

User manual

**Litter reduction system V17
(LRS V17)**

Code No. 99-97-4731 GB

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EG-Konformitätserklärung



Big Dutchman.

Big Dutchman International GmbH
Postfach 1163; D-49360 Vechta, Germany
Telefon: +49 (0) 4447 / 801-0
Fax: +49 (0) 4447 / 801-237
E-Mail: big@bigdutchman.de

Im Sinne der EG-Richtlinie:

- **Maschinenrichtlinie 2006/42/EG, Anhang II / Teil 1 / Abschnitt A**

Mitgeltende EG/EU-Richtlinien:

- EMV-Richtlinie 2014/30/EU
- Niederspannungsrichtlinie 2014/35/EU
- RoHS-Richtlinie 2011/65/EU



Das im Folgenden genannte Produkt wurde entwickelt, konstruiert und gefertigt in Übereinstimmung mit den o.g. EG/EU-Richtlinien und in alleiniger Verantwortung von Big Dutchman.

Bezeichnung	Einstreureduziersystem V17 (ERS V17)
Serien-Nr. und Baujahr	Entsprechend Kunden-Auftrags-Nr.

Folgende harmonisierte Normen wurden angewandt:

- DIN EN ISO 12100:2011-03 Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung
- EN 60204-1:2006/AC:2010 Sicherheit von Maschinen - Elektrische Ausrüstung von Maschinen - Teil 1: Allgemeine Anforderungen
- DIN EN ISO 13850:2016-05 Sicherheit von Maschinen - Not-Halt - Gestaltungsleitsätze

Bevollmächtigter für technische Unterlagen:

Produktmanager BU EGG
Auf der Lage 2; 49377 Vechta

Head of BU EGG
Unterzeichner Funktion

Friedrich Otto-Lübker
.....
Friedrich Otto-Lübker

Vechta 02.08.2019 ...

Ort Datum

Chief Engineer BU EGG

Unterzeichner Funktion

Günter Möller
.....
Günter Möller

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1 About this manual

Observe the instructions in this manual to ensure correct and safe use of the system.
Keep this manual safe for future use.

All persons assembling, operating, cleaning and servicing this system must be familiar with the contents of this manual.

These persons must always have access to the manual. Keep this manual in the immediate vicinity of the system for this reason.

Observe the comprised safety instructions!

If this manual is damaged or lost, request a new copy from **Big Dutchman**.

This manual is protected by copyright. The information and drawings included in this manual may not be copied without the manufacturer's consent, nor may they be misused or disclosed to third parties.

The contents of this manual may be altered without prior notice.

If you find mistakes or unclear information in this manual, please do not hesitate to let us know.

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For further information please contact:

Big Dutchman International GmbH, P.O. Box 1163, 49360 Vechta, Germany,

Phone: +49 4447 8010, Fax: +49 4447 801237

Email: big@bigdutchman.de, internet: www.bigdutchman.de

1.1 Structure of the safety instructions

DANGER!

This indicates risks that will lead to personal injury resulting in death or to serious injuries.

WARNING!

This indicates risks that could lead to personal injury resulting in death or to serious injuries.

CAUTION!

This indicates risks or insecure procedures that could lead to moderate or minor injuries.

NOTICE!

This indicates notes preventing property damage and leading to an effective, economic and environmentally-conscious handling of the system.

1.2 Supplier's documentation

The supplier's documentation includes all instructions for components that are supplied by **Big Dutchman** but not manufactured by **Big Dutchman**, for example motors. These instructions are usually supplied with the respective component. If this is not the case or if the language of the corresponding country is not included, please request this documentation from **Big Dutchman** .

It is essential to observe the instructions in the supplier's documentation!

2 Safety

2.1 General safety regulations

Only work with suitable tools and observe the local accident prevention regulations.

WARNING!

Live parts may be bare when performing different types of tasks. Touching live parts can lead to injuries caused by electric shock and short circuits.

- ▶ Set the main switch to "Off" before starting any repair or maintenance tasks.
- ▶ Secure the system against reactivation.
- ▶ Attach a fixed sign to indicate that maintenance and repair tasks are in process!
- ▶ Never touch bare electrical components.
- ▶ Equipment with bare electrical components must not be used by the operating staff.

Check safety and function control devices to ensure safe and accurate operation after carrying out any tasks.

Observe the regulations of local water distribution and power supply companies.

WARNING!

Defective or disassembled safety devices can lead to serious injuries or to death!

- ▶ It is strictly forbidden to remove or put out of operation any safety device.
- ▶ If safety devices are damaged, immediately put the system out of operation. Lock the main switch in zero position and eliminate any damage.
- ▶ Make sure that all safety devices are properly mounted and function after work on the system has been completed and before putting the system into operation (again).

⚠ WARNING!

- ▶ Parts lying about on the system and in its vicinity can cause persons to stumble and / or fall and thus risk injuring themselves by contact with system components.
- ▶ Parts lying about in or on the components can lead to serious damage of the system.
- ▶ Never deposit objects (e.g. spare parts, replaced parts, tools, cleaning tools etc.) in the accessible areas of the system or in the surrounding areas after having worked on the system!
- ▶ **Before** putting the system into operation again, assure yourself that all loose or replaced parts have been removed from the system components!

⚠ DANGER!

Persons may be electrocuted or suffer serious electrical injuries if water from leaking hoses, seals and pipes reaches live parts.

- ▶ Disconnect the main power supply.
- ▶ Interrupt the main water supply.
- ▶ Only now may you enter the part of the house where large quantities of water have escaped.

i NOTICE!

Leaking hoses, seals and pipes can cause structural damage or destroy electrical systems by short circuits.

- ▶ Check regularly whether large quantities of water are escaping and eliminate the leaks as soon as possible.

⚠ WARNING!

Children must not access the system. The safety distances for the system are not designed for children. A risk of injury cannot be excluded, even for supervised children.

2.2 Operator's responsibility

The operator is subject to the legal obligations regarding occupational safety and is responsible for the staff's safety. All safety, accident prevention and environmental protection regulations applicable for the area of use of the system must be observed. The following is especially important:

The operator must clearly specify responsibilities for operation, maintenance and cleaning.

The operator must provide the staff with the necessary personal protective equipment.

The operator is responsible for

- using the system in compliance with the designated use;
- ensuring that the system is only operated in an excellent state from the technical point of view and that maintenance intervals are observed;
- ensuring that his staff is trained to use the system;
- ensuring that operation instructions are prepared for the system.

2.3 Staff qualifications

Staff must consist of qualified persons who can be expected to perform their tasks reliably. Persons whose ability to respond is impaired, e.g. by alcohol, drugs or medication, must not work on the system. The operator is responsible for which persons he employs. **Big Dutchman** does not assume any liability for personal injury and property damage caused by insufficiently qualified staff.

2.4 Personal protective equipment



WARNING!

The following instructions apply to any task carried out on the system.

- ▶ Wear **close-fitting protective clothing** and **protective footwear**.
- ▶ Use **protective gloves** where there is a risk of hand injuries and **safety goggles** where there is a risk of eye injuries.
- ▶ Do not wear **any rings, necklaces, watches, scarves, ties or other items** which could get caught in parts of the system.
- ▶ Make sure that **long hair is always tied back**. Hair can get caught in driven or rotating working units or parts of the system, resulting in serious injuries.
- ▶ When working underneath the system **always** wear a **hard hat!**



2.5 Designated use

The aim of this system is to remove small quantities of dried manure and litter from an alternative layer house at regular intervals.

Due to the activity of the birds (scratching), the remaining litter is distributed evenly along the complete house length outside of the cleaning area of the litter scrapers. Thus, the litter layer is kept at a relatively low level!

The **Big Dutchman** system may only be used for the purpose for which it is designated. Any deviating use is considered non-designated use. The manufacturer shall not be liable for any damage resulting from such non-designated use. The user alone bears the risk. The designated use also includes the exact compliance with operating, maintenance and assembly requirements of the manufacturer.

2.6 Avoidance of foreseeable misuse

The following uses of this **Big Dutchman** system are not permitted and are therefore deemed a misuse:

- Housing of animal types other than laying birds.
- The use outdoor, especially in areas that are susceptible to frost.
- The litter reduction system is used for high litter, trodden down by the layers, as it often exists after several weeks of use without regular operation of the litter reduction system.
- Using the system where the temperature inside the house is below 0°C.
- Overpopulating with more animals than is permissible for the system.
- Mechanical loading of the system in excess of normal loads intended for the system with the housing of laying birds.
- Using improper detergents and disinfectants.
- Too long residence time of detergents and disinfectants.
- Utilising the system with aggressive and/or corrosive materials in quantities that do not constitute good professional practise.

A non-designated use will lead to a liability exclusion by **Big Dutchman**.

The operator of the system exclusively bears the risk resulting from misuse!

2.7 Ordering of spare parts

CAUTION!

For your own safety, use original **Big Dutchman** spare parts only. For third-party products that have not been released or recommended and for modifications (e.g. software, control units), judging whether there is a safety risk in connection with **Big Dutchman** systems is not possible.

NOTICE!

The exact description of the spare parts to be ordered can be found by means of the position number in the spare parts list.

Indicate the following when ordering spare parts:

- the code number and description of the spare part;
- the customer number or order number;
- the current supply, e.g. 230 / 400 V – 3 Ph – 50 / 60 Hz.

2.8 Safety instructions when operating electrical appliances

NOTICE!

Only persons qualified according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160) may install and work on electric parts / assembly groups.

WARNING!

If an electric part is open, dangerous electric tensions are bare. Be aware of the danger and keep staff of other professions away from the danger zone.

NOTICE!

Do not install control devices directly in the house but in the service room to prevent corrosion caused by e.g. ammonia gas.

2.8.1 Protective-equipotential bonding (earthing) of the system

The system must be earthed professionally by the operator or a company commissioned by him at suitable points and according to the valid local guidelines and standards (e.g. IEC 60364-7-705 mod. 2006 / DIN VDE 0100-705: Low-voltage electrical installations – part 7-705: Requirements for special installations or locations – Agricultural and horticultural premises) for protective-equipotential bonding.

The earthing points must be connected with the foundation earth electrode.

Recommended earthing points:

1 x per system row near the foundation earth electrode.

The material required for earthing is not included in the Big Dutchman delivery.

2.9 System-specific safety regulations

The system is designed according to the state of technology and meets current safety requirements. Nevertheless, there are residual risks, which can be prevented as follows.

WARNING!

Danger of drawing-in due to rollers, chains, gear wheels and belts!

- ▶ Disconnect the system from the power supply before starting any work on the system, because the system may turn on unexpectedly when operated automatically.
- ▶ Secure the system against reactivation.
- ▶ Prevent contact with rotating and driven system parts in general!
- ▶ Assure yourself that all safety devices have been attached correctly.

2.9.1 Safety symbols on the system

NOTICE!

Safety symbols and instructions on the system must always be easily visible and undamaged.

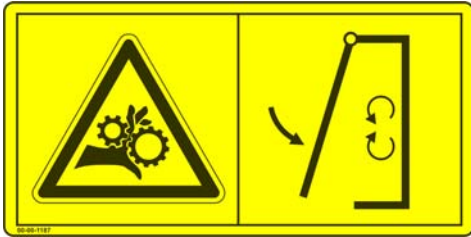
- ▶ Clean safety symbols in case they are dirty, e.g. due to dust, animal excrement, feed remains, oil or grease.
- ▶ Immediately replace damaged, lost or illegible safety symbols.
- ▶ If a safety symbol or instruction is fixed to a part to be replaced, ensure that it will be fixed to the new part as well.



General note!

Read the manual.

Code no. 00-00-1240



Danger of crushing due to rotating machine parts!

Always lock and secure safety devices before putting the system into operation. Only authorised persons may open protection devices, and only when the system is idle.

Code no. 00-00-1187



Danger of drawing-in due to operating auger, chain or rope sheaves!

Never reach or climb into the feed hopper, the feed column, the feed pipes or the feed trough while the motor is running!

Code no. 00-00-1188

2.9.2 Important notes on the use of Tangit adhesive and Tangit cleaner

WARNING!

Tangit adhesive is flammable! Therefore:

- ▶ No open fires nor hot air blowers, gas brooders and open light bulbs in the work area!
- ▶ Do not smoke, weld or grind in the work room!
- ▶ Solvent vapours are heavier than air. Such vapours may cause unconsciousness and / or form explosive mixtures. Use and dry in well-ventilated areas only. Make sure that the area stays well-ventilated after gluing work is finished!
- ▶ Remove possible solvent vapour clouds before starting to weld or grind!
- ▶ Observe the general instructions and the instructions for use of the manufacturer.

WARNING!

Tangit adhesive is harmful to health! When working with Tangit adhesive, always:

- ▶ Wear gloves!
- ▶ Wear eye protection!
- ▶ Wear breathing protection!

Notes on the glueing of components:

- The adhesive is ready-for-use and must not be diluted. The adhesive must be thin and fluid. If it is viscous and does not flow off of a dipped spatula, then the content is too old and must not be used any more. Open containers should not be used any longer.
- The glue areas must be completely clean, dry and oil-free before coming into contact with the adhesive.
- Apply the adhesive evenly with strong brush strokes.
- Move the parts to be glued into their final position immediately after applying the adhesive and hold on to the parts for a few seconds until the Tangit adhesive has hardened. The entire glueing process must be completed within a period of 4 minutes.
- Do not move the parts for a period of 5 minutes after glueing. For temperatures below 15°C this time has to be extended to 15 minutes.

 CAUTION!

Before starting to use the Tangit cleaner and Tangit PVC-U, read and observe the corresponding technical data sheets! The data sheets provide instructions regarding pretreatment, handling, storing and product safety.

3 System description

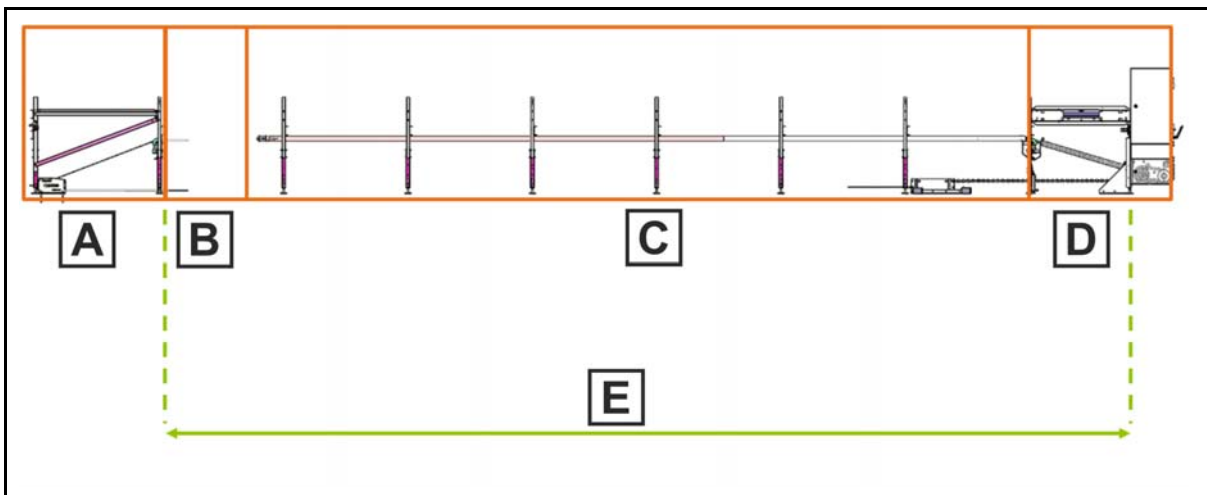
i NOTICE!

The litter reduction system is exclusively intended for litter reduction below an egg production. It only removes a narrow strip of litter.

It is not possible to remove manure in the entire house independently with the litter reduction system!

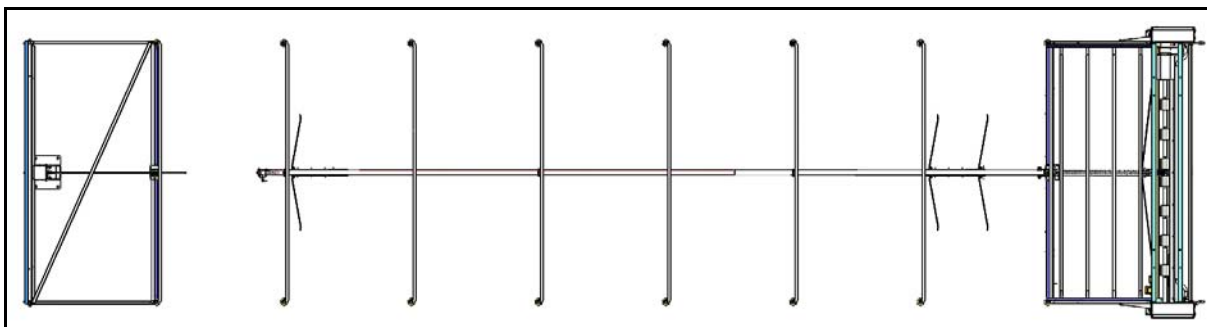
3.1 Structure

Areas of the litter reduction system V17



A =	Idler
B =	Sections
C =	3.5 sections after the drive end set
D =	Drive end set
E =	Area in which the scrapers move

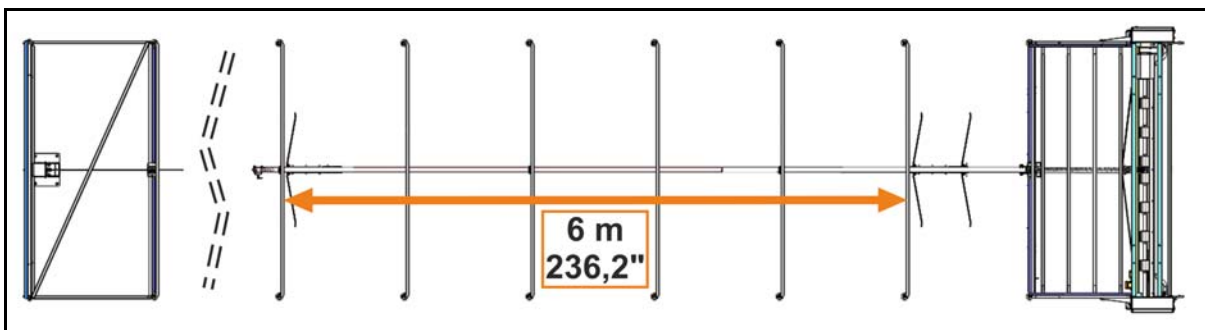
Top view



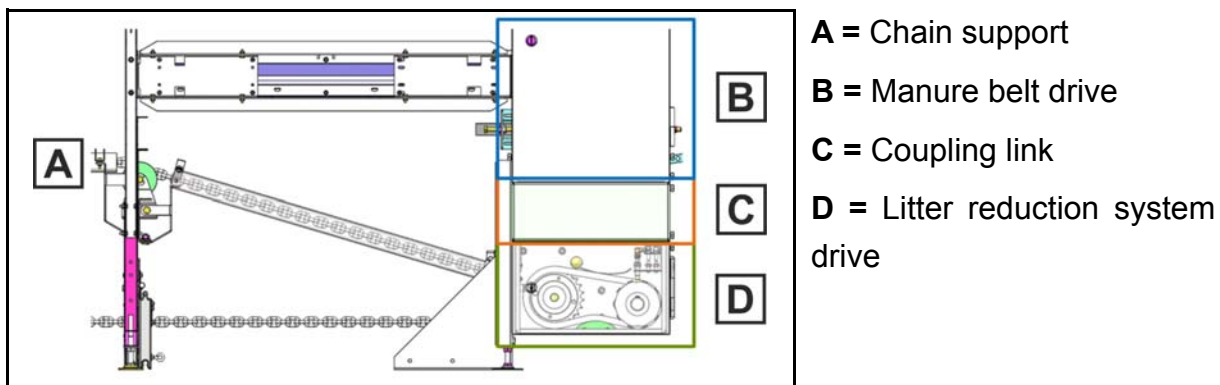
LRS V17 is installed as a vertical circuit and consists of a combination of ship chain (green) and wire rope (orange).



The litter scrapers are fastened at the lower wire rope. The upper wire rope runs without load and is situated below the returning manure belt. The distance between the litter scrapers is 6 metres (236.2").



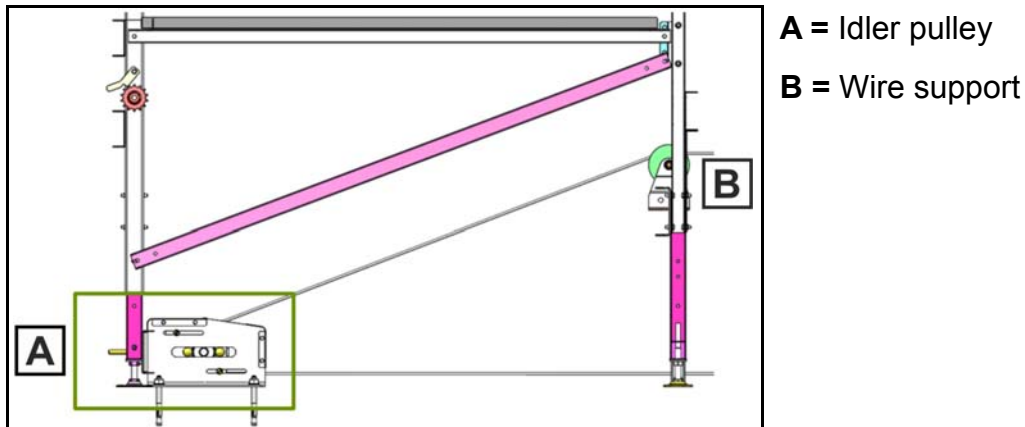
The **drive** of the litter reduction system is attached below the manure belt drive. The height of the drive for the litter reduction system above the floor cannot be changed. With the chain support, the returning chain is guided below the manure belt.



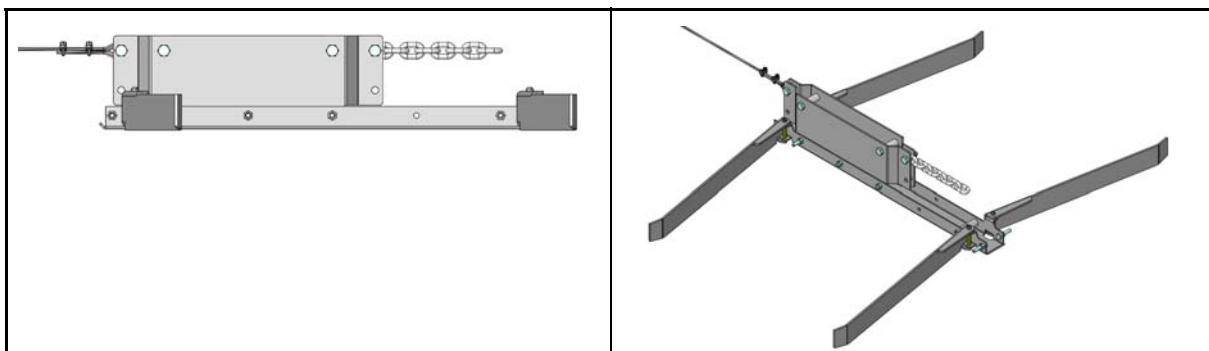
The litter reduction system is driven with positive locking by a chain wheel due to the link chain ("ship chain").

Only a very low pre-tension of the circuit is required for this reason.

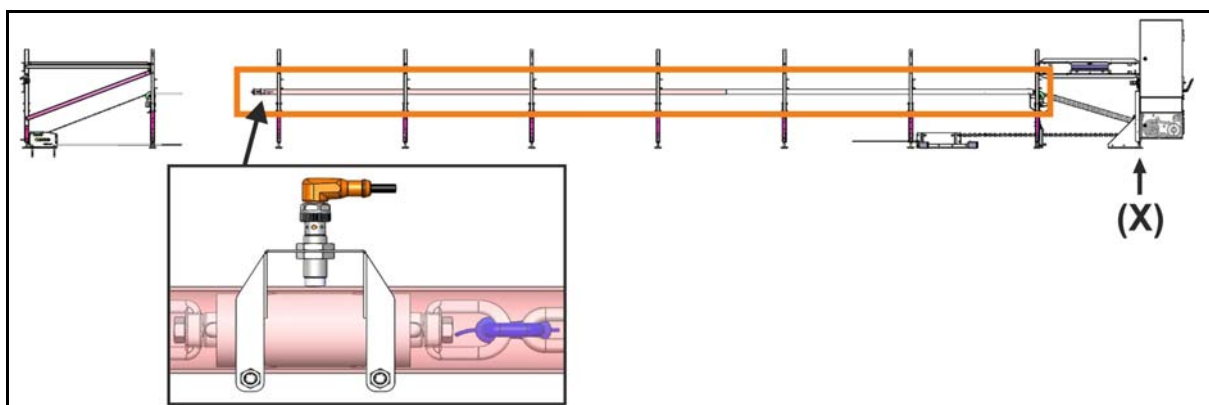
The idler of LRS V17 is located below the manure belt idler at the row end opposite the drive. With the wire support, the wire rope is guided below the manure belt.



There are two connection points between ship chain and wire rope. One point is at the final scraper in front of the litter reduction system drive. This scraper has a special seat to connect the ship chain.



The second connection point is in the guiding tube of the chain. An inductive sensor is fastened to the guiding tube as limit switch. In case of a standard travelling distance, this switch is positioned no less than 8 metres in front of the final stillage (X) on the litter reduction system's drive side.

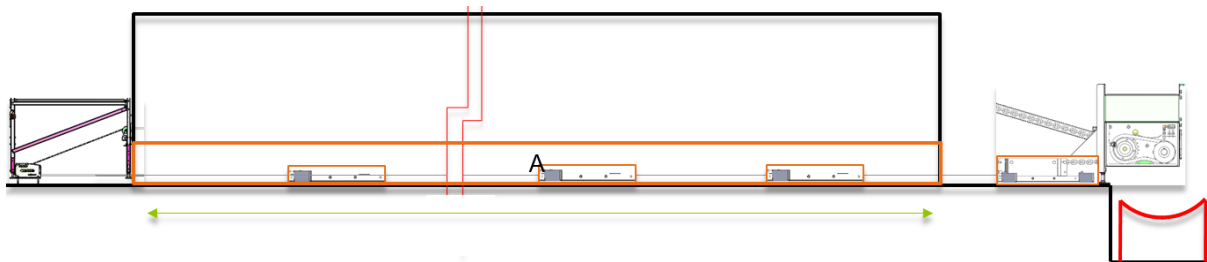


3.1.1 Distribution of the litter scrapers in a row

i NOTICE!

It is possible to replace the single-blade scrapers by double-blade scrapers.
(see chapter 10.3 "Litter scraper")

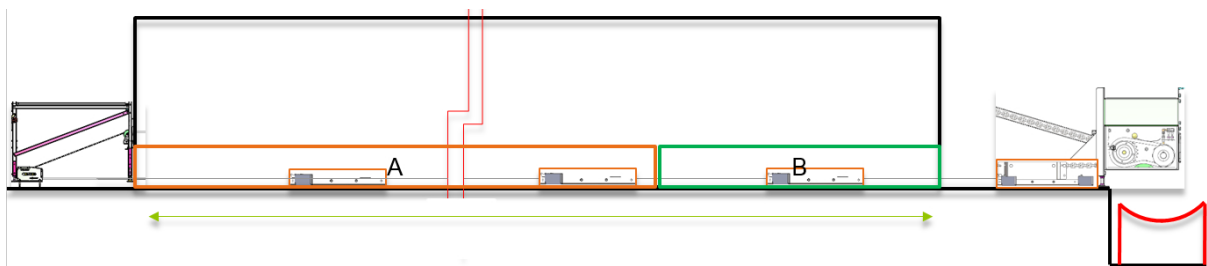
Distribution of scrapers for row lengths of up to 60 metres



Up to a row length of 60 metres (bird area)

	A: 83-17-5985 Litter scraper single-blade cpl. 700 mm BD V17	≤ 9 units
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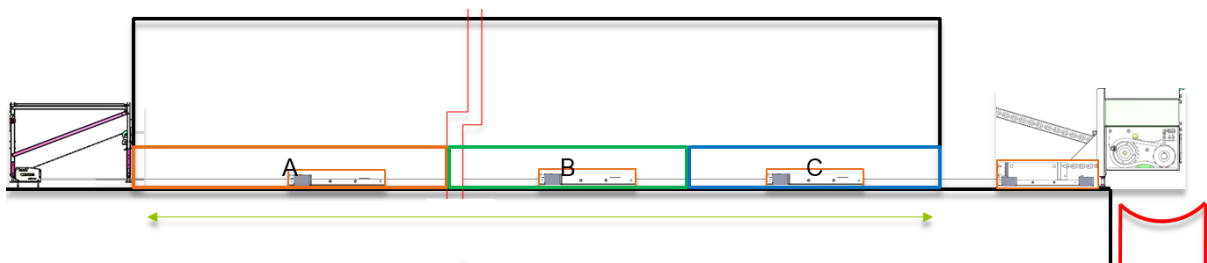
Distribution of scrapers for row lengths of more than 60 and up to 100 metres



Up to a row length of 100 metres (bird area)

	A: 83-17-5985 Litter scraper single-blade cpl. 700 mm BD V17	= 9 units
and	B: 83-17-5987 Litter scraper single-blade cpl. 900 mm BD V17	≤ 6 units

Distribution of scrapers for row lengths of more than 100 and up to 145 metres

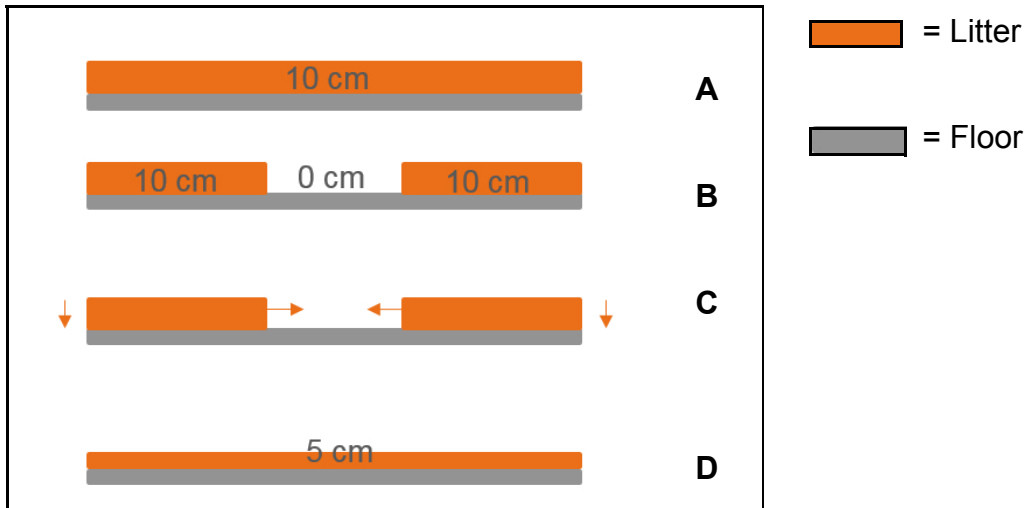


Up to a row length of 145 metres (bird area)

	A: 83-17-5985 Litter scraper single-blade cpl. 700 mm BD V17	= 9 units
and	B: 83-17-5987 Litter scraper single-blade cpl. 900 mm BD V17	= 6 units
and	C: 83-17-5986 Litter scraper single-blade cpl. 1100 mm BD V17	≤ 8 units

3.2 Function

3.2.1 Litter reduction



A= The litter layer in a house is e.g. 10 cm high.

B= Scrapers remove the litter in rows.

C= The birds then distribute the remaining litter evenly in the house.

D= The litter layer in the house has the same height again but is lower overall.

i NOTICE!

The litter reduction system must be started at least once per week to prevent overloading. If the litter is too moist, tends to clump or accumulates quickly, it may be necessary to reduce the litter several times a week or daily. A litter layer of 3-5 cm is considered sufficient.

However, any relevant guidelines and regulations of the corresponding market must be observed.

In order to start LRS V17, the manure cross belt must be switched on.

The litter reduction system is started via the control unit. The scrapers move from the starting position (final scraper is at the manure cross channel) below the system. The standard travelling distance is 8 metres and is measured by a pulse counter at the drive shaft.

When the scraper has moved 8 metres, it stops and then moves in the opposite direction. At the same time, the scraper opens and transports litter towards the manure cross channel.

Only the litter of the final scraper reaches the manure cross channel in the 1st cycle. The other scrapers have moved “their” litter only so far forward that the next scraper can collect it during the following cycle and move it further towards the manure cross channel.

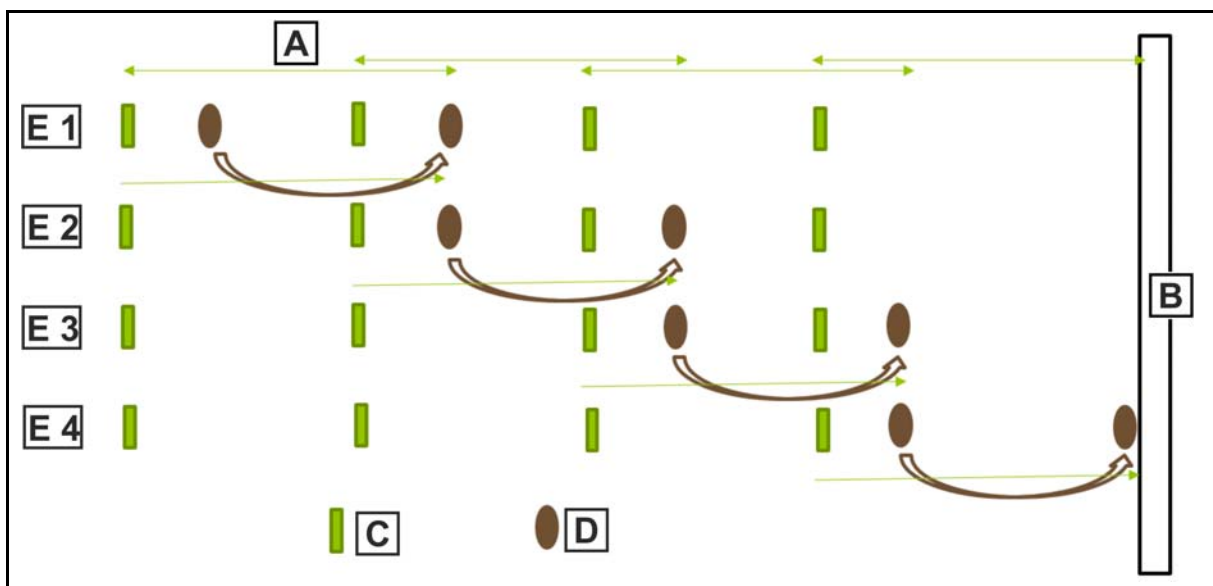
The longer the row, the more cycles are necessary to move the litter from the front to the manure cross channel.

Since the scrapers are positioned at a distance of 6 metres, one cycle is required every 6 metres of row length. This means that the litter reduction system must complete a minimum of 12 cycles where the row is 72 metres long, for example. 2 additional cycles are set in the controller for safety purposes.

General calculation:

- Row length [m] : scraper distance [m] + 2 cycles (safety) = number of cycles
- or
- Number of scrapers + 2 (safety) = number of cycles

Litter reduction process:



A = Scraper's direction of movement

B = Manure cross channel

C = Scraper

D = Pile of litter

E 1 to E 4 = Scraper cycle 1-4

3.2.2 Bird-disturbing function (optional extra)

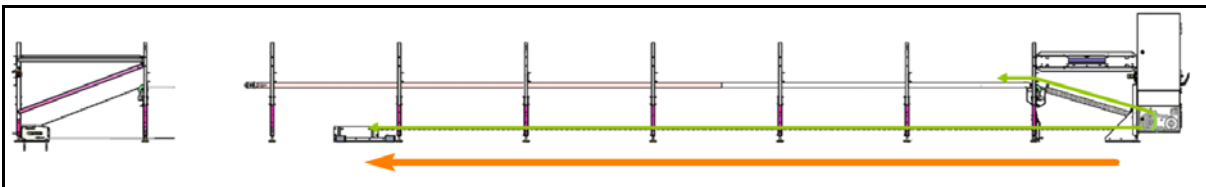
The bird-disturbing function is optional and can be carried out even without litter reduction. During the laying period, the bird-disturbing function is responsible for making the area below the system as unattractive as possible for the hens by moving the litter scrapers.

i NOTICE!

Floor eggs cannot be prevented with the LRS V17! An optimal flock management on site can solve this problem.

The bird-disturbing function consists of 3 courses of movement:

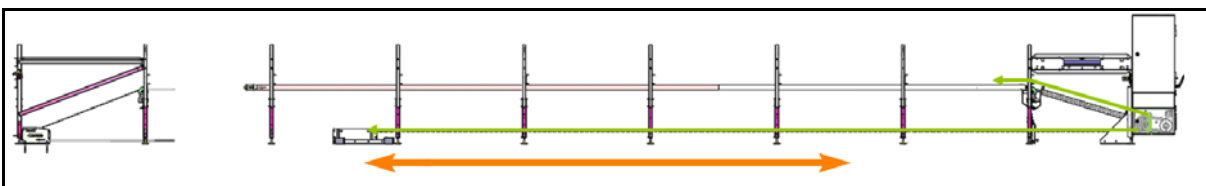
1. The scrapers move from the starting position below the system.



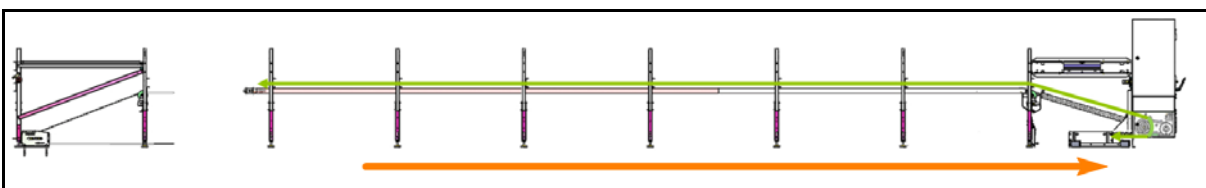
2. The scrapers only move some metres forward and backward. This is the actual bird-disturbing function. During this movement, no litter is transferred from one scraper to the other.

Each single scraper will therefore accumulate a small pile of litter. The hens will spread these piles, however, so that no unwanted litter accumulations will remain.

The movement is usually repeated several times during the laying period.



3. The scrapers move back to the starting position. A single pile of litter is then conveyed onto the manure cross belt.



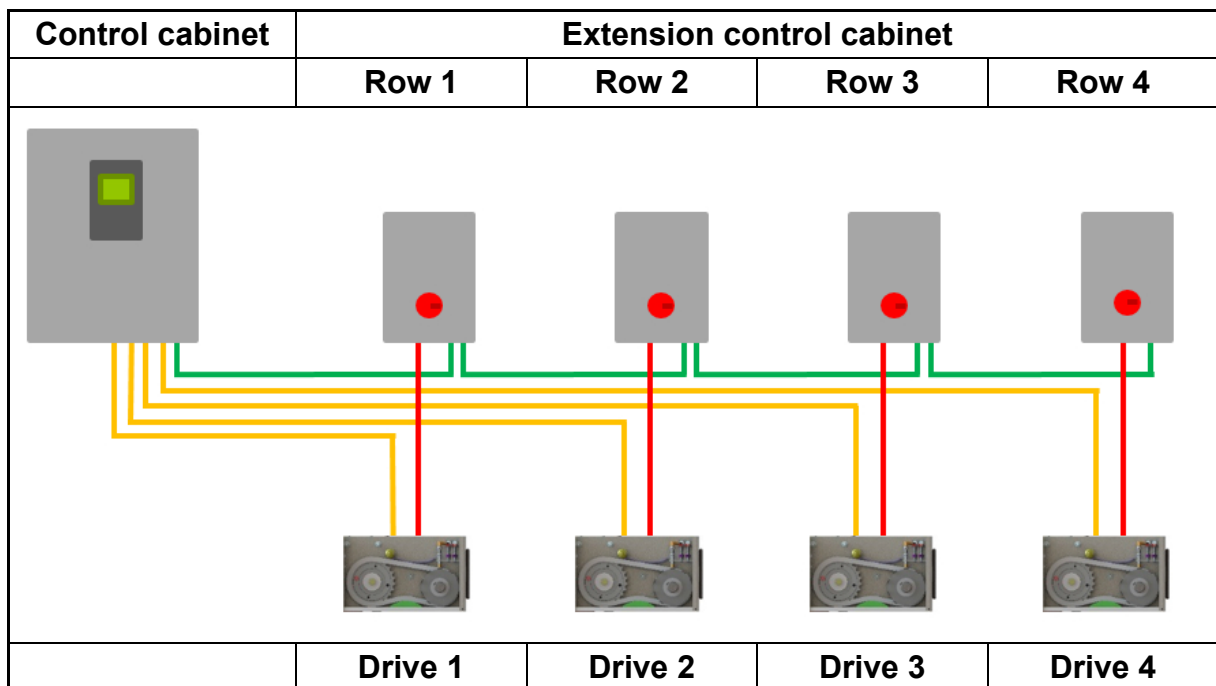
3.3 Control unit

i NOTICE!

The control cabinet comes with a detailed connection diagram!

The control unit consists of a control cabinet and the "extensions for control cabinet".

The control cabinet is installed 1 x per house in the area of the manure belt drive. The extension is installed 1 x per row, directly at the row. The control cabinet with the integrated touch screen starts the system and is used to configure settings.



i NOTICE!

Regarding the setting of the control menu, see chapter 5 "Controller: menus (overview, description and basic settings)".

4 Initial operation

i NOTICE!

Observe chapter 5.6 "Controller: Basic settings for start-up and restart" **before initial operation!** Here you will find the necessary settings of the controller for a correct initial operation or restart of the system!

i NOTICE!

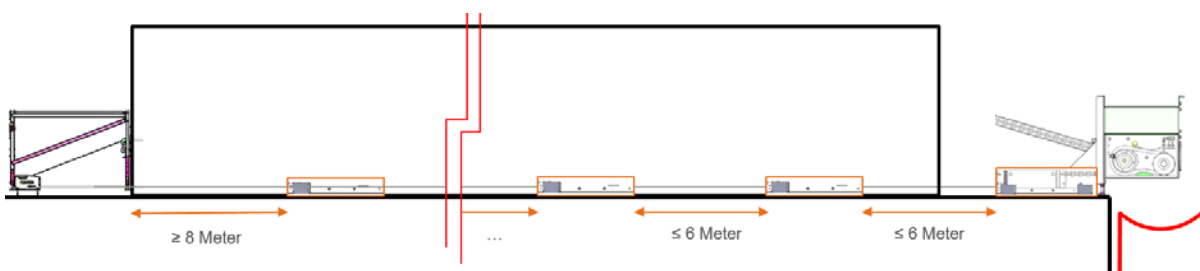
The control cabinet comes with a detailed connection diagram!

Check the following points before electrical commissioning:

1. Are the rotating directions of the motors correct?
2. Is the cross conveyor ready for use?
3. Are the pulse sensors in the drives correctly assigned and ready for use?
4. Are the inductive sensors (limit switches) at the tubes correctly assigned and ready for use?
5. Are the emergency stop buttons connected correctly?

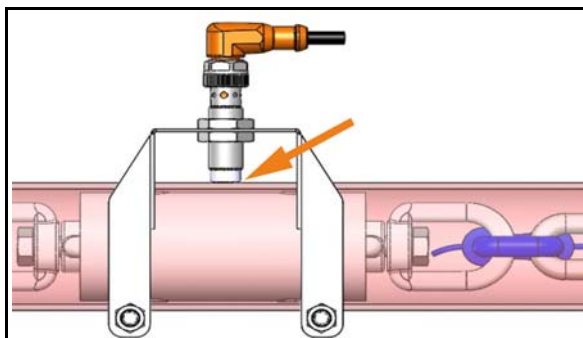
Check the following points before mechanical commissioning:

1. Are the positions of the first and last scraper 100 % correct?
 - **First scraper:** at least 8 m away from the first stillage
 - **Last scraper:** 0-10 cm distance to the dropping edge above the manure cross channel

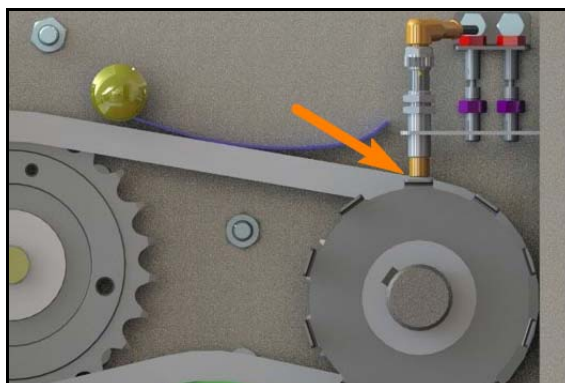


2. Is the way free from obstructions so that the scrapers can move?

- Does the limit switch (sensor at the tube) release when the last scraper is positioned at the dropping edge of the manure cross channel? Observe the LED at the inductive sensor. The sensor must lie directly on the tube.



- Does the sensor release the pulse counting in the drive? Observe the LED at the inductive sensor. The optimal distance between sensor and pulse wheel in the drive is 2 - 4 mm.



- Is the rope and chain tension correct?

An indicator for the rope tension is the chain when the system has completely run under the system.

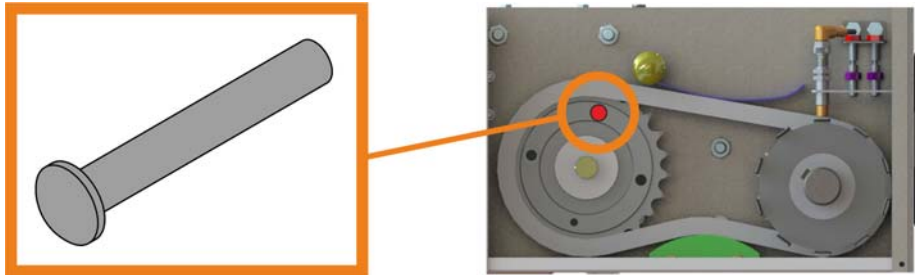
i NOTICE!

Chapter 7.1 "Adjusting the rope tension and chain tension" describes how to adjust the rope and chain tension.

Correct: Chain lies centrally on the floor	
Meaning	Necessary measure:
Optimal tension	None

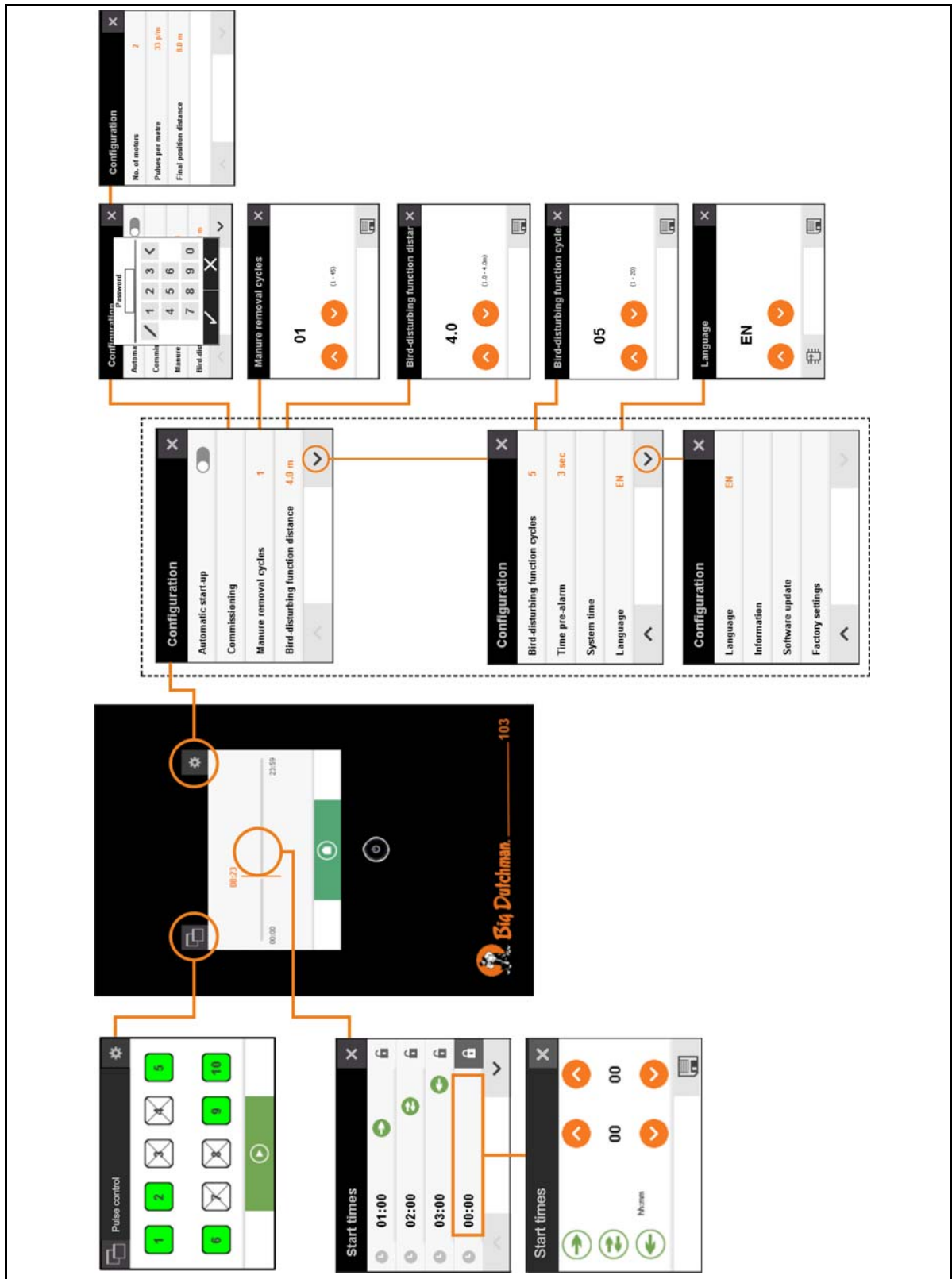
When the basic settings have been entered in the control unit (see chapter 5.6) and everything has been correctly installed and wired, insert the "Safety pin 5x35 steel round head rivet DIN 660" (99-50-3905) as described in chapter 7.3 "Replacing the safety pin in the drive".

Now the test runs of LRS V17 can be started (see chapter 5.6.1).



5 Controller: menus (overview, description and basic settings)

5.1 Menu overview



5.2 Starting LRS V17

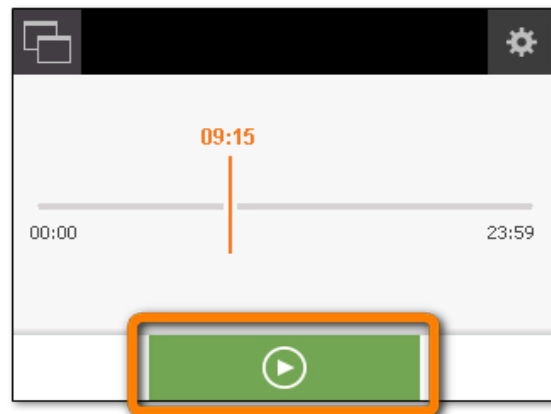
NOTICE!

Before starting the system for the first time after repairs, maintenance or a software update, make sure that all basic settings still exist. If not, configure these settings again.

(See also chapter 5.6 "Controller: Basic settings for start-up and restart" and 5.7 "Software update"!)

Start: Start the litter reduction system manually via the *Start button* on the main screen.

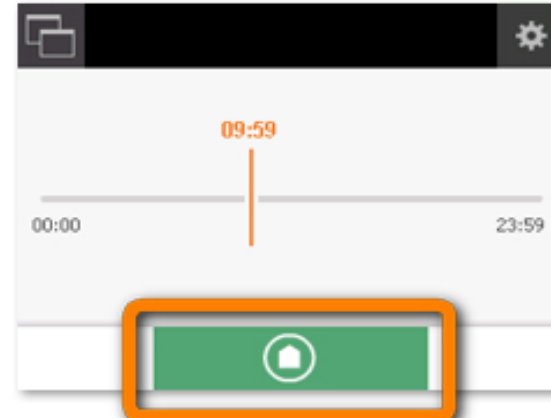
The system runs for the set number of cycles.



(This only applies to software versions up to 1.3.)

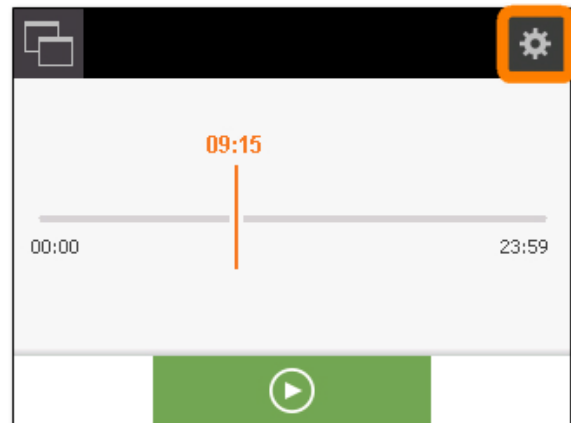
If the scrapers are not in basic position, the *Home button* is displayed instead of the *Start button*.

The scrapers are moved back to the basic position when pressing this button.



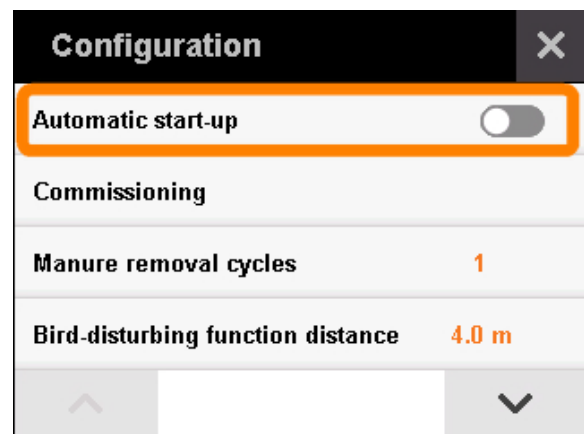
5.3 Menu: Settings

Selecting the menu settings on the main screen:



Automatic start-up:

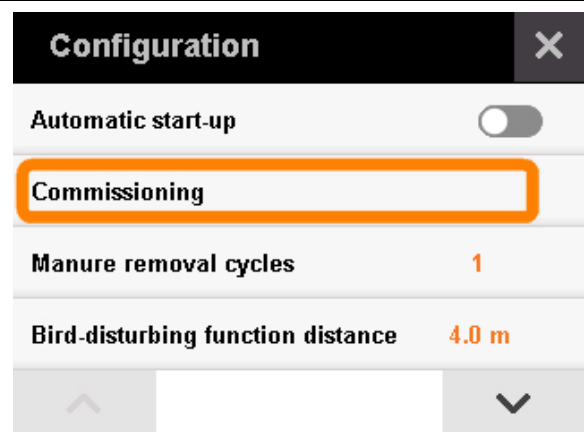
- **Active** = litter reduction starts when the cross manure removal starts
- **Inactive** = litter reduction must be started manually



Commissioning:

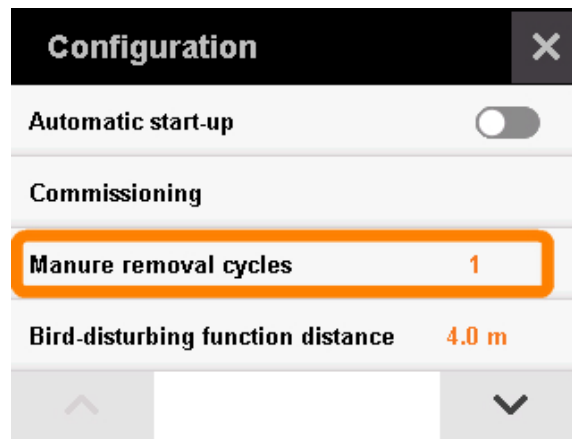
Extra menu for commissioning, password-protected

(see chapter 5.6 "Controller: Basic settings for start-up and restart")



Manure removal cycles:

Frequency with which the scrapers move forward and backward during litter reduction.

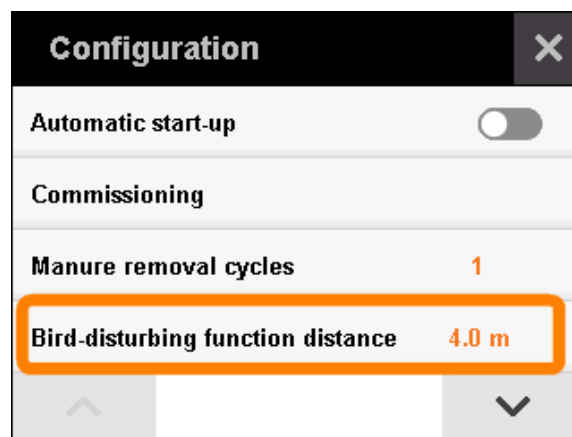
**Bird-disturbing function distance:**

Distance which the scrapers move forward and backward during the *bird - disturbing function*.

The *bird-disturbing function distance* must be smaller than the scraper distance.

Rule of thumb:

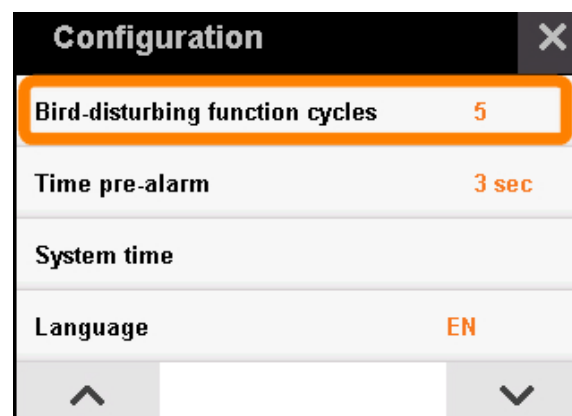
Bird-disturbing function distance = $\frac{1}{2}$ travelling distance of litter reduction.

**Bird-disturbing function cycles:**

Frequency with which the scrapers move forward and backward during the bird-disturbing function.

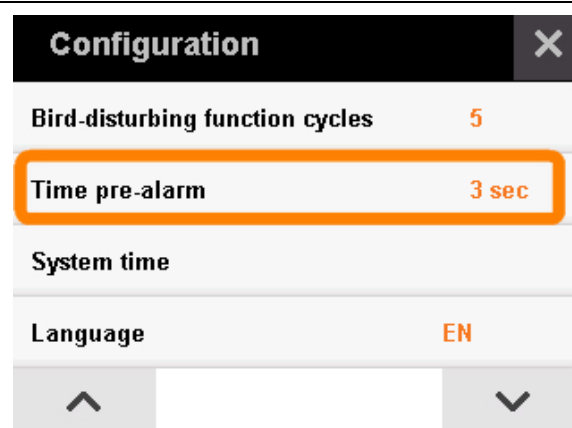
Recommendation:

Bird-disturbing function cycles = 5

**Time pre-alarm:**

The LRS V17 can be coupled with a pre-alarm to alert the birds that the system starts now.

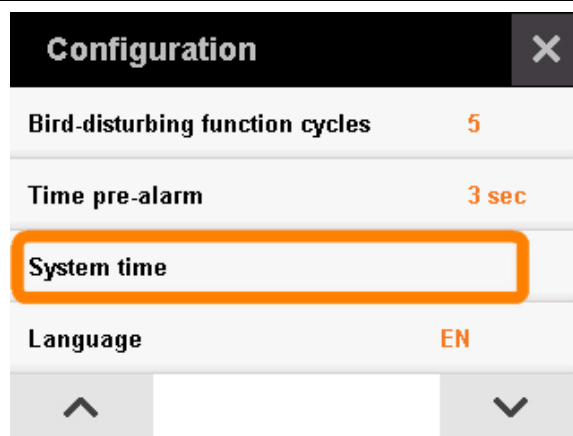
The standard equipment does not comprise an alarm device.



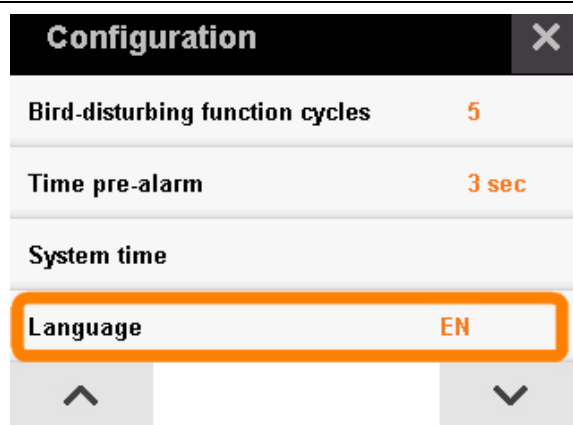
System time:

Set the current time. The *system time* is displayed on the start screen and is required to set the *starting times bird-disturbing function* (chapter 5.5).

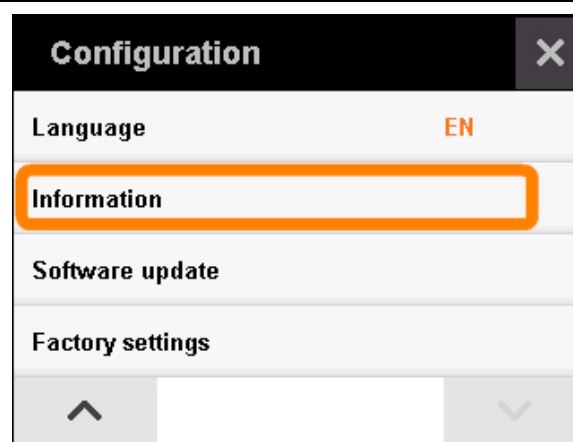
The current system time is also indicated in the timeline on the main screen.

**Language:**

The menu language can be selected here.

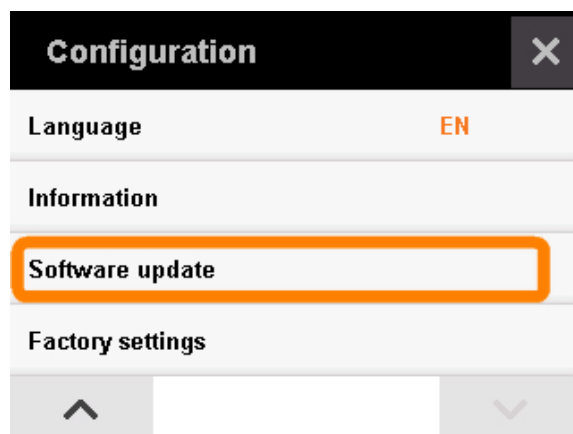
**Information:**

Indicates the installed software version.

**Software update:**

A software update can be started via a connected USB flash drive.

(For loading an update, see chapter 5.7 "Software update")

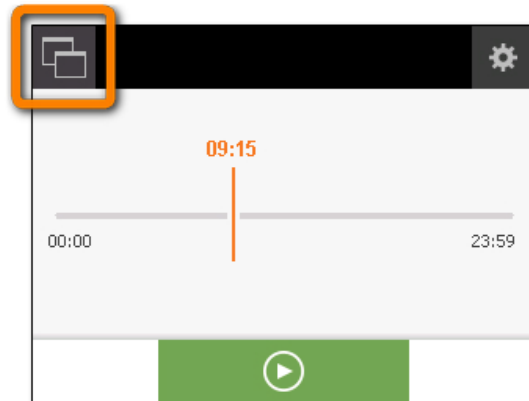


5.4 Menu: Pulse control (activating and deactivating rows)

If several rows in a house are equipped with LRS V17 and the house has a gradient to the outside, it might make sense not to run all rows simultaneously.

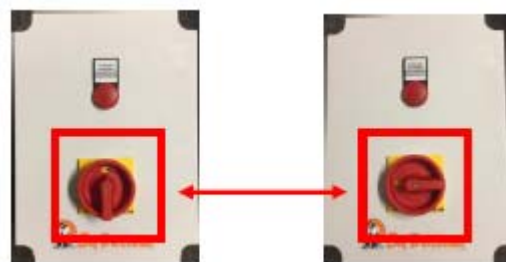
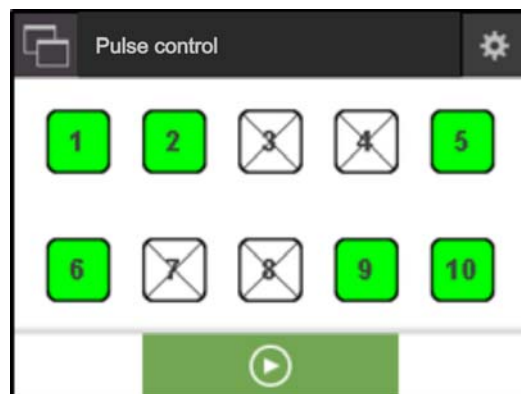
It can happen that too much litter is removed in the centre and too little litter at the sides. Individual rows can be switched off.

Opening the menu pulse control / row selection via the main screen:



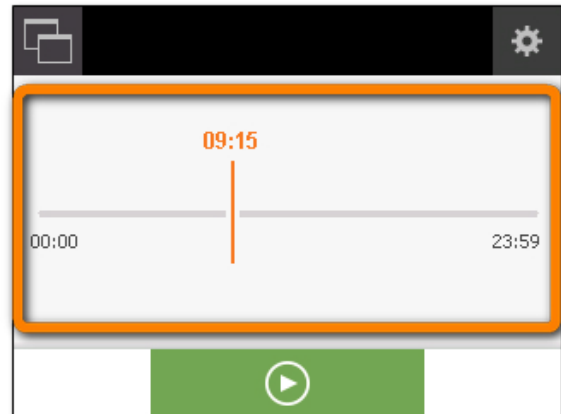
Pulse control / row selection:

1. The pulse control must be deactivated / activated for a row.
 - Highlighted in green = activated
 - Highlighted in white and crossed-out = deactivated
2. The **drive of a deactivated** row must be switched off. Turn the switch at the control cabinet extension that belongs to the row to **"Off"**.



5.5 Menu: Start times for bird-disturbing function

Opening the menu "Start times for bird-disturbing function" via the main screen:

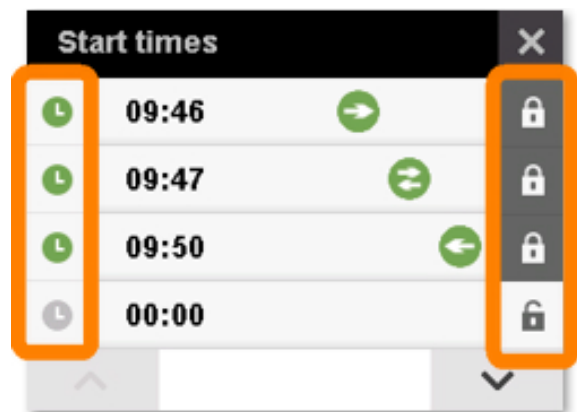


Start times:

Each action of the bird-disturbing function can be controlled via a start time.

If the padlock is **closed**, this times is deactivated and skipped.

If the padlock is **open**, the time is activated and the action is carried out at the set time. Different times can be pre-set and activated or deactivated, if necessary.

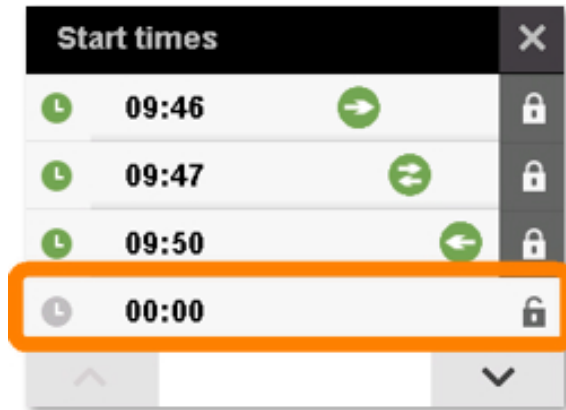


A **grey clock** indicates times which have not yet run.

A **green clock** indicates times which the bird-disturbing function has already completed on that day.

Setting the start time bird-disturbing function:

1. Open an individual start time by touching the corresponding entry.



2. Set the time via the orange arrow buttons [hh:mm].
3. Select the required scraper movement using the green arrow buttons.



(Meaning of green arrow buttons: see below)

Scrapers move from the basic position below the system.



Scrapers move forward and backward according to the set *Bird-disturbing function distance* and *Bird-disturbing function cycles*.

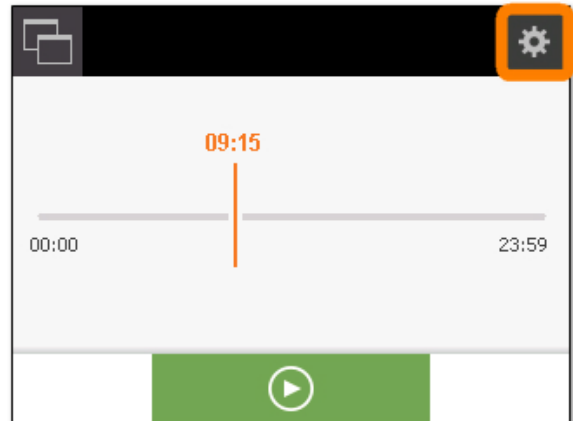


Scrapers move back to the basic position at the drive.

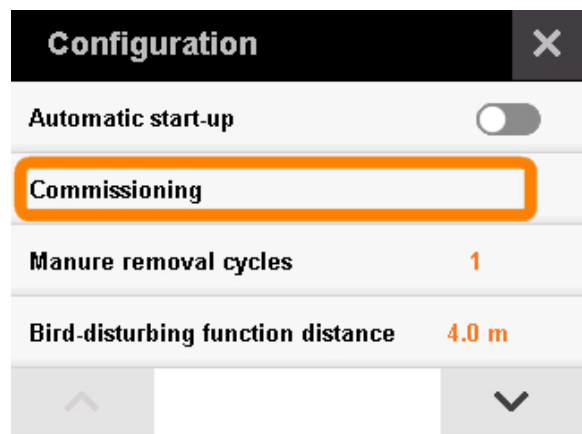


5.6 Controller: Basic settings for start-up and restart

Selecting the menu settings on the main screen:

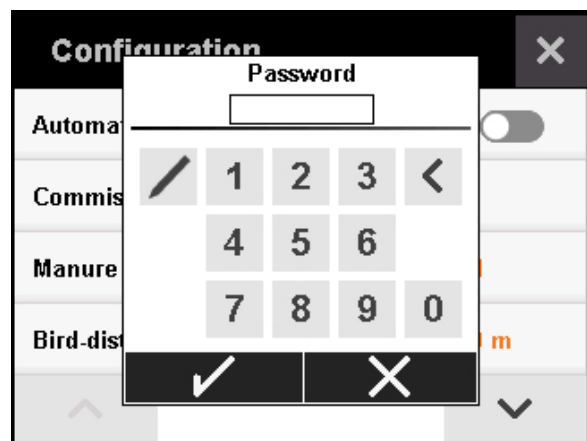


Opening the "Commissioning" menu:



Entering the password:

Password ex works: 0000



Setting the number of motors:

= number of lines LRS V17

Pulse per metre:

Note: This value may only be modified after consulting with **Big Dutchman!**

Final position distance:

The travelling distance of the scrapers depends on the scraper distance.

Rule of thumb: Scraper distance + 2 metres = final position distance

$$6 \text{ metres} + 2 \text{ metres} = 8 \text{ metres}$$

Configuration	
No. of motors	2
Pulses per metre	33 p/m
Final position distance	8.0 m

Opening the menu "Manure removal cycles":

Configuration	
Automatic start-up	<input type="checkbox"/>
Commissioning	
Manure removal cycles	1
Bird-disturbing function distance	4.0 m

Set the number of cycles (orange arrow buttons) and save it with the disk icon in the lower right corner.

Initial operation = 1

(then start test runs as described in chapter 5.6.1).

Re-starting = enter old value.

Manure removal cycles	
01	
↑	↓ (1 - 45)
<input type="button" value="Save"/>	

NOTICE!

For carrying out the test runs during initial operation, please see chapter 5.6.1 "Performing test runs for initial operation"!

Bird-disturbing function distance:

Distance which the scrapers move forward and backward during the *bird - disturbing function*.

The *bird-disturbing function distance* must be smaller than the scraper distance.

Rule of thumb:

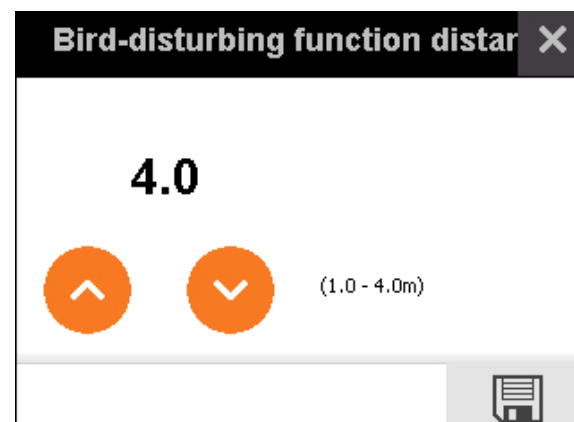
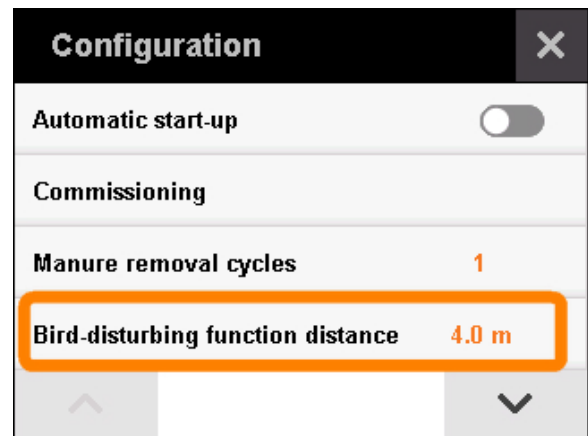
Bird-disturbing function distance = $\frac{1}{2}$ travelling distance of litter reduction.

Example:

Final position distance = 8 metres
(6 metres scraper distance + 2 metres)

$$8 \times \frac{1}{2} = 4$$

Bird-disturbing function distance = 4 metres

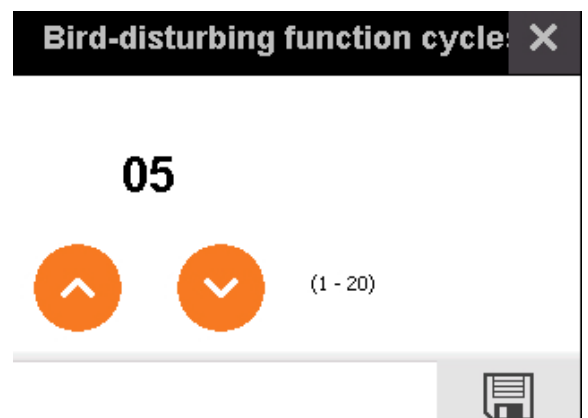
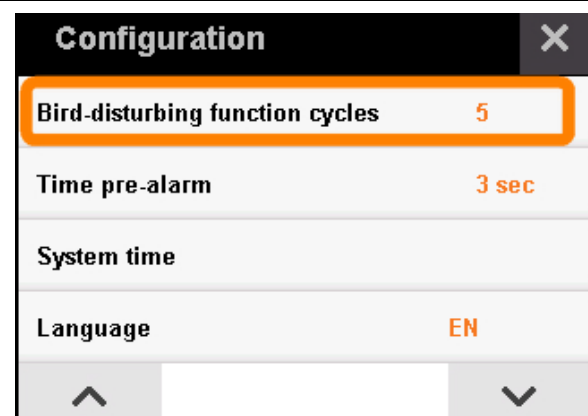
**Bird-disturbing function cycles:**

Frequency with which the scrapers move forward and backward during the bird-disturbing function.

Recommendation:

Bird-disturbing function cycles = 5

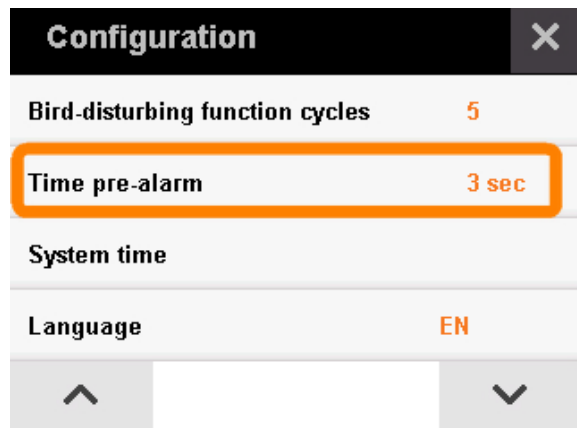
The number of cycles can be adapted to the respective requirements with the orange arrow buttons.



Time pre-alarm:

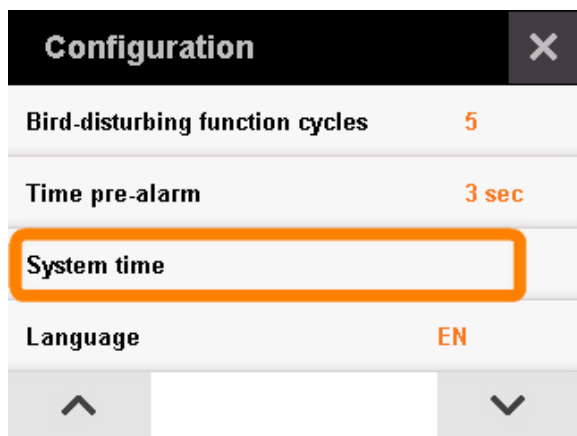
The LRS V17 can be coupled with a pre-alarm to alert the birds that the system starts now.

The standard equipment does not comprise an alarm device.

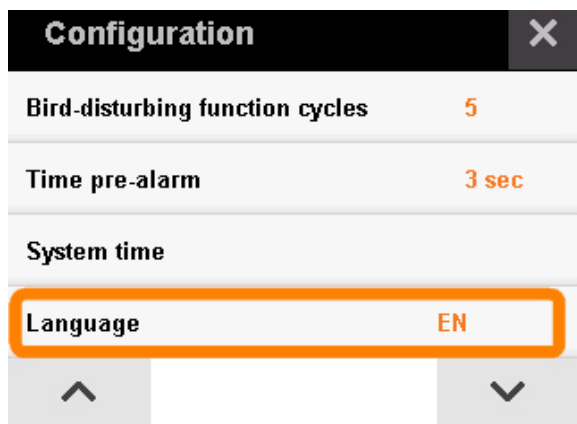
**System time:**

Set the current time. The *system time* is displayed on the start screen and is required to set the *starting times bird-disturbing function* (chapter 5.5).

The current system time is also indicated in the timeline on the main screen.

**Language:**

The menu language can be selected here.



The required language can be set with the orange arrow buttons.

The following languages are available:

- German (standard)
- English
- French (optional: must be installed via USB flash drive!)



i NOTICE!

For activating or deactivating the **Pulse control** for single rows: see chapter 5.4 "Menu: Pulse control (activating and deactivating rows)".

For entering **times for bird-disturbing function**: see chapter 5.5 "Menu: Start times for bird-disturbing function".

5.6.1 Performing test runs for initial operation

1. For the first test run of the initial operation, set the value **1** under *Manure removal cycles*.
2. If the first test run has been carried out without problems, set **5** for the second test run.
3. If the second test run is carried out without any problems, enter the number of cycles of the actual row length in the house. The number of cycles to be set is calculated as described below.

Example:

- Row length = 72 metres
- Scraper distance = 6 metres
- Number of scrapers = 12

Calculation according to the row length:

Row length [m] : scraper distance [m] + 2 cycles (safety) = number of cycles

$$(72 / 6) + 2 = 14 \text{ cycles}$$

Calculation according to the number of scrapers:

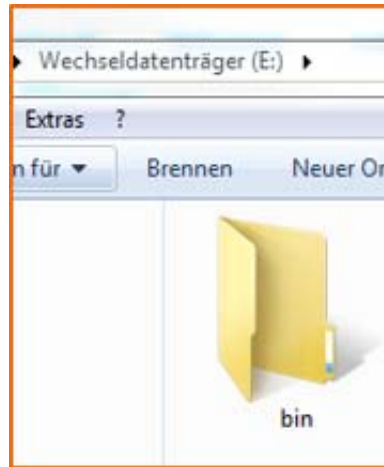
Number of scrapers + 2 cycles (safety) = number of cycles

$$12 + 2 = 14 \text{ cycles}$$

5.7 Software update

Software update with USB flash drive (from version 1.1):

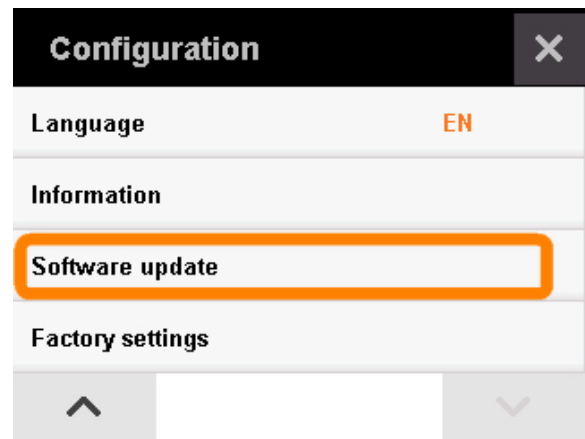
1. Save new software on an USB flash drive in the folder "bin".



2. Insert the USB flash drive into the USB slot of the Nano 103 controller.
(inside the control cabinet)



3. In the settings menu, select *Software update* and confirm.



4. Select the software from the list (A) and load it (B).
5. Restart the system (C).
6. After restarting, switch off the control cabinet and switch it on again.
7. Check in the settings menu under "Info" whether the new software has been installed.
8. **Note: In case of an update of software version 1.2 or older, the values entered under settings must be entered again.**



6 Important notes for operation

6.1 Intended purpose and prerequisites

NOTICE!

The litter reduction system is exclusively intended for litter reduction below an egg production. It only removes a narrow strip of litter.

It is not possible to remove manure in the entire house independently with the litter reduction system!

NOTICE!

Floor eggs cannot be prevented with the LRS V17! An optimal flock management on site can solve this problem.

- LRS V17 can only be used in combination with a manure cross channel or a floor conveyor!
- The "drive litter reduction system" must be mounted flush below the manure belt drive. Pay attention to the right and left type.

6.2 Maximum operating time of the litter reduction system

NOTICE!

The litter reduction system may move **45 cycles maximally at a stretch**. More cycles can overload the drive.

6.3 Litter

A litter layer of 3-5 cm is considered sufficient. The birds have enough litter for occupation. However, the litter layer is not yet so high that the hens build nests in the litter.

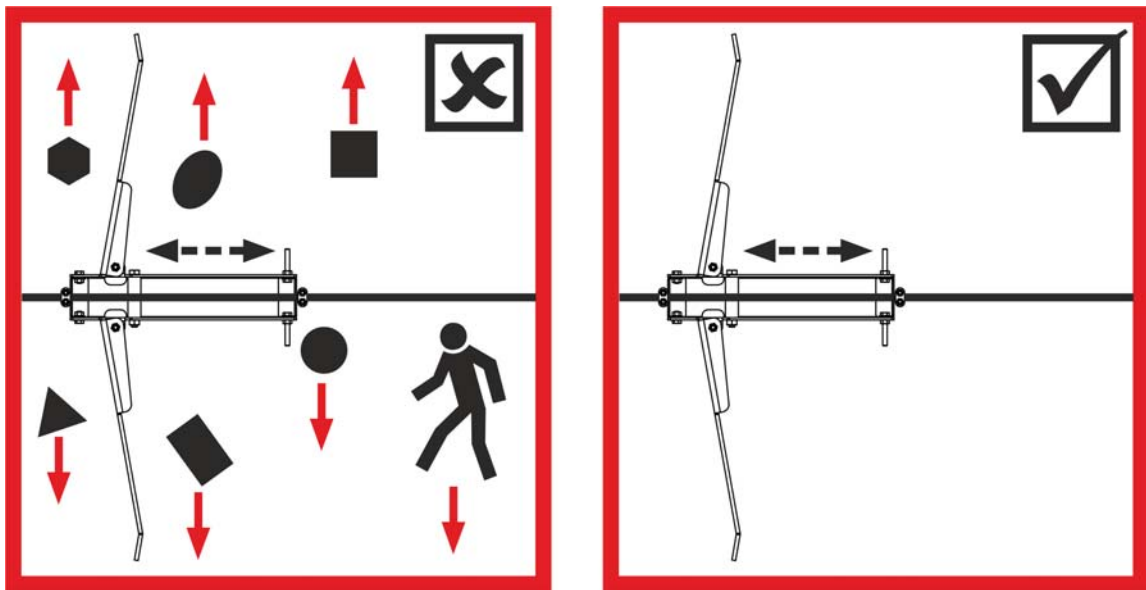
The market-specific guidelines and regulations concerning the litter height must be observed in any case.

6.4 Frequency of use

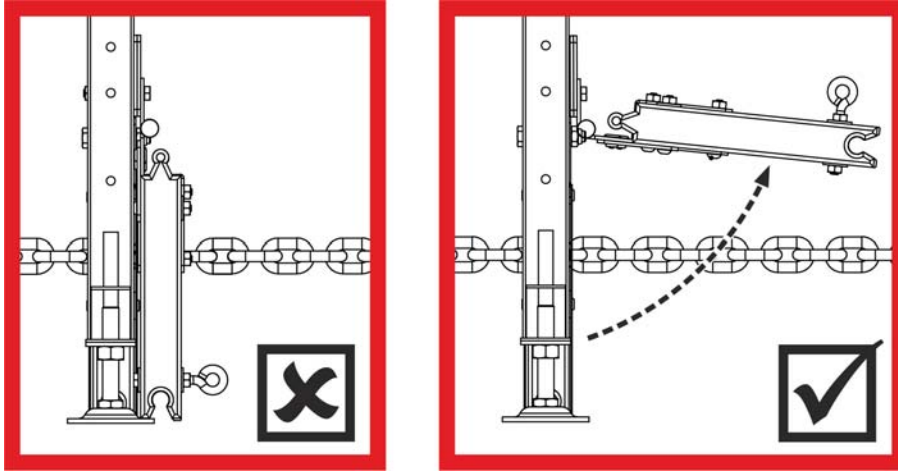
LRS V17 must be started least once per week. Possibly more often (up to 1 x per day) if the litter accumulates rapidly or forms lumps and gets sticky.

6.5 Remove obstacles from the travelling distance before starting the system

1. Obstacles as e.g. discs for pecking or dead birds must not obstruct the travelling distance of LRS V17!
 - Remove all obstacles before starting the system.
2. The system may only be started when there are no persons in the direct vicinity of the system!
 - Instruct people to leave the danger area.



3. All partitions of the system must be passable.
- If additional flaps were installed in front of the curtain strips of the cross partitions, these have to be opened.



7 Maintenance

NOTICE!

Observe any error messages of the controller. These are described in chapter 9 "Troubleshooting"!

Checks before each start

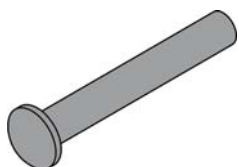
1. Are there any obstacles or persons blocking the travelling distance of the litter scrapers?
 - Remove obstacles as e.g. discs for pecking or dead birds. Scrapers stuck in hardened manure (plates of manure) can block the LRS. Remove these plates of manure.
 - Instruct people to leave the danger area.

Checks at each start

1. Is the tension of the rope / chain correct?
 - If the tension is not okay, this must be corrected as soon as possible. Re-tension at the idler unit or directly in the circuit (see chapter 7.1 "Adjusting the rope tension and chain tension")
2. Do all switched-on lines move?
 - If not, check whether a safety pin in the drive is broken. A broken safety pin must be removed and replaced by a new original safety pin.

Before re-starting the system after a pin replacement, eliminate any cause for the breaking.

(Refer to chapter 7.3 "Replacing the safety pin in the drive" for how to mount the safety pin.)



99-50-3905 Safety pin 5 x 35 steel round head rivet DIN 660

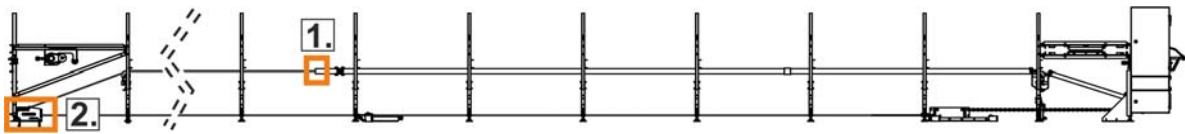
Checks during operation

1. Are there any deviations in the **travelling distance of the litter scraper**?
 - If, for example, the travelling distance of the scrapers is not 8 m but less or more, these deviations must be eliminated as soon as possible.

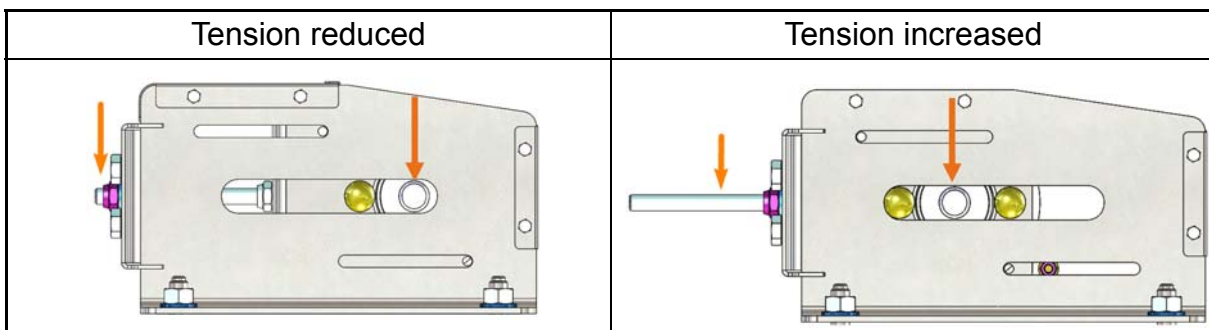
If there is a risk of damage due to the deviation, the system must not be used until the error has been eliminated.

7.1 Adjusting the rope tension and chain tension

The rope tension can be corrected:



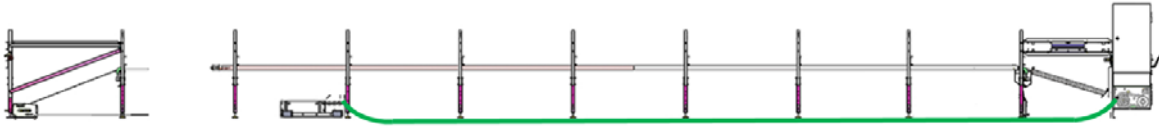
1. The rope is **excessively** long or short.
 - Shorten or lengthen the rope at the connection point of wire rope and chain.
2. The rope is **slightly** too long or too short.
 - Increase or reduce the rope tension in the end set of the idler pulley.



An indicator for the rope tension is the chain when the system has completely run under the system.

Correct: Chain lies centrally on the floor	
Meaning	Necessary measure:
Optimal tension	None

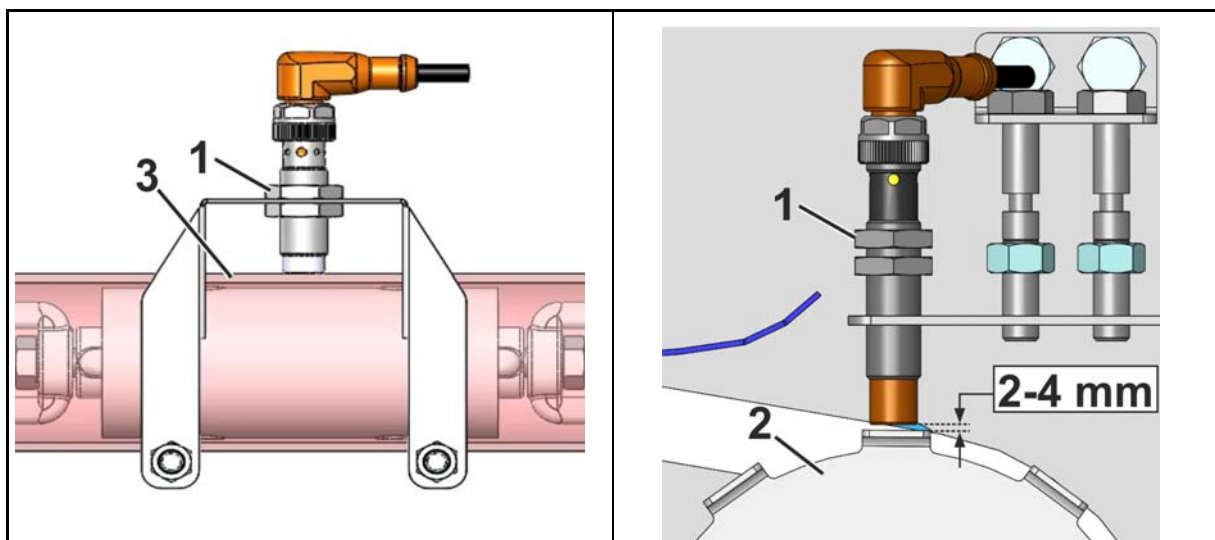
Wrong: Chain does not sag	
Meaning:	Necessary measure:
Wire rope tensioned too strongly	Lengthen the rope or reduce the tension at the idler pulley

Wrong: Chain touches the ground shortly behind the drive and scraper	
Meaning:	Necessary measure:
Wire rope tensioned too loosely	Shorten the wire rope or increase the tension at the idler pulley
	

7.2 Adjust sensor

The height of the sensors can be adjusted by loosening the screw connection (1).

- Distance between sensor and tube (3): **Sensor lies on the tube**
- Distance between sensor and pulse wheel (2) in the drive unit: **2-4 mm**



7.3 Replacing the safety pin in the drive

CAUTION!

Before inserting the safety pin, disconnect the power supply of the respective drive!

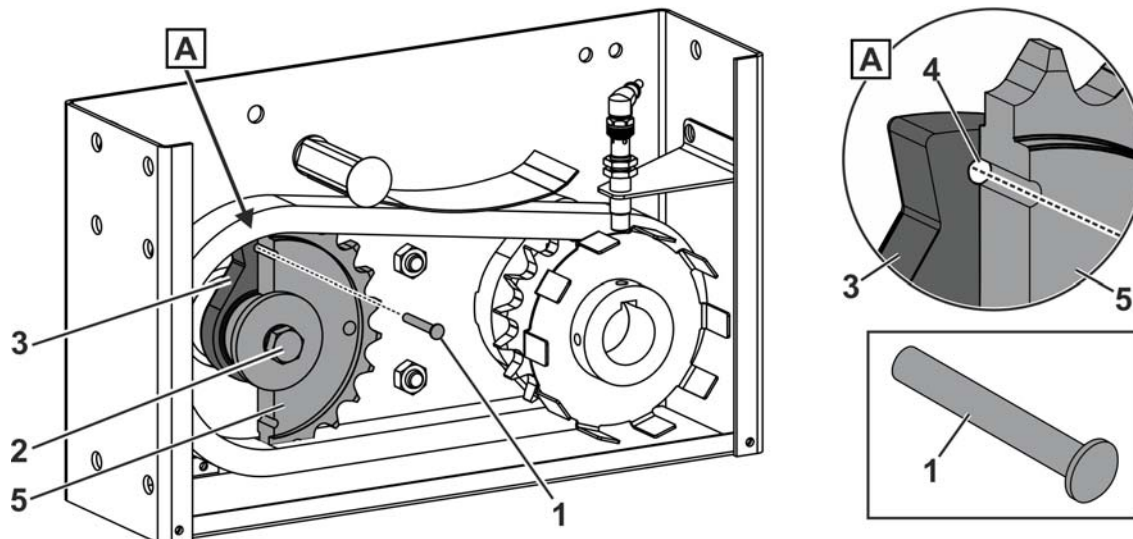
NOTICE!

An incorrectly installed safety pin can cause errors in the control unit, increased wear and premature failure!

Make sure that the safety pin is inserted correctly **into** the **5 mm** drill hole of the pusher and chain wheel.

- ▶ If the safety pin is not in the drill hole but next to the pusher, this will lead to a 270° idler turn when the direction is changed.
- ▶ If the safety pin is in the 8 mm drill holes of the pusher and chain wheel, this will lead to excessive strain or even breaking.

1. Use the central screw (2) to move the pusher (3) clockwise until the 5 mm drill holes (4) in the pusher and chain wheel (5) are directly on top of one another.
2. Push the safety pin (1) **fully** into the 5 mm drill holes.



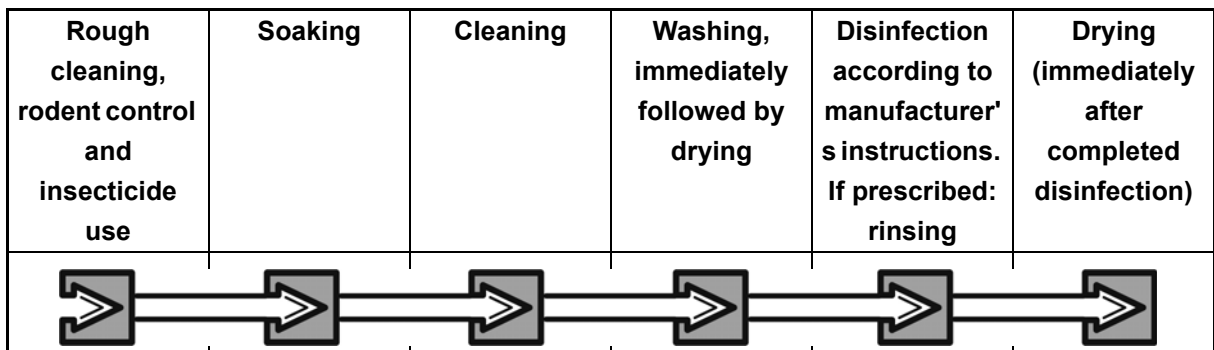
Pos.	Code no.	Description
1	99-50-3905	Safety pin 5 x 35 steel round head rivet DIN 660
2		Central screw for pusher
3		Pusher
4		5 mm drill hole in pusher and in chain wheel
5		Chain wheel

8 Cleaning and disinfection

- Shut off the power when cleaning live parts!
- Protect moisture-sensitive parts such as control cabinets and motors from splash water during wet cleaning by covering them!
- Water in combination with dust and feed remains can lead to slippery floors!
- Cleaning agents and disinfectants can cause corrosion! Observe the manufacturer's instructions!

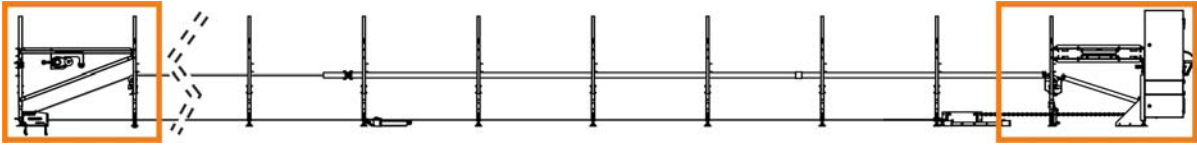
i NOTICE!

If you use thermal disinfection, ensure that the temperature does not exceed 60°C. Temperatures above 60°C can damage the equipment in the house. **Specifically, plastics may deform.**



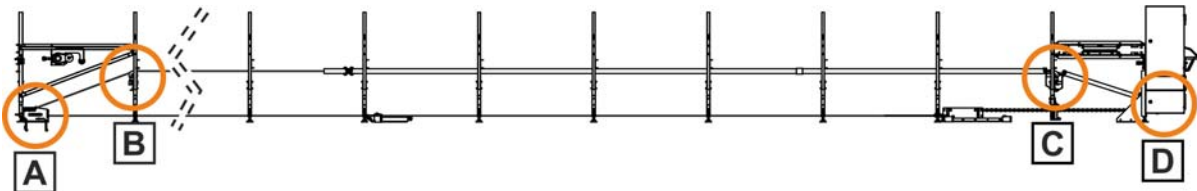
8.1 Cleaning intervals of LRS V17

- **1 x per week:**
 - Clean the end set areas with a broom, especially the floor under the end sets!



- Remove the dust from the inductive sensors in the drives and at the tubes!
- **At least 1 x per month:**

Clean the rope idler pulley (A), rope support (B), chain support (C) and drive (D) with a broom!



8.2 General notes for cleaning

Different cleaning and disinfection measures can guarantee ideal hygiene on a farm.

All measures have the following goals:

1. Reduce or eliminate contamination.
2. Prevent disease.
3. Create ideal conditions for high animal performance.

Since circumstances differ from farm to farm, **Big Dutchman** recommends the following measures to guarantee farm hygiene:

- All vehicles should be disinfected before entering the farm. Install sprinkler hoses and wheel baths for the tyres at a place outside the farm!
- The farm should be fenced in! Only open the gate when required!
- There should be no rodents on the farm! Draw up a plan for elimination and ensure that this plan is observed!
- Eliminate weed on the farm premises!
- No feed should left be open anywhere on the farm! Store feed in a dry place to which the animals have no access!

- The service room of every house should be equipped with hand sanitizer and disinfectant mats!
- All hygiene requirements should be complied with not only during the batch, but also during the entire service period!
- Keep the number of unnecessary visitors to the farm as low as possible. Upon entering the farm / the buildings, all visitors should put on protective clothing and write down their name in the visitors' log!

The farm should be equipped with a showering facility to change clothes and to prevent the introduction of germs!

8.3 Information regarding silicon dioxide for mite control

We would like to explain this topic briefly in order to avoid damage to the drive units caused by the incorrect application of silicon dioxide in the future.

In poultry houses, amorphous silicon dioxide is used as a biocide to eliminate harmful insects, such as red mites. It is also distributed under the trade name M-Ex Profi 80.

How it works: Silicon dioxide destroys the wax layer which surrounds the mites. The mites then dry out. The white powder is dissolved in water at a ratio of 1:6 to create a suspension that can easily be sprayed onto surfaces and equipment in the house using standard spraying technology.

The agent is easy to use, very effective and relatively inexpensive. Practical use has shown that the rough surface of the applied suspension causes extreme wear and tear on moving parts made of plastic or metal, however. Lubricants such as oils and greases are destroyed by silicon dioxide.

9 Troubleshooting

Errors of LRS V17 are indicated by text messages on the touch display of the controller. Their meaning and remedy are explained in more detail below.

NOTICE!

The error messages **from** software version 1.4 are explained below!

9.1 Warning message

Message	Description	Cause	Remedy
Cross manure removal not activated!	LRS V17 can only be started when the cross manure removal was started.	The cross manure removal has not started.	Start the cross manure removal. If the function "Automatic start-up" is activated, the system starts automatically. If the function "Automatic start-up" is not activated, the system must be started manually via the start button on the main screen.

9.2 Alarm messages

Message	Description	Cause	Remedy	Remarks
Basic position + row number	The limit switch has been actuated too early . (more than 7 pulses earlier than configured)	The limit switch has been actuated by a foreign object.	Mount the scraper extension to keep the limit switch area free from litter at all times.	<i>Only applies to mechanical limit switches.</i>
		The inductive sensor (limit switch) is defective or the cable is broken.	Replace the inductive sensor.	<i>Only applies to inductive limit switches.</i>
		The inductive sensor (limit switch) has been actuated by a stainless steel traction rope.	Check the rope tension. Check the position of the inductive sensor (limit switch) at the tube.	
	The limit switch has not been actuated . (more than 7 pulses later than configured)	The limit switch lever is deformed and cannot be hit.	Check mounting of the limit switch and correct it.	<i>Only applies to mechanical limit switches.</i>
		The chain slips on the chain wheel.	Replace the chain wheel. Check the chain/chain tension	
		The "stop for sensor" is no longer attached to the chain and lies in a wrong position in the tube.	Replace the stop	<i>Only applies to inductive limit switches.</i>
		The inductive sensor is placed too far from the "stop for sensor".	Correct the distance between sensor and stop. (optimally 2 to 4 mm)	

Message	Description	Cause	Remedy	Remarks
Basic position	<p>The parking position is not reached when moving to the basic position.</p> <p>(The pulses are not checked / considered during the trip to the basic position).</p>	<p>A safety pin is broken:</p> <p><i>See also alarm message ""missing pulses drive"</i></p>	<ol style="list-style-type: none"> 1. Remove any foreign objects in the area of the scraper, check rope tension, remove litter overload. 2. Replace the safety pin 	<p><i>The error can ONLY be displayed WHEN THE SYSTEM IS STARTED.</i></p> <p><i>The software checks whether the limit switch has been actuated when there is no pulse.</i></p>

Message	Description	Cause	Remedy	Remarks
Missing pulse drive + row no.	The control unit BD 103 does not receive any pulse counts although voltage is supplied to the drive. (Control time forward 1 sec. and backward 3 sec.)	A safety pin is broken: - excessive load on the system (e.g. too much litter).	1. Clear the scraper's travelling distance. 2. Replace safety pin	
		A safety pin is broken: - The rope is caught somewhere in the system.	1. Eliminate the cause of the problem (e.g. rope tension too low) 2. Replace safety pin	
		A safety pin is broken: - One or several scrapers have hit an obstacle (e.g. plates of manure or scraper stuck in manure).	1. Remove the plates of manure. 2. Replace safety pin	
		A safety pin is broken: - A foreign object in the tube of the returning chain or tube connection has become loose.	1. Remove the foreign object or reconnect the tube. 2. Replace safety pin	
		The pulse sensor is defective. - The LED bulb of the sensor stops flashing if it comes into contact with metal parts.	Replace the pulse sensor.	

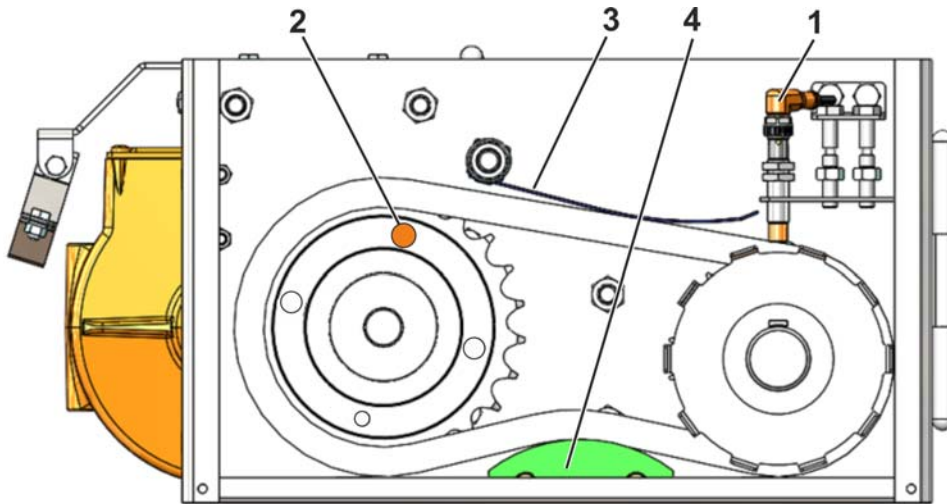
Message	Description	Cause	Remedy	Remarks
Missing pulse drive + row no. <i>(Continue)</i>		Drive chain (in the drive) is torn.	Replace the chain.	
		The protective motor switch has triggered (a red alarm lamp is visible at the extension control cabinet).	Check the cause and remedy it. (e.g. motor defective, protective motor switch incorrectly set or permanent operation (> 50 min)).	
		The motor is defective.	Replace the motor.	
		Cable break: - No voltage at the pulse sensor.	Replace the cable or pulse sensor.	
		The pulse sensor is too far away from the counter wheel.	Adjust the pulse sensor (ideal: 2 to 4 mm above the counter wheel).	
		The contactor 3Q2 or 3Q3 of an extension cabinet is defective: - Dusty contacts.	Replace the contactor or clean it with compressed air.	
		One of the extension cabinets is deactivated, but the affected row is still activated in the BD103 control unit.	Deactivate the row in BD103 or activate the extension cabinet.	

Message	Description	Cause	Remedy	Remarks
Pulse counting not activated	The system starts but no pulse count is transferred to the BD103 control unit.	All rows in the BD103 control unit are de-selected.	Activate the rows in the BD103 control unit.	

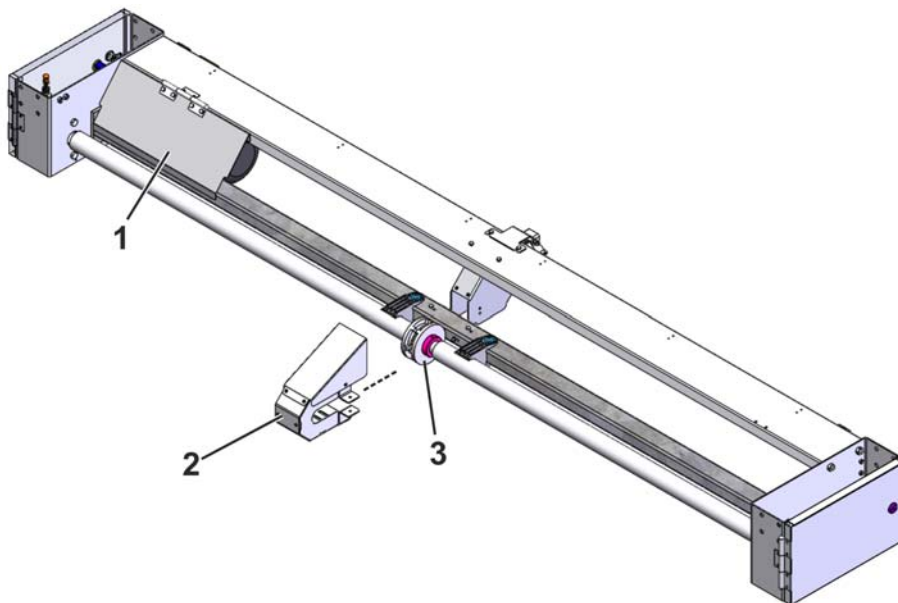
Message	Description	Cause	Remedy	Remarks
Deactivated pulse counting + row no.		All extension cabinets are activated, however, one or several rows in the BD103 control unit is/are deactivated.	Re-activate a deactivated row in the BD103 control unit or switch off the extension cabinet.	Note: <i>In this case, the pulse count of the affected row is no longer controlled / considered.</i>
		A deactivated row is activated during operation.	Re-start the system manually with activated pulse counting.	

10 Spare parts

10.1 Drive units

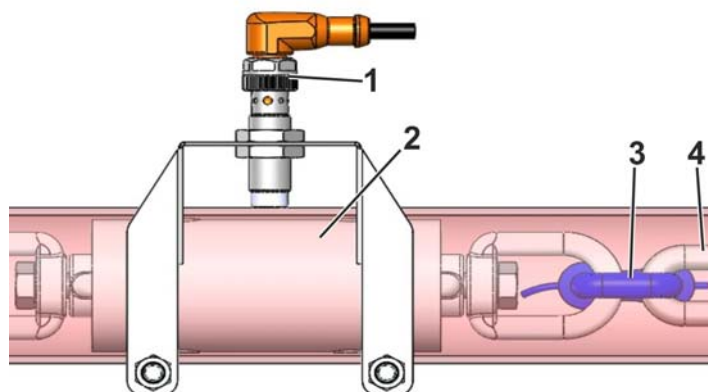


Pos.	Code no.	Description
1	91-04-0050	Sensor inductive 10-30V IFC246 including cable boxes
2	99-50-3905	Safety pin 5 x 35 steel round head rivet DIN 660
3	38-94-3200	Tightener for chain 55/160 for repair
4	83-17-1459	Chain tensioner for litter reduction system



Pos.	Code no.	Description
1	83-18-2255	Motor covering cpl. litter reduction
2	83-16-5033	Chain guard tilted cpl. for litter reduction system
3	83-16-3840	Drive wheel for chain drive litter reduction system

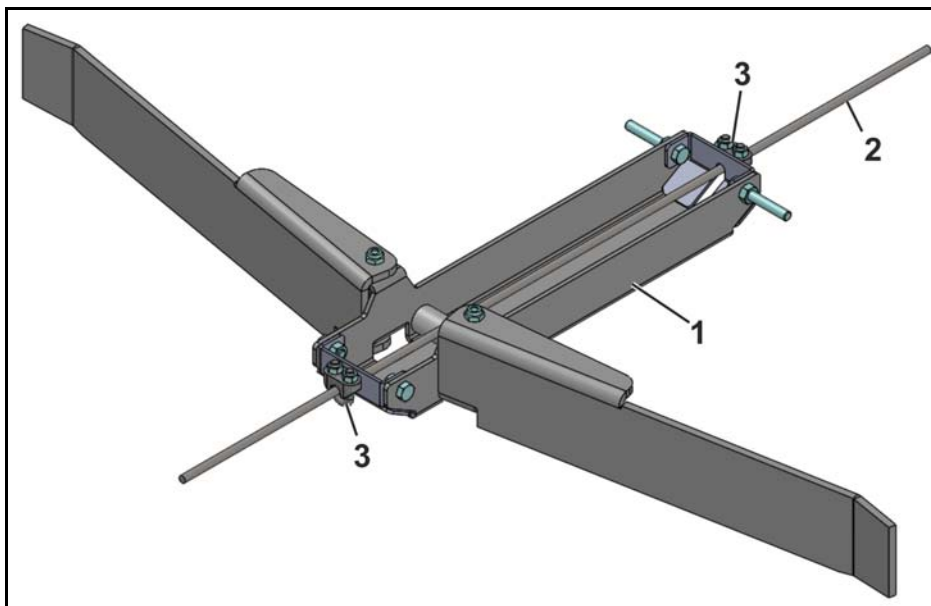
10.2 Stop, chain and sensor



Pos.	Code no.	Description
1	60-62-0431	Sensor inductive XS2 NC incl. plug XZ - prewired
2	83-50-7592	Stop for inductive sensor for LRS - supplement
3	99-50-0018	Chain link for ship chain 8 x 24 galvanized acc. to DIN 766
4	83-10-6676	Ship chain 8 x 24 galvanized acc. to DIN 766

10.3 Litter scraper

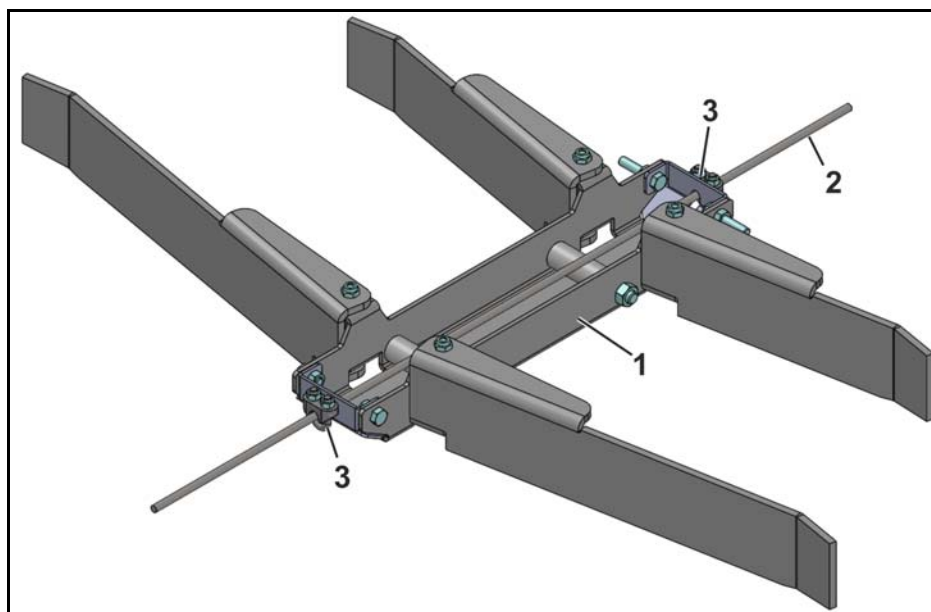
Litter scraper single-wing:



Pos.	Qty.	Code no.	Description
	1	35-00-2202	Litter scraper BD V17 per line up to 60m (single-blade)
1	1	83-17-5985	Litter scraper single-blade cpl 700mm BD V17
2	12.06 m	99-50-1047	Wire rope 5mm 7x19 SST1.4301 flexible f/drinker/feeding line
3	2	99-50-0509	Cable clamp reinforced 5mm 3/16" SST

Pos.	Qty.	Code no.	Description
	1	35-00-2203	Litter scraper BD V17 extension per line up to 100m (single-blade)
1	1	83-17-5987	Litter scraper single-blade cpl 900mm BD V17
2	12.06 m	99-50-1047	Wire rope 5mm 7x19 SST1.4301 flexible f/drinker/feeding line
3	2	99-50-0509	Cable clamp reinforced 5mm 3/16" SST

Pos.	Qty.	Code no.	Description
	1	35-00-2204	Litter scraper BD V17 extension p/line up to 145m (single-blade)
1	1	83-17-5986	Litter scraper single-blade cpl 1100mm BD V17
2	12.06 m	99-50-1047	Wire rope 5mm 7x19 SST1.4301 flexible f/drinker/feeding line
3	2	99-50-0509	Cable clamp reinforced 5mm 3/16" SST

Litter scraper double-wing:

Pos.	Qty.	Code no.	Description
	1	35-00-2205	Litter scraper BD V17 per line up to 60m (double-blade)
1	1	83-18-9805	Litter scraper double-wing cpl 500/700mm BD V17
2	12.06 m	99-50-1047	Wire rope 5mm 7x19 SST1.4301 flexible f/drinker/feeding line
3	2	99-50-0509	Cable clamp reinforced 5mm 3/16" SST

Pos.	Qty.	Code no.	Description
	1	35-00-2206	Litter scraper BD V17 extension per line up to 100m (double-blade)
1	1	83-18-9827	Litter scraper double-wing cpl 700/900mm BD V17
2	12.06 m	99-50-1047	Wire rope 5mm 7x19 SST1.4301 flexible f/drinker/feeding line
3	2	99-50-0509	Cable clamp reinforced 5mm 3/16" SST

Pos.	Qty.	Code no.	Description
	1	35-00-2207	Litter scraper BD V17 extension per line up to 145m (double-blade)
1	1	83-18-9830	Litter scraper double-wing cpl 900/1100mm BD V17
2	12.06 m	99-50-1047	Wire rope 5mm 7x19 SST1.4301 flexible f/drinker/feeding line
3	2	99-50-0509	Cable clamp reinforced 5mm 3/16" SST