Operating and Maintenance Instructions

Small Group Housing (EV-EU & KV)

Code No. 99-97-0101

Edition: 11/2011 GB

Overview of changes / updates in the manual

Name of chapter	Type of change / update	No. of BD product infor-mation	Revision date	Page
2.7 "Manure removal"	Operation / handling of manure belts changed		12/2010	38
3.4 "Manure removal"	Maintenance / repair of manure belts changed		12/2010	64
3.1.7 "Tensioning the feed chain"	Chapter for tensioning the feed chain changed		12/2010	47
3.1.9 "Welding the conveying auger"	Chapter added regarding the welding of the conveying auger		11/2011	51
2.4.3 "At the end of the laying period"	Notes added regarding the adjustment of the shutter for litter supply		11/2011	28

Product information

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No. 1554 October 1, 2014

Silicon dioxide for combating mites

Attention: not in the area of the drive!

In order to prevent damages at the drives because of the incorrect use of silicon dioxide in future, we would like to explain this subject briefly:

Amorphous silicon dioxide is a biocide for combating insect pests like e.g. red mites in poultry management. It is also distributed under the trade name **M-Ex Profi 80**.

Mode of action: Silicon dioxide destroys the layer of wax which surrounds the mites. Thus, the mites dry out.

This white powdery substance is mixed to a suspension with 1:6 water and can be sprayed easily onto the house area and equipment by means of conventional air brush technique.

The substance is easy to apply, very effective and relatively reasonable.

However, practice shows that the rough surface of the applied suspension causes extreme wear of moving parts made of plastic and metal. Lubricants like oils and fats are destroyed by silicon dioxide.

Therefore, our **urgent advice**:

	Silicon dioxide must **not** be applied **in the area of drives** (on bearings, chain drives and gears). Therefore, cover the respective areas of the drives during the spraying with silicon dioxide.

Please make sure to circulate this information if you are talking to a customer and find out that it is about hygiene and combating mites and that silicon dioxide is used. Thus, you can preventively spare the customer trouble and costs.

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Product Quality & Specification

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No. 1552 October 1, 2014

Idler roller for egg belt conic

In order to meet the demand for a more competitive egg production, systems with a length of up to 160m are not uncommon today.

To cope with the resulting increasing loads, inter alia, the design of the idler roller for egg belt had to be aligned.

The new idler roller for egg belt can be seen on the figures below.

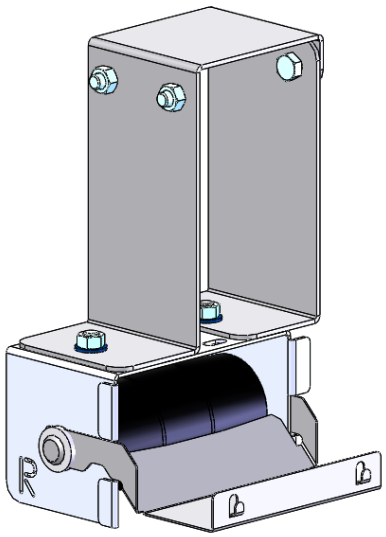

Fig. 1: *Idler roller for egg belt/fixation at regular trough*

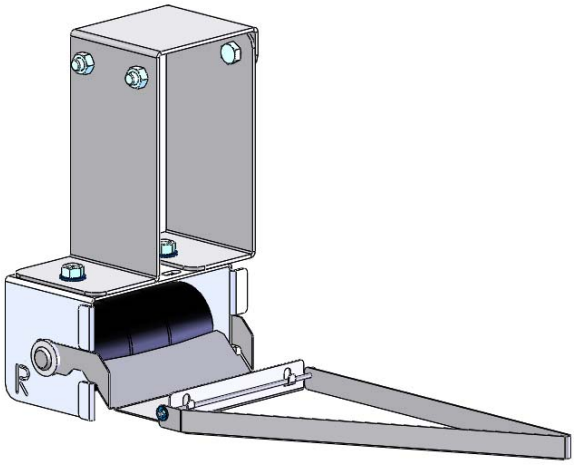

Fig. 2: *Idler roller for egg belt with additonal scraper*

Characteristics

- a co-rotating conical idler roller made of plastic improves the directional stability and entails lower frictional forces
- scraper keeps the roller and the belt clean
- optional: additional scraper at a high quantity of feathers and dust

The idler rollers for egg belt with the egg belt width E150 are already adapted in the parts lists. Now also the remaining widths E95 (or E75) and E115 will be adapted.

Example

Code no. OLD	Code no. NEW	Description
00-00-4911	00-00-5805	Idler for egg belt conic E 95 per tier / fix. at reg trough

The parts lists "Idler for egg belt per tier/2150" and "Idler for egg belt per tier/3000" etc. will be changed automatically (e.g "Idler for egg belt per tier /3000 E115 for elevator *ST EV-EU“ [Code no. 00-00-3232]*).

New idlers

Code no,	Description
	E75
00-00-5870	Idler for egg belt conic E75 per row Step/Colony
	E95
00-00-5800	Idler for egg belt conic E 95 per tier
00-00-5805	Idler for egg belt conic E 95 per tier / fix. at reg trough
00-00-5850	Idler for egg belt conic E 95 per tier FC
00-00-5871	Idler for egg belt conic E95 with bracket Nat 70 rh per row
00-00-5872	Idler for egg belt conic E95 with bracket Nat 70 lh per row
00-00-5874	Idler for egg belt conic E95 per tier PT
00-00-5875	Idler for egg belt conic E95 p/tier Stairstep/SDD/TD
	E115
00-00-5810	Idler for egg belt conic E115 per tier
00-00-5860	Idler for egg belt conic E115 per tier FC
	E150
00-00-5820	Idler for egg belt conic E150 per tier

Additional scraper

Code no.	Description
00-00-5880	Retrofit kit add. scraper f/egg belt idler E95/E115 per tier
00-00-5881	Retrofit kit add. scraper f/egg belt idler E150 per tier

Abandoned articles

Code no.	Description
	E75
37-97-6646	Idler for egg belt E75 cpl Step 24-18
83-12-0593	Mounting set f/idler units egg belt E75/E95 Step 24-18
	E95
00-00-3550	Idler roller for egg belt E 95 for trough fitting
00-00-4950	Idler roller egg belt rigid
00-00-3650	Idler roller egg belt rigid AP
00-00-4911	Idler roller rigid EC/ES for egg belt per tier UV
00-00-4910	Idler roller rigid for egg belt per tier UV
00-00-4920	Idler roller rigid for egg belt per tier UV/regul. trough
00-00-3900	Idler roller egg belt per tier f/regular trough - E 95
00-00-4931	Idler roller rigid EC/ES for egg belt per tier UV-FC-S
00-00-4930	Idler roller rigid for egg belt per tier UV-FC-S
83-11-9715	Idler roller for egg belt per tier SDD

83-03-2678	Idler roller rigid for egg belt per tier PT320B/420B-plus
83-03-2675	Idler roller rigid for egg belt PT320B/420B-plus
37-95-5422	Idler fixed per tier Stairstep314
E115	
83-04-5503	Idler roller f/egg belt w/round roller p/tier f/regular trough E115
00-00-4961	Idler roller EC for egg belt E115 for trough fitting
00-00-4900	Idler roller EC for egg belt E115 for trough fitting
00-00-3560	Idler roller for egg belt E115 for trough fitting
00-00-5501	Idler roller EC/ES for egg belt per tier f/regular trough-E115
00-00-5500	Idler roller egg belt per tier for regular trough - E115
E150	
83-09-6425	Idler roller egg belt/single E150 EV2240

The respective successor of the abandoned articles can be found in the Enterprise.

The idler rollers for egg belt have already been adapted step by step to the new solution since September.

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No. 1179 January 16, 2012

Sewing of egg belts

Referring to product information no. 731 of October 16, 2006 "Assembly of the egg belt PP" we would like to introduce a sewing maching and the corresponding necessary equipment for the sewing of egg belts.

In the past, the woven egg belts PP have often been welded by applying an ultrasonic welding process similar to the film belt in alternative housing systems.

Due to the material properties of the PP-belts, the welding seams are prone to harden and because of the small radii of the idlers at the elevators and the drives of the longitudinal egg belt and the lift damages at the welding seams and the belts might occur after some time. In this case a smooth egg transport can no longer be guaranteed.

Thus, it is absolutely necessary to sew the egg belts PP as it has formerly been described in our manuals. It is not allowed to weld the belts by means of an ultrasonic welding process.

The following products are available and included in the standard product range:

	Code no.	Description
	99-98-3853	Sewing machine f/egg belt Gritzner 1037 incl acc.
	99-98-3854	Sewing needle f/sewing machine egg belt Schmetz Universal 10 pcs/unit
	36-00-4002	Sewing thread Saba C50 100% Polyester blue 500m f/egg belt

Enclosed please find the description of the assembly of egg belts.

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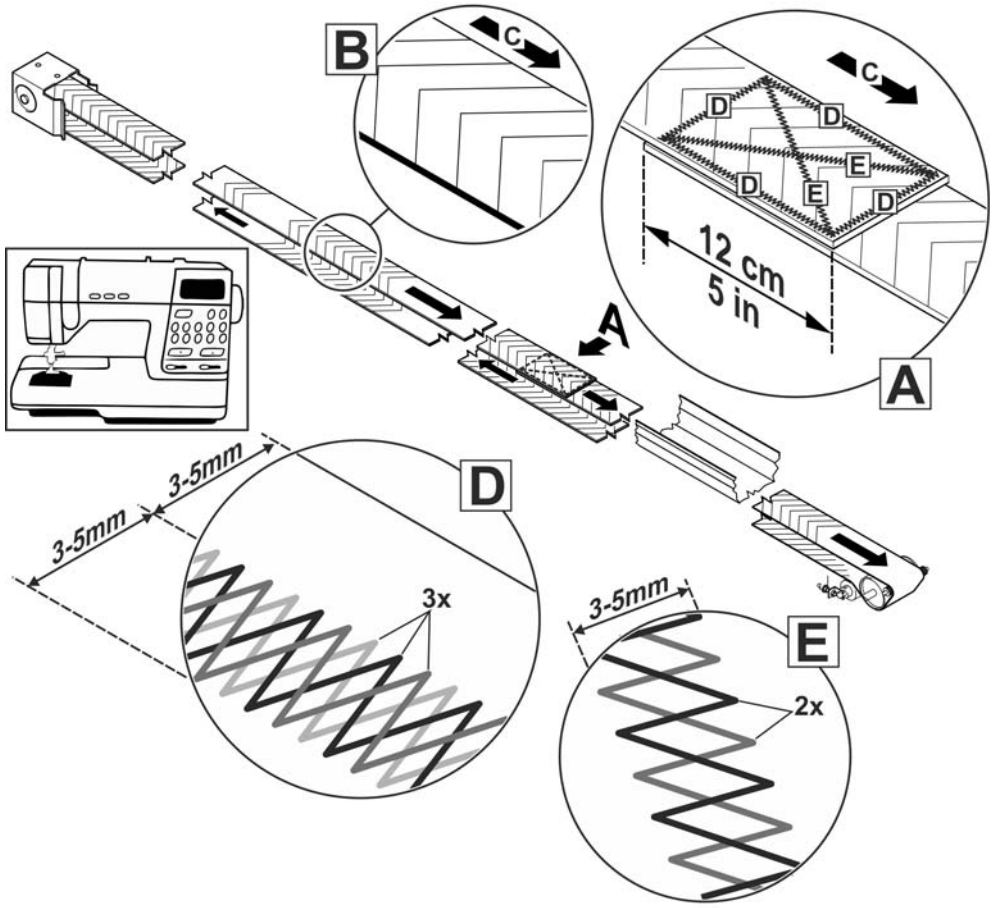
Assembly of the egg belts:



☞	Pull in the egg belt in a way so that the peaks of the weaving pattern point against the running direction (see arrow C in detail B) of the egg belt.

- Pull the egg belt between the bottom wire grilles and the brackets for the returning belt towards the egg belt idler.
- Guide the egg belt around the egg belt idler and then along the interior of the egg channel of the bottom wire meshes to the drive (elevator or lift).
- Guide the other end of the egg belt between the drive roller and the pressure roller and also put it into the connection channel so that both ends of the egg belt are brought together / lying on top of each other.
- Pull the egg belt manually until the returning belt sags 5mm between the brackets for the returning belt and cut it with an overlap of 12 cm (detail A).
- Slightly melt the cutting sites of the belt by means of a lighter so that the fabric does not fray.

⚠	Risk of injury and fire danger!

- Put one end on top of the other end (12 cm overlap) so that the bordering of the belt in running direction (see arrow C in detail A) cannot touch the transversal wires in the bottom wire grille.
- Now sew the overlap.

☞	Egg belts made of other materials will be connected according to the manufacturer's instructions.

1 Introduction

This management recommendation is intended to act as a guiding principle to optimise the housing of layers with this developed system.

1.1 System description

Big Dutchman Small Group Housing is an egg-production system of housing for layers based on scientific investigations and practical trial stages.

Small group systems mean further developments in furnished colonys with the birds' requirements being met by a greater available area and a spatial arrangement of the functional areas of nest, perches and litter. A group size of 40 to 60 birds provides them with accommodation suited to their behaviour and appropriate for them.

The entire front is equipped with sliding gates, so that moving birds in and out of the system is easily achievedd.

The floor wires in the particular segments have a mesh width of 1"x1.5" and an inclination of 7° and they sit on tensioned wires. This guarantees that the eggs roll down on to the egg collection belt in an optimised manner and consequently it guarantees good egg quality.

All wire mesh parts in the Small Group Housing are coated with Galfan®. This is a zinc-aluminium alloy guaranteeing a much greater life cycle than finally-galvanised wire.

1.2 The Components of Big Dutchman Small Group Housing

The group nest and **the litter area** are clearly separated for the sake of clear structuring of the active zones. Additional wire divisions are installed above the spiral pipe in these areas. This prevents the birds from using the pipe in this area as a perch and thus soiling the mats. In this area, the mats remain clean.

1.2.1 The group nest

The nest is kept dark by a flexible curtain so that the birds are not disturbed at the egg-laying stage. No valuable feeding space, however, is wasted.

- Strip curtains darken the nest area.
- The nest is accessible from three sides. This gives the birds unrestricted access to the nest.
- The nest mat is completely perforated, guaranteeing a high level of self-cleaning.
- For cleaning following depletion, the nest mats be easily inserted and removed.

1.2.2 The litter area

The litter mat used in the scratching area has a wavelike profile which ensures that the litter stays longer on the mat. The profile depth of the waves decreases towards the egg channel to facilitate the rolling of misplaced eggs.

Thanks to the serrated upper edge of the wave, the contact between egg and mat and thus the pollution risk of the eggs is reduced to a minimum.

In the front area, the mat is only semi-perforated. Therefore the manure possibly deposited can dry in a relatively short time and be trodden through the mat. The rear closed area, however, ensures that the litter stays longer on the mat.

If a claw-shortener is integrated in the mat, this shows a good effectiveness due to its position since many birds search the litter mat.

The litter material is fed in automatically by an auger system running lengthwise through all compartments. It may be used additionnally as perch. Since this is not requested in the litter area (and nest area), a roosting is prevented by a separating wire mesh.

Feed has proved its worth as litter medium since it is permanently available and can be taken up by the hens without any diffuculty.

- The litter area is part of the usable surface arae and is available to the birds at all times.
- The litter area is automatically supplied with scratching material at least once daily, by means of a spiral auger in the centre of the system. Holes are located above the litter mat t to allow the material to be dispensed.

1.2.3 Perches

The perches are arranged lengthwise in the **Big Dutchman** Small Group Housings. The birds can thus move unimpeded between litter area and group nest.

- Each layer has 15 cm of perch available.

1.2.4 Feed trough

The feed supply is delivered using the **Big Dutchman** CHAMPION feed chain. The feed is conveyed to the birds sparingly and without being unmixed. Feed troughs fitted outside guarantee unimpeded access to the feed. The food trough's depth and the inside rim are designed to minimise feed losses. The feeding times are controlled automatically by a time clock.

- Each bird (up to a live weight of 2 kg) has a feeding area of 12 cm.

1.2.5 Water supply

Nipple drinkers are installed in the**Big Dutchman** Small Group Housing, in the middle of the segment and provide the birds with clean drinking water. The drinker nipples have 360° action with an output of approx. 50ml/min. They are distributed in such a way that all the layers have even, easy access to the water. Drip cups catch any drips and this reduces corrosion plus the manure on the manure belt remains dry.

1.2.6 Egg-saver

The eggs roll out of the nests, across the bottom wire to the outer edges. The **egg-saver** ensures that the eggs are slowed down before they roll onto the longitudinal belt, this reduces impact cracks. For this purpose, a thin wire is fitted under the feed trough and before the longitudinal belt and this is set to rise and fall at specific intervals during the laying period and allows the eggs to roll onto the egg belt.

An additional advantage of the egg-saver is that the damp new-laid eggs tend to dry before they reach the egg belt, this reduces the amount of feathers which cannot stick to the egg and in turn reduces the number of dirty eggs.

1.2.7 Claw-shortener

The claw-shorteners integrated in the litter mats have an optimal efficiency due to their position since the laying hens search the litter mats for scratching.

As a result of scratching on this surface, the claws are shortened in a natural way.

1.2.8 Manure drying system (if desired and installed)

The manure is dried by air ducts inside the colony system. This means that the ammonia content of the house is significanly reduced. The manure on each tier falls onto manure belts under the colony and is pre-dried there. The manure is removed from the systems at regular intervals and carried away by crossbelts.

1.3 Requirements of the Small Group Housing

	Requirements in accordance with the German "Nutztierhaltungsverordnung" [directive on the welfare of farm animals] TierNutzV 2006	**Requirements in accordance with EU stipulation (Directive 199/74/EC)**
Minimum area per compartment	25.000 cm^2 = 2.5 m^2	2.000 cm^2
Area per hen	at least 890 cm^2; at an average bird weight of above 2 kg: at least 990 cm^2	at least 750 cm^2
Internal height	at least 60 cm at the side of the feed trough, no lower than 50 cm at any point	no lower than 45 cm at any point
Litter area	900 cm^2 for up to 10 layers. If the size of the group exceeds 30 birds, the litter area must be increased by 90 cm^2 for each additional bird.	no fixed specifications
Group nest	There is a group nest of 900cm^2 for up to 10 layers. If the size of the group exceeds 30 birds, the group nest must be increased by 90cm^2 for each additional bird.	no fixed specifications
Perch	At least 2 perches at different heights, 15 cm long per hen	at least 15 cm long per hen
Feed trough	At least 12 cm trough length per hen	
Drinking nipple	2 drinking points for up to 10 birds and one other for every 10 additional birds	1 drinking point for 10 birds
Walkway width	At least 90 cm between the rows; at least 35 cm distance between floor of building and bottom row of housing unit	

2 Operating Instructions

2.1 Important information

	All tasks in the occupied house must be carried out quietly. The birds must not be made anxious and frightened! Avoid unusually stressful situations in the house.

	For problem-free operation of the **Big Dutchman** system, it is essential to heed Chapter 3 "Maintenance Instructions"! Never step on components which are not reinforced! Used climbing aids, such as access platforms or ladders, for all checks in higher areas of the system.

Each day, when the lighting comes on in your house, check the following:

- that drinking and feed systems are working (the precise monitoring of water and feed consumption can provide valuable information for managing the flock)
- the house climate (ventilation and house temperature)
- lighting
- the birds' constitution and behaviour
  - the birds' state of health
  - mortality
  - condition of manure

2.1.1 moving birds in and out

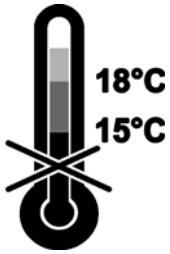
	While moving birds in or out, ensure that there is adequate minimum ventilation for the birds at all times. The negative pressure must not be reduced for too long by open doors, in order to guarantee adequate airflow.

2.1.1.1 Place birds

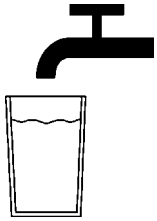
When introduced to the house, pullets must be tall enough to reach the drinking nipples; depending on the breed, that can be at the age of approx 16-17 weeks.

1. **Preparations for introduction to coop:**

- When the weather is cold, heat the house up to at least 15° C before introducing the birds to the house. If the temperature is too low, the pullets huddle together on the nest and litter mats as they can maintain their own body heat better. This can cause the mats to become heavily coated with manure, with the result that they do not clean automatically. Alternatively the mats can be used later, at the beginning of the laying period.



- Rinse out drink lines and collecting cups, to remove disinfectant, before a new flock of birds are introduced to the house.
- Press the nipples or increase the water pressure on the first day, so that drops form, enabling the pullets to find their water source more easily.



	Fill the Augermatic pipe for the litter feed as described in Chapter 2.4 .

2. **Putting the layers into the house:**

Also in the case of stocking and depopulation, good organisation and proper preparation are the key to efficient and consequently faster working.

In pratice, there will certainly be several methods or approaches for putting in and removing birds from the coop, with the result that we wish to present only one possible option here which has proved itself in pratice.

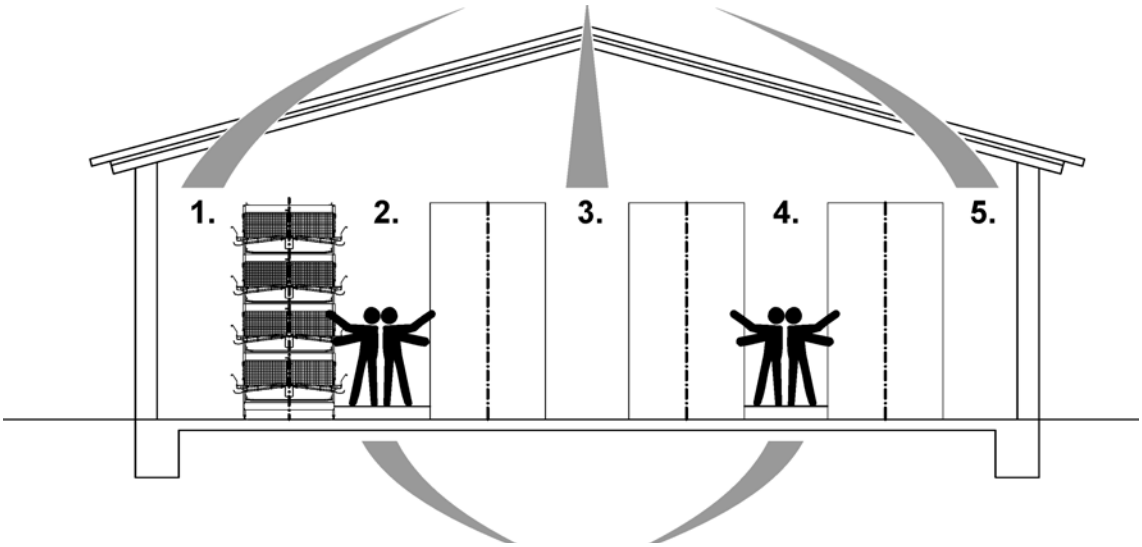
	**Putting birds into** the individual rows of colonys **must generally be done in tiers, working from the bottom to the top!** If this instruction is ignored, the system will become top heavy and consequently structurally overloaded.

- **Putting birds in in case of systems without central separation:**

To achieve efficient workforce deployment and thus a rapid introduction to the houses, it is recommended to fill two rows from one aisle. For example, in the case of a system with 4 rows, the systems should be filled from aisle 2 and 4.

Before putting the birds in, all the sliding gates in aisles 1, 3 and 5 should be closed. In aisles 2 and 4, only one sliding gate per colony should be open and all the others should be closed. Put all layers in one group into the colony through the open sliding gates.

All the sliding gates in those walkways ought to be closed.



One sliding grating per group is open and the rest are closed.

Moving birds in in case of systems with central separation:

The housing is carried out from both sides of the system.

In order to be able to recognize the groups and compartment limits quickly when housing in the birds, orange and blue fasteners for cage front are installed per compartment.

	After the birds have entered the house, the house light should remain on, to allow the birds to acclimatise to their new surroundings more easily, it also gives additional time to find foor and water.

Allow the birds to settle down during the first 24 hours after being put into the house.

3. **For the first days after being housed:**

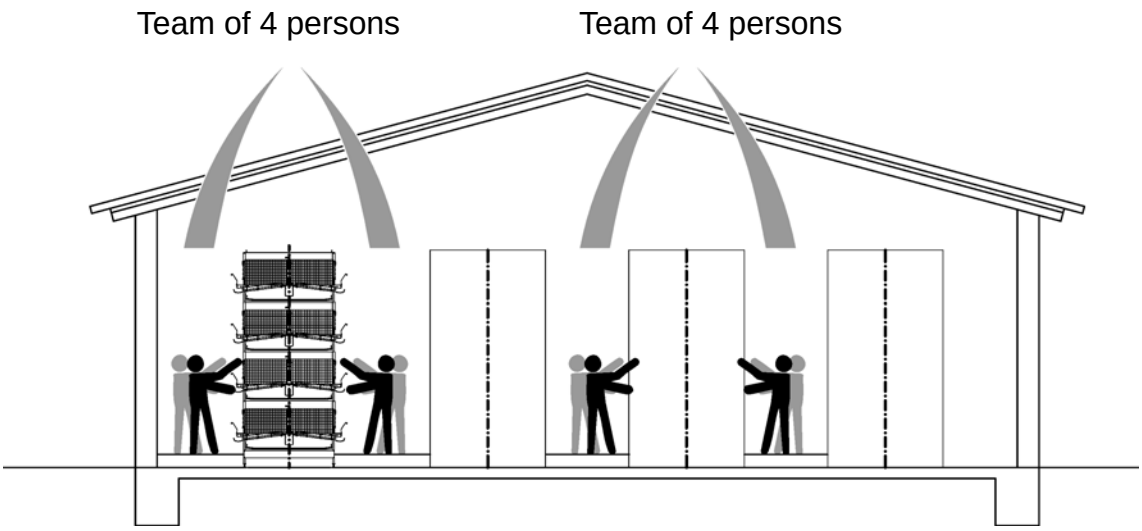
- In the first hours and days after being housed, the birds should received additional observation to ensure alls the birds have found the water source. Indications of a lack of water can be feathers standing up, wings hanging down or a change in the colour of the comb.
- Make sure that the birds are receiving sufficient feed. If necessary, give them feed supplements, to avoid any deterioration in the pullets' growth as a result of introducing them to the house.

2.1.1.2 Moving birds out

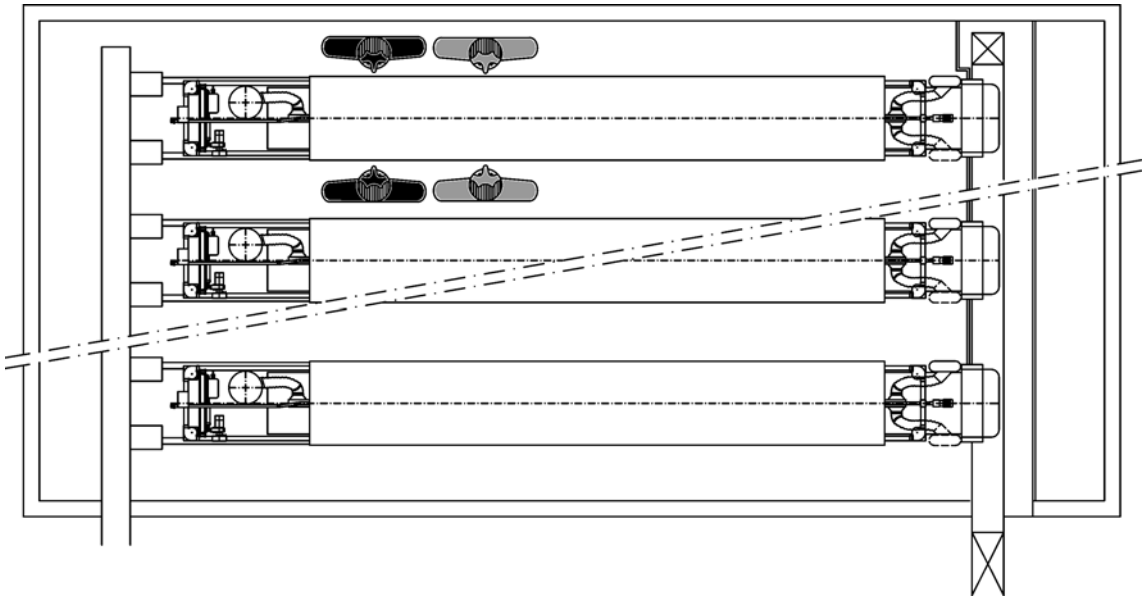
	**Removing the birds** from the individual rows of cages **must be done in tiers, from top to bottom.** If this instruction is ignored, the system will become top-heavy and consequently structurally overloaded.

1. **Taking the layers out of the coop:**

The best method for taking the birds out of the house has proved to be working in a team of four. Two people (working on opposite sides of the system) drive the birds towards one end of the segment. The following two people (also both working on opposite sides of the system) catch the birds and pass them on to workers who put them into containers/crates.



"Catching" team	"Driving" team
	

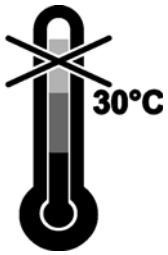


2. **Final tasks after removing birds from house:**

⚠	Slacken the manure belts completely, if the temperature in the house drops below 15° C. Because the belts shrink greatly as the temperatures drop, system parts may otherwise be damaged. The next time the birds are put into the house, the manure belts must only be retensioned when the normal house operating temperature has been reached.

☞	After removing the birds from the house, carry out a thorough cleaning process of the coop in accordance with Kapitel 3.8 ”Notes on cleaning and disinfecting.”.

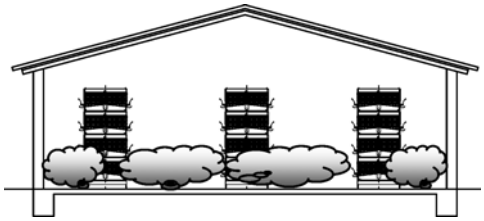
2.1.2 House temperature



- The optimal house temperature is around 18° C and a drop in winter does not cause problems for the birds. Temperatures over 30° C, however, causes stress to the birds.
- The relative humidity should be between 50% and 75%.
- When the house temperature and the feed volume is established, feather quality must be taken into account.
- Avoid high concentrations of noxious gases.

During the cold season, an adequate, even house temperature must be maintained.

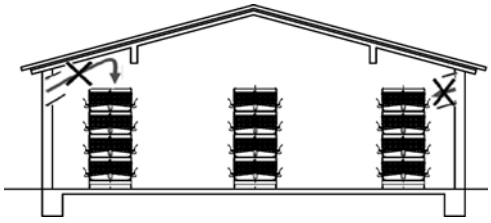
If the temperature is too low, especially near the floor of the house, the pullets huddle together on the nest and litter mats as they can maintain their own body temperature. That can cause the mats to become heavily coated with manure.



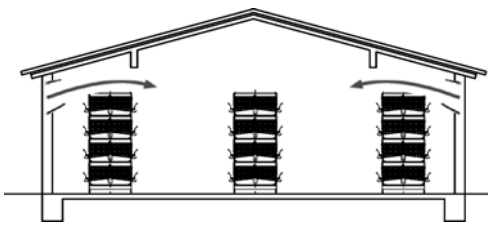
Fresh air intake

Correct setting for the fresh air flaps

Avoid draughts, especially in the nest area, as birds move away from draughty places.



Set the air intake flaps so that the air is blown over the system into the centre. This results in mixing and thus temperature adaptation and the flow slows down.



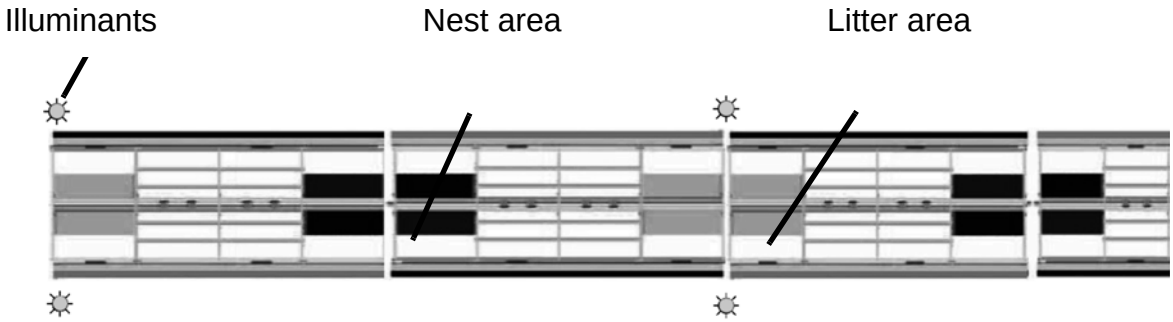
This then contributes to an even distribution of the birds throughout the system.

2.1.3 Lighting

Correct lighting plays a crucial part in Small Group Housing, with its various active zones (nest, litter and perch areas). Lighting, in which brightness and simulated daylight duration and the interaction of these two factors can be optimally adjusted, positively affects laying performance and bird health.

	In house systems with multiple tiers, care must be taken to ensure efficient, even illumination.

The lighting must be installed in each walkway, in front of the litter area. No lighting must be installed in front of the nest area. This guarantees that the litter and perch area are optimally illuminated and the nest area remains relatively dark, to enable eggs to be laid without disturbance.



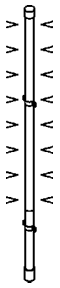
(With a group size of, for example, 60 hens per compartment, a fluorescent lighting tube must be installed every 7.20 m.)

Bird inspection and other activities in the aisle necessitates that the lights can be lifted from the vertical to the horizontal which then clears the aisles of any restrictions.

The best source of light for layers is a high-frequency lamp (over 2 kHz), shining within a natural range. Normal economical lights and tubular fluorescent lights (max. 100 Hz) cause nervousness and feather-pecking. Dimmable lights are an advantage.

Dimmable fluorescent tubes with reflectors

The use of “true-light” fluorescent tubes has really proved itself in practice. The fluorescent tubes, hanging rising vertically in coop walkways, guarantee even illumination of the individual tiers.



	Difficulties with the birds' water supply can occur in tiers which are badly lit. Birds are particularly at risk after being introduced to the house, as the drinking nipples are often not found immediately, if the lighting is poor.

- The lighting programme must be designed in accordance with breeding company recommendations.
- When it comes to brightness, consider breed, age and the flock's stress situation.
- During the laying period, the length of daylight must not be shortened.

	Check all the lights daily to ensure they are working correctly and immediately replace faulty bulbs. After each inspection check, check the lux level against the lighting programme.

2.2 Feeding

2.2.1 Important information

An adequate bird feed consumption is required to maximize egg production. Layers' feed consumption is particularly affected by the following.

Layers' feed consumption is particularly affected by the following:

- body weight and breed
- egg mass output
- house temperature
  (-> low temperatures raise the birds' feed requirements)
- feather condition
  (-> wrong maintenance feed level or feeding errors cause poor feathering)
- feed structure
  (-> rough consistency increases and fine consistency lowers feed intake)
- energy content
  (-> more energy lowers and less energy increases feed intake)
- nutrient imbalances
  (-> the bird tries to compensate for deficits in individual nutrients by eating more).

nutrition and egg weight

Within certain limits, the egg weight can be influenced as a result of the correct nutrition. Here, the following factors must be particularly taken into consideration:

- **breeding**
- **ration composition (nutrition during laying period)**
- **feeding techniques**

1. **breeding**

- At the chickens' and the pullets' various growth stages, it is essential to use types of feed which vary in nutritional content.
- Chickens and pullets ought to receive a roughly-ground feed in powder form (see table for grain sizes). Excessive ratios of very fine components or a consistency which is too rough result in selective feed intake and uneven nutrient supply. A feed consistency which is too fine reduces the birds' feed intake and can result in undersupply of individual nutrients.

Recommended grain size distribution for chicken starter, special chicken feed, special pullet feed and special layer feed (in powder form)

Mesh size [mm)	Sieved ratio (%)	Mesh size interval (mm)	Ratio within interval (%)
0,5	19	0 - 0,5	19
1,0	40	0,51 - 1	21
1,5	75	1,01 - 1,5	35
2,0	90	1,51 - 2	15
2,5	100	> 2	10*

* individual particles no greater than

- 3 mm in chicken starter/special feed
- 5 mm in special feed for pullets/layers

Chickens prefer larger particles in their feed. Since smaller feed particles also contain important nutrients, it is important to prevent selective feed intake.
For that reason, allow the feed chain to be consumed completely once per day.

2. **Nutrition during laying period** (phase feeding for layers)

Feeding a higher body weight at the start of the laying period increases the egg weight over the total laying period.

The layers' nutrient requirement changes continuously as the birds age increases. That is why feed in different proportions/made from different recipes must be used at different stages:

- **Layer starter (Phase 1)** with high nutrient density

  Until the flock has reached approx. 5% laying output, pre-laying feed should be given. After that, high-energy layer starter with a high nutrition density should be distributed for approx. 16 weeks, for a good start to the laying period.

  The period of use of pre-laying feed and the best time for changing diets should be agreed with the pullet supplier.

  The layer starter is high in energy and nutrients with rough grain consistency and a calcium content of 3.7%. The feed must be made up in such a way that it covers the requirements of the period of increasing the laying output and increasing feed consumption up to the laying peak (approx. 28th week of bird's life).

- **Balanced feed (Phase 2)** to ensure you maintain high egg output

  Layer feed with reduced protein and amino acid content and reduced linoleic acid content.

- **Feed (Phase 3)** formulated for optimal shell quality and suitable egg weights

  The feed types in Phases 2 and 3 are intended to take into account the decreasing need for organic nutrients and the increasing need for calcium, as the birds' age increases.

	The exact nature of the food should depend on the birds' development; **the times for changing the food are determined by production and by the requirement for calcium, which is less age-specific**. During the laying period, the feed composition should be adapted to the birds' growth in output and to the need for nutrients, every 10 weeks. Please decide this in accordance with Breeding Association regulations.

3. **feeding techniques**

During the laying phase, it is important to specify precisely the feeding time, the feed level in the trough and the feeding frequency.

- Feed should be given between three and four times per day.
- The egg weight can be increased by stimulating the feed intake and limited by controlled feeding.
- The timers for lighting and feeding must be synchronized (for the first feed of the day)
- Calculate the feed chain running time for one circuit and program the duration of the feeding time on the timer, so that the chain's complete track is filled, plus approx. 10 m. This prevents the following:

  - feed running over when it returns to the feed column,

  - pelletised feed being ground and

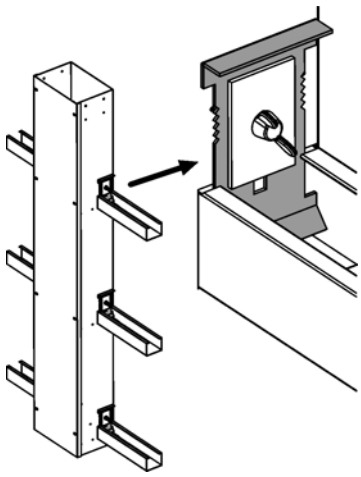
  - power being consumed unnecessarily.

	Avoid feeding processes during the main laying phase. (That is why we recommend keeping the conveying and feed system out of operation during the main laying period, to avoid cracked eggs). Layers should go onto the perches in the evening with full crops.

With an optimal house temperature and good plumage on the birds, we can assume a consumption rate of 110-120 g per day.

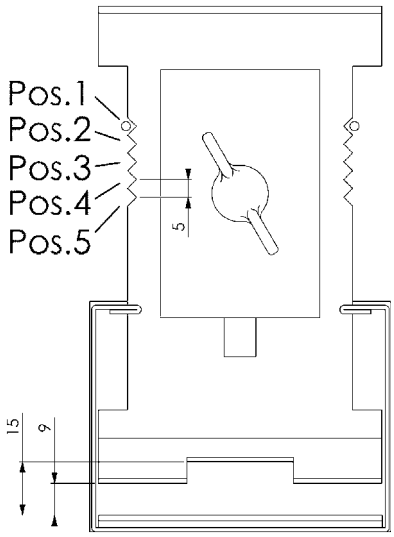
2.2.2 The adjustable plate for controlling the feed level in the trough

- Set the adjustable plate on the feed column outlet to a standardised low level. In this way, you prevent feed losses.
- Every day, check the feed level on the adjustable plate and remove feathers and other foreign bodies.



Position 1, shown on the adjustable plate, corresponds to the quantity allowed through from the feed column in the lowest possible position through which the **Champion** feed chain can be drawn.

The figures below have been calculated using layer feed, i.e. they apply to meal of commercially-available composition and can be used as recommended values.



Item	Feed volume [g/m]
1	490
2	640
3	830
4	1.000
5	1.230

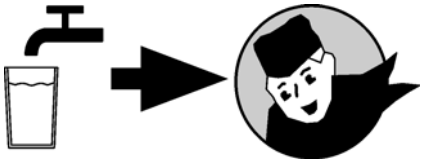
You will find further information on the components of the **Big Dutchman-**feeding system in Chapter 3.1 from page 39.

2.3 Water supply

	Immediately repair any points where leaks occur. Water which has leaked out can result in the risk of slipping, if it is mixed with dirt or feed residue.

	At least once per day, check **all connections, couplings and drink nipples for a tight seal.**

2.3.1 Water quality



The birds' drinking water should be good enough for the layer farmers to drink themselves.

Clean water is as important for good egg output as good feed. Excessive salt content in the drinking water may permanently damage the eggs' shell quality.

Food and water consumption are closely related but the birds drink more at higher temperatures and if they are affected by certain illnesses. When there is a lack of water, the birds eat less. (What is the ratio?)

	PH value < 6.0: Acid water damages vaccines and medications!

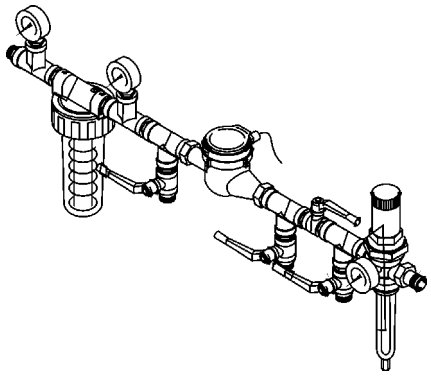
Limit values/recommendations for poultry

Parameters	Unit	Recommended limit value	Remarks	
Bacterial counts	Volume per ml	100	-	
Coliform bacteria	Volume per ml	0	-	
Nitrate	mg per l	25	Values as low as between 3 and 20 mg can restrict development.	
Nitrite	mg per l	4	-	
Chloride	mg per l	250	Values as low as 14 mg per litre can be harmful if the sodium level is above 50 mg per litre.	
Copper	mg per l	0,6	Higher values cause a bitter taste.	
Lead	mg per l	0,02	higher values are toxic.	
Sodium	mg per l	50	Values over 50 mg per litre with high chloride or sulphate values cause slow development.	
Sulphate	mg per l	250	Higher values cause diarrhoea-based illnesses. At high chloride or magnesium values and at over 50 mg sulphate per litre, development is restricted.	
Zinc	mg per l	1,5	Higher values are toxic.	
Common salt content (NaCl)	mg per l	330	Overall salt content:	
			< 1000 ppm	very good
			1000-3000 ppm	acceptable
			3000-4000 ppm	bad (liquid manure)
			> 4000 ppm	dangerous (kidney damage)

Limit values for the connection unit and the drinking system

Parameters	Unit	Recommended limit value	Remarks
Grain size for indissoluble particles and suspended solids	µm	60	Furthermore, a filter is necessary
pH value		6,5 - 8,5	-
Overall hardness	mg per l	20	-
Calcium	mg per l	100	-
Magnesium	mg per l	50	-
Iron	mg per l	0,2	-
Manganese	mg per l	0,05	-

2.3.2 Water connection units



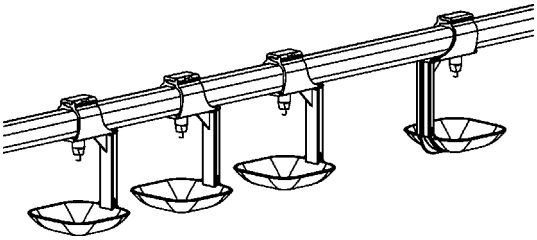
- Every day, check the system input pressure and provide adequate primary pressure, if necessary
- The on-site input pressure must be between 1.5 and 6 bar.
- Check the water filter daily and clean it, if the difference in pressure is over 0.5 bar.
- Check pressure controller/filter combination outlets on the connection unit daily. Clean filter if necessary.

  The output pressure can be a maximum of 3 bar; clean filter if necessary

	Every day, log the birds' water consumption, to allow you to detect differences and look for reasons.

2.3.3 Nipple drinker

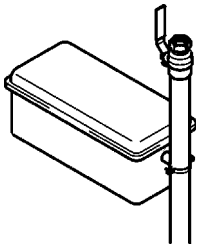
The Small Group Housings are equipped with a nipple drinkers and water collection cups.



- Every day, do a spot check to ensure that the nipples in each drink line are functioning properly. It is recommended to do this at the breather end of the house.
- Clean and flush the nipple pipes and water collection cups every month.

2.3.3.1 Inflow via float tank

- The water pressure before the ball valve must not exceed 3 bar - otherwise the ball valve leaks; float tanks may overflow because the birds' water consumption is minimal at night.
- Check the water levels in the float tanks daily. Correct water levels are as follows: see sticker on the float tank.

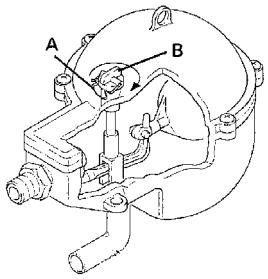


2.3.3.2 Inflow via float-ball tank

⚠	The float-ball tank may be operated at a maximum input pressure of 3 bar! Excess pressure can also result in damage to couplings and nipple pipes.

- For the rinsing process, always set drainage system to " Rinse", first of all.

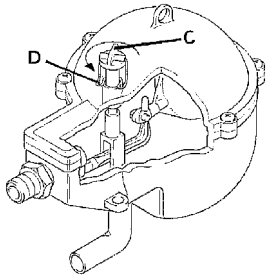
Enable rinsing process



- Release safety catch (A) on float-ball tank
- press red seal (B) downwards and rotate clockwise through 90°, as far as it will go

The rinsing process is enabled.

Finish rinsing process



- Rotate red seal (C) anticlockwise through 90°, as far as it will go, and pull upwards. The rinsing process is complete. The seal is in the "park position". In the park position, the pressure in the float-ball tank is lowered - time taken is approximately 30 seconds.
- After approx 30 seconds, turn the seal clockwise through 30°, as far as it will go, and pull it up.
- Lock safety catch.

The float-ball tank is operating normally.

2.3.3.3 Drain at end of row

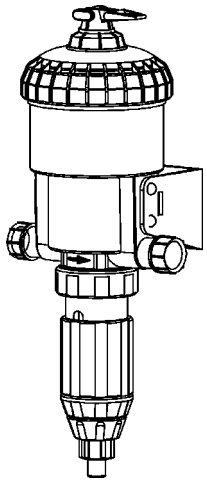
- Every day, check the level of all the water columns in the vents at the end of each drink line and correct if necessary. Low pressure in the nipple pipes is ideal - if the pressure is too high, drops are constantly forming on the nipples.

2.3.4 Dispensing medication via the water supply

	Fatty and sticky medications must not be mixed in with the water supply. All medications used must be completely water-soluble.

The medications must be metered, prepared and stirred thoroughly in a tank separate from the system. It is essential to take care to ensure that the medications are fully dissolved in the water. This can then be poured into the float tanks as drinking water, completely metered and mixed according to regulations.

A **Big Dutchman** medicator is used to automatically metre medications.



- When making the connection, heed the direction of flow (arrow on housing).
- Adjust the rate of flow, depending on the amount of birds.
- Every day, check proper functioning during operation (see separate manual).
- Thoroughly clean and rinse medicator each time after use.

If medications are used which are difficult to dissolve, we recommend an additional filter before the medicator, to protect the nipple drinker. For this purpose, you can use a pressure-reducer and filter combination. A filter between the bypass and pressure-reducer may also be retrofitted.

	The medicator must never be allowed to run dry! Always keep it filled with water and protected from frost.

2.4 Litter management

In the EV-EU- and KV systems, litter (normally feed) is transported to the litter mats by means of an Augermatic tube. The Augermatic tube issupplied with a hole in the litter area. (Depending on the system type, central feed troughs - in the middle of the colony - are supplied via the Augermatic tube as well).

2.4.1 Operation

At the beginning of each batch, the Augermatic tube must run until the system is charged and feed arrives in the cross trough at the end of the installation. This first filling takes approx. 10 - 12 min. dependent upon system length of e.g. 100m.

The filling of the Augermatic lines with feed/litter should take place before the birds are moved in. If this has to be carried out when the system is occupied, this must be done in darkness to avoid unnecessary stress for the birds as well as feed losses.

If the system was cleaned with water, the litter supply system may only be filled and activated **one week** after the birds have been moved in.

Thus it is guaranteed that there is no residual moisture in the Augermatic tubes through which the feed/litter can harden.

From this moment on, the following applies:

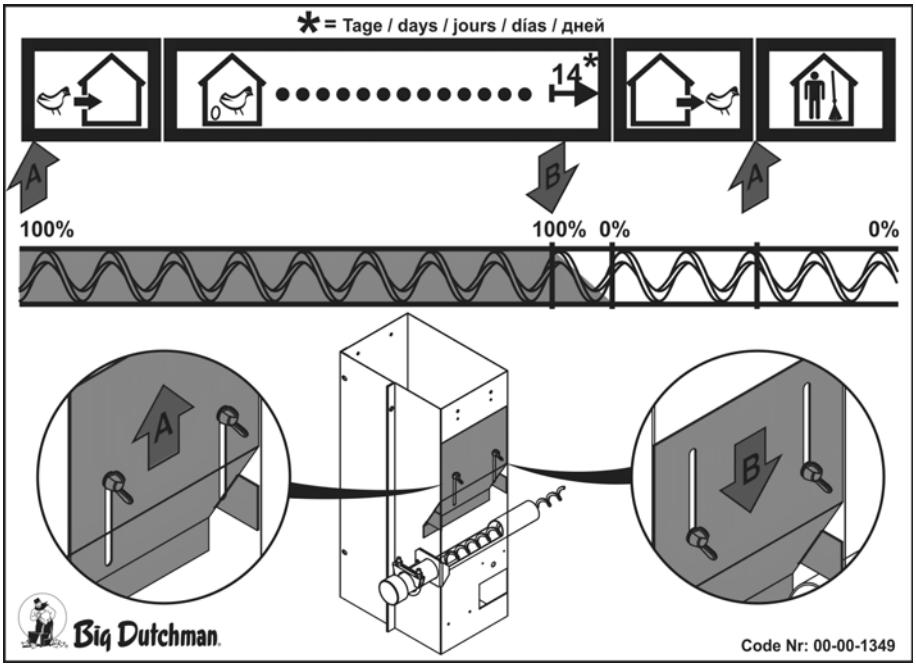
The litter supply must be activated **at least once a day** to prevent the litter (feed) from hardening in the tube due to ageing process and thus blocking the auger.

2.4.2 Control of the litter supply

	Since the "dust bathing" should take place during the main laying period, the litter supply should also only be carried out in the third feed of the day feeding when laying is completed. Please take into consideration that the feeding times change!

2.4.2.1 Notes regarding the adjustment of the shutter for litter supply

	You will find the following label at the feed column. This describes the optimal position of the feed shutter during the whole laying period and beyond. The corresponding explanations can be found in the following chapters.

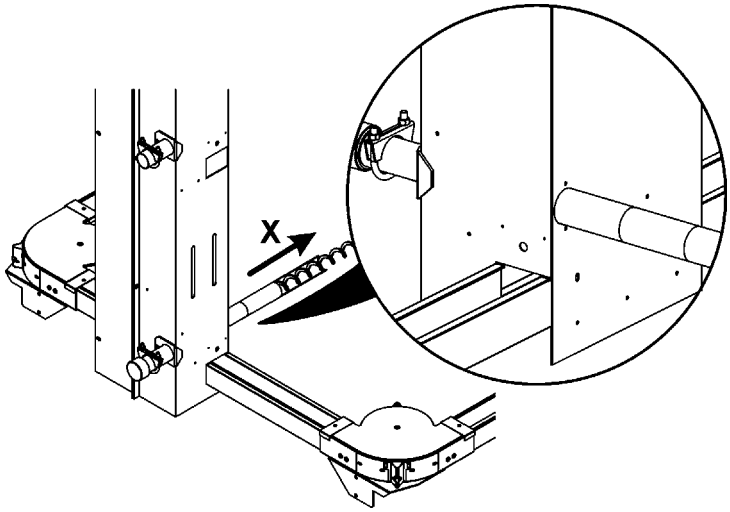


2.4.2.2 Feed as litter from the feed column CAS

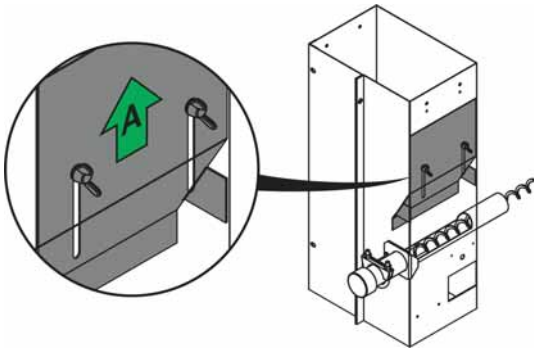
Taking feed from the feed column

Taking feed from the feed column

The litter supply - with or without central feed trough - is controlled by a timer which has to be synchronized with the feeding.



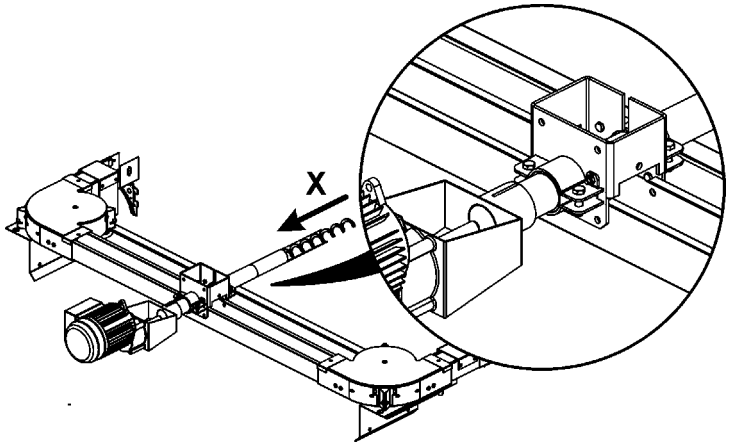
X = Conveying direction of the Augermatic tube



The shutter for the litter supply must be completely open during the whole laying period and placed at the top position.

Transfer from the Augermatic system to the cross trough

The Augermatic lines must run time-delayed with the chain feeding. Thus it is guaranteed that the remaining feed at the end of the system can flow back into the cross trough and does not overflow.



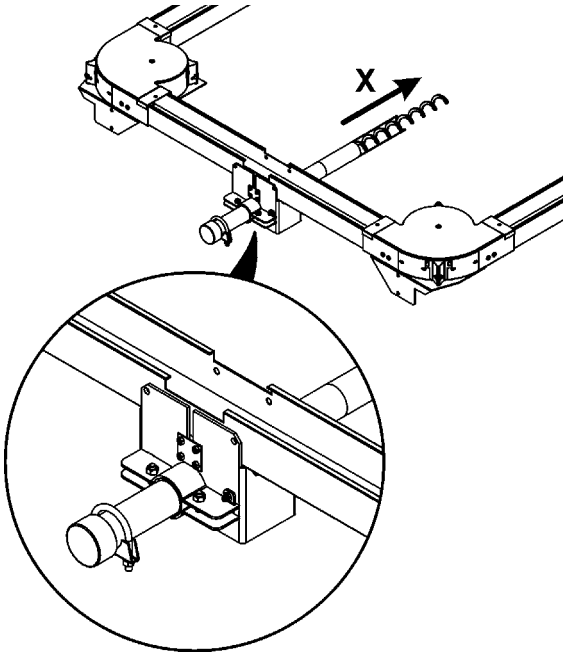
X = Conveying direction of the Augermatic tube

2.4.2.3 Feed as litter from the cross trough of the chain feeding

Transfer from the cross trough to the Augermatic

If the litter supply is carried out via the cross trough of the chain feeding system (only when the feed columns are at the manure removal end), make sure that the hopper for litter underneath the feed trough is supplied with feed when starting the Augermatic auger.

Firstly the running time of the feed has to be considered from the side feed column to the connection of the Augermatic system (this is half the length of the total system). The Augermatic line must now be started with a time-delayed after the start of the feed chain.



X =Conveying direction of the Augermatic

	Rule of thumb: The Augermatic line should only be switched on after half a feed chain circuit length.

2.4.2.4 Running time of the auger for litter supply

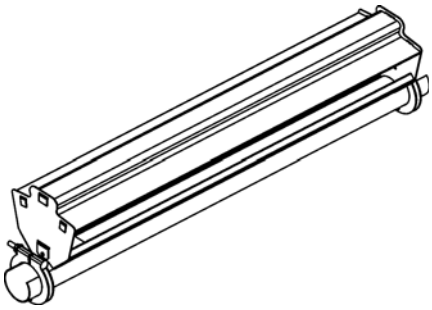
The running time should be adjusted during the laying period according to the system length:

System type		Running time
Systems without central feed trough	KV1500-D60	45 sec./ 100 m
	EV1250-EU60	
Systems with central feed trough	EV1500-D60	100 sec./ 100 m
	KV1500-EU72	

In case of shorter or longer systems, the running time has to be adjusted accordingly.

	Check the functioning of the conveying augers every day!

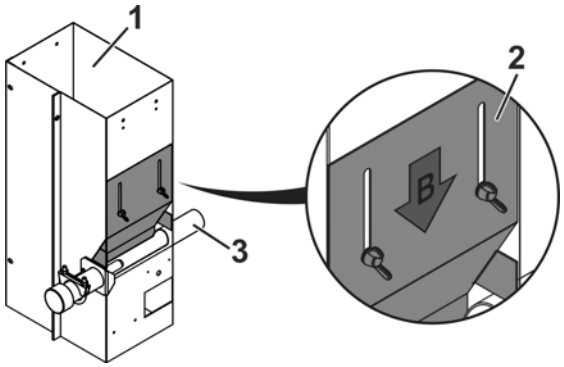
2.4.2.5 Systems with central feed trough



If a simultaneous operation of the Augermatic lines with several chain feeding times is required for systems with central feed troughs, the Augermatic line must not run with the first feeding early in the morning. A certain part of the birds pass the night in the area of the central feed trough, therefore it may happen that the birds get hurt in/at the feed trough if the augers suddenly start running at this time.

	For all other feeding processes, the feed chains must be started before the automatic lines, which have a time delay (approx. 1 minute).

2.4.3 At the end of the laying period



Shut the litter supply in the feed column CAS-S approx. 2 weeks before the birds are moved out so that the Augermatic tube can still be emptied during the laying period.

.

Pos.	Description
1	Feed column
2	Shutter for litter supply
3	Augermatic tube

	Before wet-cleaning of the house, the Augermatic tubes must be completely empty! Any remaining litter may harden due to the high level of humidity. Furthermore, they also pose a sanitary risk.

2.4.4 Tips for clean nest and litter mats

- Don’t exceed the recommended bird number!
- Regularly control the health of the birds (weak birds will escape into the nests).
- Make sure that the litter mats are sufficiently illuminated.
- Regular supply of litter (once a day).
- Operate a sunrise/sunset phase in order to attract the birds out of the nests to the perches.

2.4.5 Suitability of different litter materials

Litter material	**Dust load**	**Availa-bility**	**Poultry health**	**Dust-bath**	**Suitability for small group systems**	**Ready for conveyance with auger**
Feed for laying hens	+	+ +	+ +	+	+ +	++
Wood chips/ wood granulates	-	+/-	+/-	+	+/-	+/ -
Sawdust	- -	+/-	Risk of crop obstruction	+	+/-	+
Wheat straw, chaff	-	+ +	+/-	-	+/-	-
Sand	+	+ +	Better function of the gizzard; risk of pollution	+ +	- -	-

+ + very positive; + positive; +/- average; - negative; - - very negative

2.5 Egg collection system

The correct functioning of the automatic egg collection system depends on careful operation and servicing. For that reason, you should pay particular attention to the following points, for optimal egg quality:

	Gather the daily crop of eggs every day, in order to prevent collisions and egg congestion. Remove dead birds every day so that their bodies do not prevent the eggs from rolling down. Before each collection, remove the broken and wind eggs from the egg belts, to prevent the existance of dirty eggs. Record cracked, hair-cracked and dirty eggs every day, trying to remove the causes of them. Regularly clean the floor wires under the feed troughs, the collecting boxes and the entire egg collection area, in order to reduce the ratio of dirt. Always leave all safety devices working.

2.5.1 Lengthwise egg collection

2.5.1.1 Important information

- Check daily if all the egg belts are running.
- Immediately remove any sharp edges in the egg channel system.
- Check the tensioning of the egg belts regularly: an egg belt may hang down a maximum of 5 cm between two return belt guides.

Please ensure that the system for feeding the longitudinal belts in sections is functioning, in order to optimise the egg distribution on the belts and to reliably prevent egg congestion.

2.5.1.2 Feeding longitudinal belts in sections

	Please also observe the manual "Egg weigher WIN4 for small group housing EV/EV-EU / Operating instructions ".

In Small Group Housings, because of the high rate of nest acceptance, the eggs are laid almost exclusively in the nest area and roll onto the egg belt from there. That means that the eggs lie only on a short section of the belt.

The accumulation of eggs is so great that the egg belt cannot directly support the quantity and the eggs pile up in the colony as a result!

Egg congestion in the nest area can result in eggs which have been pecked, trampled upon or dirtied. For that reason, the longitudinal belts must be moved during the laying phase, in order to distribute the eggs evenly on the egg belt.

The infeed time

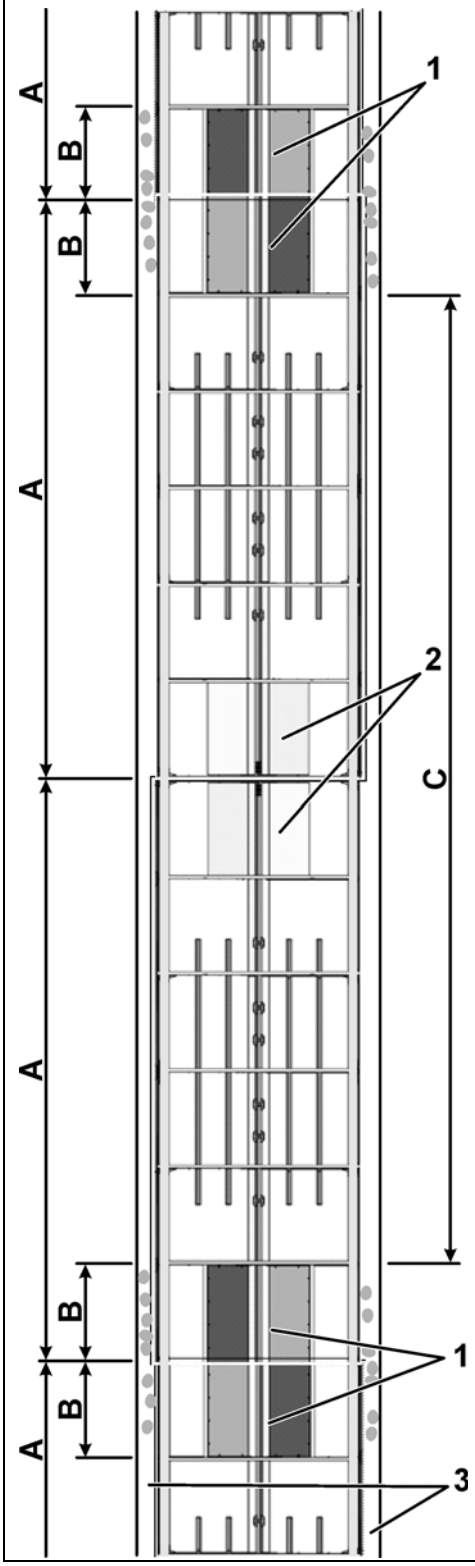
Moving the belt with a timer must be corrected more often, because the laying rhythm changes with time.

By **moving the belt with the WIN4 egg scales** the capacity of the longitudinal belts can be exploited to its best advantage, because the belts are always moved with the determined weight of eggs.

The length of an individual section

The length of a section depends on the nest's width. We recommend a measurement of 75%-100% of the double nest width.

From this the maximum number of possible movements can be calculated, depending on system length. The set weight of the WIN4 also decides the number of movements.

	Pos.	Description
	1	Nest area
	2	Litter area
	3	Longitudinal belt
	A	Length of a compartment
	B	Width of a nest
	C	total maximal feed: - distance between 2 nests or - distance from the first/last nest for egg collection
		Movement length = 2 x B

Examples of the various system variants

System type	**Movement with timer or WIN4**	
	Length	Quantity
EV1250/a-EU60 (segment length 3618mm)	120 cm	5
EV1250/a-EU40 (segment length 2412mm)	120 cm	3
EV1500/a-EU72 (segment length 3618mm)	120 cm	5
EV1500/a-EU48 (segment length 2412mm	120 cm	3
EV1500/a-EU60 (segment length 3015mm)	120 cm	4
KV1500/a-D60 (segment length 3618mm)	150 cm	3
KV1500/a-D40 (segment length 2412mm)	120 cm	3
KV1500/a-EU72 (segment length 3618mm)	150 cm	3
KV1500/a-EU48 (segment length 2412mm)	120 cm	3

If the number of moves is to be increased, the feed length must be reduced accordingly.

Total feed with elevator

If the distance from the last nest to the elevator is shorter than the length of belt fed forward, the cross collection must run in conjunction with the movements or be adapted the number of moves or their length. This guarantees that there is no egg congestion.

Total moves with elevator

If the distance from the last nest to the elevator is shorter than the movement in belt length, the number of movements or its length must be adapted. This guarantees that there is no egg congestion.

This longitudinal egg belt feed only produces the desired success if the egg collection system **is not operated during the laying phase**!

2.5.1.3 Programming the egg scales (WIN4/AMACS)

The task of the WIN4 egg scales consists is preventing a pileup of eggs on the longitudinal egg belt. The egg belts are specifically moved forward on the basis of the egg weights. The even distribution of the eggs on the longitudinal belts reduces the ratio of cracked and broken eggs and the quality of the eggs is thus maintained.

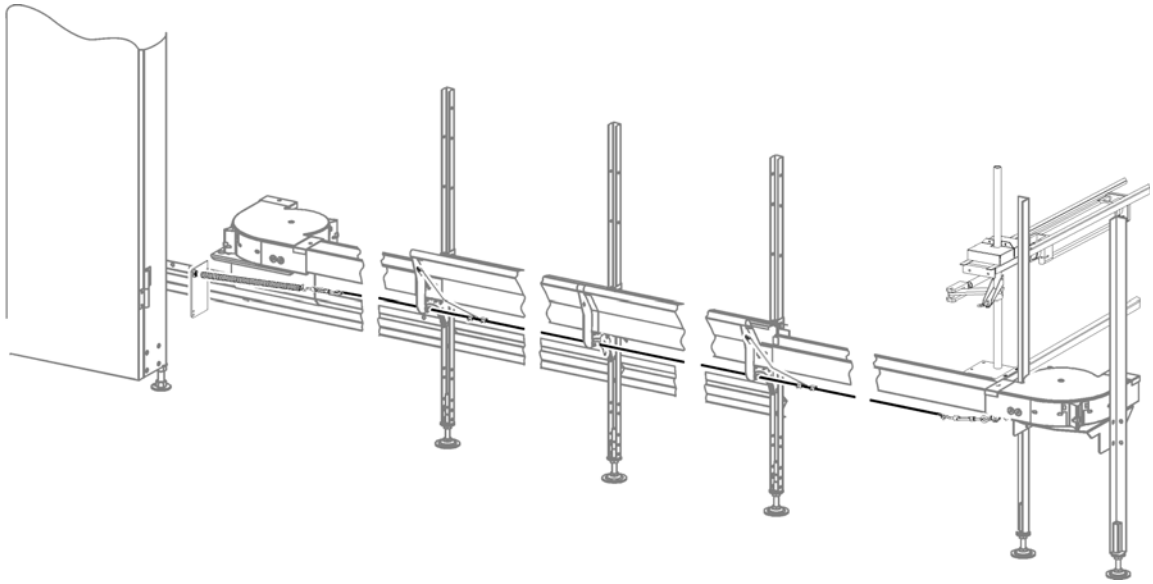
The following adjustment values have proved to be effective:

Movement speed:	1.7m per min at 50Hz, as standard

	If a frequency inverter is connected, there must be a guarantee that the frequency is not modified. If the frequency is modified on the drive, the egg belt's runtime also changes.

Length per feed:	double nest width
Maximum number of movements:	Distance from the nest to the egg collection divided by the movement length
Minimum time between 2 movements:	30-45 minutes
Weighing principle (WIN4):	average weight of all scales in a group: "**average value exceeded**" If the average value of all connected scales exceeds the average value of the set target values by more than 10 seconds, a signal is set for feeding the egg belt forward.
Reference weight:	dependent on the number and age of the birds **Information:** The experience of **Big Dutchman** demonstrates that, with target values of **approx. 0.30 kg** (5-6 eggs) an even distribution of the eggs on the egg belt can be achieved. With a young flock, the target values may be set higher, if necessary, as the eggs are smaller in this case and thus have more space on the egg belt.

2.5.1.4 Egg-saver



Check the proper functioning of the egg saver regularly: If necessary, adjust the wire's insulating screw joints and check the compressed air connections on the pneumatic cylinder.

Adjusting the egg saver wire:

The times for raising and lowering the egg-saver cord must be adjusted in such a way that no eggs pile up in the cage, but that as many eggs as possible are still slowed down by the egg saver. Thus cracked eggs are avoided and the new-laid, still damp eggs can dry before they reach the egg belt.

For this reason, to let the eggs through, the egg-saver wire cable should be raised **every 10-15 minutes for approx. 10 seconds**. Outside of the main laying phase, the wire cable can stay down for approx. 60 minutes.

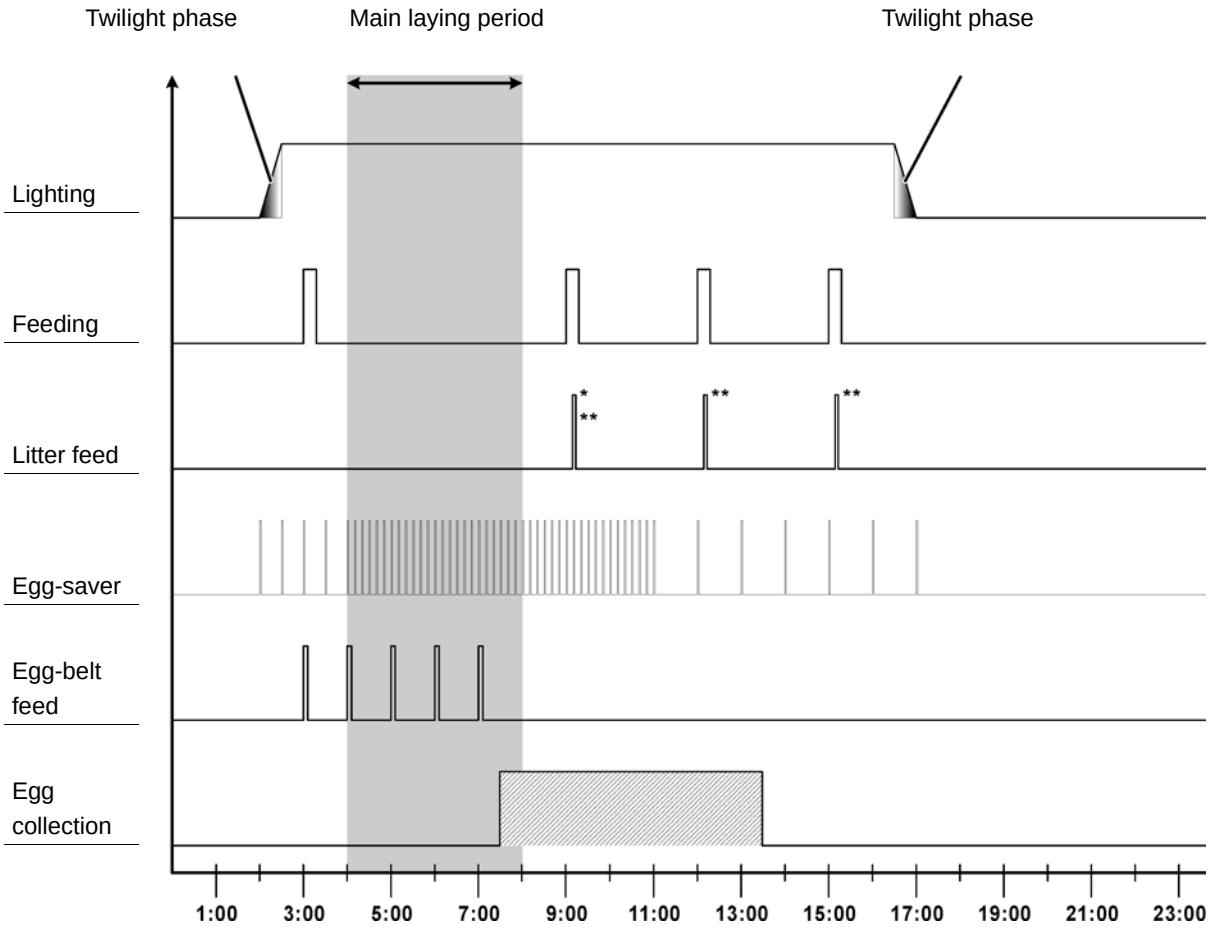
Egg storage:

For maintaining the egg quality, attention should be paid to the following:

- Store eggs at temperatures of between 5° C and 10° C and at a relative humidity of 80-85%.

Storage at higher temperatures and lower humidity results in rapid weight loss and deterioration in the albumen quality as a result of the increased gas exchange.

2.6 Example of the most important time intervals in BD Small Group Housing



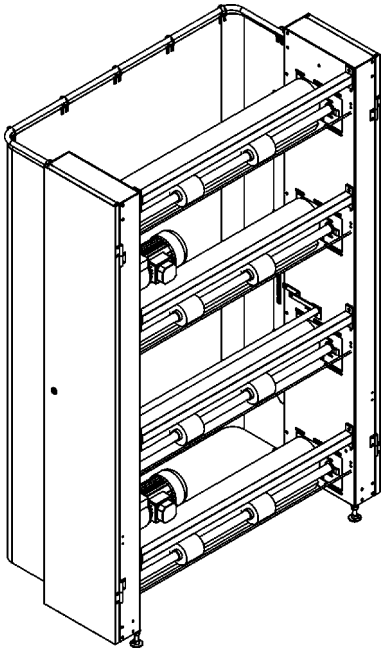
Notes on litter feed:

* Systems **without** central feed trough (EV1250-EU60 & KV1500-EU60)

** Systems **with** central feed trough (EV1500-EU60 & KV1500-EU72)

2.7 Manure removal

2.7.1 Important information



Clean the drive mechanism regularly.

Check the welded joints for the manure belts regularly.

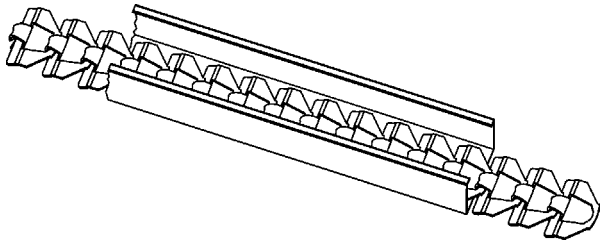
While the house is being wet-cleaned, the manure belts must run continuously to prevent water from accumulating on them; allow any accumulated water to run off at the sides.

	Regarding the operation of the manure removal system, especially the manure belt, please observe the manual "Adjustment of the manure belt".

3 Maintenance Instructions

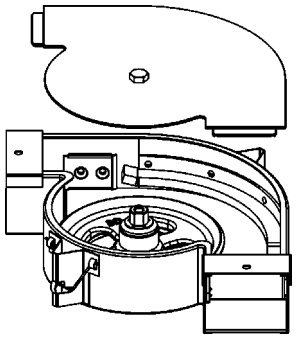
3.1 Feeding

3.1.1 The feed chain



- Check daily if all the feed chains are running. Before replacing a sheared-off locking pin, always remove the cause of the fault first.
- Every week, check the tension on any new feed chain. Keep doing the weekly check until changes in length cease to occur. After that, a monthly check is recommended.
- Make sure that the feed chain is always lying flat in the feed trough.
- Check regularly that the drive is pulling the feed chain to run straight. If necessary, align the drive.
- If the chain kinks while running, this must be examined immediately. Please check if the feed chain is catching somewhere and remove obstructions if necessary.
- After cleaning, all the feed chains and feed troughs must be dried completely before the chain is put into operation again.

3.1.2 Feed chain corners



The feed chain corners are equipped with a maintenance-free plastic slide bearing in the corner wheel, a chain guide track and an additional guide strap on the base of corner.

Check the corners for wear on friction bearings, guide tracks and guide straps; replace faulty and worn parts.

Check the feed chain corners as follows:

1. slacken feed chain,
2. remove wing screw, U-washer, cover, circlip and spacer,
3. check if corner wheel is scraping on the base, this occurs if the bearing play is too great and if it can swing on the axle.
4. pull corner wheel with connector off the axle,
5. remove encrusted feed residue etc. and replace bearing if necessary,
6. it must be possible to easily turn the wheel manually on the axle,
7. Reassemble feed chain wheel in opposite order.

3.1.3 Continuous chain track

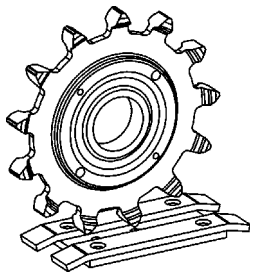
Always turn off the master switch before undertaking repair or servicing tasks on the system.

Control by the timer can easily result in accidents, as it can easily set the feeding system in motion.

- Check regularly if the feed troughs are running in a straight line and parallel to the corners and that they have not moved, for example, in the couplings and corners.
- Every day, check all the continuous feed chain tracks for proper functioning and dirt requiring removal.
- Bent feed troughs result in faults in the feed chain and in increased chain wear and, for that reason, they must be repaired immediately.

3.1.4 The "reversible toothed drive wheel” and SF/MP guide shoe

Inspect these components quarterly for wear and correct functionality. In the case of wear to the teeth on the "reversible toothed drive wheel” and the SF/MP guide shoe’s running surface, these can be reversed, effectively doubling their useful life.



	While replacing or reversing a "reversible toothed drive wheel", care must be taken to ensure that there is enough grease between the catch's contact surfaces and the "reversible toothed drive wheel".

Grease the contact surfaces between carrier and toothed drive wheel regularly.

We recommend the following types of grease:

- Chevron Dura-Lith Grease EP 2
- Shell Retinex-A
- Shell Alvania EP 2
- Esso Beacon EP 2
- Texaco Multi Purpose Grease H

3.1.5 Locking pin on the feed chain drive wheels

The yoke fixed to the drive shaft drives the feed chain drive wheel by means of the locking pin (reversible toothed drive wheel). If the feed chain seizes for any reason, the shear pin will break, stopping the feed chain drive wheel, this prevents consequential damage to the system. The 99-50-3905 shear pin 5x35 button-head rivet DIN 660 is used as a shear pin. Heed Chapter 3.1.7 "Tensioning the feed chain".

An accidental drive start can cause serious injuries.

Always switch the drive's main switch off when replacing the locking pin!

Never replace a broken shear pin without resolving the cause of the break.

Check the following at least twice a day:

- the functioning of the feeding system,
- whether the chains are running and the corner wheels turning,
- the fill level at the feed column outlet.

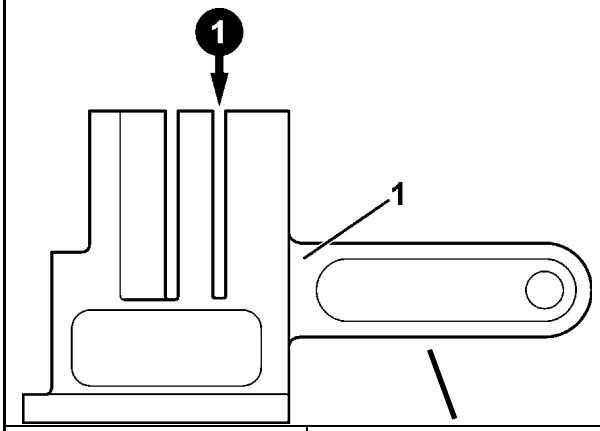
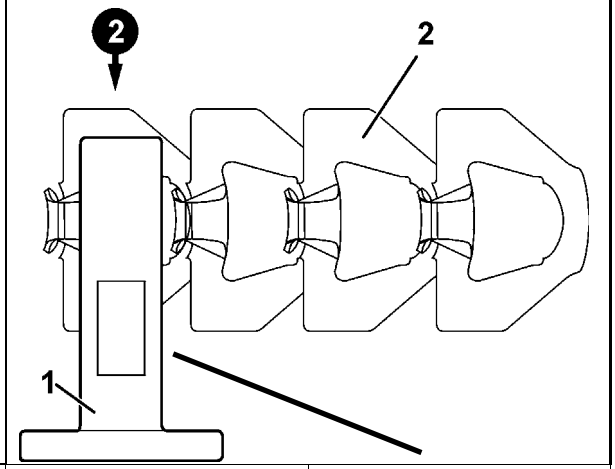
3.1.6 Taking out and adding chain segments

The tension of the Champion feed chain is changed by taking out or adding chain segments. Every segment can easily be separated from the next segment and can easily be connected to another segment.

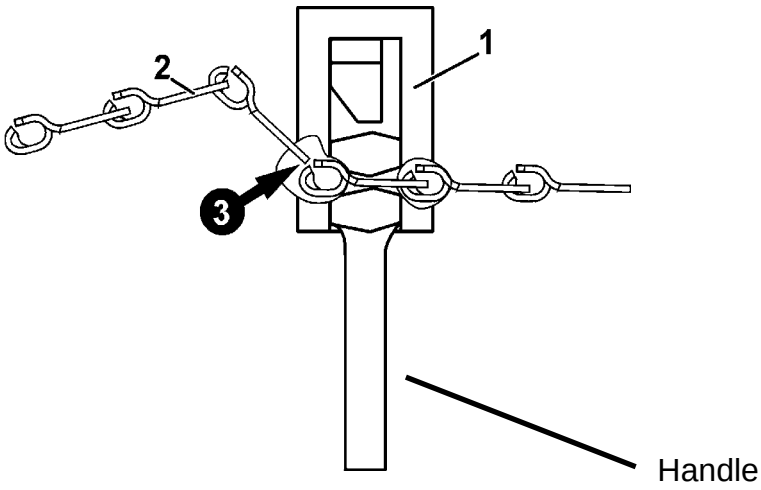
The segments of the Champion feed chain are separated and joined by means of the feed chain breaker.

	Always wear goggles while strengthening the chain.

3.1.6.1 Joining the links in the chain

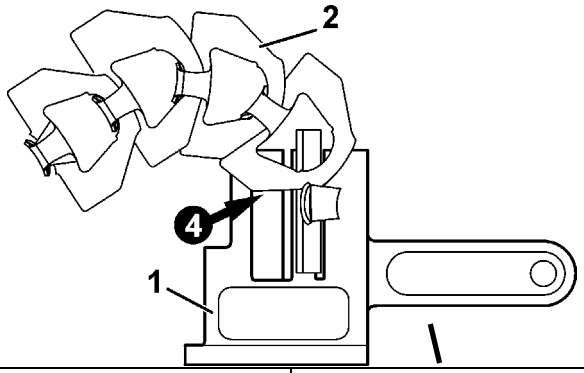
Side view	Front view
	
Handle	Handle
1. Use the slot which is right beside the handle.	2. Introduce the last chain link in the chain breaker slot.

Top view



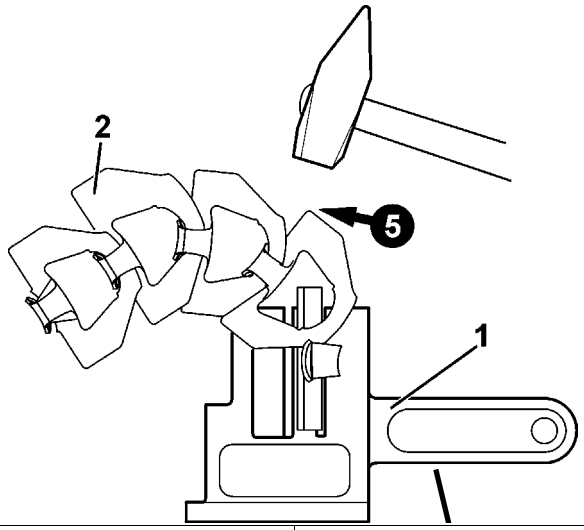
3. Position the closed end of the first chain link over the hole in the convex end of the last chain link.

Side view



4. Turn the first chain link upwards at an angle until its closed end fits into the hole in the convex end of the last chain link.

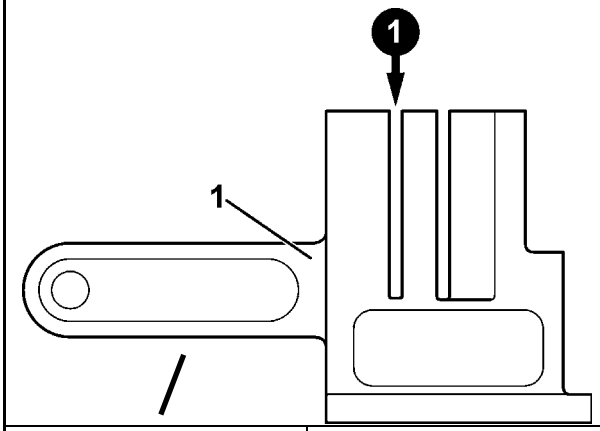
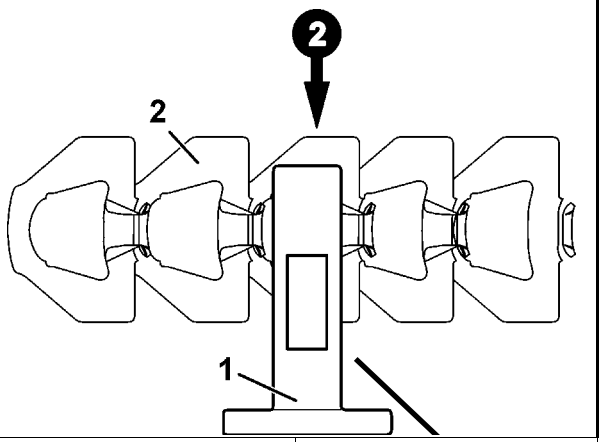
Side view

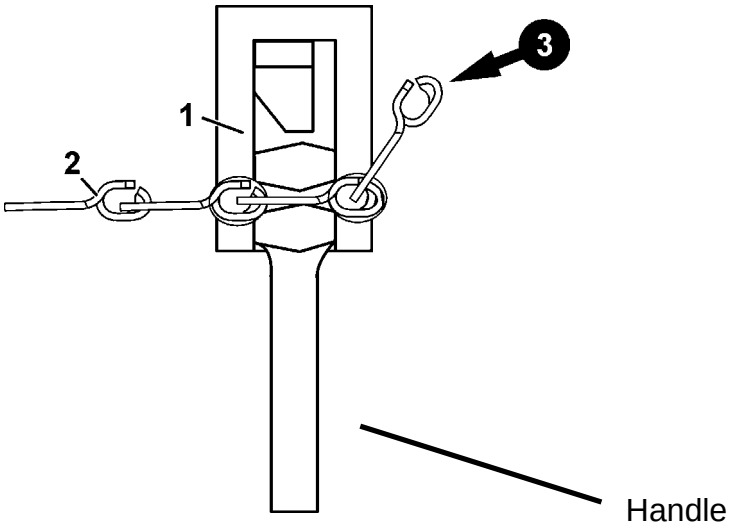


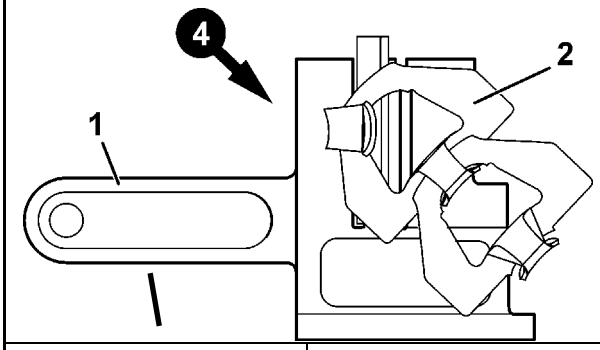
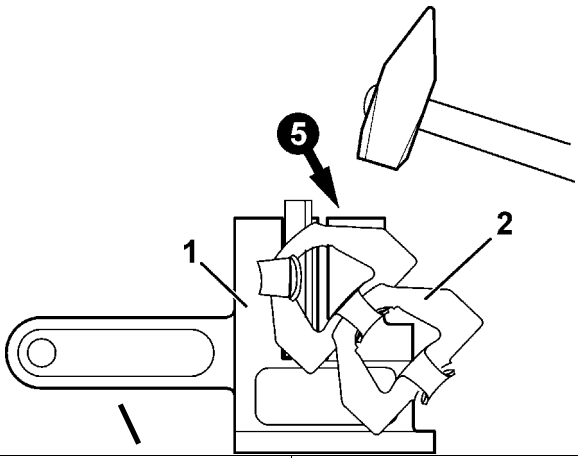
5. Using carefully-aimed hammer blows, tap the first chain link until the two links are joined.

Pos.	Qty.	Code no.	Description
1		10-00-0025	Breaker F/Feed chain,"chain tool"
2		15-15-5001	Feed chain Champion

3.1.6.2 Breaking the chain links

Side view	Front view
	
Handle	Handle
1. Use the slot which is right beside the handle.	2. Introduce the chain in the chain breaker slot.

Top view

3. Bend the chains backwards (away from the handle).

Side view	Side view
	
Handle	Handle
4. Turn the chain downwards, in order to be able to release the closed end of the one chain link from the hole in the curve of the other.	5. Using carefully-aimed hammer blows, tap the chain link until the two links are split.

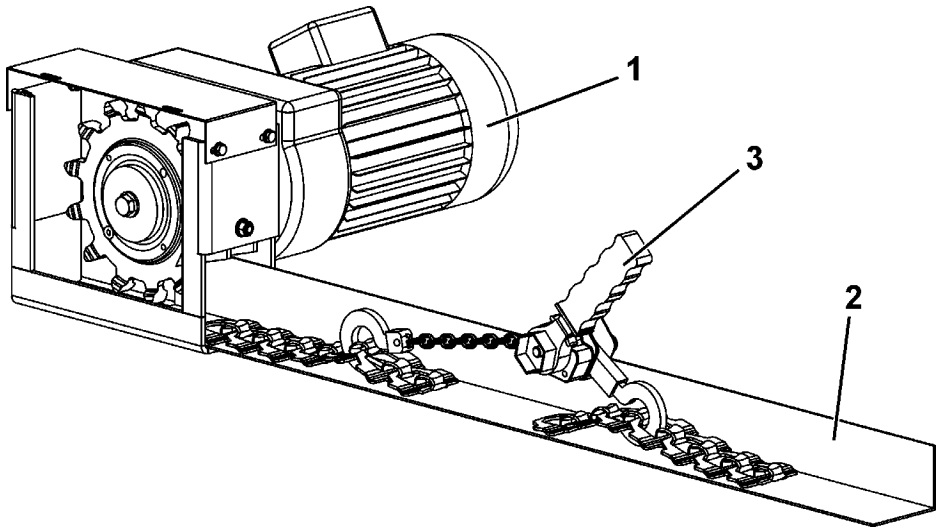
Pos.	Qty.	Code no.	Description
1		10-00-0025	Breaker F/Feed chain,"chain tool"
2		15-15-5001	Feed chain Champion

3.1.7 Tensioning the feed chain

3.1.7.1 Feed chain tensioner

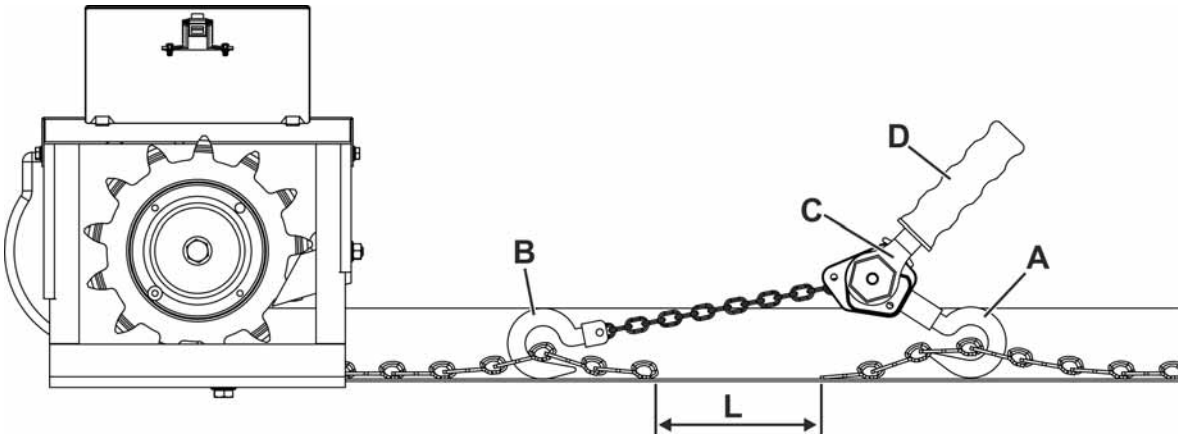
Important:

Observe the instruction manual that is supplied with the feed chain tensioner, **pay special attention to the safety and handling instructions!**



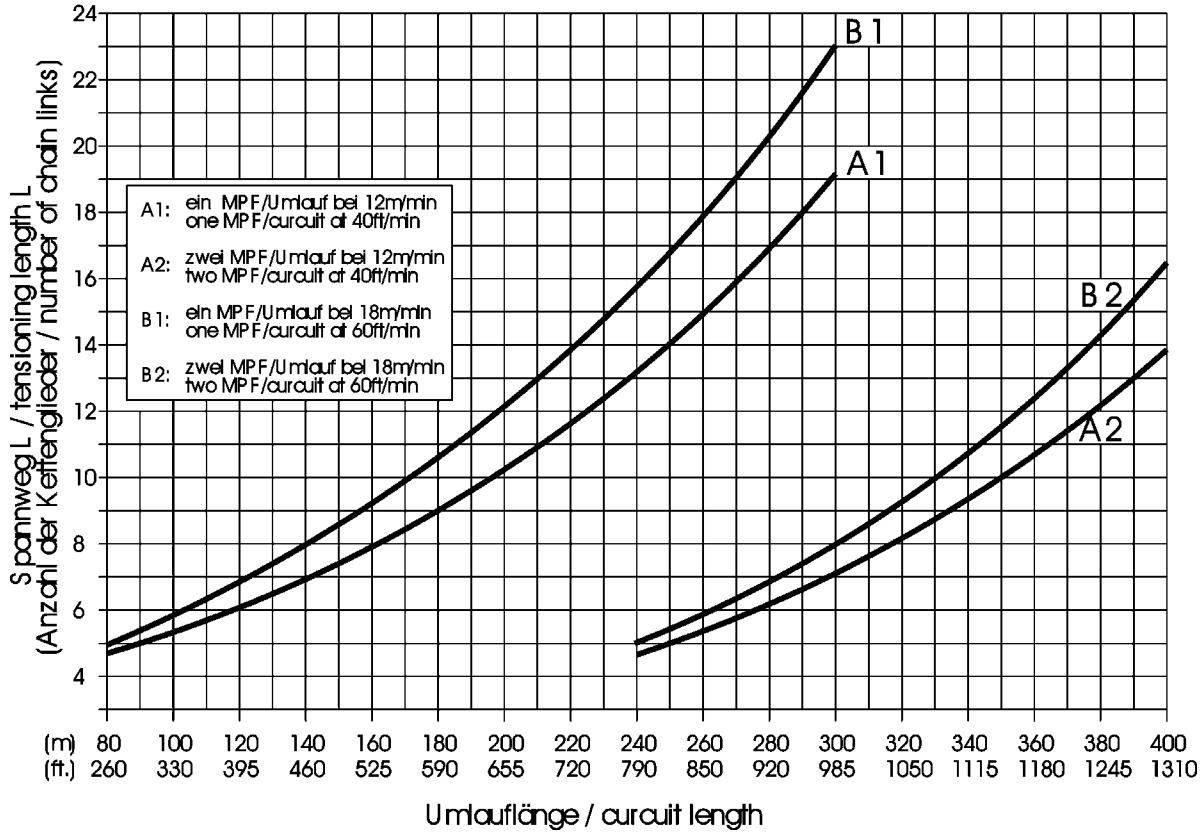
Pos.	Qty.	Code no.	Description
1			Drive MPF
2		15-20-1001	Feed trough 3000 regular 1.2mm (cut)
3		38-91-3100	Chain tensioner tensile load 250kg

3.1.7.2 How to handle the feed chain tensioner



1. Fix the hook **(A)** of the feed chain tensioner behind the drive MPF ccw at the end of the feed chain.
2. Put the lever **(C)** in the central position "FREE" and pull the hook **(B)** from the lever tensioner in order to hook it in at the other end of the feed chain.
3. Move the lever **(C)** to the "UP" position. Tighten the feed chain by pumping the lever **(D)** until the chain lies tight in the entire circuit but **without preliminary tension**.
4. Refer to the diagram "pre-tension of the feed chain" **(see the following chapter)** to see how big the gap **(L)** between the chain ends has to be in order for the feed chain to have the correct preliminary tension for the respective circuit length.
5. Shorten the feed chain to the correct length by means of the feed chain breaker (also seeKapitel 3.1.6).
6. Pump the manual lever **(D)** evenly and pre-tighten the feed chain until ends of the feed chain can be connected.
7. Connect the ends of the feed chain by means of the hammer and feed chain breaker.
8. Move the lever **(C)** to the position "DN" (=down) and release the lever tensioner.
9. Release the two load hooks **(A+B)** from the feed chain and remove the feed chain tensioner.

3.1.7.3 Diagram feed chain tensioning



Example:

1x MPF per circuit with 12m/min. Use curve A1.

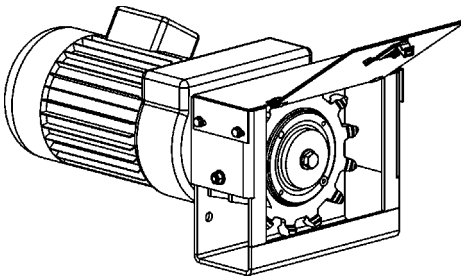
If the circuit is 200m long, the tension distance (gap between beginning and end of chain) is 10 segements long.

	The circuit length includes 4 corners 90deg BD2000. For circuits with more 90deg BD2000 corners, add 12.5m per corner. These values are approximate values only. They are influenced by different factors such as humidity, structure and fat content of the feed. The feed chain is correctly tensioned if the segements of the feed chain slide slightly on top of each other at the exit of the MPF drive but do not lift more than 10mm when the system is running.

	Retension the feed chain Champion after a run-in period of 2 to 6 weeks according to the previously described procedure, since a colour abrasio at the chain links leads to an elongation of the chain.

3.1.8 The gear motor

Remove the plug from the bleeder screw of the gear motor before putting the drive into operation.



- An oil or grease change is not necessary under normal circumstances.
- Perform the oil change as prescribed by gear motor's manufacturer (see label on gear motor). The grease volume for ESTA model gear motors is 90 g for 0.37 kW or 280 g for 0.75 kW.
- As an exception, after leaks, for example, we recommend the following types of grease:

ARAL	aral grease FDO
BP	BP energrease HT-EP-OO
CALYPSOL	calypsol D 8024
ESSO	esso fibrax EP 370
MOBILOIL	mobilflex 46
SHELL	shell special reductor grease H
	shell grease S 3655
	shell semnia grease-O
TEXACO	glissando GF 1464

- Take precautions to prevent condensate and cleaning water from penetrating these devices.
- Clean the motors' cooling fins regularly, to prevent overheating.

3.1.9 Welding the conveying auger

– **Selection of the welding filler metal**

a) Gas metal arc welding

Welding wire: SG 2 Ø 0.8mm

Description according to EN ISO 14341-A: G 42 3 M G3Si1

b) Manual arc welding

Stick electrode 2.5 x 350 [mm]

Description according to EN ISO 2560-A: E 38 2 RB 12

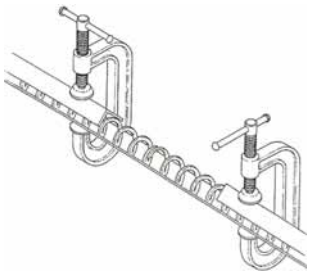
– **Procedure**

• *Step 1: Cleaning and degreasing of conveyor auger*

The ends of the auger must be thoroughly cleaned and degreased before the welding process. For this purpose it is possible to use for example customary wash dilution.

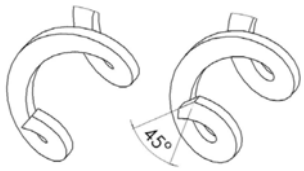
• *Step 2: Alignment of the conveyor augers to be welded*

Both ends of the auger must be aligned and fixed to each other as an L- or U-profile. The fixation of the conveyor augers can be done by means of normal screw clamps.

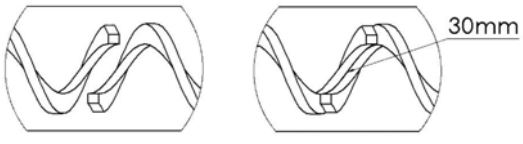


	The longer the profiles for the alignment, the more accurate the alignment of the conveyor augers to each other.

a) In order to prevent damages of the tubes due to sharp edges, the ends of the auger have to be furnished with amply 45° bevels and edges have to be removed.

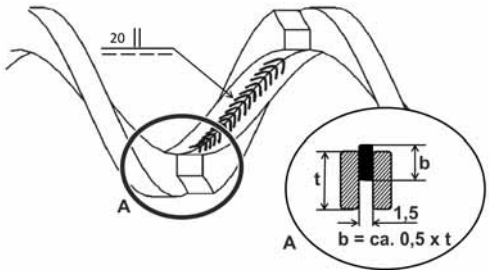


b) Both ends of the augers must overlap 30mm. It is important that they are pushed in front of each other and do not twist them together.



- *Step 3: Preparation of a welding seam*

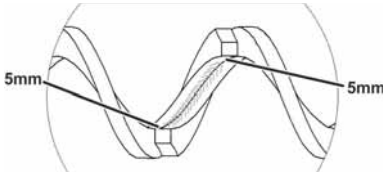
a) Join both auger ends with an internal welding seam with a length of 20mm.



t= height of the auger (in section)

b= maximum depth of the welding seam (approx. 0.5 x t)

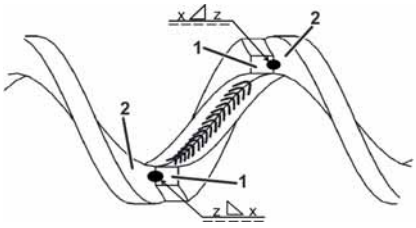
The distance of the welding seam must be 5mm from both ends of the auger.



!	The welding seam has to cool down for approx. 30 seconds after the welding. An acceleration of the cooling-down process for example by means of water is <u>not</u> allowed!

b) After the 20mm welding seam has cooled down, the ends of the auger have to be welded to the respectively other auger by means of an additional welding seam.

Explanation of symbols of the welding seam:



x=	Material thickness e.g. Augermatic auger 3.85mm
b=	0.5 x height of the auger e.g. Augermatic auger 0.5 x 8 = 4[mm]

!	When the welder prepares the welding seam he has to start at point 1 and move the welding device towards point 2. It must be observed that point 2 is not heated for too long as this spot will soften and consequently break during operation.

c) After both welding processes are carried out, there is <u>no need</u> for any rework e.g. with an angle grinder. An edge which might have developed during the welding process does not disturb the feed transport!

If the manual arc-welding procedure was applied, just remove the dross by tapping.

3.1.10 Egg fencing wires

	Please also observe the manual regarding the assembly and operation of egg fencing wires.

3.1.10.1 Maximum length of the egg fencing wire

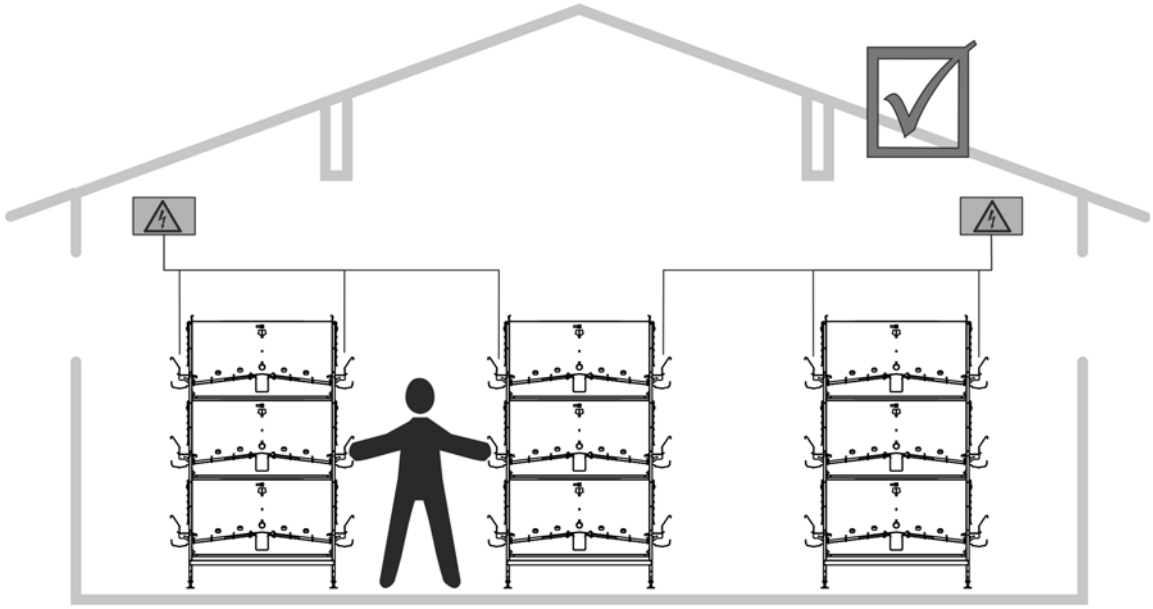
In order to prevent the hens from pecking and eating eggs, an egg fencing wire can be installed.

The maximum length of the egg fencing wire per electric fencer is limited to 2400m since otherwise a sufficient deterrent effect is no longer given when touching the egg fencing wire.

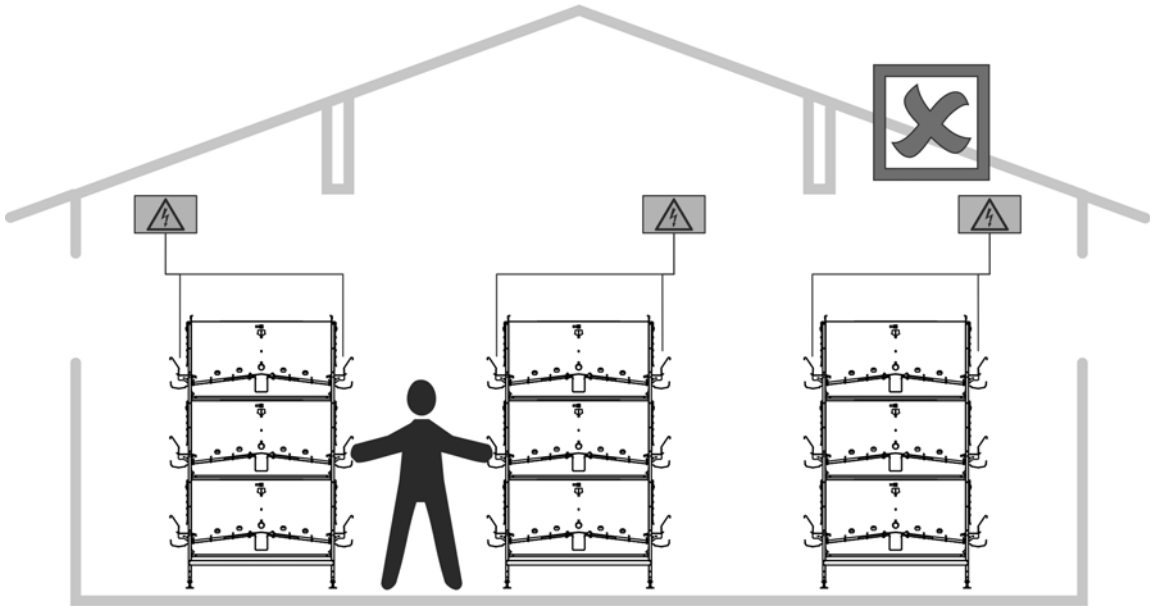
3.1.10.2 Assembly and connection of the electric fencer

	It must be ensured that the egg fencing wires which are fed by several electric fencers, cannot be touched simultaneously be one person. Otherwise dangerous current conductions may occur.

<u>right</u> connection of the electric fencers



<u>wrong</u> connection of the electric fencers



When planning and dimensioning the electric fencers pay attention to the correct connection of the egg fencing wires.

3.2 Egg collection system

3.2.1 Important information

Always keep all transfer points clean. Every day, check and maintain the proper functioning and cleanliness of egg counters, drive pulleys and pressure rollers, as well as of idlers and egg belt cleaners. Immediately remove dirt and repair other faults.

Do not feed too many eggs onto the cross belt and slant belt.

Every day, when switching the drives on, check if the egg collection belts are running centrally on the drive rollers and idler pulleys. If necessary, set rollers correctly.

3.2.2 Lengthwise egg collection

3.2.2.1 Egg belts:

A characteristic of egg belts made from PP (polypropylene) is that they shrink when they cool down. If the PP egg belts are pretensioned during fitting, the shrinking causes the pretensioning to increase. Belts which are pretensioned cannot be adjusted any further. In addition, the bearings for the idler and the egg belt cleaner are under additional stress, reducing their working life.

- Do not pretension the belts!

3.2.2.2 Replace the egg belts

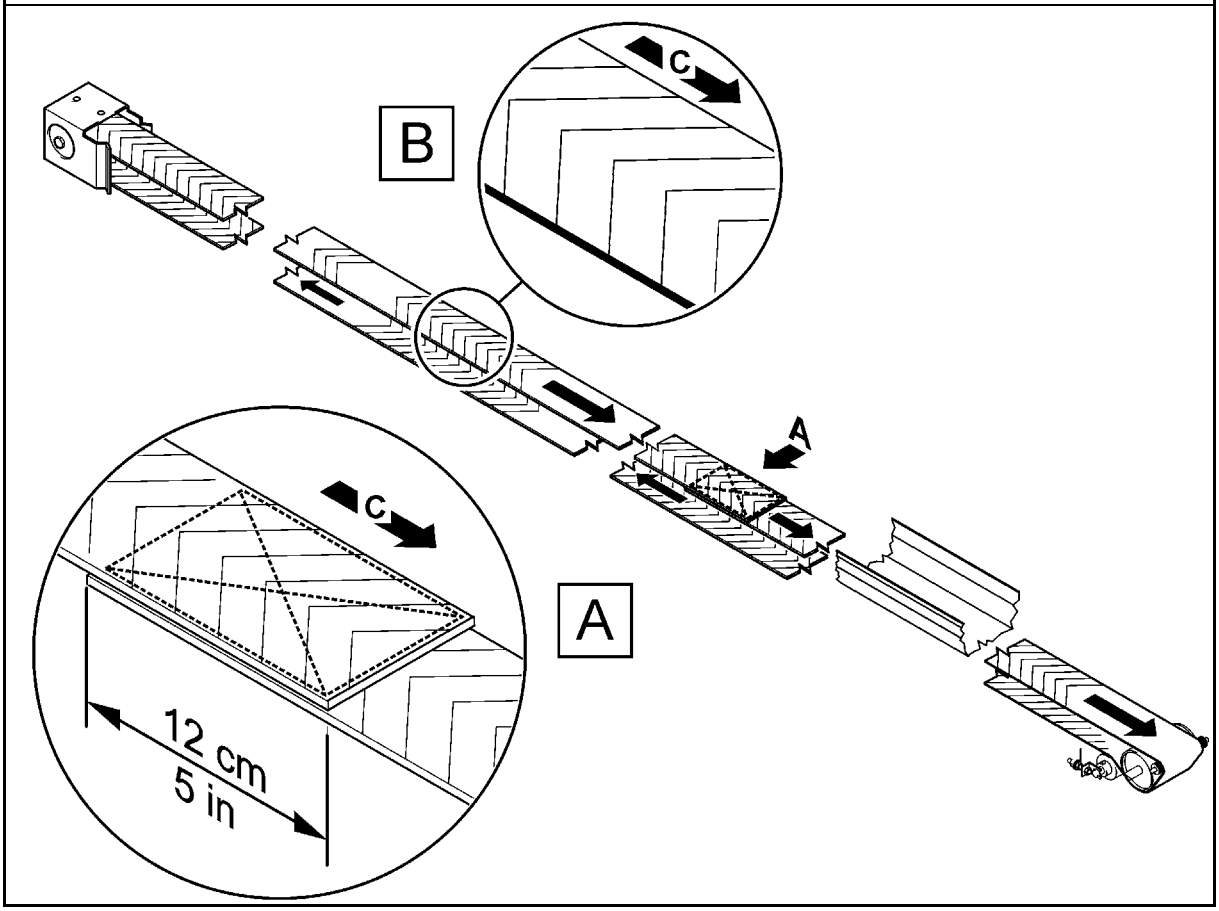
	Pull in the egg belt so that the tips of the fabric pattern point against the moving direction of the egg belt.

- The egg belt has to be tightened towards the egg belt idler unit between the bottom wire mesh and the brackets for the returning belt.
- Guide the egg belt around the egg belt idler unit and pull it back towards the elevator inside the egg channel of the bottom wire mesh.
- Guide the egg belt back through the drive and pressure rollers of the elevator and through the connection channel and back into the egg channel of the bottom wire mesh.
- Tension the egg belt manually enough so that it does not sag more than 5cm between the brackets for the returning belt in the return circuit. Cut it off, allowing for 12cm overlapping.
- Now surface-fuse both intersecting points of the belt with a lighter so that the textile cannot fringe any more.

⚠	Risk of injury and fire!

- Place both ends of the egg belt upon one another on a length of 12 cm in that way that the bordering of the egg belt in running direction cannot butt at the cross wires in the bottom wires
- Now the overlapping can be sewed.

Connection of egg belt



Detail A:

Overlapping of the ends = 12cm

Detail B:

The points of the herring-bone pattern are directed opposite to the travel direction (C) of the egg belt.

☞	Egg belts made of other materials are joined according to the manufacturer's application.

3.2.2.3 Egg belt cleaner

- Each day at startup, check the correct functioning of the egg belt cleaner.
- Each day after egg collection, clean the brushes of dust, dirt and feathers.
- Replace worn brushes.

3.2.2.4 Egg belt drives (in elevators or lifts)

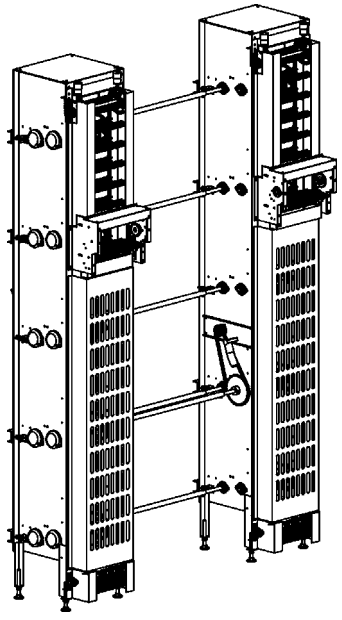
- Coat roller chain drives with oil once per month. Use a paintbrush for this purpose.
- In the case of gear motors, remove the plug from the bleeder screw at the time of installation. Carry out gear oil change according to specifications on the model plate.
- Every day after egg collection, clean the dirty egg collecting boxes and any area where egg has been deposited.
- In order to prevent corrosion to the egg belt drives, **after each wet cleaning** it is absolutely necessary to lubricate all the chain drives.

3.2.2.5 Using an ST (safety transfer) elevator

Every day, check the simultaneous belts and the finger wheel transfers to ensure that they function correctly. Leave all the safety devices working.

Regularly check the adjustment of the metering wheels and the pretensioning of the elevator chains. Correct the settings if necessary.

Oil the elevator chains regularly. This is done via the oil tanks on the top idler which must always be kept full for the purpose.



After a fairly long period of use, the roller chains can become stretched to varying degrees, as more eggs are transported in the area of the outer chain as there is more stress there. Before the chains are completely renewed, they can be rotated in sections.

Maintenance of the elevator chain in the elevator ST:

In our egg elevator ST (safety transfer) the eggs are transferred from the longitudinal egg belt to the cross conveyor by means of plastic bars which are fixed to roller chains on both sides.

After several years of operation, an uneven elongation of both roller chains can occur so that the bars get into an inclined position which has a negative effect especially on high systems (> 6 tiers). This inclined position may be substantial so that the eggs start to roll on the bars. The elongation results from the wearing within the roller chain which - according to experience - always occurs on the outer roller chain. Obviously, this is due to the higher load and the increased dirt accumulation since most of the eggs are conveyed in the outer area of the elevator chain. In this case the elevator chains do not necessarily have to be replaced but can be adjusted by a smart separting and re-assembling. The elvator chain can be divided into several sections. By turning every second section, a uniform length of both roller chains can be achieved so it is possible to reconstruct a correct alignment of each individual bar.

The following material is necessary for the modification:

- Chain joint 3/8"x7/32 (38-94-3544)

  Calc: 8 x per elevator chain for elevators up to 6 tiers

  12 x per elevator chain for elevators of more than 6 tiers
- Strap 200mmx4,5 nature/white (38-90-3809)

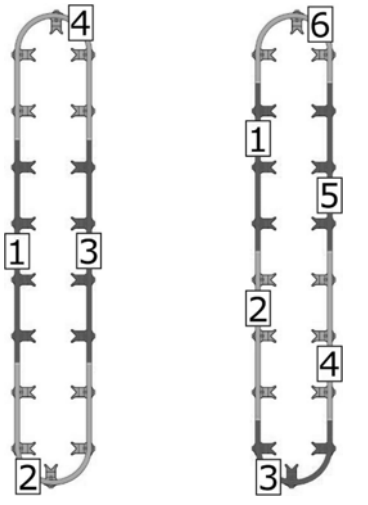
  Kalk: 8 x per elevator chain for elevators up to 6 tiers

  12 x per elevator chain for elevators of more than 6 tiers

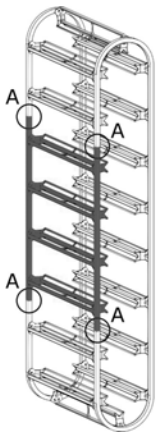
Mounting instructions:

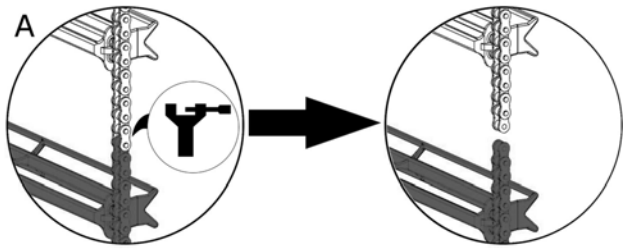
1. The necessary number of chain sections has to be checked: for elevators up to 6 tiers the elevator chain has to be divided into 4 sections. In case of more than 6 tiers a division into 6 sections has to be made.
2. All bars have to be counted and divided by the necessary number of sections (according to point 1). The result is the number of bars per section. Each section must be marked (e.g. by application of coloured insulating tape at each first bar of the individual sections).
3. Loosen the elevator chain on both sides.
4. Fasten the elevator chain directly above and below the first chain section (e.g. with cable strap on the sliding grille) so that the chain cannot unwind after the separation of the chain links and in order to prevent the dosing wheels form changing their position.

up to 6t **more than 6t**



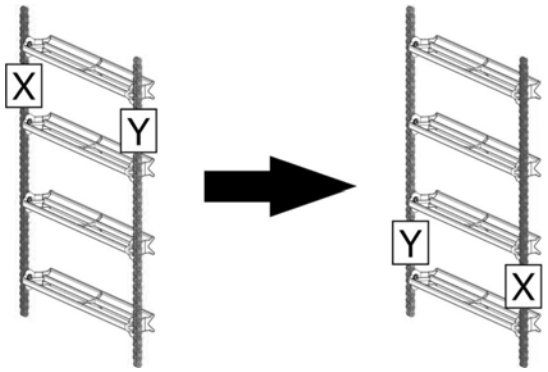
5. The roller chains must now be separated above and below the first chain section. For this purpose, the middle chain link of the chain between the two elevator bars must be opened by means of an appropriate tool (e.g. chain separator).



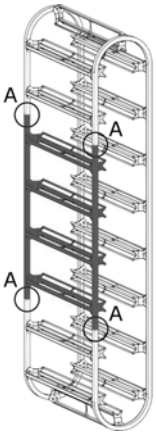


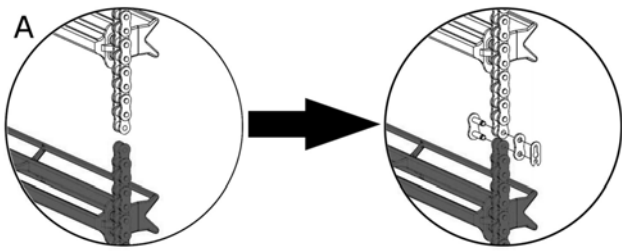
	The elevator chain must only be separated by removing the middle chain link which is positioned between two bars so that the space between the elevator chains is not changed after the chain sections are turned.

6. Now the section of the elevator chain has to be turned in the way that the upper/left end [X] is down/right and vice versa.



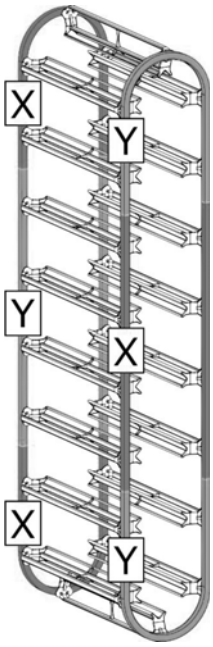
7. Reinsert the turned elevator chain section into the elevator and reconnect them by means of the chain joints 3/8"x7/32 (38-94-3544).





8. Depending on the overall chain length, keep on turning further elevator chain sections if required.

   Note: Every second chain section has to be turned (see following grapics)! First of all, the fixations must be loosened for this purpose according to fig. 2.
9. Now make the elevator chain run up to the next but one chain section.
10. Repeat the steps 4 to 8 until every second chain section is turned.
11. Finally pre-tense the elevator chain ideally on both sides. Now the bars should be realigned quite horizontally.
12. However, if the bars are all inclined too much but quite equally, one of the two roller chains on the idler roller chain wheels has to be shifted by one sprocket upwards and downwards.

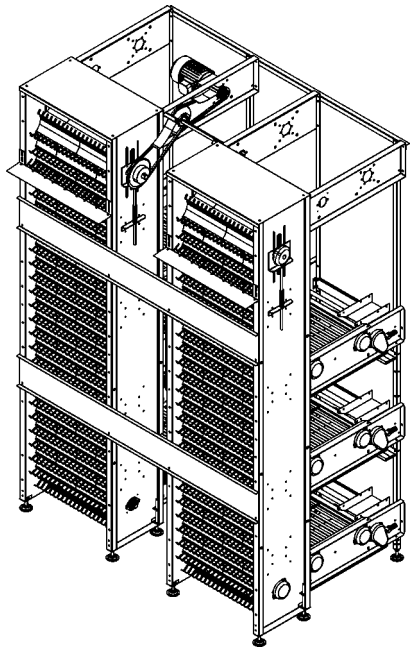


Monthly inspection:

- Lubrication of elevator chains!
- Check the pre-tension of the elevator chains and retension if necessary!

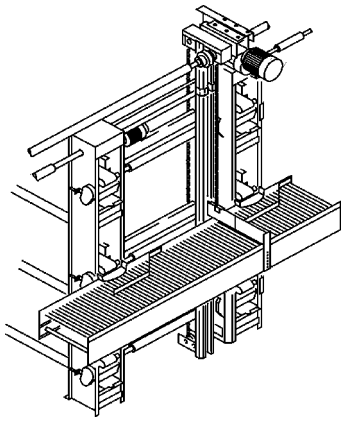
3.2.2.6 Using an EC (EggCellent) elevator

The **Big Dutchman** "EGGCELLENT" egg elevator requires very little servicing. In addition, very few settings are required to achieve correct functioning.



Service interval	Assembly/component for inspection
daily	Check all transfers (longitudinal belt to rod conveyor/rod conveyor to conveyor chain/conveyor chain to cross collection). Immediately remove any foreign bodies present. Functional check of all safety devices
monthly	Check pretensioning of all drive chains on elevator. Retighten the chain adjusters, if necessary.
monthly	Oil all drive chains and chain wheels on the elevator.
monthly	Check elevator conveyor chain for correct tension. It should be possible to pull the conveyor chain out of the vertical unit housing by a maximum of 1 cm/0.5”. If necessary, retighten on the elevator tensioning unit.

3.2.2.7 Using a lift.



Always keep the area underneath the overall cross collection free.

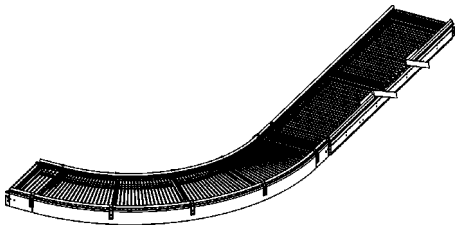
Every day, check the proper functioning of the sliding coupling on each tier.

Regularly check and correct the cross collection position on each tier; reposition the trigger cams, if necessary.

Clean and oil the sliding coupling regularly.

3.2.3 Egg cross collection

3.2.3.1 Cross conveyor



Check that conveyor chains or conveyor belts are running smoothly; readjust immediately, if necessary.

Regularly service and adjust sorting and packaging machine.

Leave all the safety devices working.

- Automatic lubrication: check oil levels and proper functioning of chain lubrication; top up oil, if necessary.
- Manual lubrication: Heed specified lubrication intervals.

3.3 Drive oil-level check on litter supply

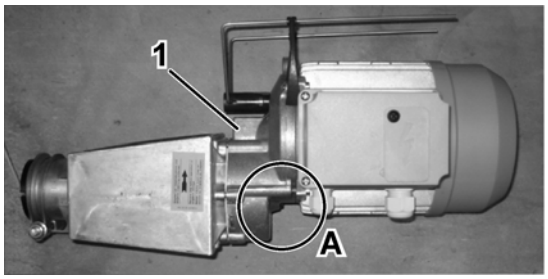
Leaks may occur on the AM5 drive as a result of **bleed plugs not being opened** or of **spraying directly** with the high-pressure cleaner.

To prevent damage, a **visual check** of the Augermatic drive must thus be performed regularly - after each batch!

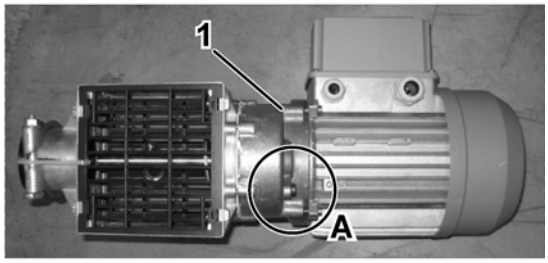
If a leak is detected, the drive's **gearbox oil level** must be checked.

On the gearbox (1) there is a monitor screw (2) which must be opened for checking the oil level.

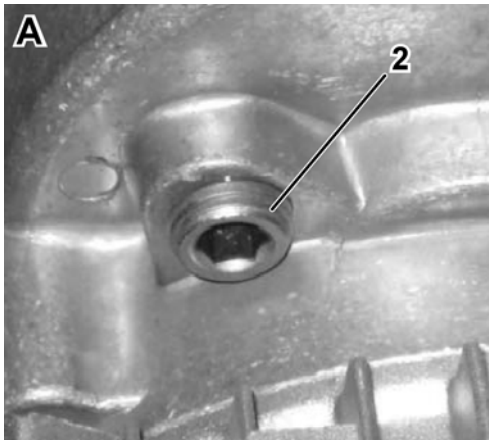
Side view



View from beneath



Pos.	Code no.	Description
1		AM5 drive with switch box
2		Oil level monitor screw



If the gear box leaks oil or if the oil is right beneath the lower edge of the hole, then oil level is correct. Otherwise use oil of specification SAE 85W-90 until it comes out of the monitor hole.

3.4 Manure removal

Regarding the maintenance of the manure removal system, especially the manure belt, please observe the instructions in the manual "Adjustment of the manure belt".

3.4.1 Manure belt drive

- Regularly oil all the roller chains and chain wheels with a paintbrush (oil: SAE 90).
- Clean the motors' cooling fins regularly, to prevent overheating.
- Regularly check the roller chains' pretensioning and retighten them if necessary; also check the locking pin.
- After each procedure:
  - Check chains, wheels and chain adjusters for wear.
  - During cleaning, protect the motors from water.
  - After wet cleaning, oil the chain drives immediately.

3.5 Inspection cart

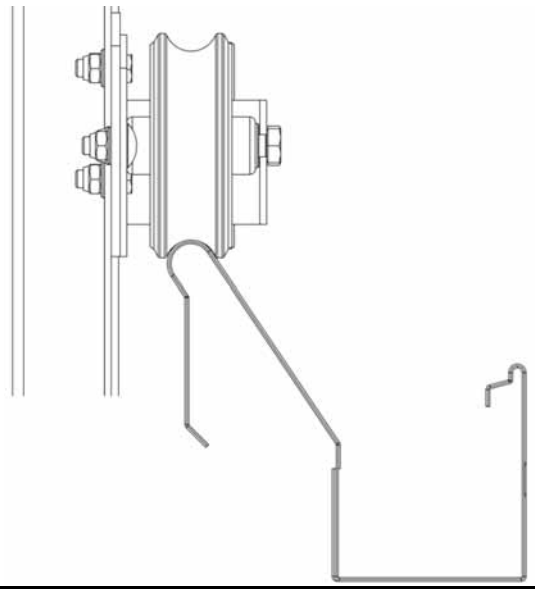
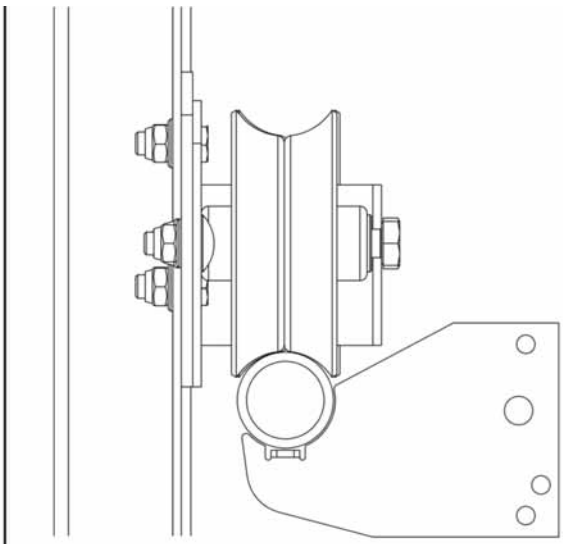
An inspection cart is optionally available. This can be operated on a guidance for container or on the feed trough.

Please consider that the feed trough on which the inspection cart is run has to be an accessible feed trough!

More detailed information regarding the inspection cart are indicated in the corresponding manual for the assembly of the inspection car.

Only inspection cars with rubberized rollers may be operated on the feed troughs in order to avoid that these are damaged.

Inspection carts which are run on the guidance for container may not be retrofitted! The rubberized rollers do not match the tube diameter.

Rubberized rollre on feed trough	Steel wheels on guidance for container
	

3.6 Water supply

	Overflowing water presents a high risk of slipping when mixed with dust and feed residue! Stop leaks immediately!

3.6.1 Danger of frost

	If temperatures below 0° C are expected (with empty house), there is a risk that the nipple pipes will burst from becoming frozen. The water supply tank must then be emptied, as a precaution.

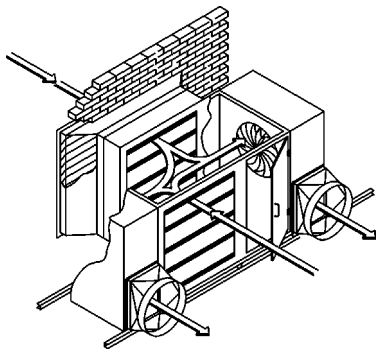
3.6.2 Float tanks

- Once a week, check the floats in the float tanks for a tight seal and correct adjustment.
- Immediately seal leaks in the water supply line.
- Clean the float tanks of deposits. Close the line to the nipple pipes with a dummy plug. Only then can the bleed screw be opened and the tank cleaned.
- Take care that no dirt enters the nipple pipes. This could cause the nipples to block.

3.6.3 Ball tank

- Once a week, check the float-ball tank for a tight seal and correct adjustment.
- During the rinsing process, check whether the rinsing hose is properly attached in the rinsing outlet.

3.7 Air mixer and air duct



Every day, check the proper functioning of fans and of air valves. If necessary, remove dirt from wheels.

Check V-belts regularly for wear and tensioning.

Clean filter mats regularly with vacuum cleaner or compressed air. It is necessary to blow against the airflow with compressed air!

After each procedure, check flexible hoses for leaks/ damage.

3.8 Notes on cleaning and disinfecting.

	Switch off the power, when cleaning live parts. For **wet cleaning** protect damp-sensitive parts, such as switching cabinets and motors, by covering them from splashing water.
	Water presents a high risk of slipping when mixed with dust and feed residue!
	Cleaning agents and disinfectants can cause corrosion! Observe the manufacturer's instructions!

The systems may be either wet-cleaned or dry-cleaned. Wet cleaning makes for a more effective disinfecting process.

The system should only be cleaned one week before putting the birds into the house, or the systems will be damp for a very long time and rust may form.

3.8.1 Before cleaning

- Completely remove feed residue from the system as a whole, along with litter residue and manure.
- Allowed silo and feed screws to run empty, along with the Augermatic pipes for distributing the litter. To do this, first close the litter feed in the feed column.
- Allow the birds to empty the feed troughs,
- open the feed columns and remove remaining feed.
- Fold up manure belt scrapers.
- Egg belts: disconnect jute belts and leave PP belts in the systems.

3.8.2 Cleaning and disinfecting

As soon as the birds have been taken out of the house, the walls and ceilings should be treated with insecticides while the house is still warm. After that, all objects (nest and litter mats, inspection cart, etc.), which can be removed from the house must taken outside.

Before the start of the **wet cleaning** (10 am), the entire insides of the house, the walls and ceilings and the remaining equipment must be soaked. Products which dissolve fat and albumen must be used. The house must be cleaned from ceiling to floor with high-pressure cleaning apparatus. Particular attention must be paid to ventilation components including air-mixers, pipes, edges and the tops of beams.

Adequate light must always be provided for washing, so that dirt deposits can be easily seen. After washing, it is advisable to rinse the surfaces and the equipment with clean water.

Inadequately-cleaned drinkers and water tanks are potential sources of danger. That is why it is essential to clean and disinfect them thoroughly (See Kapitel 3.8.2.1 ”Clean the nipple pipework”). After disinfecting, the drinker pipes should be rinsed thoroughly. It is necessary to prevent disinfectant residue from remaining in the drinkers.

The equipment which has been brought outside, plus the outside areas of the building, including any concreted, must be washed.

The feed residue must be removed from the farm. All parts of the feed supply system and the feed silo must be cleaned, washed and disinfected.

Manure belts and feed chains must be kept running continuously during the wet-cleaning process.

After cleaning, thoroughly pump the cleaning water out of the manure cross-channel.

- You must take suitable measures to check the effectiveness of the disinfecting process. => Take contact and swab samples from house equipment and surfaces. If an excessive level of microorganisms is detected after cleaning and disinfecting, the procedures must be repeated and reintroducing the birds delayed.
- After cleaning, check the holes in the ventilation channels for blockages. Air ducts may have to be cleaned from inside with a brush.
- Oil all the chain wheels, roller chains and rust-sensitive parts again.
- After cleaning, carry out necessary repair tasks.

3.8.2.1 Clean the nipple pipework

- Lower the plastic hose endpiece at the end of the nipple pipework so that the outlet is approx 5 cm over the nipple pipe. This is essential for letting the rinsing water escape plus for preventing air from entering the nipple pipe.
- Insert the water hose in the float tank outlet pipe connection and thoroughly rinse out the nipple tube, using mains water supply pressure. Depending on the length of the system, the rinsing process takes 2 to 4 minutes.
- After the cleaning process, make sure that the water level in the float tank is correct.

4 Troubles and their remedies

The faults listed below are merely examples. The problems listed have not necessarily caused any faults.

4.1 Feeding system

4.1.1 Shear pins break too frequently

- A machine part (feed chain, corner or corner wheel) blocked by a foreign body
  -> remove foreign body
- Feed chain kinks upwards in the feed trough: Chain possibly too loose
  -> correct feed chain tension
- Excessive chain tension causing high tensile load on the feed chain
  -> correct feed chain tension
- Feed chain jamming
  -> a feed chain corner or feed inner coupling must be aligned or changed
- Feed chain catching
  -> rough areas on the drive guided shoe. Smooth off or replace drive guide shoe
- Feed chain drive wheel is worn
  -> it must be reversed or replaced
- Feed chain drive wheel and guide shoe are not properly aligned
  -> correct play of 0.5 mm-1 mm
- Feed chain corner wheels are not rotating
  -> all the corners must be tightened and fitted so that they do not move
- Feed status, number of feeds per cycle too high
  -> correction necessary.

4.1.2 Feed chain broken

- Use only genuine **Big Dutchman** locking pin. Never replace a shear pin with a nail, a screw or any other type of pin.
- Water has entered the feed. Wet feed swells and accumulates in the corners.

4.1.3 Gear motor overheating

- Dust deposits on the housing are preventing the motor from cooling down sufficiently
  ->remove dust
- Motor protection switch not set to the correct amperage
  -> correct setting
- Gear motor wiring incorrect or loose.

  Correct wiring diagram on the underside of the connection cover. Check and correct. A motor wired for 380V is running sluggishly at 220V.

  => Correct wiring
- Oil volume in gearbox incorrect or too low
  -> check volume and condition of gear oil. Change oil if necessary.
- Feed chain tension too high or too low, causing motor overload. Correct chain tension.
- Stopper not removed from bleed screw

  => Remove stopper

4.1.4 Feed chain corner wheels not running

- Feed chain tension too high or too low

  => Check and correct.
- Foreign bodies have jammed a corner wheel

  => Remove foreign body
- Plastic bearing bush worn out

  => Remove corners and replace bearing bush.
- Feed chain corner axle not probably installed in housing

  => Remove and reassemble in correct order.

4.2 Litter supply unit

4.2.1 Hooked bolt M 6x35 broken

- Congestion, obstruction in the auger

  => Localize the place where the tube is empty. Dismount the tube at that place and remove the congestion.

- Auger broken

  => Remove the auger and repair it.

4.2.2 Auger runs unevenly

- Bearing or tension shaft jammed or defective

  => Replace the bearing

- Tension of the auger too low

  => Shorten the auger

- Foreign body in the auger

  => Remove the foreign body

- Auger tensioned too much / Auger has worked loose from the tension shaft

  => Lengthen the auger at the feed column. Control whether the tension shaft is correctly fastened.

4.2.3 Protective motor switch switches off the motor regularly (motor overloaded)

- Insufficient voltage supply to the motor

  => Check the terminal voltage at the motor and compare it with the values specified on the type plate. The cross section of the connecting wire may be too small. Check if the motor 380V is to be connected to 3 phases, however, is only fed by 2 phases.

4.3 Egg collection system

4.3.1 Dirty and cracked eggs

There can be various reasons for the occurrence of dirty and cracked eggs. It is necessary to inspect the complete path of the eggs (floor wire, egg belt, transfers, etc.).

4.3.2 Longitudinal belts and cross belts not running

- Electrical control system faulty

  => Call in electrician to test controls

- Fuse faulty

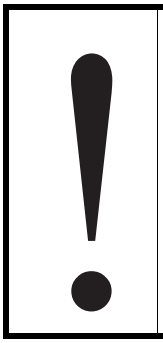
  => Fit new fuse and test motor protection switch

- Shear pin broken

  => First determine causes and remove them. They could be as follows:

  - egg belt has wound itself round the pressure roller (shorten egg belt) or it is sticking.
  - Idler faulty or too many eggs on collection belt.

4.4 Manure removal



In case of a failure during the manure removal, please observe the manual "Adjustment of the manure belt".

4.4.1 Drive pulley slipping

- Too much manure on belt

  => On both sides of the manure belt drive, pull manure belt manually until belt runs by itself
- Pressure roller not being applied

  => Retighten pressure roller
- Pressure roller is wet

  => Keep pressure roller and manure belt dry

4.4.2 Idler roller stuck

- Manure and dust in idler pulley area

  => Clean idler pulley and idler scraper
- Idler pulley and idler scraper are jamming

  => Determine cause and remove it.

4.4.3 Manure belt drive not running

- Power supply interrupted
  -> fit new fuse if necessary
- Roller chain on manure belt drive too loose

  => Retighten roller chain

4.5 Water supply

4.5.1 Float tank overflowing

- Ball valve leaking

  => Fit new seal or valve.

- Water pressure too high

  =>Insert reducing valve and reduce water pressure to 3-4 bar.

4.5.2 Float tank empty

- Insufficient water running

  => Insufficient water pressure - increase water pressure

- Ball valve blocked

  => Remove foreign body

- Water supply failed

  => various causes: pump, etc.; identify and remove immediately

- Water mains pipe too small

  => Increase cross-section

- Water mains pipe blocked by water deposits

  => Fit new pipe and pre-connect filter

4.5.3 Nipple pipes blocked

- Reduction of area by water deposits, fatty medications or foreign bodies

  => Rinse nipple pipes thoroughly and remove and clean nipples if necessary.

- Coupling for pipes has moved

  => Fit new coupling

- Air bubbles in inlet

  => Run plastic hoses without allowing them to sag

- Air bubbles in nipple pipe

  => Rinse nipple pipes out thoroughly and press nipples to bleed them

5 Important information

!	Please take care of this manual and always keep it in the same place close to the installation for quick reference. All persons working with the system, assembling, cleaning and servicing have to be familiar with the contents of these instructions. Please observe the contained safety instructions! If this manual gets damaged or lost, request a new copy from **Big Dutchman**.

5.1 Basics

The **Big Dutchman** installation has been constructed according to the current state of the art and all acknowledged regulations regarding technical safety. The installation is reliable. Upon operation, however, dangers to life and limb of the user or third persons or impairments of the system or other material property are still possible.

The system may only be mounted, attended, repaired und used:

- for due use
- in an excellent state from the safety and technical point of view
- by persons who are familiar with the safety regulations

In the event of special problems which are not described in detail in this manual, we recommend to contact us for your own safety.

5.2 Designated use

The **Big Dutchman** Small Group Housing system serves the objective of housing layers in an appropriate manner and producing eggs.

The **Big Dutchman** system may only be used according to its designated use.

Every other use is considered as non-designated use. The manufacturer does not accept liability for damages resulting from other uses, the user alone has to bear the risk. The designated use also includes the exact following of the operation, maintenance and repair conditions as prescribed by the manufacturer.

5.3 Prevention of reasonably predictable incorrect uses

The following applications of **Big Dutchman** Small Group Housing are strictly forbidden and are considered to be incorrect applications:

- The modification of the prescribed physical embodiments in regard to the position and equipment which is not intended for this system.
- loading the litter pipe with litter materials other than feed, because of the central feeding area (if there is an additional central feeding area).
- Housing of animal types other than laying birds.
- The watering of animals with other liquids than drinking water.
  - Except: feedstuffs additives and medicines which usually are given via the drinking system.
- The feeding of animals with feed that is not intended for chain feeding.
- The use outdoor, especially in areas that are susceptible to frost.
- The use of the system where the temperature inside the house is below 0°C.
- Utilising the system with aggressive and/or corrosive materials in quantities that do not constitute good professional practise.
- Mechanical loading of the system in excess of normal loads intended for the system with the housing of laying birds.
- Unattended manure removal.
- Starting the linear manure removal before the start of the transverse manure removal.
- Overpopulating with more animals than is permissible for the system.

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

Only the user of the system takes the risk resulting from a misuse!

5.4 Explaining the symbols

5.4.1 Safety symbols in this manual

Upon reading this **manual** you will come across the following symbols

	**WARNING** This symbol indicates risks possibly leading to personal injury resulting in death or to severe injuries.
	**CAUTION** This symbol indicates risks or insecure procedures possibly leading to injuries or material damage.
	**NOTE** This symbol indicates notes leading to an effective, economic and environmentally-conscious handling of the installation.

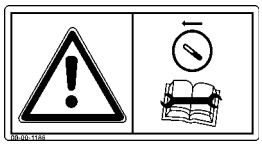
5.4.2 Safety symbols in the manual and on the installation

These safety symbols illustrate remaining dangers when handling the system. They are supplements to the above-mentioned symbols:

	Warning against dangerous electrical voltage
	Warning against the cold
	Warning against slippery surface

5.4.3 Safety symbols and notes on your installation

Depending on the type of installation you will find the following safety symbols. They indicate technically remaining dangers when handling the system and give information on how to avoid these dangers.

	**GENERAL DANGER !** Installation automatically starts working. Before starting repair, maintenance or cleaning work, put main switch to ”OFF”.
	**Danger of bruising due to rotating machine parts!** Close protective devices each time before taking the system into operation. Opening protective devices is only allowed when the system is in a standstill. People have to be authorised for this.
	**RISK OF INJURY due to operating auger, chain or cable discs!** Never reach into or climb into a feed container or trough while the motor is running.
	**DANGER OF SKIN CORROSION due to purifying agents!** Always wear protective clothing when repairing, maintaining and cleaning the installation. Always observe the manufacturer’s instructions when using acids!

Implicitly observe the instructions attached to the installation, such as the arrow on the motor indicating the direction of rotation.

The signs and safety instructions always have to be visible and must not be damaged. If they are soiled by dust, manure, feed remains, oil or grease, clean them by means of a water-detergent mixture.

	**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.**

5.5 Ordering spare parts

Operational safety is the prime necessity!

For your own safety only use original **Big Dutchman** spare parts. For foreign products that have not been released or recommended or for modifications carried out (e.g. software, control units) we cannot judge whether there is a safety risk in connection with the **Big Dutchman** systems.

The exact designations of parts (code numbers) for spare part orders can be found in the separate installation manuals.

Indicate the following for ordering spare parts:

- Code No. and description of the spare part or
- Invoice No. of original invoice
- Power supply e.g. 230/400V-3Ph.- 50/60Hz

5.6 Obligations

Closely adhere to the instructions in this manual.

A basic condition for safe operation and trouble-free handling of this system is the knowledge of the basic safety instructions and regulations.

These mounting and operating instructions, particularly the safety instructions, have to be observed by everyone working with this system. Moreover, the regulations and instructions for the prevention of accidents valid at the respective place of use have to be observed.

The manufacturer is not responsible for any damages to the machine resulting from changes done by the user.

5.7 Warranty and liability

Warranty and liability claims regarding personal and material damage are excluded if they result from one or several of the following causes:

- non-designated use of the installation
- inappropriate mounting and operating of the system
- operating the system with defective safety equipment or not duly fixed or not functioning safety and protective devices,
- non-observance of the instructions in this manual regarding transport, stock keeping, mounting, maintenance, operating and upgrading of the system
- unauthorised modifications on the system
- inappropriate repairs
- in the event of disasters caused by foreign matters or force majeure.

5.8 Disorders due to power failure

We recommend the installation of warning systems for a better monitoring of your production units and the installation of an emergency power-generating set for adequate supply with power in case of power failure. By this, you protect the animals and thus your own economical health. For further information please contact your property insurance.

5.9 First aid

For the case of an accident, unless specified otherwise, a first-aid kit must always be available at the place of work. Material taken out and used is to be replaced immediately.

If you need help, describe the accident as follows:

- where it happened
- what happened
- the number of persons injured
- what type of injury
- who is reporting the accident (your data)!

5.10 Pollution abatement regulations

All works on and with the installation have to be carried out in compliance with the legal requirements concerning waste prevention and proper recycling / disposal of waste.

Special care has to be taken when carrying out installation, repair and maintenance works, as water pollutants like lubricating grease and oils, as well as solvent-containing cleaning solutions are not to pollute the soil or get into the canalisation! These materials have to be kept, transported, collected and disposed of in appropriate containers!

5.11 Waste disposal

After finishing the assembly or repair of this installation, dispose of the packing material and remains which do not need to be further used according to the legal provisions for recycling. The same applies to the component parts after putting the installation out of service.

5.12 Notes for use

We reserve the right to modify the construction and technical data for reasons of further development. Therefore, no claims can be derived from the information, pictures, drawings and descriptions. Subject to correction! In addition to the safety-relevant instructions in this manual and the safety precautions valid in the country of use, also observe the generally acknowledged technical regulations (safe and appropriate working according to UVV, VBG, VDE etc.). In addition to these operating instructions, please also observe the instructions supplied by the manufacturers (e.g. sensors).

5.13 Copyright

This manual is subject to copyright. The information and drawings included in this manual shall not be copied without the manufacturer's consent, nor shall they be used for anything other than the designated use. Neither shall they be given to third parties.

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

All trade marks mentioned or shown in the text are trade marks of their respective owners and are recognised as patented.

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6 Safety instructions

These mounting and operating instructions, particularly the safety regulations, have to be observed by all persons working on this system. Moreover the regulations for accident prevention valid for this place have to be observed!

6.1 General safety instructions

All established safety precautions and other generally accepted safety regulations and medical references have to be observed. Please check safety and function control devices to ensure safe and accurate operation:

- before putting into operation
- at adequate time intervals
- after modifications and repairs.

Check the proper functioning of the system after any kind of repair works. You may only take the device into operation, when all protective systems have been put into place again. Follow the directions of the electric and water supply company.

6.2 Safety instructions when operating electrical appliances

You have to ensure that the system with the electrical appliances is operated and maintained according to the electro-technical regulations.

 	Installation and work on electric components/structural groups may only be carried out by qualified personnel according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160). Dangerous electric tensions are bare in case of open control equipment. Be aware of the danger and keep workers of other professions away from the danger zone !
	Do not install control devices directly in the house, but in the service room to prevent corrosion caused by ammonia gas.

Warning

Never repair or bypass the fuses!

Damaged fuses have to be replaced with new fuses!

Immediately switch off the installation in the event of malfunctions of the power supply units. Use a bipolar voltage probe to make sure that the electrical equipment is not alive.

Check the electrical wiring and cables for recognisable damage before putting the device into operation. Replace damaged wiring and cables before taking the device into operation.

Only use the fuses indicated in the circuit diagram. Immediately replace damaged fuses. Never repair or bypass the fuses!

Never cover the electrical motor. This can cause high temperatures resulting in fire and a break-down of the equipment.

The control box as well as the terminal and connector boxes of the installation must always be kept shut.

Let damaged or broken plugs be replaced by an electrician.

Do not pull the plug from the socket at the flexible cable.

For the respective connections please see the enclosed connecting plan of the system parts delivered.

6.3 System safety instructions

6.3.1 Danger zone

	Never reach into the running installation. Before reaching into the installation, turn the system off and secure it against unintentional actuation. Assure yourself beforehand that the main switch is in the OFF position and can not be put in the ON position without your knowledge.

The different areas of the **Big Dutchman** installations are characterised by different types of construction.

There are several system parts that run out, rotate or slide that can increase the risk of an accident when you are unaware of the type of construction.

There are hazard areas where a risk of injury exists

- due to rotating parts
- due to electrical current in case of non-reliable or defective switching-off of overload current.

6.3.2 Entire system

- Parts lying about on the system or around it can cause you to stumble or fall so that you can get injured by the constructional parts of the system.
- Ignorance of the constructional structure of the system can lead to injuries.
- Parts lying about in / on the components (e.g. in the feed trough, on the egg belt, in the nests etc.) can severely damage the system.

	After repair or maintenance work, never place any objects (e.g. spare parts, replaced parts, tools, cleaning implements etc.) in the accessible areas of the system or around it! Make sure that all loose or replaced parts have been removed from the system components **before** the system is taken into operation again! Make yourself familiar with the construction of the system in sufficient light! If this is not possible at site, get all available information on the remaining dangers in connection with this system! When working **under** the installation, always wear a safety helmet!

6.3.3 Individual components

6.3.3.1 Feeding

- Rotating or sliding parts of the feeding system can lead to injuries!

	Always disconnect the power supply before carrying out any work at the feeding system, as the feeding system switches on automatically when controlled by an automatic switch clock. Never reach into the feed chain that runs inside the feed trough! Never reach into the rotating feed chain drive (always keep the protecting cover closed)! Never touch or reach into rotating or driven parts of the installation.

6.3.3.2 Water supply

- Leaky hoses, seals or nipple drinkers can cause water damage in the house and destroy the installation and electrical systems.
- Danger of electric shock
- Danger of short circuits

	First disconnect main power supply and then enter the house compartment! If you have to carry out maintenance, cleaning or repair work get the information beforehand, where the main electric switch is located. Put main switch to ”Off” and indicate maintenance or repair work by a sign fixed to the main switch! Immediately disconnect main water supply!

6.3.3.3 Egg collection system

- Rotating parts (drive rollers, guide rollers and idler rollers etc.) can lead to severe injuries!

	Never touch drive, guide or idler rollers when the egg collection system is in operation! Make sure all covering caps or protection covers are properly closed and secured!

6.3.3.4 Manure removal

- Rotating parts (drive rollers, guide rollers and idler rollers etc.) can lead to severe injuries!

	Never touch the driving, guide and deflection rollers when the manure collection is switched on! Make sure that all covers and protecting covers are duly closed and secured!

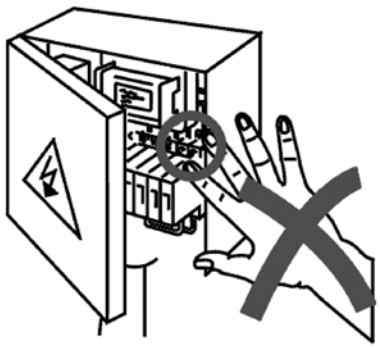
6.3.3.5 Ventilation system

- Rotating fans can lead to severe injuries.
- Fans can start due to their automatic control units.

	Never reach through the protective grills or blade flaps into a fan, even if it is not in operation!

	Before carrying out repair or maintenance work, disconnect power supply and indicate this by a sign fixed to the main switch!

6.3.3.6 Electrical components



 	**High electric tension!** If touching live parts, severe injuries due to electric shocks are possible! During repair or maintenance work, live elements can be bare! Never touch bare electrical components. Staff members must not use machines with bare electrical components.

6.4 Personal safety instructions

These safety instructions are intended to make you familiar with all information regarding the system that are important for your safety and that of the system.

Maintenance may only be carried out by specially trained and briefed users.

Keep with the safety instructions in this manual.

	Missing knowledge on the structural design of the installation can lead to injuries. Make yourself familiar with the design and construction of the installation Inform yourself and your colleagues about the remaining dangers in connection with this installation!

6.4.1 Clothing for personal safety

	Wear close-fitting clothes when carrying out mounting, maintenance and cleaning work at the installtation. Do not wear rings, chains, watches or other items which could get caught at parts of the installation.
	Never work with long hair that is not tied together. Your hair could get caught in moving devices or system parts and thus cause serious injuries.
	During all mounting, maintenance and cleaning work at the installation, wear protective clothes and shoes as well as safety glasses and gloves if required.

6.4.1.1 Clothing and footwear

- Wide, fluttering clothes increase the risk of an accident.
- Wide pieces of clothing, ties, scarves etc. can get caught in the moving or rotating system parts.
- High heels are a safety risk.
- If you stumble, you can knock against sharp-edged, moving or rotating system parts and get severely injured.

	Secure wide, fluttering clothes or take them off! When working at or on the system, only wear slip-free footwear and safety shoes when replacing heavy system parts!

6.4.1.2 Jewellery

- Loose or large jewellery increases the risk of an accident.
- The large or loose parts of jewellery can get caught in components of the installation.

	Take off all jewellery, particularly necklaces, bracelets and rings!

6.4.1.3 Hair

- Long hair increases the risk of an accident.
- Long hair can get caught in moving or rotating system parts.

	Secure long hair by tying it back or wearing a bandanna or cap!

6.5 Safety contrivances

It is strictly forbidden to remove or put out of operation any safety contrivances. This leads to risk of injury and danger of life! Should the safety devices be damaged, the system has to be put out of operation immediately. The main switch has to be locked in zero position.

6.6 Dangers resulting from non-compliance with the safety instructions

Non-observance of these instructions can cause severe danger for life and health of people or can lead to material or environmental damages and to the forfeiture of any claim for damages. To be precise, the non-observance of these instructions can lead to:

- Failure of vital functions of the installation
- Failure of prescribed maintenance methods
- Dangers for people owing to electrical and mechanical influences.