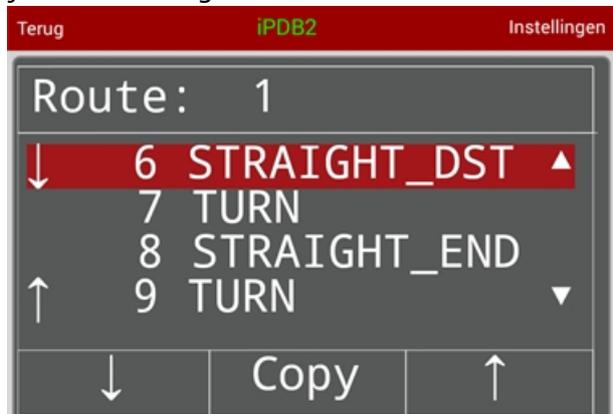
Do not use de-icing salt on the route, only use it when there is no other option. This may cause corrosion and damage the Mixing and Feeding Robot. It is best to use sand.

During periods of frost and snow fall the routes of the Mixing and Feeding Robot outside the barn must be de-iced and cleared of snow. During this period it is recommended to let the Feeding Robot drive outside the barn with a lowered skirt. With heavy snowfall use for example a shovel to clear the route.

To lower the skirt on the routes outside the barn do the following:

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Controller.
2. Go to the page **Settings > Routes MFR > Skirt position**.
3. Select a route,
A list of route actions is shown.
4. Select the first route action outside the barn and push:
 -  to lower the skirt.
5. Push  **Copy** to set the same skirt position for the next route actions outside the barn.
6. Use the button  to go to the last route action outside the barn.

7. Push **Copy**.
 on the first and last of the route actions an arrow was set to indicate the direction of the skirt. When you scroll through the action list the arrow before the action number shows which direction was set.



In this figure the skirt is set to down on route action 6, 7 and 8, the skirt is up on route action 9.

8. Push **Esc** to save the skirt positions.
 A question appears:
9. Push to save the skirt positions.
10. Repeat step 3 - 9 for all routes.

When there is no longer risk of snow and ice on the route, the skirt must be set in the lifted position while driving outside the barn. Repeat the procedure described above but in step 4 push **↑** to lift the skirt on the route actions.



Make a copy of the route and set the skirt position on all route actions outside the barn to lifted on the original route and to lowered on the copied route. By activating either the “winter” or “summer” route you can easily change to the correct route when necessary and switch back again.

5.8 Set the Automatic (Barn) Door Control

Door settings on the MFR software

To use the automatic (barn) door the function of the automatic door must be set to On, on the Mixing and Feeding Robot.

1. Go the page **Settings > Auto. door active**.
2. Select On.

Set the Automatic (Barn) Door to Automatic Control

1. Turn the switch on the Lely door control box to automatic.
 When the Mixing and Feeding Robot wants to pass: the software will open the door and send a message to the Feeding Robot that the door is open when the Lely switch senses that the door is open.

2. Release or activate the door control, see the manual of the supplier of your automatic door.

Set the Automatic (Barn) Door Continuously Open

NOTICE

If the automatic door must be opened continuously, you must first open the door manually. After that the Lely automatic door must be set to manual with the switch see procedure below.

1. Manually set the automatic door continuously open, see the manual of the supplier of your automatic door.
2. Turn the switch on the Lely door control box to manual.
The software will no longer monitor the Lely door switch, but sends a message to the Mixing and Feeding Robot that the door is open when the Feeding Robot wants to pass.



To prevent communication alarms with the door, you can also disable the door in the software of the Mixing and Feeding Robot, on the page **Settings > Auto. door active.**

5.9 Change Feed in the Digital Output

During installation the Lely technician made settings for the feed in the digital output.

The first time the digital output is used and when the digital output is filled with a new type of feed, a person must be present to view how much feed is loaded. The first time the feed is loaded into the mixing bin the system assumes a flow, but that can be different from the actual flow. Make sure that the ration is safe to feed to the animals for example if too much is loaded by the digital output. The second time the feed is loaded, the system has “learned” what the flow is.

If a new type of feed causes too many alarm message, you must ask your Lely technician to adjust the settings.

6 Maintenance Procedures

6.1 Preventive Maintenance Schedule Farmer

The following table shows the preventive maintenance schedule for the Vector. Preventive maintenance must obey all applicable local regulations.

NOTICE

The frequencies of the tasks shown in the table are the minimum frequencies recommended.

Table 1. Maintenance

| Task | Day |
|--|-------------------|
| Examine the stock (see Examine the Stock on page 6-21) | 1 |
| Sweep the feed kitchen and remove spilled feed | 1 |
| Correct the number of animals in the group see T4C | 1 |
| Examine the Feeding, see reports T4C | 1 |
| Fill the feed kitchen (see Fill the Feed Kitchen on page 5-20) | 3 (or more often) |
| Clean and Inspect the Feed Loading location (see Clean and Inspect the Feed Loading Location on page 6-2) | 7 |
| Examine and repair the metal strips (see Examine and Correct the Metal Strips on page 6-17) | 7 |
| Clean the feed height sensor on the Mixing and Feeding Robot (see Clean the Feed Height Sensor on page 6-5) | 7 |
| Clean the ultrasonic sensor (see Clean the Ultrasonic Sensors on page 6-7) | 14 |
| Clean the feed height sensor on the Feed Grabber (see Clean the Feed Height Sensor on page 6-20) | 14 |
| Clean the pipe to the drop pipe of the additives dispenser (frequency pulse) (Option) (see Clean the Drop Pipe of the Additives Dispenser(s) (frequency pulse) on page 6-22) | 14 |
| Clean the position sensor of the dosing roll (see Clean the Dosing Roll and Position Sensor on page 6-3) | 14 |
| Examine the reports on the Mixing and Feeding Robot Software (see Examine the Reports in the Mixing and Feeding Robot Software on page 6-19) | 14 |
| Clean the magnet on the Mixing and Feeding Robot (see Clean the Magnets on page 6-4) | 14 |

Table 2. Maintenance during the year

Table 2 Maintenance during the year (cont'd.)

| Task | months |
|--|--------|
| Calibrate the additive dispenser(s) (frequency pulse)(Option) (see Calibrate the Additives Dispenser (frequency pulse) on page 6-23) | 1 |
| Examine the mixer knives (see Examine the Mixer Knives on page 6-8) | 1 |
| Clean the IPE profile of the Bridge Crane (see Clean the IPE profile of the Bridge Crane on page 6-22) | 4 |
| Clean the control boxes (see Clean the Control Boxes on page 6-23) | 6 |
| Make sure an authorized person approves the Bridge Crane, Feed Grabber and the Lely stepladder yearly | 12 |

6.2 Mixing and Feeding Robot



Unexpected movement of machine.

Risk of personal injury.

Always switch off the Mixing and Feeding Robot and remove the key before doing any maintenance. After maintenance, make sure all covers are installed and properly fixed. Do not put the Mixing and Feeding Robot into operation without the covers.



Do not lubricate the nipples on the ball bearings of the dosing roll and the feed door.

The Mixing and Feeding Robot has ball bearings on the dosing roll and the feed door with lubrication nipples, but they must not be lubricated.

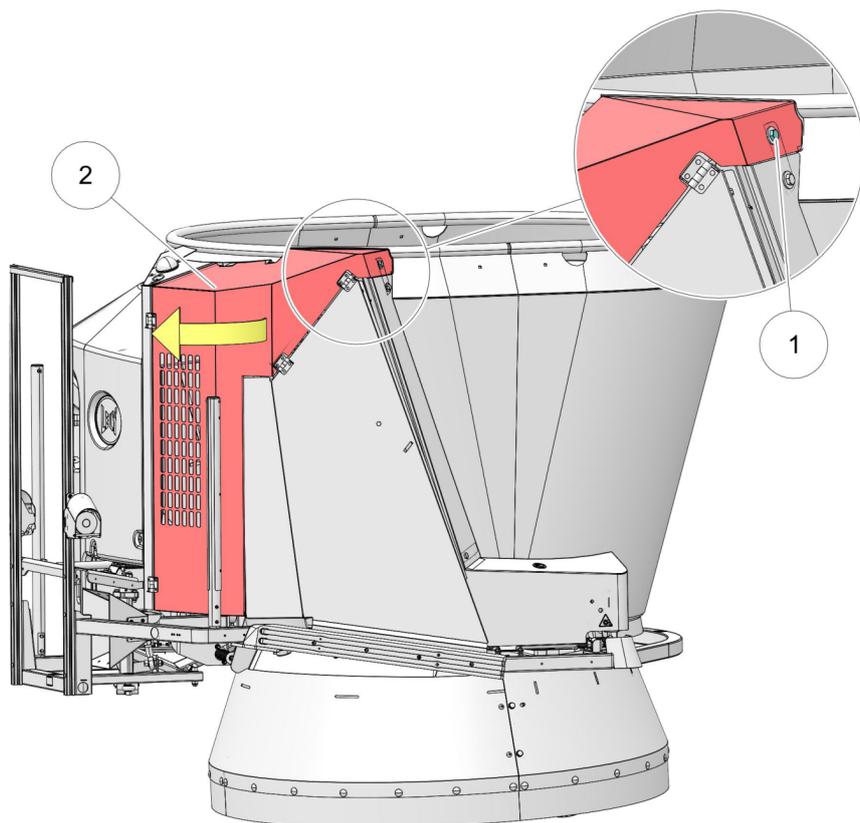
6.2.1 Clean and Inspect the Feed Loading Location

1. Clean the area near the feed loading position and charger.
2. When the Mixing and Feeding Robot is at the feed loading point, make sure the weight measurement is not influenced and make sure:
 1. The Mixing and Feeding Robot does not lean against any object.
 2. No auger pipes, damaged fences, dugout or other objects lean on the Mixing and Feeding Robot.
3. Clean the floor and the strips that prevent the Mixing and Feeding Robot from rolling backwards out of the charger.

6.2.2 Clean the Dosing Roll and Position Sensor

Preparation

1. Switch off the Mixing and Feeding Robot with the key and remove the key (see Switch off the Mixing and Feeding Robot with the Key on page 5-9).
2. Remove the bolt (1) and open the maintenance door (2) (see figure 40 on page 6-3).



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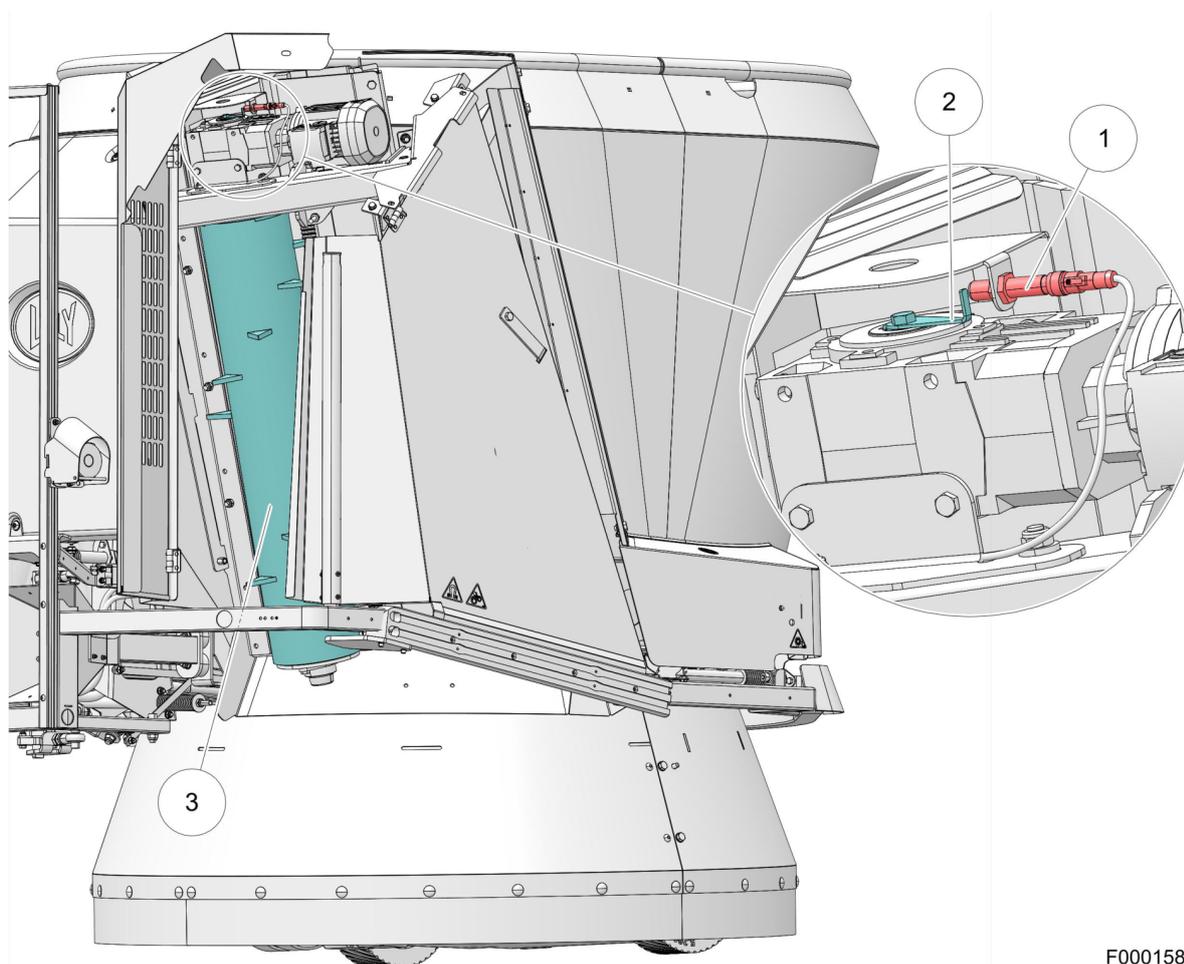
F000156-007

Figure 40. Open the maintenance door

KEY: 1. Bolt - 2. Maintenance door

Clean

1. Carefully remove all feed remains from the dosing roll (3) (see figure 41 on page 6-4).
2. Remove all dirt and fibers between the position sensor (1) and the metal arm (2) on the dosing roll.
3. Remove all dirt in the top area and between the motors.
4. Every two or three months use compressed air to blow all dirt from the motor of the dosing roll and the motor of the feed door.



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Figure 41. Dosing roll and position sensor

KEY: 1. Position sensor - 2. Metal arm - 3. Dosing roll

Close-up

1. Close the door and install the bolt.
2. Switch on the Mixing and Feeding Robot with the key (see Switch on the Mixing and Feeding Robot with the Key on page 5-12).

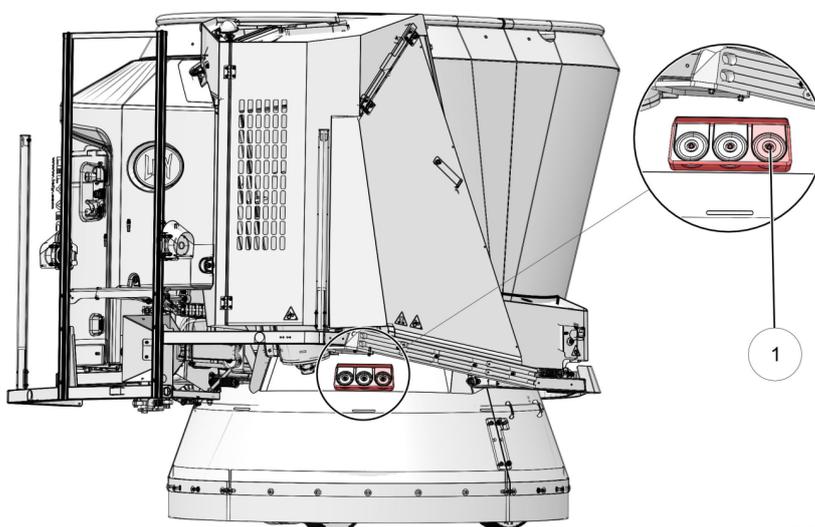
6.2.3 Clean the Magnets

Tools

Preparation

1. Push the pause button (see figure 33 on page 5-4) once to take the Mixing and Feeding Robot out of operation.

Clean



F000190-001

Figure 42. Magnets

1. Push all metal parts upwards and remove them from the magnets (1) (see figure 42 on page 6-5).

Close-up

1. Push the pause button once to put the Mixing and Feeding Robot in operation.

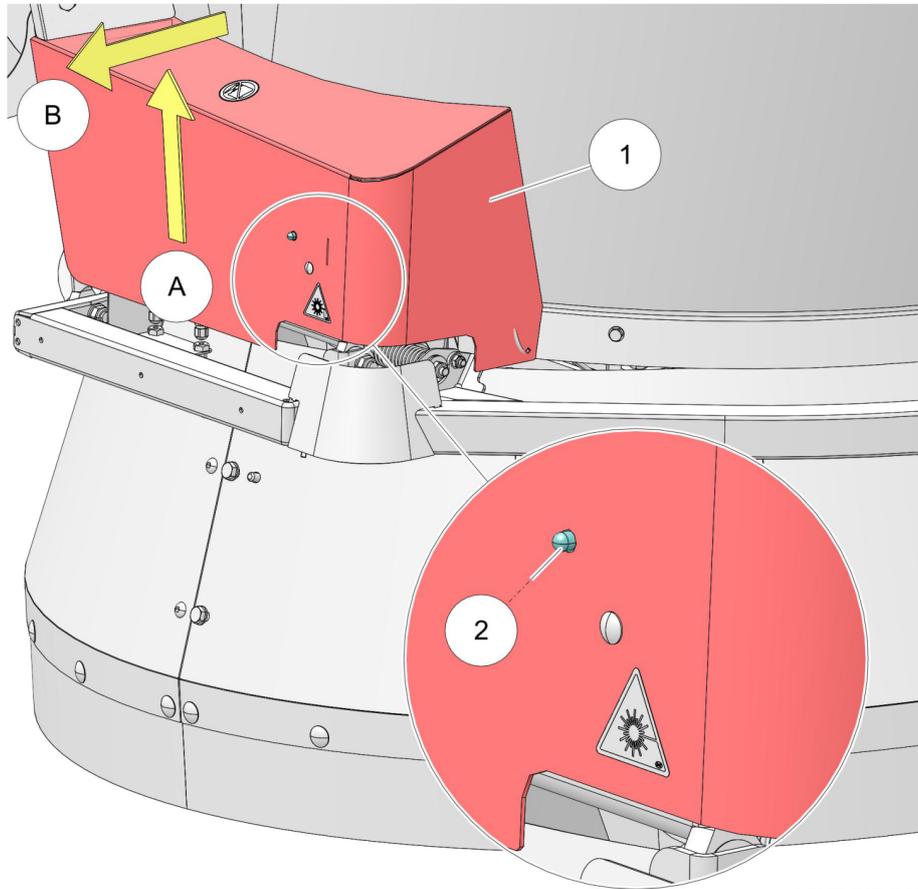
6.2.4 Clean the Feed Height Sensor



*Laser light.
Risk of getting blind.
Do not stare into the beam.*

Preparation

1. Take the Mixing and Feeding Robot out of operation (see Take the Mixing and Feeding Robot Out of Operation on page 5-4).
2. Push the button (2) (see figure 43 on page 6-6) on the laser cover (1) to release the lock, lift (A) and pull (B) the laser cover.



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Figure 43. Open the laser cover

KEY: 1. Laser cover - 2. Button

Clean



*Laser light.
Risk of getting blind.
Do not stare into the beam.*

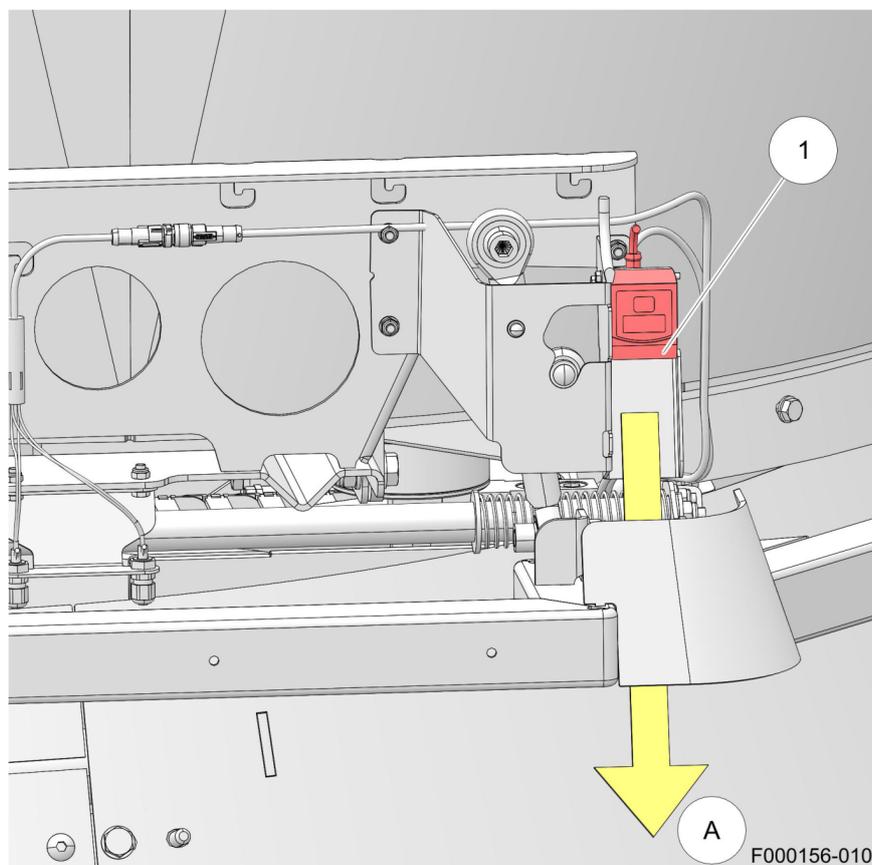


Figure 44. Clean the laser

KEY: 1. Feed height sensor

1. Use a small brush or cloth to remove all dirt and cobwebs under the laser (A) of the feed height sensor (1) (see figure 44 on page 6-7).
2. Use a wet cloth to clean fly droppings and dirt from the glass.

Close-up

1. Install the laser cover.
2. Put the Mixing and Feeding Robot in operation (see Put the Mixing and Feeding Robot In Operation on page 5-2).

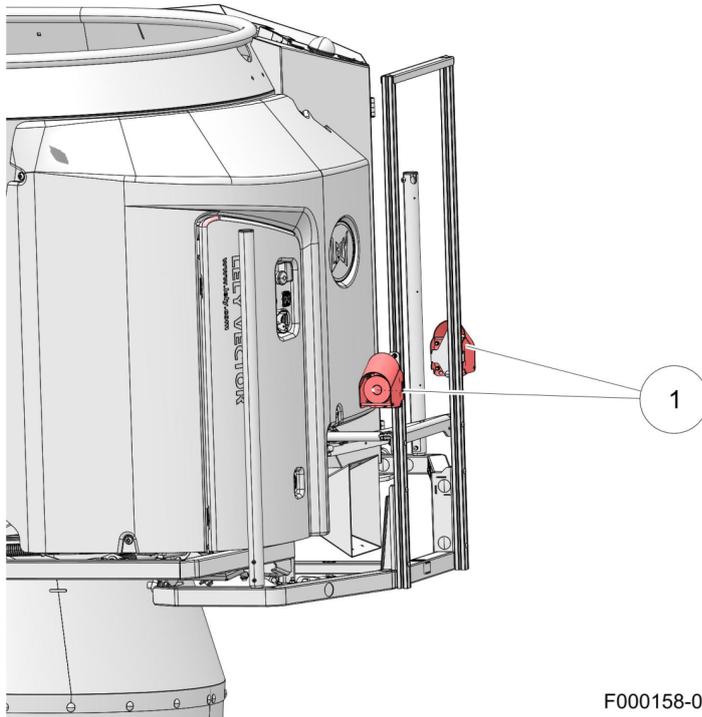
6.2.5 Clean the Ultrasonic Sensors

Preparation

1. Take the Mixing and Feeding Robot out of operation (see Take the Mixing and Feeding Robot Out of Operation on page 5-4).

Clean

1. Use a wet cloth to remove all dirt from the ultrasonic sensors (1) (see figure 45 on page 6-8).



F000158-007

Figure 45. Ultrasonic sensors

KEY: 1. Ultrasonic sensors

Close-up

1. Put the Mixing and Feeding Robot in operation (see Put the Mixing and Feeding Robot In Operation on page 5-2).

6.2.6 Examine the Mixer Knives

⚠ DANGER

**Sharp rotating knives.
Risk of severe injury or death.
Remove the key before you do work in the mixing bin.**



Sharp knives.

Risk of severe injury.

When you enter the mixing bin always wear cut resistant clothes to protect your hands arms and legs. You must wear at least gloves, sleeves and trousers, all with a cut resistance according to the standards mentioned in the paragraph 'Cut resistant clothing' (see page 2-4). Preferably also wear a jacket or an overall according to the standards.



Use the Vector stepladder to do this procedure.

Preparation

1. Examine the feed at the feed fence and see if it is mixed and cut as well as when the knives were new. If the ration is the same and the mixing time is the same, bad mixed and cut feed could indicate that the knives are dull or worn.
2. Examine the alarms, alarms and notifications that the mixer is blocked are also an indication that the knives are dull or worn.
3. Switch off the Mixing and Feeding Robot with the key and remove the key (see Switch off the Mixing and Feeding Robot with the Key on page 5-9).

Examine

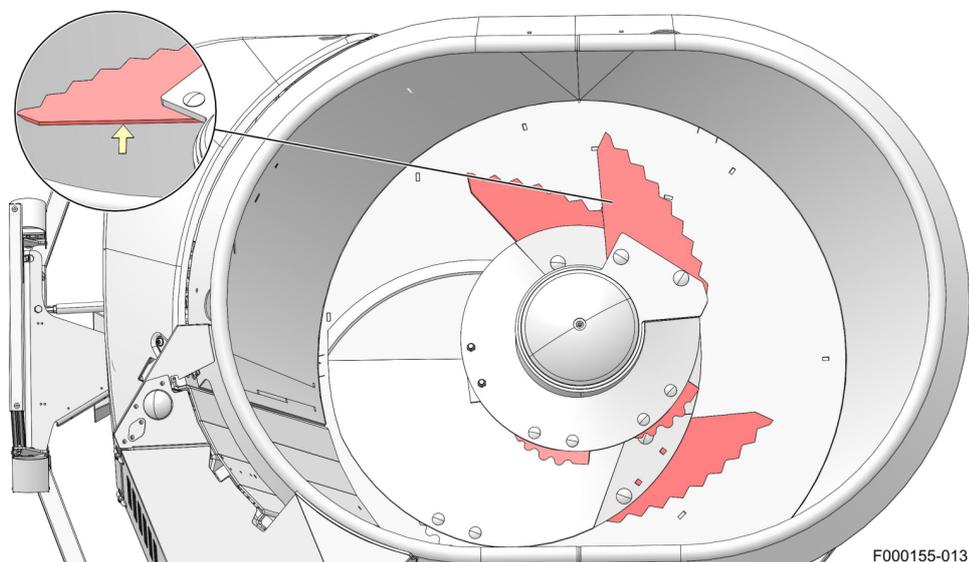


Figure 46. Examine the mixer knives

1. Use the stepladder and carefully look into the mixing bin and examine the knives, do not climb into the mixing bin.
2. The knives must not be broken or worn and they must be sharp.
3. The big knives (new knives are 8 mm thick) must be at least 4 mm thick at the location of the arrow in the figure (see figure 46 on page 6-10).
4. If necessary replace the mixer knives (see Install or Replace Mixer Knives on page 6-11).

Close-up

1. Switch on the Mixing and Feeding Robot with the key (see Switch on the Mixing and Feeding Robot with the Key on page 5-12).

6.2.7 Install or Replace Mixer Knives

NOTICE

There are two sizes of mixer knives in use, the optimal number of small and big knives depends on the feed types. Ask Lely FMS for advise about the knives.

Always use stainless steel bolts M16 x 45 for big knives and M12 x 35 for small knives and anti seize paste.

DANGER

**Sharp rotating knives.
Risk of severe injury or death.
Remove the key before you do work in the mixing bin.**

WARNING

***Sharp knives.
Risk of severe injury.
When you enter the mixing bin always wear cut resistant clothes to protect your hands arms and legs. You must wear at least gloves, sleeves and trousers, all with a cut resistance according to the standards mentioned in the paragraph 'Cut resistant clothing' (see page 2-4). Preferably also wear a jacket or an overall according to the standards.***

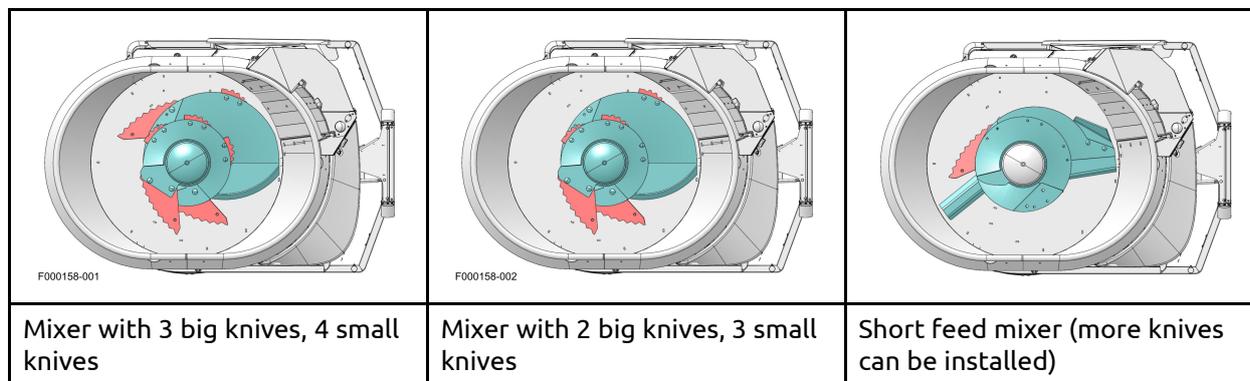
WARNING

***Sharp knives.
Risk of severe injury.
Before you enter the mixing bin you must install the knife guards on the knives located at the top of the mixer. When you have climbed in the mixing bin you must first install the knife guards on the other knives.***

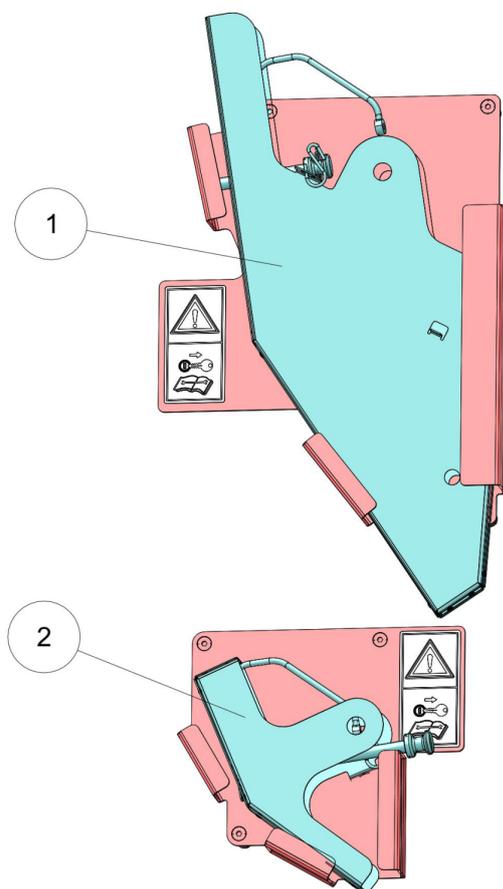
Preparation

1. Switch off the Mixing and Feeding Robot with the key and remove the key (see Switch off the Mixing and Feeding Robot with the Key on page 5-9).

2. Make sure you know the position of the knives.



3. Take the large (1) (see figure 47 on page 6-12) and small knife guards (2) from the holders near the power distribution box.



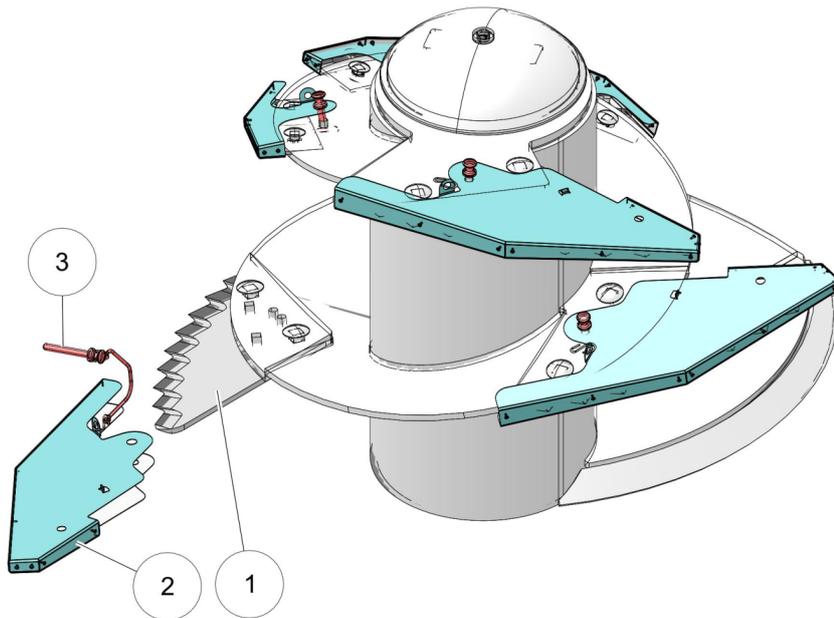
F000210-002

Figure 47. Knife guard holders

KEY: 1. Large knife guards - 2. Small knife guards

4. Climb on the lely step ladder and stand on the service platform.

5. Start at the blade on top and install the knife guards (2) (see figure 48 on page 6-13) on the knives and secure them with the locking pin (3) on the knives on the top of the mixer. Install as many knife guards as you can safely reach while standing on the service platform.



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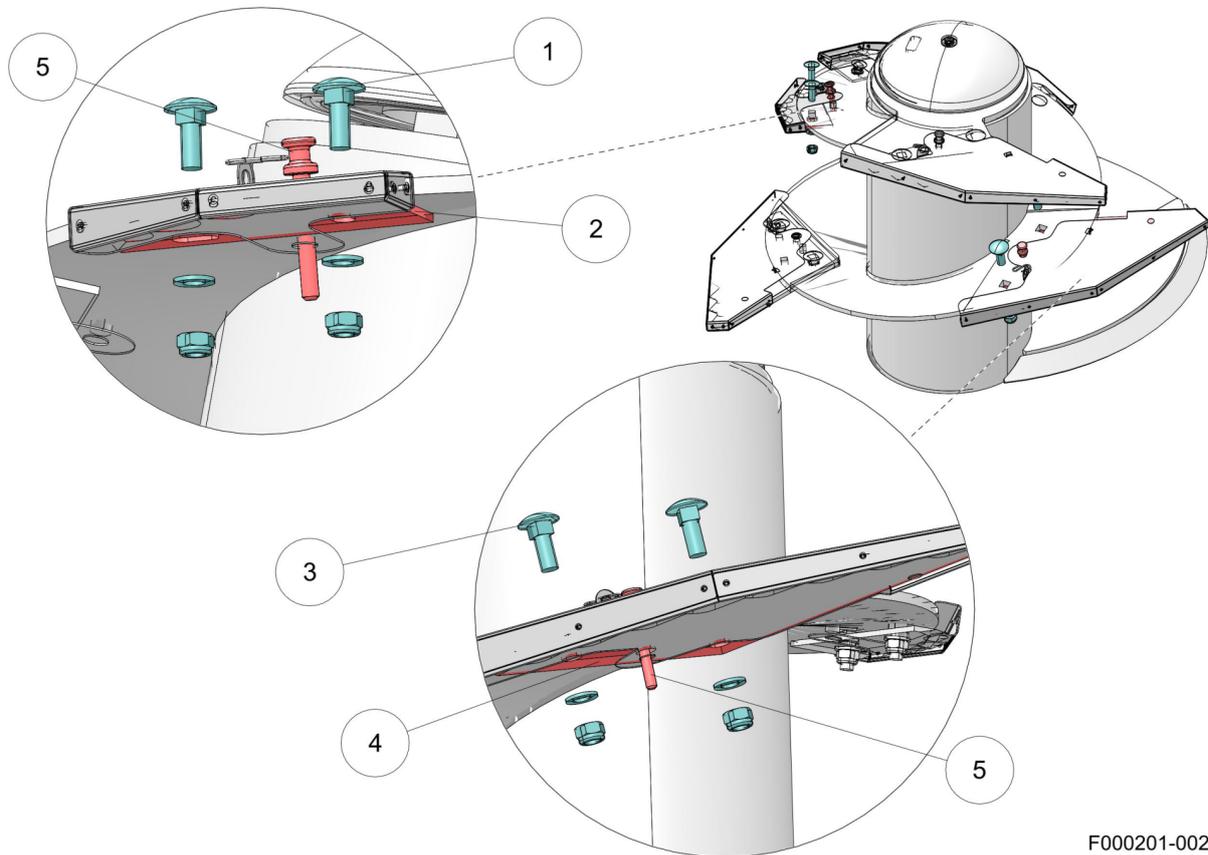
Figure 48. Install the knife guards on the knives

KEY: 1. Knife - 2. Knife guard - 3. Locking pin

6. Carefully climb into the mixing bin.
7. Install the knife guards on the remaining knives lower in the mixing bin.

Removal

1. Remove the two nuts, washers and bolts and the old mixer knife (2) or (3) (see figure 49 on page 6-14).

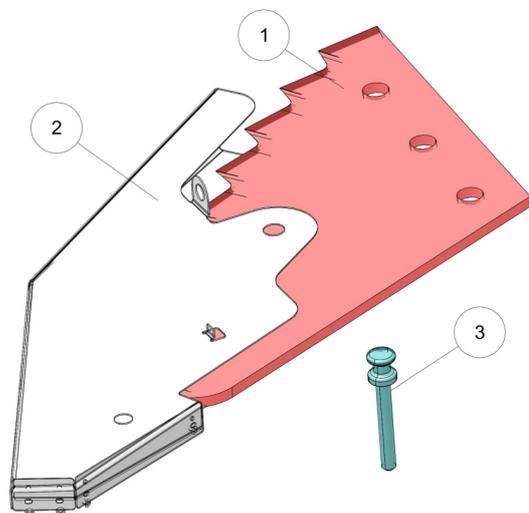


F000201-002

Figure 49. Install or remove the mixer knives

KEY: 1. Bolts M12x35 - 2. Small knife - 3. Bolts M16x45 - 4. Big knife - 5. Locking pin

2. Remove the locking pin and the old knife (1) (see figure 50 on page 6-15) and knife guard (2) from the mixing bin.



F000201-003

Figure 50. Knife with knife guard

Installation

1. Put the new knife (1) (see figure 50 on page 6-15) into the knife guard (2).
2. Install the new knife and knife guard with the locking pin (3) in the correct position on the mixer.
3. Install the mixer knife:
 1. Put the mixer knife (2) (see figure 49 on page 6-14) or (4) in the correct position on the holes on the mixer.
 2. Apply anti seize paste on the bolts.
 3. Install the mixer knife with new bolts, washers and nuts.
 - For big knives use bolts M16 x 45 and tighten to 80 Nm.
 - For small knives use bolts M12 x 35 and tighten to 30 Nm.
4. Remove all tools and parts from the mixing bin.
5. Carefully remove the locking pins and knife guards from the knives in the lower positions.
6. Make sure the lower knife guards are removed from the mixing bin before you climb out of the bin.
7. Remove the knife guards from the higher position while standing on the service platform, and work your way to the top.

Close-up

1. Switch on the Mixing and Feeding Robot with the key (see Switch on the Mixing and Feeding Robot with the Key on page 5-12).

6.2.8 Clean the Mixing and Feeding Robot

Preparation

1. Manually drive (see Drive the Mixing and Feeding Robot Manually on page 5-25) the Mixing and Feeding Robot to a clean and level place.

Empty the mixing bin

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
2. Open the feed door on the page **Test > Testing motors > Feed door**.
3. Push the button .
4. Push  until the feed door is closed.

Clean



**Sharp rotating knives.
Risk of severe injury or death.
Remove the key before you do work in the mixing bin.**



***Sharp knives.
Risk of injury.
Do not go inside the mixing bin during this procedure.***

NOTICE

Do NOT use a high pressure cleaner to clean the outside of the Mixing and Feeding Robot, this can cause serious damage to the electrical circuitry.

1. Switch off the Mixing and Feeding Robot with the key and remove the key (see Switch off the Mixing and Feeding Robot with the Key on page 5-9).
2. Use a pitch fork to remove all feed, do not climb into the mixing bin.
3. Clean the outside of the Mixing and Feeding Robot with a wet brush.
4. Clean the inside of the mixing bin with a wet brush or a high pressure cleaner.



The inside and outside of the Mixing and Feeding Robot can also be cleaned with pressurized air.

Close-up

1. Switch on the Mixing and Feeding Robot with the key.
2. Manually drive and connect the Mixing and Feeding Robot to the charger (see Connect the Mixing and Feeding Robot Manually to the Charger on page 5-26).

Tare the loadcells

If all feed was removed from the mixing bin and the weight is now a negative value, you must tare the load cells.

1. Go to the page **Settings > Tare loadcell**.
2. Make sure the mixing bin is not moving.
3. Push the button  **TAR**.
The weight is now zero.
4. After a feed task is done and the usual remains are in the mixing bin, repeat step 1 - 3 to tar the mixing bin.

6.2.9 Examine and Correct the Metal Strips

NOTICE

A metal strip that is not properly attached to the floor and points upwards on one side can severely damage the rubber protection on the inductive sensors.

NOTICE

The metal strip must be installed in its original place. If the Mixing and Feeding Robot does not find the metal strip on the same location it can get lost on the route and generate an alarm.

Examine

1. Examine if all metal strips are installed correctly to the floor.
2. If necessary determine if you must:
 - Turn the strip, and drill new holes in the floor.
 - Replace the metal strip.

3. Do the appropriate procedure below.

NOTICE

Do not use an impact wrench.

If the old strip was shortened, make sure the new strip is shortened at the same length.

If an extra hole was made in the old strip at 35 mm (1.4 in) from the cut part, make a hole with a diameter of 11 mm (0.43 in) in the new strip at the same location.

Only the hole (A) in the center is round, the holes B and C are slots to allow the metal strip to shrink and expand a bit with temperature changes.

The metal strips are not symmetrical, if a hole in the concrete can not be used anymore, you can turn the strip over the long side and drill new holes in the concrete.

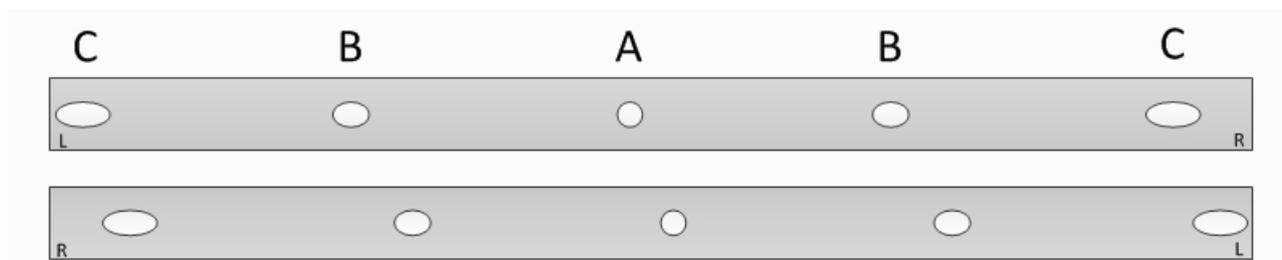


Figure 51. Metal strips

KEY:
A: Round hole
B: Slotted hole
C: Slotted hole

L = left; R = Right

Turn the strip

1. Remove the screws and turn the strip (left side becomes the right side).
2. Drill the holes with a 10 mm drill and >65 mm deep, drill in the in the new center (A) of the strip and in the center of the slotted holes (B) and (C).
3. Clean the floor and holes from drilling waste.
4. Turn the screw (BT 6x65) a bit in the duo plug.
5. Use a hammer to insert the plug and screw through the metal strip. Make sure the top of the plug is level with the concrete.
6. Use a bit T30 to tighten the metal strip with the screws (BT 6x65). Tighten only with a torque of 20 Nm, it must still be possible to move the strip.

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Replace the metal strip

1. Remove the screws, plugs and old metal strip.
2. Put the new strip on the floor, make sure the Mixing and Feeding Robot will find the metal strip on the exact same position as the old one.
3. If possible use the old holes.
4. Turn the screw (BT 6x65) a bit in the duo plug.
5. Use a hammer to insert the plug and screw through the metal strip. Make sure the top of the plug is level with the concrete.
6. Use a bit T30 to tighten the metal strip with the screws (BT 6x65). Tighten only with a torque of 20 Nm, it must still be possible to move the strip.

6.2.10 Examine the Reports in the Mixing and Feeding Robot Software

1. Connect the smart phone to the Mixing and Feeding Robot.
2. Go to the page **Alarms > Report list**.
3. Read the messages of the last few days. If some messages occur more often than should be expected, try to solve the issue or contact your Lely service technician for advise. Examples are messages concerning batteries or a silo.

6.2.11 Empty the Mixing Bin and Tare the Load cells

Because the mixing bin will never be completely empty after feeding at the end of a location it is best to tare with the amount of feed in the mixing bin that always stays in. Do this procedure when the mixing bin is filled too much and the measured feed weight is zero.

Preparation

1. Manually drive (see Drive the Mixing and Feeding Robot Manually on page 5-25) the Mixing and Feeding Robot to a feed fence.

Empty the mixing bin

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
2. Open the feed door on the page **Test > Testing motors > Feed door**.
3. Push  to select the direction and  to start or stop the motor.
4. Start the dosing roll in the correct direction on the page **Test > Testing motors > Dosing roller**.
5. Push  to select the correct turning direction, and  to start or stop the motor.
6. Start the mixer in the correct direction on the page **Test > Testing motors > Mixer**.
7. Push  to select the correct turning direction, and  to start or stop the motor.
8. Manually drive along the feed fence.

9. When no more feed comes from the mixing bin:
 1. Stop driving.
 2. Stop the mixer on the page **Test > Testing motors > Mixer**.
 3. Stop the dosing roll on the page **Test > Testing motors > Dosing roller**.
 4. Close the feed door on the page **Test > Testing motors > Feed door**.

Push the button  to select the direction push  until the feed door is closed.

Tare the loadcells

1. Go to the page **Settings > Tare loadcell**.
2. Make sure the mixing bin is not moving.
3. Push the button  **TAR**.

Close-up

1. Manually drive and connect the Mixing and Feeding Robot to the charger (see Connect the Mixing and Feeding Robot Manually to the Charger on page 5-26).

6.3 Feed Grabber

6.3.1 Clean the Feed Height Sensor



*Laser light.
Risk of getting blind.
Do not stare into the beam.*



Use the Vector stepladder to do this procedure.

Preparation

1. Take the Feed Grabber out of operation (see Put the Feed Grabber In Operation on page 5-5).
2. Drive the Feed Grabber to the service location.

Clean

1. Use a cloth or soft brush to remove all feed, dirt and cobwebs from:
 - The cover (1) (see figure 52 on page 6-21) and the feed height sensor (2).
 - Under or in the field of vision of the laser.

2. Use a wet cloth to remove fly droppings and dirt from the glass of the laser.

Close-up

1. Put the Feed Grabber in operation (see Put the Feed Grabber In Operation on page 5-5).

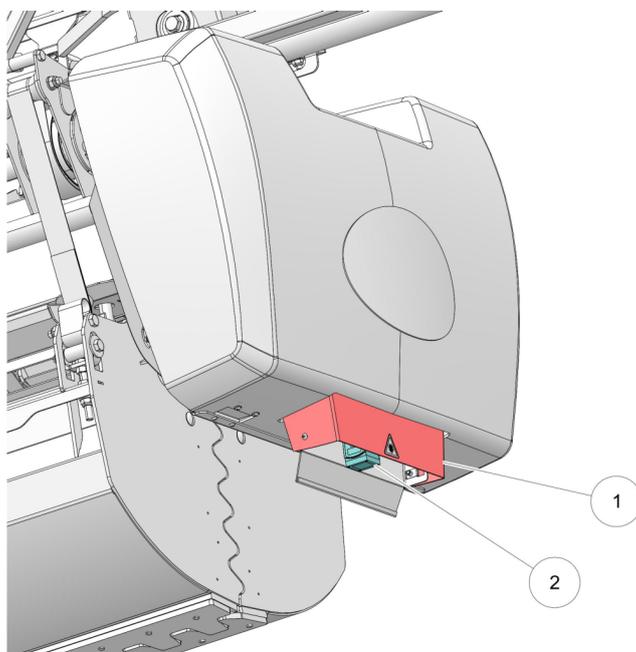


Figure 52. Feed height sensor

KEY: 1. Cover - 2. Laser

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6.4 General Feed Kitchen

6.4.1 Examine the Stock

1. Examine the stock of all the feed types, roughage, additives and concentrates.
2. If necessary:
 1. Fill the feed kitchen (see Fill the Feed Kitchen on page 5-20).
 2. Fill the additives dispenser (frequency pulse) (see Fill the Additives Dispenser (freq p) on page 5-21).
 3. Fill the concentrates silo (frequency weight).

6.4.2 Examine the Feeding

1. Examine the feed distributed at the feed fence and see if it is well mixed and cut.
If necessary examine the knives in the Mixing and Feeding Robot or adjust settings in T4C.
Ask Lely FMS for more advise about feeding.

2. Examine the feeding in the T4C reports.
If necessary adjust the settings in T4C for example:

- Proportions in a ration
- Scan interval
- Feed height or additional feed height
- In between and post mixing times
- Loading order
- Dosing weight

6.4.3 Clean the Drop Pipe of the Additives Dispenser(s) (frequency pulse)

Preparation

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
2. If necessary Manually drive (see Drive the Mixing and Feeding Robot Manually on page 5-25) the Mixing and Feeding Robot away from the drop pipe.
3. Switch off the Mixing and Feeding Robot with the key (see Switch off the Mixing and Feeding Robot with the Key on page 5-9).
4. If there are 2 Mixing and Feeding Robots, make sure the Mixing and Feeding Robot is not blocking the return way of the other Mixing and Feeding Robot.

Clean

1. Use a stick to remove feed from the inside of the drop pipe (1) (see figure 29 on page 4-9) of the additives dispenser(s) (frequency pulse).

Close-up

1. Switch on the Mixing and Feeding Robot with the key (see Switch on the Mixing and Feeding Robot with the Key on page 5-12).
2. Manually drive and connect the Mixing and Feeding Robot to the charger (see Connect the Mixing and Feeding Robot Manually to the Charger on page 5-26).
3. Put the Mixing and Feeding Robot in operation (see Put the Mixing and Feeding Robot In Operation on page 5-2).

6.4.4 Clean the IPE profile of the Bridge Crane

Preparation



*Unexpected movement of vehicle.
Risk of personal injury.
If no AGS settings are set, take the Mixing and Feeding Robot out of operation.*

1. Take the Feed Kitchen out of Operation (see Put the Feed Kitchen in the Filling Mode with the Console (Out of Operation) on page 5-3).
2. Put the Vector step ladder under the IPE profile.

Clean

1. Climb on the Vector step ladder.
2. Use a dry brush to clean the IPE profile.
3. Climb down and move the ladder to the next part of the IPE profile.
4. Repeat step 1 - 4 until both IPE profiles are clean.

Close-up

1. Remove the Vector step ladder from the feed kitchen.
2. Put the feed kitchen in operation (see Put the Feed Kitchen in Operation on page 5-1).

6.4.5 Clean the Control Boxes

NOTICE

To prevent corrosion all control boxes that are covered by or have contact with minerals and concentrates must be cleaned regularly.

NOTICE

Clean the master and slave control box of the Bridge Crane during the procedure Clean the IPE profile (see page 6-22) and use the Lely step ladder.

1. Use a wet cloth to clean all control boxes in the green and yellow zone.

6.4.6 Calibrate the Additives Dispenser (frequency pulse)

Calibrate the additives dispenser (frequency pulse):

- When you start with a new type of additive.
- After the weather or humidity has changed.
- When you notice a change in the coarseness of a new badge.
- Once a month.

Tools

1. Bucket for 3 to 6 kg (6.6 to 13 lb).
2. Scale with an accuracy in grams.

Preparation

1. Take the Feed Kitchen out of Operation (see Put the Feed Kitchen in the Filling Mode with the Console (Out of Operation) on page 5-3).
2. To make sure the Mixing and Feeding Robot does not return during calibration, switch off the Mixing and Feeding Robot with the key (see Switch off the Mixing and Feeding Robot with the Key on page 5-9).

Calibrate

1. Make sure the transport pipe with the spring auger is completely filled with the additive. If necessary fill the transport pipe (see Fill the Additives Dispenser (freq p) on page 5-21).
2. Hold a clean bucket under the drop pipe.
3. Connect the smartphone to the Feed Controller.
4. Go to the page > >.
5. Select .
6. Select and set the number of the bin you want to calibrate.
7. Select and if necessary change the RPM frequency (Hz) (default value = 50 Hz). This set frequency is used during calibration and dispensing.
 - For conventional dispensers default value = 50 Hz
 - For dispensers with a stir motor default value = 20 Hz
8. Push the button  to start calibration.
9. Wait until the spring auger has made 60 turns and stops.
10. Tare the bucket and weigh the additive in the bucket.
11. A text box is displayed .
12. Enter the weight of the additive.
13. An info screen shows the calibrated gram per pulse and time per pulse. If **gr/pulse** is zero and a message **calibration failed** is displayed, do the calibration again. This often happens when the smartphone screen locks because it takes too much time before the weight is entered. Try to enter the weight in time. If that does not work, ask your Lely technician to do the following:
 - Examine and if necessary correct the connections.
 - Examine and if necessary correct the address IDs.
 - Examine if the pulse sensor detected that the motor rotated.
 - Unblock the motor.
14. Push the button  to exit the info screen.



Make sure the speed is optimal for this type of additive. Sometimes calibrating at a slower speed may improve the accuracy in certain rations, ask Lely FMS for advise.



Close-up

1. Put the feed kitchen in operation (see Put the Feed Kitchen in Operation on page 5-1).



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7 Troubleshooting

If there is an alarm, follow the instructions in the paragraph Examine the alarm and Report list (see Examine the Alarms and Reports List on page 7-1). This chapter has a troubleshooting table with some specific problems for the Mixing and Feeding Robot and the for the Feed Grabber.

For problems with grabbing feed due to feed type settings more information can be found in the T4C manual.

7.1 Examine the Alarms and Reports List

Examine

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Controller.
2. If there is an alarm on the Feed Controller it is shown on the display on your smartphone.
3. Read the alarm message, if necessary see Troubleshooting to see what actions should be taken to remove the cause of the alarm.
4. Push  to confirm the alarm message.
5. If there is an alarm on another device go to the page > .
6. See on which device the alarm is generated.
7. Push  to view more information, if necessary see Troubleshooting to see what actions should be taken to remove the cause of the alarm.
8. If the alarm is on the Mixing and Feeding Robot, Feed Grabber or Bridge Crane:
 1. Connect the smartphone to the software of the device.
 2. Read the alarm message, if necessary see Troubleshooting to see what actions should be taken to remove the cause of the alarm.
 3. Push  to confirm the alarm message.
9. If the Mixing and Feeding Robot reported an error on the automatic (barn) door:
 1. Remove any blockage from the automatic door.
 2. Use the buttons on the controller of the supplier of the door to reset the alarm of the door as follows:
 - Close the door if it was opened.
 - Open the door if it was closed.
 3. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
 4. Push  to confirm the alarm message.

10. If the alarm is on the additives dispenser (frequency pulse):
 1. Make sure the additive dispenser is operational, make sure the bin is not empty, and the transport pipe is not clogged up.
 2. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Feed Controller.
 3. Go to the page >
 4. Push the button .
11. If necessary reset the MODalarm (see Reset alarms on the MODalarm on page 5-16) or the alarm on CRS.

NOTICE

A history of the alarms is displayed on the web page of the Vector (<https://10.4.1.85>). If an alarm message is generated on one of the other devices (Feed Grabber, Bridge Crane or Mixing and Feeding Robot) you must confirm the alarm on that device.

7.2 Troubleshooting Table

Explanation of the fields in the troubleshooting table:

| Number of the alarm shown on the webpage and alarm message | | |
|--|---|--|
| A possible cause of the alarm | Solution: | Preventive measure: |
| More information about the cause of the alarm | Measures to take solve the alarm and continue operation | General measure to take to prevent this alarm in the future. |

MFR = abbreviation of Mixing and Feeding Robot in the following tables.

| 1608 | | |
|--|---|--|
| The kitchen or storage place of one of the feed types is empty | Solution: | Preventive measure: |
| One or more feed storage locations is empty in the feed kitchen. Keep in mind that a certain cleaning level can prevent to empty the storage place completely. | Fill the kitchen storage places and/or set the cleaning level. Keep in mind that changing the cleaning level can change the capacity of the system. | Fill the kitchen storage places and also check the stock of the other feed types. It is advisable to fill all the storage places in the kitchen completely and not fill it partially. Also fill the kitchen when the Vector system has been out of operation for a while (alarm or maintenance). |

| Storage places are not set to filled again | Solution: | Preventive measure: |
|--|--|---|
| In normal situations all storage places are set to filled again after using the filling mode, but if for some reason the filling mode is not used, than the filling places must be set to filled manually. | Set the storage places to filled again: connect the smartphone to the Feed Controller, go to Fill kitchen > Storage places and select FILL ALL . This can also be set in T4C. | Use the filling mode as much as possible. |

3C64

| Unstable bumper | Solution: | Preventive measure: |
|---|--|---|
| When one of the bumper springs is already under tension (a bent spring, bumper does not hang straight) the bumper is rapidly losing its stable center point. This will make the bumper more sensitive for cattle and feed to activate it. | Feel if there is a distinct neutral point when moving the bumper, if this is absent check for bent springs or attachment points that are not supported by a spring (where the bumper is floating and not resting on the spring). | Contact your Lely Center to replace springs and/or adjust bumper attachment points. |

| MFR lost its path | Solution: | Preventive measure: |
|--|--|---|
| Often the bumper alarm is a result of driving somewhere unintended. Understanding where it should have driven can help where to look for the cause. The alarm list will give information about on which route and during what action the alarm was given. Some examples: <ul style="list-style-type: none"> When it crosses the feed alley: Feed or flies influencing the ultrasonic sensor, misalignment of the ultrasonic sensor (bent backwards or up/down). | Clean the ultrasonic sensors and the area around them, check the alignment of the sensors. Manually drive the MFR back at the correct distance from the feed fence and parallel to the feed fence. When needed check in the test menu if the feed fence is seen at the correct distance. Resume the route. | <ul style="list-style-type: none"> Prevent feed from falling on the sensors during loading (use a dugout) and prevent overfilling the bin (reduce the max load of that ration). |

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| | | |
|--|---|---|
| <ul style="list-style-type: none"> A lot of feed at the end of a feed fence can push an MFR outwards, this may influence the next route action(s) | | <ul style="list-style-type: none"> Prevent excessive build up of (rest) feed. Stop the dosing earlier (only done by service technicians) or remove the feed regularly. |
| <ul style="list-style-type: none"> Missed reset point <p>When a MFR hits a wall past the point where it should have stopped on a reset strip it may have started to look for the reset strip too late or it may not have recognised the strip. The difference between detecting steel and no steel must be big enough for both sensors at the same time to recognize a strip. Reset strips should be as close as possible and perpendicular to the driving direction. Preferably not more than 30 degree but certainly not at a 45 degree angle or bigger. If there is a lot of feed on top of the reset strip it could be that the MFR is pushed to the middle and miss the strip. Wet dirt or ice on the sensors or strips influences the measurement. Misalignment of the sensors will make them unreliable.</p> | <p>Manually reverse the MFR to a position before the reset strip and resume the route. Remove feed which was buildup on top of the reset strip. Clean the inductive sensor unit and make sure there is no metal under it.</p> | <p>Clean the sensor unit, make sure the height adjustment of sensor bracket is correct. Ask your Lely Center to check if sensors are positioned correctly in their bag (not pushed upward). Ask them to adjust the wheel diameter when the MFR is structurally to late in seeing the reset points (increase diameter) and let them improve unreliable routes (positioning and use of reset strips).</p> |
| <p>Feed falling from the inside</p> | <p>Solution:</p> | <p>Preventive measure:</p> |
| <p>When feed dosed from the bin cannot fall freely on the feed alley, there can be a buildup around the dosing roller that eventually can push the whole bumper outwards.</p> | <p>Clear the feed under the dosing roller (see Clean the Dosing Roll and Position Sensor on page 6-3) and resume the route.</p> | <p>Aim to cut roughage as much as possible during harvest. Make sure the knives and mix settings are optimal, consider lowering the amount of feed (dosing weight) for that location, Consider to ask your Lely Center to adjust the route to allow more space for the feed to fall (drive at a larger distance from the feed fence).</p> |

| Cattle | Solution: | Preventive measure: |
|--|---|--|
| Cows or bulls have pushed the bumper. | Resume the route. | Ask lely Center to optimise routes to: <ul style="list-style-type: none"> • Minimise driving forwards toward the feed fence • Prevent driving close past bulls etc • Make sure there is sufficient clearance between the MFR and the feed fence or the cattle Consider using the optional electric bumper protection. |
| High piled up feed | Solution: | Preventive measure: |
| When the feed is piled up, the tube of the feed height laser can get caught by feed and activate the bumper. | Try to spread the feed so the bumper does not get caught on it and resume the route. | Consider lowering the dosing weight for that feed location. |
| Foreign objects | Solution: | Preventive measure: |
| Farm implements or traffic on an outside route. | Remove the object and resume the route | Consider marking the route of the MFR so it is clear for visitors where not park vehicles or store material. |
| 3CCC | | |
| No feed falls in the MFR from the digital output dispenser | Solution: | Preventive measure: |
| Via a digital output (relay circuit board on PDB circuit board) a wide variety of dispensers can be controlled, ranging from a water valve to a tower silo and conveyor belt system. To cater for all these different technologies there are settings to generate an alarm when problems or blockages are assumed and to prevent damage. When no start of a feed flow has been detected within a set time (margin) the alarm no initial feed flow will be generated. (Info: A start of a feed flow is recognised by the MFR if there is 10 kgs increase in weight or a constant flow of more than 350g/s for 3 seconds.) | Find the fault why the dispenser has not started to dose feed in the MFR, check: <ul style="list-style-type: none"> • If the system is powered • If the storage is empty • If there is a blockage of augers, loaders or transport system Fix the fault and resume the feeding task on the MFR. | |

| | | |
|--|---|--|
| <p>The dispenser has not started dumping feed in the MFR before the set start up margin</p> | <p>Solution:</p> | <p>Preventive measure:</p> |
| <p>The settings Startup delay and Startup margin must both be set correctly, for filled and near empty dispensers.</p> | <p>Resume feeding task on MFR, but if no changes are made to the settings the alarm will occur again.</p> | <p>Ask your Lely Center to make adjustments in the settings., if the alarm was triggered while the dispenser was operating normally. The delay setting may be set too short. Measure the time the dispenser takes to start up and use that time as the setting for delay of that dispenser. Do not set this time too long, because the alarm is there for a reason. When a conveyor belt or chute is blocked you do not want to continue requesting that feed type endlessly and cause damage or a pile of feed in the wrong location.</p> |

| 160D | | |
|--|--|---|
| <p>The Bridge Crane has an alarm, this alarm is generated on the Feed Grabber</p> | <p>Solution:</p> | <p>Preventive measure:</p> |
| <p>The Feed Grabber notifies messages and alarms of the Bridge Crane. First the crane alarm needs to be solved before the Feed Grabber can be put back in operation.</p> | <p>Connect the smartphone to the Bridge Crane and see which alarm is active, resolve the problem and put the Bridge Crane back in operation. Only then log into the Feed Grabber, accept the crane alarm and resume operation of the Feed Grabber.</p> | <p>If the Bridge Crane alarm is often caused by slip, you can prevent this alarm by regularly cleaning the IPE profiles. Clean these beams before the season of fog and condensation starts (for example during fall and spring, when cold steel and warm air can be expected). In a very dusty kitchen consider to install the optional brush set.</p> |

| 3C7F | | |
|--|--|---|
| Feed Grabber out of operation | Solution: | Preventive measure: |
| <p>The MFR has sent a task to the Feed Grabber, but the Feed Grabber did not accept the task within 5 minutes to execute it. The Feed Grabber may be out of operation because it has not started up (no power) or autostart has failed. The Feed Grabber can not start automatically when the grabber is closed, this can happen when the power supply is unexpectedly taken away from the Feed Grabber. This can happen with unauthorised kitchen access, power failure or an emergency stop. Another reason is when you forget to put the Feed Grabber back in operation after changing the priority of feed blocks in the kitchen menu.</p> | <p>Before resuming the MFR first make sure the Feed Grabber is in operation. Connect the smartphone to the Feed Grabber, if it is not possible to log in, it may not have power yet. Check if the play button on the kitchen console is still blinking and if so push it. When the Feed Grabber can be accessed, put it in operation. When the grabber is closed holding feed (which will have prevented automatic startup) the grabber will drop the feed during the start up to look for the reset magnets. If you do not want that in that location first manually drive the Feed Grabber to the location where it is convenient to drop the feed, preferably above a storage place of the same feed type. When the Feed Grabber is back in operation, connect the smartphone to the MFR and let it resume its task. The request for the Feed Grabber will be sent again and the Feed Grabber will immediately execute that task.</p> | <p>It is also possible to change priorities of storage places from the PDB user interface and from T4C. When using that setting in the Feed Controller, you do not have to put the Feed Grabber back in operation after changing the priorities. Use the setting Max kitchen time to receive an alarm when the kitchen is not put in operation after filling of the kitchen.</p> |
| No communication between MFR and Feed Grabber | Solution: | Preventive measure: |
| <p>A reliable bluetooth connection between MFR and Feed Grabber is necessary.</p> | <p>Ask you Lely Center to check the reliability and path of the bluetooth communication between the MFR and Feed Grabber. This can be done with the Map option in your phone app (Lely Control), this option shows how the connection is made and how strong the signals are between the nodes.</p> | <p>If necessary consider relocating antennas or adding nodes to the network.</p> |

| 3DBC | | |
|--|--|---|
| See alarm 3CCC | Solution: | Preventive measure: |
| This is the non critical version of alarm 3CCC, so the MFR will have continued without this feed type, problems and solutions are similar. | | |
| 3C76 | | |
| No mains available on the MFR when it is loading feed (mixing) | Solution: | Preventive measure: |
| <p>When a task is started and during the loading of the feed the MFR checks if there is main power available to turn the mixer. When no power is detected, this can be caused by:</p> <ul style="list-style-type: none"> • Power is present at the charge pole, but not in the MFR • No power on the charge pole | <p>Check if MFR is properly engaged with the charge pole, reconnect if necessary.</p> <p>Check if power is reaching the charge pole and if the circuit breaker of the charger in the Power Distribution Box is still on, the kitchen relay needs to be activated for this (if it is not, the white light in the play button on the kitchen console will be on or blink).</p> <p>Ask your Lely center to check if the connectors on the charge pole and/or on the MFR are worn.</p> | <p>When the MFR often loses connection during loading of feed, check the condition of the plastic strip on the floor, this prevents the MFR from rolling back. Also a pile of feed built up under the wheels can make the plastic strip useless. Regularly clean this area.</p> |
| 3C03 | | |
| MFR already past the reset strip before it starts looking for it | Solution: | Preventive measure: |
| <p>The MFR will only search for reset points in the last part of the route action. If the action has been started in the wrong position or the wheel diameter is set incorrect, the MFR may have travelled further already than it assumes.</p> <p>If route actions have been changed recently all related actions may not have been adjusted.</p> | <p>Reverse the MFR manually to a point just before the reset strip and resume the route.</p> | <p>Ask your Lely Center to adjust (increase) the wheel diameter when the MFR always looks too late for the reset points. When it only looks too late on one action reduce the length of that route action.</p> <p>Beware: Always write down the initial values before you make changes.</p> |

| MFR is in alarm before reaching the reset strip | Solution: | Preventive measure: |
|---|--|---|
| <p>The MFR assumes it is further on the route than it actually is. Excessive slip while driving the route action is a possible cause. Maybe the length of the route action has been altered or affected because of other changes in the route. A wheel diameter that is set too high will also cause this type of problem.</p> | <p>Manually drive the MFR forwards to just before the reset strip and resume the route.</p> | <p>Improve the conditions for the MFR (clean surface, check the condition/tread of wheels). Ask your Lely Center to adjust wheel diameter when necessary:</p> <ul style="list-style-type: none"> • When the MFR always looks too early for the reset points: decrease wheel diameter • When the MFR only looks too early on one route action: increase the length of that route action. |
| Reset strip not recognised | Solution: | Preventive measure: |
| <p>To recognise a reset point as such, the MFR needs to detect a big enough change in magnetic field of both inductive sensors. If the sensor already detects a field when there is no strip this will decrease the sensitivity, equally so when the sensor does not detect enough magnetic field when there is steel under it. If one sensor detects the steel long before the other sensor does, the MFR may not see it as a reset point. Reset strips should be as close as possible and perpendicular to the driving direction. Preferably not more than 30 degree but certainly not at a 45 degree angle or bigger. If there is a lot of feed on top of the reset strip it is possible that the MFR is pushed to the middle and miss the strip. Wet dirt or ice on the sensors or strips influences the measurement and Misalignment of the sensors will make them unreliable.</p> | <p>Manually put the MFR just before the reset strip and resume the route. If it does not find the reset point look in Test > Test sensors > inductive sensors.</p> <p>When no steel is present the ADC value should be significantly higher than 700. If it is lower the sensor(housing) may be full of conductive dirt (wet), influenced by foreign steel objects or water in the housing.</p> <p>When a (steel) reset strip is under the sensor the ADC value should be significantly lower than 200, preferably around 80. If it is higher the sensor may be adjusted too high, the sensor may have become dislodged in the sensor housing or defective. A reset strip should be perpendicular (as much as possible) to the driving direction to prevent a confusing signal given by the set of sensors.</p> | <p>Put reset strips perpendicular to the driving direction, clean sensors and keep them well adjusted.</p> |



| A703 | | |
|--|--|--|
| Wrong time setting | Solution: | Preventive measure: |
| It takes longer than the set time to fill the MFR bin. It is possible that the set time is timed during a full kitchen but once the kitchen becomes half empty it takes more time. | Fill up the bin with the largest ration, time it and add half of the time to it. Set this value for the setting Max MFR load time . | Set the loading time using the rule of thumb and adjust it when necessary. |
| Bad grabbing performance | Solution: | Preventive measure: |
| The Feed Grabber needs too many retries before a good grab is taken, which causes the loading time to exceed. | <p>Find out which feed type causes this alarm by watching the Lely Control screen of the Feed Grabber during operation. There are 2 types: retries on weight estimation and retries on grabber opening. Once known which retry is causing the delay check the placement of the feed block or bale and the corresponding Feed Grabber settings in T4C. Make sure:</p> <ul style="list-style-type: none"> • The feed blocks are placed in the center of their storage location • There are no overhanging blocks • Slopes created by Feed Grabber grabbing in loose product like corn or beet pulp is prevented | Place Feed blocks or bales in the middle of the kitchen storage places. Discuss T4C feed type settings of the Feed Grabber with the FMS department of the Lely Center. |
| The Feed Grabber is not in operation | Solution: | Preventive measure: |
| If the Feed Grabber is out of operation or in alarm state this caused the delay. | Clear the alarm and or put the Feed Grabber in operation again | |
| Grabber grabs structurally to high because of fine dirt on the glass of the feed height sensor | Solution: | Preventive measure: |
| Fine dust or fly droppings on the glass will affect the measurement slightly, causing the Feed Grabber to grab to high or even in the air. | Clean the feed height sensor (see Clean the Feed Height Sensor on page 6-5) | Regularly clean the glass with a soft cloth and/or wet cloth. Especially in a dusty kitchen. |

| A702 | | |
|---|---|--|
| Wrong time setting | Solution: | Preventive measure: |
| The MFR dosing/driving time takes longer than the set timeout time. | Drive and feed on the largest route with the largest feed location, time it and add half of the time to it. Set this time value to the setting Max MFR dose time . | Set the dosing time using the rule of thumb and adjust it when necessary. |
| Bumper is activated many times | Solution: | Preventive measure: |
| If the bumper of the MFR is activated many times by e.g. cows/bulls it takes too long before the MFR is back in the feed kitchen. | Add some time to the set Max MFR dose time . | Set the dosing time using the rule of thumb and adjust it when necessary. Consider to install the optional electric bumper protection on the MFR, for information ask the Lely Center. If possible make the feeding distance between the fence and the MFR a little bit wider. |
| The MFR did not return from the route | Solution: | Preventive measure: |
| The MFR is in alarm outside the range of the PDB bluetooth connection. It has for instance driven into an obstacle and is stuck in the route. | Solve and reset the alarm and resume the route. | Extending the range of the PDB by adding repeater nodes so the initial alarm is immediately forwarded to the farmer and rapid action can be taken. |

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| 3C66 | | |
|---|--|--|
| Unexpected reset point | Solution: | Preventive measure: |
| <p>This alarm is triggered when the MFR is following a steel strip and the steel unexpectedly is not detected anymore, like finding an actual reset point (gap in the strip) but at the wrong position. This can be caused by a wrong wheel diameter setting (MFR assumes it has not travelled as far as it already did). Or it can happen when the MFR was put on a wrong position in the route after other issues (MFR assumes it follows a different strip).</p> | <p>Manually reverse the MFR to a position some distance before the reset point and resume route.</p> | <p>Ask the Lely Center to make adjustments. When an MFR is too late in slowing down before a reset point or finds reset points before expecting it, the wheel diameter is probably set too high or the route action is shorter than the specified length in the route. Using Auto wheel diameter is advised but even then a route can have become corrupt over time by many changes and new actions added with different (often inaccurate diameters) over time. Adjust the wheel diameter and increase it when the MFR is structurally to late in looking for the reset points. When it only involves one action reduce the length of that action. Beware: Always write down the initial values</p> |
| MFR lost its path during following a strip | Solution: | Preventive measure: |
| <p>When following the strip the MFR responds immediately when it is not centered on the strip anymore, this enables the MFR to react fast enough when following a bend. If the sensors are too close to the strip the MFR will respond much later. Also if there is some play in the chains the response of the MFR is late. Slip or sideways force (gravity when driving on a slope or a castor wheel not turning freely) will make matters worse. Feed caught under the MFR is also a possible cause.</p> | <p>Manually put the MFR back on the strip and resume the route. Check if the MFR is free to turn left and right, remove feed from underneath the skirt if present.</p> | <p>Ask your Lely Center for advice. While following a strip the MFR should drive straight, behaviour like being drunk is an indication the sensors may need adjustment or the chains need tensioning.</p> |

| 3C65 | | |
|--|--|---|
| MFR cannot find the strip while turning. | Solution: | Preventive measure: |
| For example during a route action to turn until a strip is found. If the MFR is unable to detect the strip fast enough this alarm will be generated. | Check if the MFR is free to turn and turns in the correct position on the route. If necessary manually drive the MFR to the correct point to turn where it is sure to find the strip and resume the route. | Ask your lely Center to make sure the actions preceding this turn have a clear reset point and no chance of slip or interference so the MFR will turn in the correct position. Check adjustment of sensors. |
| The next action is to start to follow a strip which the MFR is unable to find within a reasonable distance | Solution: | Preventive measure: |
| <p>The MFR can pick up a strip at a small angle easily and start following it. A reason for not finding the strip can be:</p> <ul style="list-style-type: none"> • Distance to the strip is too long. • The strip is missed because the MFR is not facing the right direction at the start. • The MFR has an offset to its normal path. | Manually put the MFR back in a position just before it will encounter the strip it needs to follow and resume the route | Ask your Lely technician to make a more reliable route by combining strip following and reset points to increase certainty of positioning of the MFR. Make sure the strips are in the correct position where the MFR starts to look for them. |
| 3CCD | | |
| Flow of feed is below the expected flow for a certain period of time | Solution: | Preventive measure: |
| The feed flow has been under the set percentage of the normal flow during the set time. | Find the fault of the interrupted feed flow in the dispenser, check if there is a pipe clogged, or the feed is blocked. Resume the task of the MFR after the dispenser operation has been restored. | When water is used, the use of water elsewhere on the farm can lower the pressure enough to trigger this alarm. Consider using a buffer tank that will dispense with a steady (and large) flow when needed. If the installed buffer tank turns out to be too small, consider putting this feed type twice in the ration, and dose it on two separate times. |

| Incorrect settings | Solution: | Preventive measure: |
|--|--|--|
| <p>Feed activated by a digital output can be dispensed using a wide variety of dispensers, ranging from a water valve to a tower silo and conveyor belt system. To cater for all these different technologies there are settings to raise an alarm when blockages are assumed and to prevent damage. The alarm of a flow below the threshold is triggered when the current flow goes below a percentage (setting) of the normal flow (historic data), during a period of time (another setting). If the fluctuation of the flow is normal and not harmful to the dispenser the percentage can be set low. If the dips in delivery can last for a longer time without the dispenser being at risk, the time before actually going in alarm can be set high.</p> | <p>Reset the alarm and resume operation.</p> | <p>Ask your Lely center that understands the dispenser to adjust the settings wisely. When an alarm is triggered, first consider if it is a rightful alarm (was there a situation that needed attention to prevent damage to the dispenser or considerable loss of capacity), if not lower the percentage and/or increase the time. There is a fine balance between generating unnecessary alarms and generating the alarm too late when there is a real problem with the dispenser.</p> |

| 1603 | | |
|--|--|--|
| It takes the Feed Grabber too long to drive to the intended position | Solution: | Preventive measure: |
| <p>The Feed Grabber is allowed a maximum time of 2 minutes to get from the starting position to the desired position. If the speed is too low or the position cannot be reached this maximum time is exceeded.</p> | <p>Remove obstacles, check if maybe feed hanging underneath the grabber prevents a normal forwards motion.</p> | <p>If feed underneath the grabber is causing the timeout, optimise the grabber settings (less grab depth etc), prevent the feed gets caught behind fences or edges of the MFR (smooth dugout). Take into account that the feed types that are used most, should not be located on a position with the maximum driving time in the kitchen.</p> |

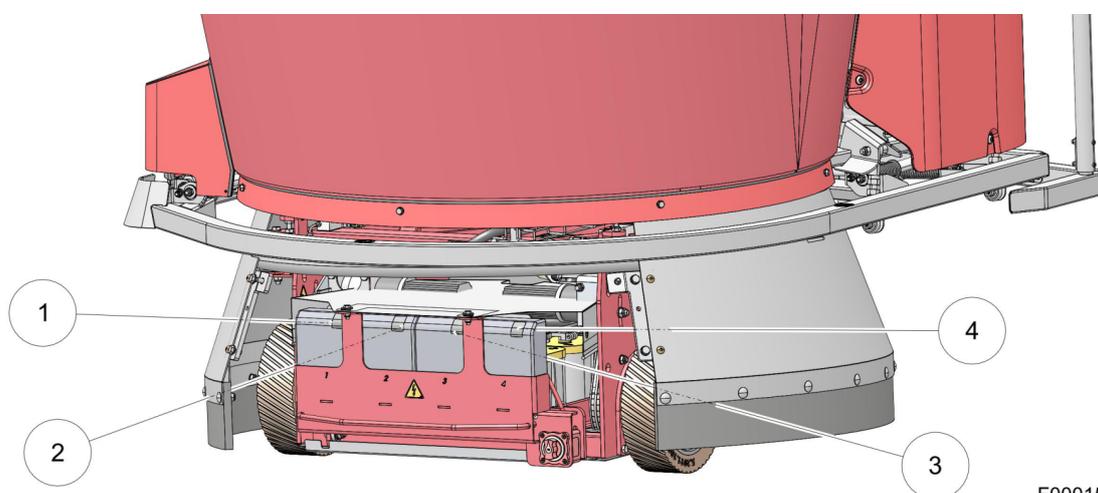
| 3C86 | | |
|---|--|---|
| Communication network problem | Solution: | Preventive measure: |
| The Bluetooth communication of the door has an error, therefore the MFR is not able to open the door. Manually open and close the door with the button to see if the door functions well. Connect the Lely Control app with the door to see if it is possible to open the door via the MFR. If this is not possible the communication is the problem. | | Position the Bluetooth antenna in such a way that there is a good connection from both sides of the barn door or ask the Lely Center to position the antenna. |
| Communication problem control box of the door | Solution: | Preventive measure: |
| Connect the Lely Control app with the door to see if it is possible to open the door directly. If a connection can not be made the control box of the door could have a software malfunction. | Restart the complete door control box by switching the main power switch to off and switch it on again. After a few minutes the communication comes online again. | |
| Power loss control box of the door | Solution: | Preventive measure: |
| The barn door cannot be controlled by the control box because there is no power on the box. | Check the fuse in the main power box of the farm. The control box of the barn has a different power connection than the Vector system. | |
| Communication problem MFR | Solution: | Preventive measure: |
| The Bluetooth communication part of the MFR has an error and can therefore not communicate with the Bluetooth module of the door. Connect the lely control app with the MFR to see if it is possible to open the barn door via the MFR. | Take the MFR out and in operation again to trigger the communication. Restart the MFR with the key switch, be aware that the current route and information will be lost. Check the MFR communication by opening the barn door. Drive back to the charger and start a manual route for the just interrupted feeding task. | |

| | | |
|---|--|--|
| Door is in error state | Solution: | Preventive measure: |
| The door control box is not able to change the state of the door because the open/close sensor does not work properly. | Check if the light on the open position sensor is on when the door has reached the open position. Adjust the door and or the sensor until the light comes on. Resume the route of the MFR. | Make sure the metal plate on the door is big enough to be sensed under all circumstances (for example wind moving the door). |
| Automatic door does not work | Solution: | Preventive measure: |
| The control of the barn door itself is not working and the Lely barn door control box is therefore not able to open the door. | Reset or restart the control box of the external supplier and try to open the door afterwards with this control. | |
| 3C0C | | |
| Dirt on sensor | Solution: | Preventive measure: |
| Dirt on the sensor | Clean the sensor. | Clean the sensor regularly. |
| Foam is worn | Solution: | Preventive measure: |
| Foam is worn. | Replace the foam. | |
| Broken sensor | Solution: | Preventive measure: |
| Broken sensor. | Ask the Lely Center to replace the sensor. | |
| Object not within the ranger | Solution: | Preventive measure: |
| The ultrasonic sensor is bent, or parts on the route are missing or moved. | Make sure the parts on the route are unchanged. Make sure the sensor is in the correct position. | |

7.3 Make sure the Battery is Charging Correctly

1. Make sure the Mixing and Feeding Robot is connected to the charger. If necessary connect the Mixing and Feeding Robot manually to the charger (see Connect the Mixing and Feeding Robot Manually to the Charger on page 5-26).

2. If necessary examine the LEDs on the charger of the Mixing and Feeding Robot:
 1. Rotate the skirt until the skirt piece is on the front of the Mixing and Feeding Robot.
 2. Remove the bolts (1) (see figure 37 on page 5-11) and the skirt piece (2).
 3. Look at the four battery chargers (1) - (4) (see figure 53 on page 7-17) and make sure the orange and green led are both on, on all chargers. Call your Lely service technician:
 - If on a charger only one led is on the battery is not charging.
 - If the leds are blinking, in that case an error has occurred.
If a temperature below -15 °C (5 °F) or above 40 (104 °F) may cause the error, you can wait for the temperature to change.
 4. Install the skirt piece.



F000158-006

Figure 53. Battery chargers

KEY:
1 - 4. Leds on charger 1 - 4

The Mixing and Feeding Robot must charge for at least one hour.

7.4 Release a Jammed Mixer

Do this procedure when the mixer is jammed for example because there is too much feed with long fibers in one place.

Turn the mixer in the opposite direction

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
2. Select the page **Test > Test motors > Mixer**.
3. Push .
4. Push a few seconds until the mixer is turning.
5. Push .

6. Push  a few seconds until the mixer is turning smoothly, if the mixer does not turn, the feed must be removed.

Remove the feed



Sharp knives.
Risk of severe injury
Never climb into the mixing bin when it is filled with feed because the knives can cause severe cuts.

1. Switch off the Mixing and Feeding Robot with the key (see Switch off the Mixing and Feeding Robot with the Key on page 5-9).
2. Use the Vector stepladder and remove the feed from the mixing bin with a pitchfork.
3. Switch on the Mixing and Feeding Robot with the key (see Switch on the Mixing and Feeding Robot with the Key on page 5-12).

7.5 Release a Jammed Dosing Roll

Do this procedure when the dosing roll is jammed because there is too much feed with long fibers around the dosing roll.

Turn the dosing roll in the opposite direction

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
2. Use the password you received from your Lely technician and:
 Select the page **Test> Test motors > Dosing roller**.
3. Push  .
4. Push  a few seconds until the dosing roll is turning.
5. Push  .
6. Push  a few seconds until the dosing roll is turning smoothly, if the dosing roll does not turn:
 1. Clean the dosing roll (see Clean the Dosing Roll and Position Sensor on page 6-3).

7.6 Release a Jammed Feed Door

Do this procedure when the feed door is jammed because feed is stuck.

1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
2. Select the page **Test> Test motors > Feed door motor**.

3. Push button  to open the door.
4. Switch off the Mixing and Feeding Robot with the key (see Switch off the Mixing and Feeding Robot with the Key on page 5-9).
5. Remove the bolt (1) and open the maintenance door (2) (see figure 40 on page 6-3).
6. Carefully remove all feed remains from the dosing roll and in the opening of the door.
7. Remove all feed remains from the rail in which the door slides.
8. Close the maintenance door (2) and install the bolt (1).
9. Switch on the Mixing and Feeding Robot with the key. (see Switch on the Mixing and Feeding Robot with the Key on page 5-12)
10. Select the page **Test**> **Test motors** > **Feed door motor**
11. Push  to close the door.

7.7 Reset the PCB of the Mixing and Feeding Robot

1. Remove the skirt piece and switch off the battery (see Switch off the Main Switch on the Mixing and Feeding Robot near the Battery on page 5-10).
2. After 20 seconds, switch on the battery to switch on the PCB.
3. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
4. Push  to reset the alarm.
5. Push  **Yes** to calibrate the gyroscope.
6. Go to the page **Work** on the first tab.
7. Push  to start the Mixing and Feeding Robot.

7.8 Pull a Broken Mixing and Feeding Robot Out of the Way

NOTICE

Make sure the battery of the Mixing and Feeding Robot is still ON before you push or pull the Feeding Robot. When the wheels turn, electricity is generated and this must be collected in the batteries, otherwise the PCBs and other electronics will be overloaded and damaged.

NOTICE

Make sure the emergency stop button is NOT pushed and the safety key is switched to ON, otherwise the electronic brake is activated during pulling.

NOTICE

Do this procedure when the Mixing and Feeding Robot can not drive manually and has to be pushed or pulled out of the way.

1. If possible lift the skirt:
 1. Connect the smartphone (see Connect the Smartphone to Device Software on page 5-12) to the Mixing and Feeding Robot.
 2. Select the **Test> Test motors > Skirt motor**.
 3. Push button  until the skirt is lifted.
2. Rotate the skirt until the skirt piece is on the front of the Mixing and Feeding Robot.
3. Remove the bolts (1) (see figure 37 on page 5-11) and the skirt piece (2).
4. Make sure the main switch (3) on the battery is switched to the “On” position.
5. Rotate the skirt until the swivel caster is visible.

Attach a tow rope (1) (see figure 54 on page 7-21) on the frame of the Mixing and Feeding Robot above the swivel caster, make sure the rope can not damage any sensors.
6. Attach the tow rope (horizontal) to a tractor or device that can pull 1880 kg (4144 lb), make sure the tow rope does not touch and damage parts of the Mixing and Feeding Robot.
7. Slowly pull the mixing and feeding robot out of the way, make sure you drive:
 - Maximum 10 m (33 ft) in one time, than wait 5 minutes to cool the Mixing and Feeding Robot
 - Not faster then 5 km/h (3 mile/h)

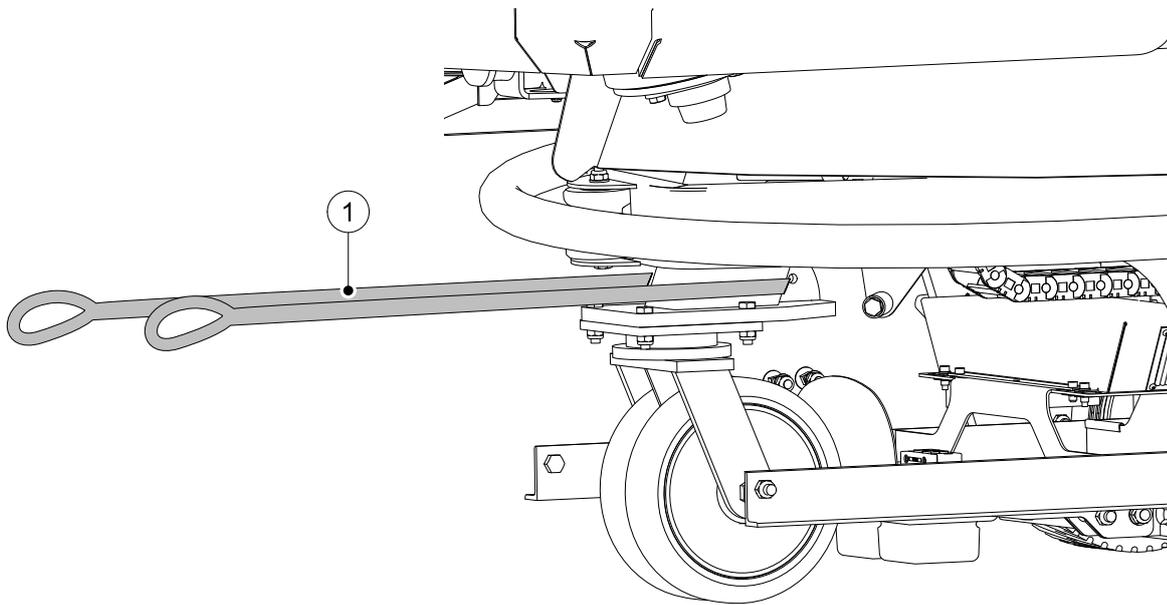


Figure 54. Tow a broken Mixing and Feeding Robot

KEY: 1. Tow rope

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7.9 Reset the Feed Grabber

1. Take the Feed Kitchen out of Operation (see Put the Feed Kitchen in the Filling Mode with the Console (Out of Operation) on page 5-3).
2. Wait a few seconds.
3. Put the feed kitchen in operation (see Put the Feed Kitchen in Operation on page 5-1).



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8 Disposal

Disposing this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

Decommissioning and disassembly of the product can be dangerous and must be done only by qualified recycling organizations. All components must be disposed in compliance with the local rules and regulations.

Lubricants and fluids must be disposed correctly to prevent pollution of the environment. Read the safety data sheets of the used lubricants and fluids for correct disposal. All lubricants and fluids must be disposed in compliance with the local rules and regulations.

Contact your local authority or local Lely service provider for further details.



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9 EC Declarations of Conformity

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 herewith declare, on our own responsibility, that the machinery:
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 Produktbezeichnung
 description du produit
 descrizione del prodotto
 nombre del producto
 designação de produto
 produkthavn
 tuotenimi
 produktnavn
 produktname
 vörulýsing

Lely Vector Mixing and Feeding Robot

περιγραφή του προϊόντος
 descrierea produsului
 termék megnevezése
 označení produktu
 opis produktu
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 toote kirjeldus
 gaminio aprašymas
 наименование изделия
 naziv proizvoda

typenummer

model number
 Typnummer
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 número do modelo
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 mallinnumero
 modellnummer
 gerðarnúmer

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αριθμός μοντέλου
 numărul modelului
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 numer modelu
 typové číslo
 tüübi number
 modelo numeris
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 broj modela
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 podle směrnice
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 v zohode so smernicami
 direktivide järgi
 pagal direktyvas
 соответствует требованиям директив
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 uppfyllir eftirlitandi staðla
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EN-ISO 12100:2010
 EN 1525:1997
 EN 60204-1:2006/AC:2010

în conformitate cu standardele
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handtekening en datum

signature and date
 Unterschrift und Datum
 signature et date
 firma e data
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 assinatura e data
 underskrift og dato
 allekirjoitus ja päiväys
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 undirskrift og dagsetning

S. Loosveld
 Director Product Development
 Lely Industries N.V.

J.W. Rodenburg
 Manager Product Safety & Compliance
 Lely Industries N.V.

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5-7-2018

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Lely Vector Feed Grabber

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EN-ISO 12100:2010, EN 13001-1:2015
 EN 13001-2:2014, EN 13001-3-1 + A1:2013
 EN 13001-3-1:2012+A1:2013, EN
 15011:2011+A1:2014

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Lely Vector Bridge Crane

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 zgodny z dyrektywą
 v zhode so smernicami
 direktivide järgi
 pagal direktyvas
 соотвествует требованиям директив
 po smjernicama
 v skladu z direktivo

en in overeenstemming is met de volgende normen of andere normatieve documenten :
 and is in conformity with the following standard(s) or other such specifications :
 und den folgenden Normen oder vergleichbaren Spezifikationen entspricht:
 et aux normes et autres spécifications suivantes :

è conforme alle norme
 de acuerdo con las normas
 de acordo com as normas
 oppfylger følgende standarder
 täyttää seuraavien standardien vaatimukset
 oppfyller følgende standard
 uppfyller följande standarder
 uppfyllir eftirfarandi staðla
 πληροί τις προδιαγραφές

EN-ISO 12100:2010, EN 13001-1:2015
 EN 13001-2:2014, EN 13001-3-1:2012+A1:2013
 EN 15011:2011+A1:2014, EN 60204-1:2006/AC:2010
 EN-IEC 60204-32:2008

în conformitate cu standardele
 megfelelő a szabványoknak
 odpovídá normám
 zgodny z normą
 zodpovedá normám
 normidele vastavus
 atitinka standartus
 соотвествует стандартам нормам
 u skladu sa standardima
 v skladu s standardi

handtekening en datum

signature and date
 Unterschrift und Datum
 signature et date
 firma e data
 firma y fecha
 assinatura e data
 underskrift og dato
 allekirjoitus ja päiväs
 signatur og dato
 underskrift och datum
 undirskrift og dagsetning

S. Loosveld
 Director Product Development
 Lely Industries N.V.

J.W. Rodenburg
 Manager Product Safety & Compliance
 Lely Industries N.V.

υπογραφή και ημερομηνία
 semnătura și data
 aláírás és dátum
 podpis a datum
 podpis i data
 podpis a dátum
 allkiri ja kuupäev
 parašas ir data
 подпись и дата
 rotpis i datum
 podpis in datum

7-2-2018

5.2013.8503.9A

EC DECLARATION OF CONFORMITY
 EG-KONFORMITÄTSEKTLÄRUNG
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 EU-KONFORMITETSEKTLÆRING
 EG-FÖRSÄKRAN OM ÖVERENSSTÄMMELSE
 CB – SAMRÆMISYFIRLÝSING



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 ES – PREHLASENIE O ZHODE
 VASTAVUS EU DIREKTIVIDELE
 ES ATITIKTIES DEKLARACIJA
 ЗАЯВЛЕНИЕ О СООТВЕТСТВИИ НОРМАМ ЕС
 EG - POTVRDA O SUKLADNOSTI
 ES IZJAVA O SKLADNOSTI

Wij fabrikant

We manufacturer
 Der Hersteller
 Nous, soussignés, le fabricant
 fabricante
 fabricante
 producent
 valmistaja
 produsent
 tiliverkare
 framleiðandi

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 www.lely.com

Εμείς, ο κατασκευαστής
 fabricant
 gyártó
 výrobce
 producent
 výrobca
 tootja
 gamintojas
 производитель
 proizvođač
 naziv proizvajalca

verklaren geheel onder eigen verantwoordelijkheid dat de machine:
 herewith declare, on our own responsibility, that the machinery:
 erklärt hiermit eigenverantwortlich, dass die Maschine:
 déclarons que les machines désignées ci-après :

productbeschrijving

description of product
 Produktbezeichnung
 description du produit
 descrizione del prodotto
 nombre del producto
 designação de produto
 produktnavn
 tuotenimi
 produktnavn
 produktnamn
 vörulýsing

Lely Vector Power Distribution Box

περιγραφή του προϊόντος
 descrierea produsului
 termék megnevezése
 označení produktu
 opis produktu
 označenie výrobku
 toote kirjeldus
 gaminio aprašymas
 наименование изделия
 naziv proizvoda

typenummer

model number
 Typnummer
 numéro de modèle
 numero di modello
 modelo
 número do modelo
 modelnummer
 mallinnumero
 modellnummer
 gerðarnúmer

5.2011.0532.x
 5.2011.1174.x
 5.2011.1241.x

αριθμός μοντέλου
 numărul modelului
 típus száma
 numer modelu
 typové číslo
 tüübi number
 modelo numeris
 номер модели
 broj modela
 številka artikla

waarop deze verklaring betrekking heeft, in overeenstemming is met de bepalingen van de volgende Richtlijn(en):
 which this declaration refers to, is in accordance with the conditions of the following Directive(s):
 worauf sich diese Erklärung bezieht, hergestellt ist gemäß den Bestimmungen der Richtlinie(n):
 auxquelles la présente déclaration se rapporte, sont conformes aux dispositions de la ou des directives suivantes :

è conforme alle direttive
 de acuerdo con las normas
 de acordo com a directiva
 opfylder følgende direktiver
 täyttää seuraavien direktiivien vaatimukset
 oppfyller følgende direktiver
 uppfyller följande direktiv
 uppfyllir eftirfarandi tilskipanir

**Low voltage directive 2006/95/EC
 Electromagnetic compatibility 2004/108/EC**

conform cu directivele
 rendelkezéseknél megfelelően
 podle směrnice
 zgodny z dyrektywą
 v zhode so smernicami
 direktiivde järgi
 pagal direktyvas
 соотвествует требованиям директив
 po smjernicama
 v skladu z direktivo

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 oppfyller følgende standard
 uppfyller följande standarder
 uppfyllir eftirfarandi stæðla
 πληροί τις προδιαγραφές

EN 60204-1:2006/A1:2009
 EN 61000-3-2:2014
 EN 61000-6-1:2007
 EN 61000-6-3:2007/A1:2011

în conformitate cu standardele
 megfelel a szabványoknak
 odpovídá normám
 zgodny z normą
 zodpovedá normám
 normidele vastavus
 atilinka standartus
 соотвествует стандартам нормам
 u skladu sa standardima
 v skladu s standardi

handtekening en datum

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 Unterschrift und Datum
 signature et date
 firma e data
 firma y fecha
 assinatura e data
 underskrift og dato
 allekirjoitus ja päiväs
 signatur og dato
 underskrift och datum
 undrskrift og dagsetning

S. Loosveld
 Director Product Development
 Lely Industries N.V.

J.W. Rodenburg
 Manager Product Safety & Compliance
 Lely Industries N.V.

20-1-2015

5.2011.8504.9

5.2011.8567.0 B

EC DECLARATION OF CONFORMITY
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 výrobce
 producent
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 tootja
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productbeschrijving

description of product
 Produktbezeichnung
 description du produit
 descrizione del prodotto
 nombre del producto
 designação de produto
 produktnavn
 tuotenimi
 produktnavn
 produktnamn
 vörulýsing

Lely Additives Control box

περιγραφή του προϊόντος
 descrierea produsului
 termék megnevezése
 označení produktu
 opis produktu
 označenie výrobku
 toote kirjeldus
 gaminio aprašymas
 наименование изделия
 naziv proizvoda

typenummer

model number
 Typnummer
 numéro de modèle
 numero di modello
 modelo
 número do modelo
 modelnummer
 mallinnumero
 modellnummer
 gerðarnúmer

5.2011.0496.0
 5.2011.0533.0

αριθμός μοντέλου
 numărul modelului
 típus száma
 numer modelu
 typové číslo
 tüübi number
 modelo numeris
 номер модели
 broj modela
 številka artikla

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 de acordo com a directiva
 opfylder følgende direktiver
 täyttää seuraavien direktiivien vaatimukset
 oppfyller følgende direktiver
 uppfyller följande direktiv
 uppfyllir eftirfarandi tilskipanir

Machinery directive 2006/42/EC
Low voltage directive 2006/95/EC
Electromagnetic compatibility 2004/108/EC

conform cu directivele
 rendelkezéseknél megfelelően
 podle směrnice
 zgodny z dyrektywą
 v zohode so smernicami
 direktiivde järgi
 pagai direktivas
 соотвѣтствует требованиям директив
 þó smjærnicama
 v skladu z direktivo

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 uppfyllir eftirfarandi staðla
 πληροί τις προδιαγραφές

EN 60204-1:2006/A1:2009, EN 61000-3-2:2014
 EN 61000-3-3:2013, EN 61000-6-1:2007
 EN 61000-6-3:2007/A1:2011

în conformitate cu standardele
 megfelel a szabványoknak
 odpovídá normám
 zgodny z normą
 zodpovedá normám
 normidele vastavus
 atilinka standartus
 соотвѣтствует стандартам нормам
 u skladu sa standardima
 v skladu s standardi

handtekening en datum

signature and date
 Unterschrift und Datum
 signature et date
 firma e data
 firma y fecha
 assinatura e data
 underskrift og dato
 allekirjoitus ja päiväs
 signatur og dato
 underskrift och datum
 undskrift og dagsetning

S. Loosveld
 Director Product Development
 Lely Industries N.V.

J.W. Rodenburg
 Manager Product Safety & Compliance
 Lely Industries N.V.

υπογραφή και ημερομηνία
 semnhatura și data
 aláírás és dátum
 podpis a datum
 podpis i data
 podpis a dátum
 allkiri ja kuupäev
 parašas ir data
 подпись и дата
 rotpis i datum
 podpis in datum

20-1-2015

5.2011.8505.9

EC DECLARATION OF CONFORMITY
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 CB – SAMRÆMISYFIRLÝSING



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 EG - POTVRDA O SUKLADNOSTI
 ES IZJAVA O SKLADNOSTI

Wij fabrikant

We manufacturer
 Der Hersteller
 Nous, soussignés, le fabricant
 fabricante
 fabricante
 producent
 výrobca
 valmistaja
 produsent
 tiliverkare
 framleiðandi

Lely Industries N.V.
 Cornelis van der Lelylaan 1 • 3147 PA Maassluis • The Netherlands
 tel. +31 (0)88 - 12 28 221 • fax +31 (0)88 - 12 28 222
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Εμείς, ο κατασκευαστής
 fabricant
 gyártó
 výrobce
 producent
 výrobca
 tootja
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 naziv proizvajalca

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productbeschrijving

description of product
 Produktbezeichnung
 description du produit
 descrizione del prodotto
 nombre del producto
 designação de produto
 produktnavn
 tuotenimi
 produktnavn
 produktnamn
 vörulýsing

Lely External Concentrates box

περιγραφή του προϊόντος
 descrierea produsului
 termék megnevezése
 označení produktu
 opis produktu
 označenie výrobku
 toote kirjeldus
 gaminio aprašymas
 наименование изделия
 naziv proizvoda

typenummer

model number
 Typnummer
 numéro de modèle
 numero di modello
 modelo
 número do modelo
 modelnummer
 mallinumer
 modellnummer
 gerðarnúmer

5.2011.0534.0

αριθμός μοντέλου
 numărul modelului
 típus száma
 numer modelu
 typové číslo
 tüübi number
 modelo numeris
 номер модели
 broj modela
 številka artikla

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 worauf sich diese Erklärung bezieht, hergestellt ist gemäß den Bestimmungen der Richtlinie(n):
 auxquelles la présente déclaration se rapporte, sont conformes aux dispositions de la ou des directives suivantes :

Low voltage directive 2006/95/EC
 Electromagnetic compatibility 2004/108/EC

è conforme alle direttive
 de acuerdo con las normas
 de acordo com a directiva
 oppfylger følgende direktiver
 täyttää seuraavien direktiivien vaatimukset
 oppfylger følgende direktiver
 oppfyllir eftirfarandi direktiv
 uppfyllir eftirfarandi tilskipanir

conform cu directivele
 rendelkezőseknek megfeleleően
 podle směrnice
 zgodny z dyrektywą
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 pagal direktyvas
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EN 60204-1:2006/A1:2009, EN 61000-3-2:2014
 EN 61000-3-3:2013, EN 61000-6-1:2007
 EN 61000-6-3:2007/A1:2011

è conforme alle norme
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 oppfyller følgende standard
 oppfyllir eftirfarandi staðla
 πληροί τις προδιαγραφές

în conformitate cu standardele
 megfelel a szabványoknak
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 zgodny z normą
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 underskrift och datum
 undirskrift og dagsetning

S. Loosveld
 Director Product Development
 Lely Industries N.V.

J.W. Rodenburg
 Manager Product Safety & Compliance
 Lely Industries N.V.

20-1-2015

5.2011.8507.9

5.2011.8567.0 B

EC DECLARATION OF CONFORMITY
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 Produktbezeichnung
 description du produit
 descrizione del prodotto
 nombre del producto
 designação de produto
 produktnavn
 tuotenimi
 produktnavn
 produktnamn
 vörulýsing

Lely Automatic door control box

περιγραφή του προϊόντος
 descrierea produsului
 termék megnevezése
 označení produktu
 opis produktu
 označenie výrobku
 toote kirjeldus
 gaminio aprašymas
 наименование изделия
 naziv proizvoda

typenummer

model number
 Typnummer
 numéro de modèle
 numero di modello
 modelo
 número do modelo
 modelnummer
 mallinnumero
 modellnummer
 gerðarnúmer

5.2011.0831.0
 5.2013.0637.0

αριθμός μοντέλου
 numărul modelului
 típus száma
 numer modelu
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 uppfyller följande direktiv
 uppfyllir eftirfarandi tilskipanir

Low voltage directive 2014/35/EU
 Electromagnetic compatibility 2014/30/EU

conform cu directivele
 rendelkezőseknek megfeleltetés
 podle směrnice
 zgodny z dyrektywą
 v zohode so smernicami
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 uppfyllir eftirfarandi stæðla
 πληροί τις προδιαγραφές

EN 60204-1:2006/AC:2010, EN 61000-6-3:2007/A1:2011/AC:2012
 EN 61000-3-2:2014, EN 61000-3-3:2013
 EN 61000-6-1:2007

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 v skladu s standardi

handtekening en datum

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 undskrift og dagsetning

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17-8-2017

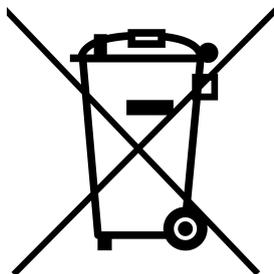
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10 WEEE



This symbol [crossed-out wheel bin WEEE Annex IV] indicates separate collection of electrical waste and electronic equipment in the European countries. We are committed to being a good corporate citizen. As part of that commitment, we strive to maintain an environmentally conscious manufacturing operation

In accordance with the European Union WEEE (Waste Electrical and Electronic Equipment) Directive 2012/19/EC, we would like to notify you that this product might contain regulated materials, which upon disposal, according to the WEEE directive, require special reuse and recycling processing.

For this reason, Lely Industries N.V. has arranged that this product can be recycled at the local recycling/disposal companies to collect and recycle this product at no cost to you.

Additional local legislation may apply.

NOTICE

Please note, only this product itself falls under the WEEE Directive. When disposing of packaging and other related shipping materials we encourage you to recycle these items through the normal channels.



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