User Manual

Repromatic

Code No. 99-97-0006

Edition: 11/2017 GB

EC Declaration of conformity

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In accordance with EC Directives:

- **Machines 2006/42/EG, Annex II / Part 1 / Chapter A**

Further applicable EC directives:

- Electromagnetic compatibility 2014/30/EU
- Low voltage 2014/35/EU
- Construction Products Regulation N° 305/2011
- Directive Ecodesign 2009/125/EC

The product mentioned below was developed, constructed and produced in accordance with the above mentioned EC Directives and under sole responsibility of Big Dutchman.

Description:	Chain feeding system for floor management
Type:	Repromatic
System no. and year of construction:	see customer order no.

The following harmonised standards apply:

- DIN EN ISO 12100:2011-03 Safety of machinery - General principles for design - Risk assessment and risk reduction
- EN 60204-1:2006/AC:2010 Safety of machinery - Electrical equipment of machines Part 1: General requirements
- DIN EN ISO 13850:2016-05 Safety of machinery - Emergency stop - Principles for design
- DIN EN 4414:2011-04 Safety of machinery - Safety requirements for fluid power systems and their components - Pneumatics

Authorised person for technical documents: Productmanager "Poultry meat production"
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Head of BU .....

Vechta 28.08.16 Chief Engineer BU i.A. .....

Place Date Signer and information regarding signer Signature

Overview of changes / updates in the manual

Chapter name	**Type of change / update**	**Product information** */ editor*	**Issue date**	**Page**
3.3.4.2 ”Inner and outer FXB cylinders”	Feed values updated, notes inserted	*SSa*	11/2016	25
, , ,	Chapter updated	*SSa*	09/2016	
	Correction of feed volumes FXB	*MRe*	09/13	
	Correction of feed volumes Repropan	*MRe*	09/13	
	Chick paper added		02/12	
	Section inserted		04/10	

1 Basic instructions

!	**Important:** Please take care of these documents and keep them close to the system **at all times for quick reference**. All persons operating, maintaining and cleaning this system have to be familiar with the contents of these instructions. Observe these security instructions whenever any work is carried out on this system! Manuals can be reordered from **Big Dutchman** when necessary.

One of the following information is required to reorder a manual:

- the 8-digit code number of your language version [99-97-xxxx] as stated on your manual's cover;
- the complete title of the manual including information on the type of instruction;
- if stated, the 8-digit universal code number [99-94-xxxx] including information on the required language version.

1.1 EC declaration of conformity

We hereby declare that the system described in this manual corresponds to the relevant health and safety requirements according to the EC directive because of its design and construction as introduced to the market by us.

The declaration of conformity can be found at the beginning of the manual.

1.2 Purpose of the BD manuals

Depending on the intended use, **Big Dutchman** provides the following documentation:

1. Assembly manual
2. User manual
3. Operation manual (assembly and use of the system)
4. Spare parts lists
5. "Local add-on manuals": (for products which differ from those of the original manual in specific countries).

The type of instruction of your manual can be found on the cover above the title.

1.3 Basics

The **Big Dutchman** system has been built with state-of-the-art technology and fulfils the recognized technical safety requirements. It is safe to operate. However, danger to the life and limb of third parties or impairments to the system or other property can occur if it is used in an incorrect manner.

The system may only be installed, used, serviced and repaired under the following conditions:

- in accordance with its designated use
- in an excellent state from the safety and technical point of view
- by trained, safety-conscious personnel familiar with the hazards associated with the machine's use.

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

1.4 Explanation of the symbols and structure of these instructions

1.4.1 Structure of the safety instructions in this manual

Basic structure:

Pictograph	**Type of danger**
	Possible consequence(s) of non-compliance
Signal word	• Measure(s) against the danger

Meaning of the signal words:

Pictograph	**Signal word**	**Meaning**	**Consequences of non-compliance**
Possible personal injuries:			
possible safety symbols: see chapter 1.4.3	**DANGER**	**directly** dangerous situation	**Will** lead to death or severe injuries.
	WARNING	**possibly** dangerous situation	**May** lead to death or severe injuries.
	CAUTION	**possibly** dangerous situation	**May** lead to minor injuries.
Possible damage to property:			
	**CAUTION**		**May** lead to damage to property

1.4.2 Structure of the general instructions in the manual

IMPORTANT!

This symbol indicates important information. There is no risk of personal injuries or damage to property.

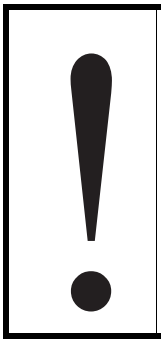
1.4.3 Special safety symbols in the manual and on the system

These safety symbols (pictographs) illustrate remaining dangers when handling the system. They are used in the safety instructions of this manual (also refer to chapter 1.4.1) and on the system.

	Warning: general danger
	Warning: dangerous electric tension
	Warning: danger of tripping
	Warning: hand injuries
	Warning: danger of entanglement due to straps / transport belts

1.5 Necessary qualifications of the persons working with the system

1.5.1 Employing external personnel



IMPORTANT:

The supervisor is responsible for the safety of external personnel.

Mounting works are frequently carried out by external personnel not familiar with the circumstances specific for the system and the inherent dangers.

You as operator are to survey the personnel and to define responsibilities and powers. Inform these people in detail on the dangers of their area of work. Check their method of working and intervene as soon as possible.

1.5.2 Assembly

Assembly of the system can be carried out by the farmer himself or by a person authorized by him. We assume that the operator or the authorized person either have received technical training or have the necessary knowledge or practical experience that are necessary for a proper assembly of the system.

1.5.3 Electrical installation

Work on the electric components may only be carried out by technically skilled personnel and according to German Industry Standards, VDE regulations, safety instructions and electro-technical regulations of the power supply industry (EVU) and the applicable national regulations.

1.6 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.

This manual, particularly the safety instructions, must be observed by all persons working on 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 damage to the system resulting from changes not authorized by **Big Dutchman**.

1.7 Warranty and liability

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

- inappropriate assembling of the system;
- non-compliance with the instructions in this manual regarding transport, storage and assembly;
- unauthorized modifications to the system;
- disasters caused by foreign matter or force majeure.

1.8 First aid

In the case of an accident, a first-aid kit must always be available at the place of work, unless otherwise specified. 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.

1.9 Transport

Due to the high number of possible building units and parts, we can only supply general information in this manual. This information should be sufficient for experienced technicians and transport experts. If you have questions, please contact **Big Dutchman**.

The system is supplied in pre-assembled building units and packaging units. They have to be secured adequately against shifting and tilting during transport. The transport has to be carried out by experts.

The building and packaging units are transported to the construction site with appropriate means of transport. To avoid any possible damage, make sure that the units are loaded and unloaded carefully. If the goods are transported by hand, please keep in mind the reasonable human lifting and carrying abilities.

See that the transport is carried out safely. Avoid bumps and impacts and see to a secure standing at every stage of the transport.

The scope of the delivery is listed in the shipping documents. Please check for completeness upon receipt. Possible transport damage and / or missing parts have to be reported immediately in writing.

1.10 Storage

 **CAUTION**	**Thermal expansion causes by temperature changes**
	• Store the building parts where they will be needed so that their temperature can adjust to the environment.

The storage area should be dry and roofed. If this is not possible, the parts should be covered with PE-foil and stored with enough ground clearance. Make sure that, when stored, the parts are protected against dust and moisture.

 **CAUTION**	**Storage of electrical parts**
	• Store all electrical parts in a dry and closed space.

Open-air storage is acceptable only for a short time. If stored outside for a longer time, the parts have to be protected against harmful environmental influences. They also have to be protected against mechanical damage.

1.11 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.

Water pollutants like lubricating grease and oils as well as solvent-containing cleaning solutions may not pollute the soil or reach the canalisation! These materials have to be kept, transported, collected and disposed of in appropriate containers!

1.12 Waste disposal

After completing the assembly, dispose of the packing material and all remains which cannot be used further according to the legal provisions for recycling.

1.13 Notes for use

In the interest of further development, we reserve the right to modify design and technical data of this installation.

No claims can therefore be derived from any information, illustration or drawing and description contained herein. Errors and omissions excepted!

Inform yourself about adjusting, operating and maintenance requirements before putting the system into operation.

Apart from the safety information in this manual and the obligatory accident prevention regulations applicable in the user's country, please heed the accepted technical rules (safe and expert working in accordance with UVV, VBG, VDE etc.).

1.14 Copyright

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

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

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

All trademarks mentioned or shown in the text are trademarks of their respective owners and deemed patented.

For further information please contact:

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2 Safety instructions

2.1 Instructions on accident prevention

Before assembling this system, the operator or person authorized by him is obliged to instruct any person carrying out any of these works on

- the remaining dangers when carrying out these tasks
- the applicable rules and regulations regarding accident prevention and to ensure they are complied with!

The basis for these are:

- the installation's technical documentation, specifically the included safety instructions,
- the applicable safety and health regulations applicable at the place of work.

2.2 General safety instructions

	**Risk of injury**
	Children in the area of the system are at risk of injury as they can often not be supervised sufficiently and are not able to recognize hazards.
WARNING	• Ensure that children do not use the system as a playground and are not left unsupervised in the vicinity of the system. Explain remaining dangers fully to the children.

The respective safety precautions and other generally accepted regulations regarding safety and operational health have to be observed.
Please check safety and function control devices to ensure safe and accurate operation:

- before putting into operation
- in adequate intervals (confer maintenance intervals)
- after modifications or 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.

Also observe the regulations of local water distribution and power supply companies.

2.3 Personal protective equipment and measures

 **WARNING**	**Risk of injury**
	The following instructions apply to all works carried out on the system. • Wear **close-fitting protective clothing** and **protective footwear**. • Use **protective gloves** where there is a risk of hand injuries and **safety goggles** where there is a risk of eye injuries. • Do not wear **any rings, necklaces, watches, scarves, ties or other items** which could get caught in parts of the system. • Make sure that **long hair is always tied back**. Hair can get caught in powered or rotating working units or parts of the installation, resulting in severe injuries. • When working underneath the installation **always** wear a **hard hat**!

2.4 Initial operation

 **CAUTION**	**The following must be strictly observed for initial operation:**
	• Initial operation must be carried out by a qualified technician with the respective proof of knowledge (service technician). • The following protocols and minutes required by **Big Dutchman** must be filled out during initial operation and made available to the operator: confirmation minutes and, if necessary, the corresponding inspection minutes.

2.5 Protective-equipotential bonding (earthing) of the system

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

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

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

Recommended connection points:

1 x per system row near to the foundation earth electrode.

2.6 Positioning of electrical drives and protected cable guiding

The following item is decisive for a smooth and long-term safe operation:

- the correct positioning within the system according to the assembly instructions.
- preferred assembly outside the direct bird area if no clear specification was made or cannot be made.
- a correctly installed and protected electrical cabling.

If carried out carefully, the above mentioned items contribute significantly to the work safety and animal welfare as well as to the preventive fire protection.

Notes regarding the assembly positions for the drives can also be found in the planning documents. The assembly positions described there must be observed.

	**Consequences:**
	Bare live cables can cause electric shocks to humans and animals or short circuits in the electrical installation. Bent cables can lead to cable breaks. These can cause a fire due to a possible overheating of the cable.

	The drives which must be positioned and wired in the bird area due to their function, have to be installed and connected with greatest care.

The following points must be observed for the drive units and their cable guiding in the animal area:

1. **Protected cable guiding:**

   Lay the cables with protection so that the animals cannot reach the cables or their live wires!

– This can be carried out by a very close cable guidance and fixing to the components of the system and through covers respectively mechanical protective equipment, as e.g. tubes (flexible or rigid) and cable channels.

2. **Minimum permissible bending radius of the cables and wires:**

   Observe the minimum permissible bending radius depending on the mechanical structure of the cable/wire!

   – If the bending radii are not observed, the mechanical structure of the cables and wires will change due to material stretching and compression!

	**Consequences:**
	The electrical properties of the cables can be affected and cable breaks can occur. Cable breaks can cause short circuits or overheating of the cable and can therefore lead to fire.

3. **Tension-protected cable laying:**

   Fasten the cables/wires by means of clamps, straps, strain relief, etc. so that the electrical properties of the cables and wires are maintained for the loads to be expected (including overload and short circuits) during operation.

4. **Cable entry in devices, junction boxes, drives etc. from below:**

   Always guide the cables and wires from below into the devices, junction boxes, drives, etc., if possible!

   – This kind of cable guidance prevents that condensation or cleaning water which flows along the cable, will penetrate the components and thus cause a short circuit.

   However, if this type of cable guidance is not possible, lay the cable with a water drip bow front of the cable entry of a components. The water can drip off from this bow before entering the component.

5. **Observe protection class (splash protection):**

   The splash protection must be ensured when entering the cables in a housing.

   – The cable entries must not be too large since otherwise splash water will penetrate the housing and can thus cause a short circuit. The figure shows a junction box inappropriate for wet cleaning.

The points 4 and 5 are very important aspects which are decisive for a later wet cleaning of the system. Short circuits can be avoided.

6. **Cable guidance through sharp-edged components (e.g. metal ceilings):**

   Protect cables and wires which are guided through sharp-edged drill holes at these positions of passing!

   – The protection can be ensured by using cable glands or other mechanical protection components (as e.g. tubes) at the position of passing.

	**Consequences:**
	Bare cables can cause an electric shock when touching and can result in a short circuit.

- The installation, connection and put into operation of electrical components may only be carried out by skilled electricians.

Definition skilled electrician: (according to DIN VDE 1000-10)	A skilled electrician is a person who can evaluate the works assigned to him and recognise possible dangers due to his technical training, knowledge and experiences as well as knowledge of the relevant regulations.

- Notes and specifications of the connection diagrams and documentations belonging to the system.
- Following international regulations:
  – **IEC 60364-4-41 / VDE 0100-410**

    Construction of low-voltage installations - part 4-41: Protective measures - Protection against electrical shock

  – **IEC 60364-5-51 / VDE 0100-510**

    Construction of low-voltage installations - part 5-51: Selection and erection of electrical equipment - General regulations

  – **IEC 60364-5-52 / VDE 0100-520**

    Construction of low-voltage installations - part 5-52: Selection and erection of electrical equipment - Cable installations - Limiting the temperature rise at interface connections

– **IEC 60364-7-705 / VDE 0100-705**

Construction of low-voltage installations - part 7-705: Requirements for special installations or locations - Electrical equipment of agricultural and horticultural premises

- The rules, regulations and norms valid in the respective country, which relate to a professional construction of an electrical system.

2.7 Use of electrical appliances

  **WARNING**	**Risk of injury and danger to life** **Dangerous electric tension may be bare in the case of open control units and may cause severe injuries or lead to death!** • Be aware of the danger and keep workers of other professions away from the danger zone. • Installations and works on electric components/building units may only be carried out by qualified persons according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).

 **CAUTION**	**Corrosion caused by ammonia gas** **Ammonia gas may corrode control units.** • Never install control units directly in the house but in the service room.

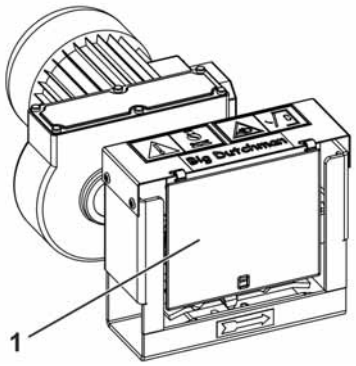
- Only use the fuses indicated in the circuit diagram.
- Do not pull the plug from the socket at the flexible cable.
- For the respective connections please see the enclosed connecting plan of the system parts delivered.

2.8 Overview of the safety components

The system described in this manual may only be operated if the listed safety component parts have been mounted and installed correctly and have been checked for correct functioning!

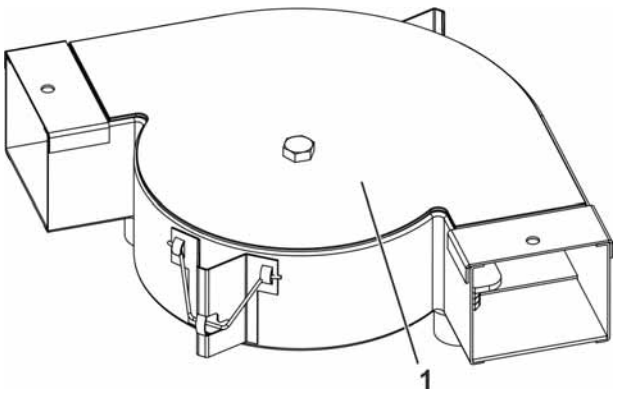
If safety component parts are missing or defective, the original part must be ordered from **Big Dutchman** and replaced immediately!

2.8.1 MPF drive



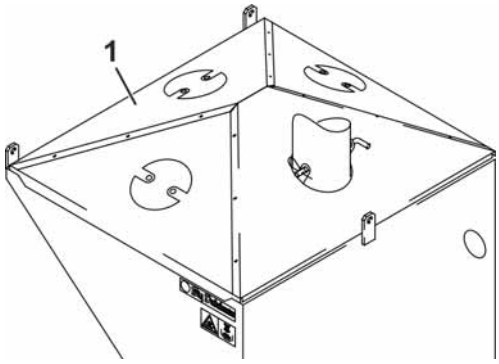
Pos.	Code no.	Description
1	10-93-3173	Protecting cover MPF 1 line cpl. collapsible

2.8.2 Feed corner 90 degrees



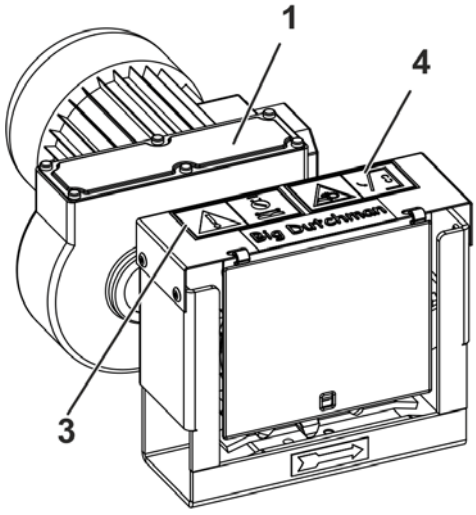
Pos.	Code no.	Description
1	83-00-4430	Cover for corner 90° BD2000

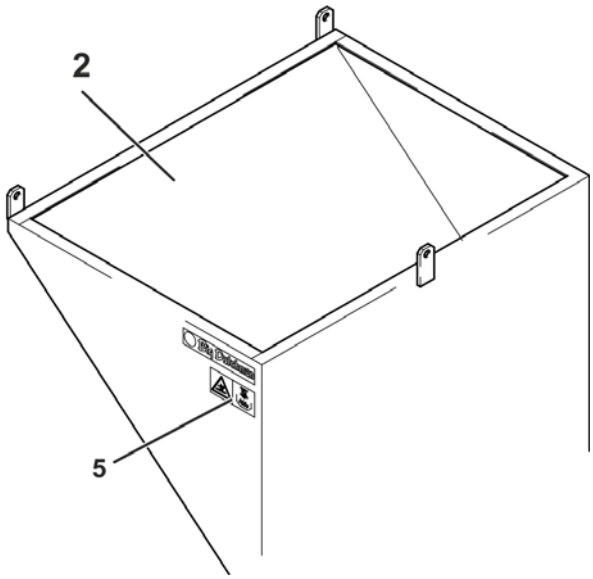
2.8.3 Feed hopper



Pos.	Code no.	Description
1	11-31-3851	Cover for feed hopper RPM 1l-1w
	10-93-3503	Cover cpl for extension column MPF Mini 1 - 4 lines

2.9 Overview of safety symbols and hazard warnings on the system





Pos.	Code no.	Description
1	81-04-4197	Body for corner RPM/Challenger incl. chain guide rail
2		Feed hopper RPM
3	00-00-1186	Pictograph: Before maintenance work main switch "OFF"
4	00-00-1187	Pictograph: Protective devices
5	00-00-1188	Pictograph: Risk of injury / hopper

2.10 Dangers resulting from non-compliance with the safety instructions

Lack of compliance with these instructions can cause severe danger to personal life and limb and damage the environment or the installation and may lead to the forfeiture of any damage claims. The non-compliance with these instructions can specifically lead to:

- failure of vital functions of the system,
- failure of prescribed maintenance methods,
- risk of injury due to electrical, mechanical and chemical influences.

3 System description

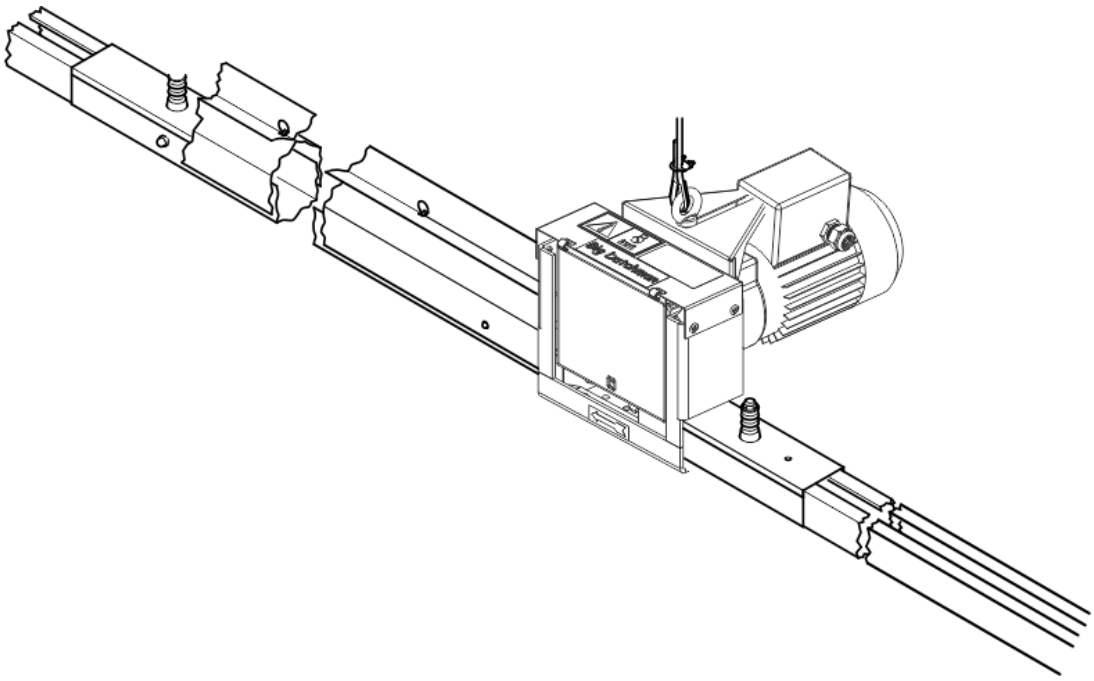
The **Big Dutchman Repromatic** is a specially designed feeding assembly for broiler breeders equally suited to the requirements of 1-day old chicks as well as mature laying hens.

While on the one hand, broiler breeders are genetically predisposed to realise enormous growth but on the other hand, the objective of production at this level is to produce hatching eggs, very special feeding requirements must be fulfilled.

This includes especially the restrictive feeding, i.e. the providing of a daily ration that falls below the amount the animals can consume.

A physically and sexually uniformly developed flock can be achieved when practising restrictive feeding only if:

- every hen is provided a feeding location that is sufficiently wide. In this way, each individual animal is provided the opportunity to feed without stress during the entire feeding period.
- all of the hens in the flock feed at the same speed during the entire feeding period. This is achieved with an extremely low fill-level in the feed pan which forces the animals to feed more slowly.
- every hen is provided the same quality of feed with regard to calcium and crude protein.
- all hens can feed at the same time. This is achieved by the high conveyor capacity and the **Repromatic's** special control.



The heart of the **Repromatic** feeding assembly is the conveyor system by which the feed pans are filled. It comprises the drive, the feed pan, the feed channel and the feed chain that runs in the feed channel. This conveyor system only allows simple circuits to be realised, i.e. with a total of 4 corners per circuit. An anti ride-on device is installed around the entire circuit.

The following differences and features distinguish the feeding of broiler feeders using the **Repromatic** feed pan feeding system from the use of traditional chain feeding:

the feed pans **Fluxx Breeder** or **Repropan**, which are used alternately, hang under the feed channel in which the **Challenger** feed chain runs.

In a complete feeding cycle, at a predetermined time, feed is carried from the feed hopper through the feed channel to the feed pans by the feed chain.

3.1 Designated use

The aim of this system is supplying the birds with feed. The **Big Dutchman** system may only be used for the purpose for which it is intended.
Every other use is considered non-designated use. The manufacturer shall not be liable for any damage resulting from such improper use. The risk is to be borne exclusively by the user. The designated use also includes the exact adherence to the operating, maintenance and assembly requirements of the manufacturer.

3.2 Prevention of reasonably predictable incorrect uses

The following uses of the **Big Dutchman** system are not permitted and qualify as misuse:

- Feeding the animals with feed which is not suitable for the chain feeder.
- Operation of the system with wrong tension of the chain.
- Mechanical loading of the system in excess of normal loads associated with the housing of broiler breeders.
- the use of the system in the open especially in areas subject to freezing.

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

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

3.3 Single components Repromatic

3.3.1 The Repromatic feed hopper

Extreme demands are put on the **Repromatic's** feed hopper. On the one hand, a high initial conveyor capacity of approx. 2 tonnes/h must be realised to ensure quick refilling of the feed channel at the beginning of the feed cycle while at the same ensuring that the animals' feeding capacity is met. Likewise at the end of the feeding cycle, care must be taken, if the feeding channel has been filled again, that feed does not backup at the feed input.

3.3.2 Corner 90° RPM/Challenger

Raised corner wheels are used in the corners to process the large flow of feed.

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.

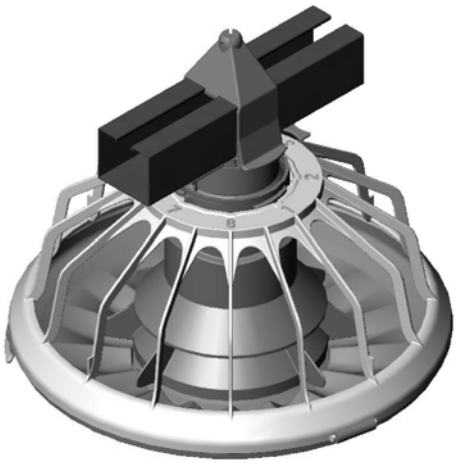
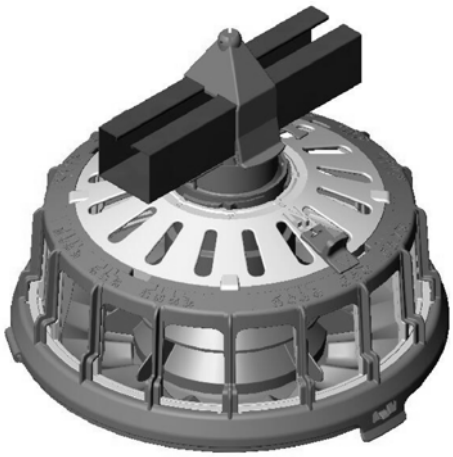
3.3.3 Feed channel, coupling and Challenger feed chain

The **Repromatic** conveyor system distinguishes itself from all others not only in its appearance but also in its output. The advantages which characterise this system are briefly described below.

- Large feed volume in the feed channel: the volume of feed found between two feed pans in the feed chain ensures that feed is available to all of the animals in each feed pan only seconds after the start of the feed assembly.
- 36 m/min conveyor speed: so that every feed pan in the circuit is kept full during the entire feed cycle until the entire daily ration has been distributed.
- 2 tonnes/h conveyor volume: it can only be ensured that feed pans are filled immediately if the the conveyor volume is operating at a maximum. Stress and agitation are prevented as a result. At the same time, the high conveyor volume ensures that exactly the same ration is made available in every feed pan which in turn guarantees high uniformity among the animals.
- The large chain link openings result in all feed pans in the circuit being consistently filled.
- Calcium and phosphorus: The chain link's shape allows feed to be carried to the feed pans without being pulverised or separated. The quality of the feed delivered to each of the feed pans is the same as a result.

- Open feed channel: this facilitates easy cleaning an maintenance of the feed channel. Malfunctions caused by dirt and foreign objects are easily localised and corrected in comparison with closed feed tubes.
- Yielding suspension: Because of the feed channel's open shape, feed pans give elastically to the side when pressure is applied without however changing their position permanently relative to the channel. This eliminates any risk of animals suffering crushing injuries.
- Reliable because of the high tensile strength of the resilient **Challenger** feed chain.
- Freedom of movement: The elevated feed channel makes it possible for animals to cross the coop without obstruction. So chicks have no obstacles to keep them from feed or water in the the rearing period. Reaching laying nests during egg production is optimised.

3.3.4 The Fluxx Breeder 360 system

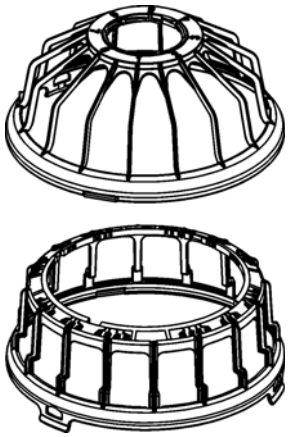
	
Fluxx Breeder for rearing	**Fluxx Breeder** for rearing and production

The **Fluxx Breeder Rearing** (**FXB-AZ**, shown left) was developed for the rearing of broiler breeders, with the rooster and hen together or separate. The **FXB Rearing & Production** (**FXB-A&P**, shown right) is also designed for rearing but was developed primarily for the feeding of hens in the production phase.

The following kinds of coops can be equipped with these feed pans:

- pure rearing coops (1st day - 16th/18th/20th week) => **FXB Rearing**
- pure production coops (20th - 64th week) => **FXB Rearing & Production**
- rearing and production in the same coop (1st day - 64th week) the so called "day old to death" production process => **FXB Rearing & Production**

3.3.4.1 Grille for the Fluxx Breeder (FXB) feed pan

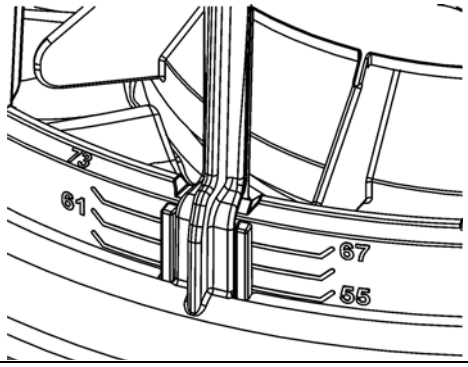
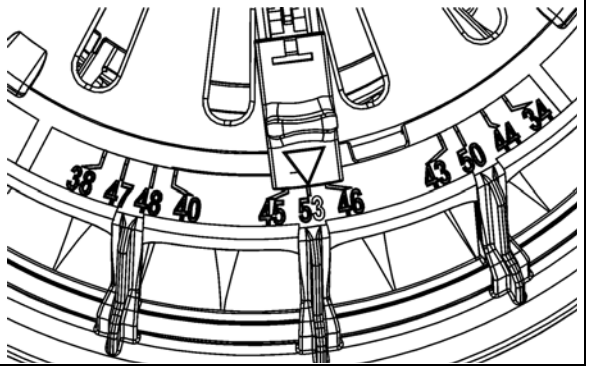


The grille (shown right) divides the feed pan into 16 equally large feed windows, the result being 16 feeding locations per pan.

The small clearance between the bars limits the chick's access feed pan from relatively early on. At the same time the bars are flexible enough to make it possible animals to escape. (**FXB**-**AZ**).

The feed window can be adjusted both in its width and in its height in the **FXB A&P** feed pan. This allows the windows to be narrowed to their ideal width, depending on the breed of chicken, so that only hens have access to the feed.

The window height can be adjusted in 4 steps. In that the outer grille is turned by 90° with each step relative to the inner ring, the level ring is raised by 6mm.

Height	**Feed window width (mm)**										
(mm)	34	38	40	43	44	45	46	47	48	50	53
73 67 61 55											

These heights result in rim heights for the pans of 67, 73, 79 and 85 mm.

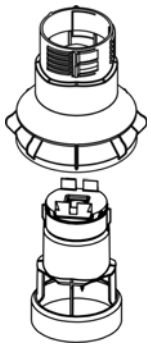
The widths of the feed windows are marked on the outer grille 4 times, i.e. in 4 distributions. In this way, the width - within a single quarter for the same height - can be adjusted directly.

However it is not until about the 25th week, the point at which roosters and hens differ significantly in their physical development, that roosters no longer have access to the hens' feed.

In a 2 phase production process, i.e. rearing and production, roosters should normally be brought into the coop 2-3 days before the hens are.

If roosters are fed only from the feeding assembly intended for them, they generally do not try later to steel feed from the hens' feed pans.

3.3.4.2 Inner and outer FXB cylinders



1-day old chicks are fed "ad libitum" in the first 3-4 weeks. During this time, the **FXB**-**A** or **FXB**-**A&P** feed pans are lowered to the floor to activate the flow mechanism.

If feed is found in the litter, the feed pans should be raised to prevent further loss of feed.

During restrictive feeding, feed pans should no longer be in the flooded position but raised in accordance with the size of the animals. The feed level is set to level 3 - 4 depending on the density of the feed and how easily it flows.

	Following feed quantities in grams per pan apply both to the FXB360/ rearing as well as the FXB360 rearing/production.

		Position of the outer cylinder at a not flooded pan							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Density	**750 kg/m³**	502	540	569	601	646	721	756	831
	650 kg/m³	435	468	493	521	560	625	655	720
	550 kg/m³	368	396	417	441	474	529	554	609

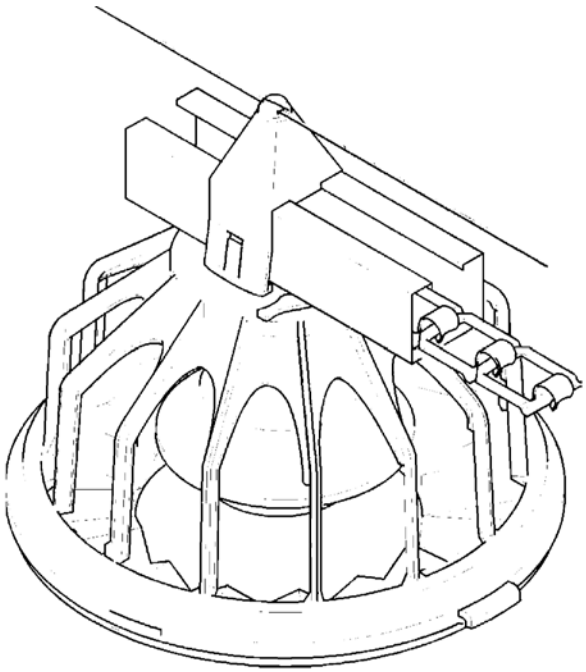
		Position of the outer cylinder at a not flooded pan							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Density	**750 kg/m³**	817	847	882	978	1065	1133	1290	1402
	650 kg/m³	708	734	764	848	923	982	1118	1215
	550 kg/m³	599	621	646	718	781	831	946	1028

	Use positions 1 to 8 for the feed supply of broiler breeders. The positions 9 to 11 are only used for broiler growing.

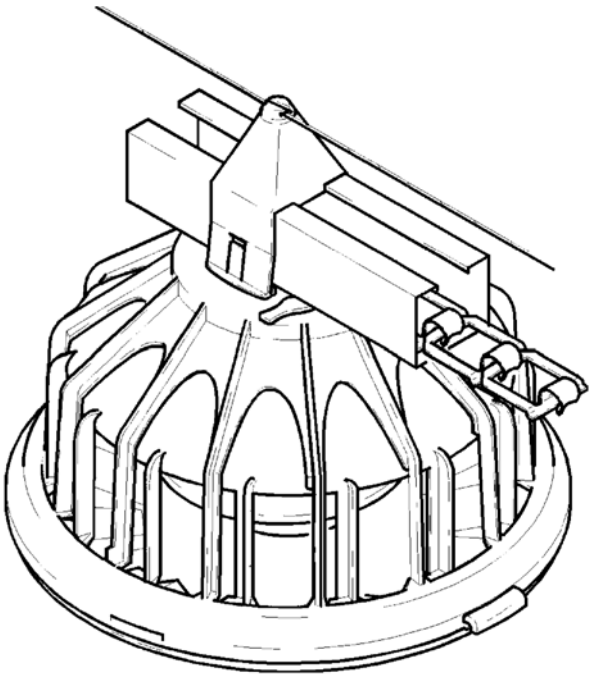
To operate the Repromatic feeding system as well as possible, it is necessary to keep the feed level as low as possible. However, always provide sufficient access for the birds. This can be adjusted by flow tests with the available feed.

3.3.5 The Repropan system

without FO grille



with FO grille

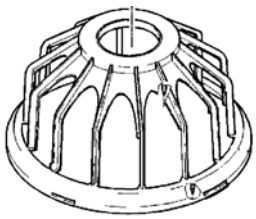


The **Repropan** food pan was developed for the rearing of broiler breeders, with the rooster and hen together or separate, as well as for the feeding of hens in the production phase, i.e. in the laying phase.

The following can be set up:

- pure rearing coops (1st day-16th/18th/20th week);
- pure production coops (20th-65th week);
- rearing and production in one coop (1st day - 64th week) the so called "day-old to death" production process.

3.3.5.1 Grille for the Repropan feed pan

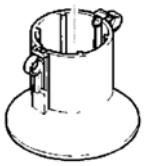


The grille (shown right) divides the feed pan into 14 equally large compartments, the result being 14 feeding locations.

Because of the small clearance between the bars, chicks are kept away from the feed pans from relatively early on. Nevertheless, the grille's bars are flexible enough to make it possible for the growing animals to escape the food pan.

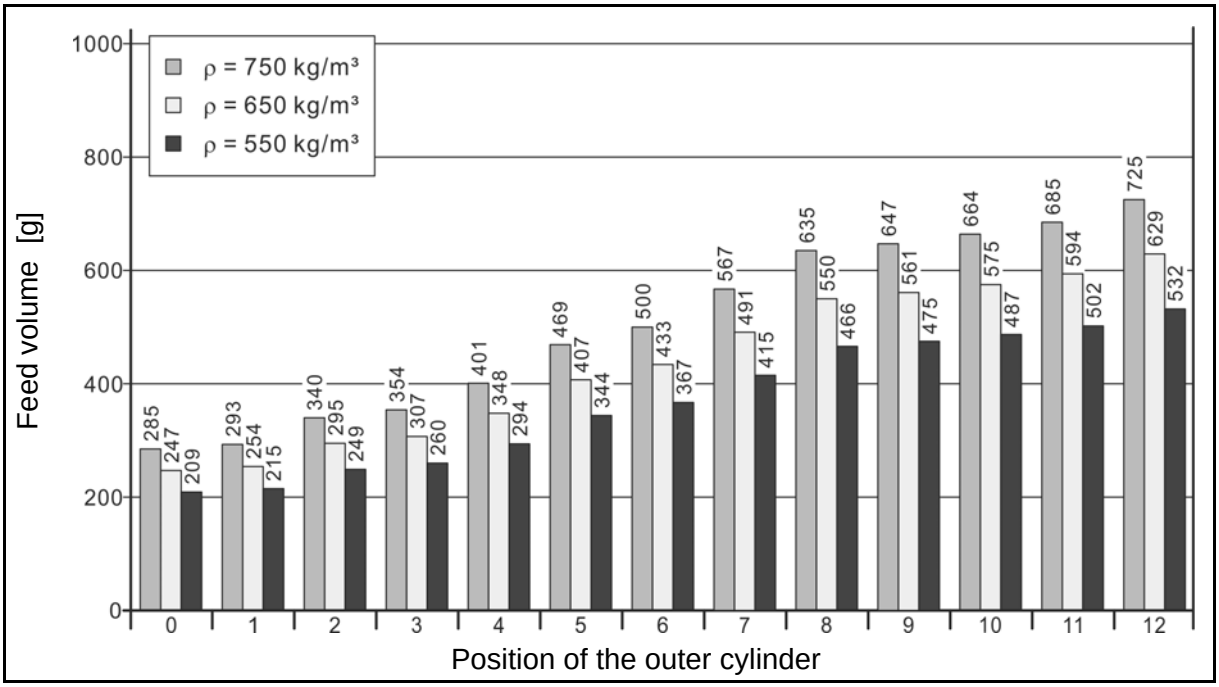
The arrangement of the grille's bars around the inner perimeter of the feed saver rim ensures a good access to the animals. In this way, especially at the beginning of the feed cycle, the animals can quickly find or change a feeding location and then feed comfortably at the feed pan.

3.3.5.2 Inner and outer Repropan cylinders



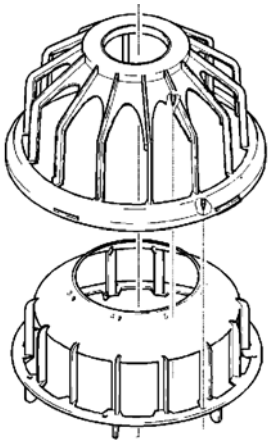
1-day chicks are fed "ad-libitum" in the first 3-4 weeks. Set the **Repropan** food pan's outer cylinder to the positions 5-6 during this period.

When feed restriction begins, beginning approx. in the 4th week, the outer cylinder (shown right below) should be lowered as far as the feed flow into the pan allows (feed position 2-3). It depends in large measure on the quality of the feed.



Feed volume as a function of the different specific densities of the feed and the position of the outer cylinder of the feed pan **Repropan.**

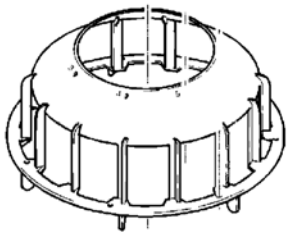
3.3.5.3 Repropan for hens only - Separate-Sex-Feeding with the "Female Only" (FO) grille



Position of the FO grille	Width of the feed slot in mm
1	42
2	43
3	44
4	45
5	46
6	48
7	50

It is especially important to control the weight of the animals using the restrictive and separated rooster-hen feeding for which however different amounts of feed are provided depending on the sex.

The separate rooster-hen - feeding ("separate sex feeding") can however only be realised if the roosters are not permitted access to the hens' feed pans and at the same time are provided a feed location which, because of the higher elevation, is not accessible to the hens.



To achieve this a so called FO grille (shown right) can, beginning in the 18th week, be inset in the **Repropan** feed pan's grille. The rooster with its typically wider head will no longer be able to eat from the feed pan because of the narrowed feed compartment.

3 models of the non-adjustable FO grille are available. These allow 3 feed elevations of 55 mm, 63.5 mm und 72 mm to be realised.

However it is not until about the 25th week, the point at which roosters and hens differ significantly in their physical development, that roosters no longer have access to the hens' feed.

In a 2 phase production process, i.e. rearing and production, roosters should normally be brought into the coop 2-3 days before the hens are.

If roosters are fed only from the feeding assembly intended for them, they generally do not try later to steel feed from the **Repropan** feed pans.

The FO grille, which can be selected in accordance with typical head size of the rooster which in turn depends on the the breed of chicken, prevents roosters from gaining access to the hens' feed.

3.3.6 FXB and Repropan feed pans

3.3.6.1 FXB/ Repropan feed channel adapter and shutter

The feed pans' removable feed channel adapter (shown right) allows easy assembly and disassembly in case it becomes necessary to replace a pan.

The essential aspects of the shutter (shown right) are shown below:

- Using the shutter, a share of the feed pans can be closed especially in the initial rearing phase. This opens the possibility to begin as early as possible with the "Every day" feed programme".
- On the other hand, the shutter allows feed to be directed to that part of the coop in which chicks are actually kept especially in the first weeks of rearing. This can be an advantage especially in the 1-phase production process.
- If roosters and hens are only separated in the coop by a wire separation during the rearing phase but should be fed at a single **Repromatic** circuit, the shutter offers the possibility by targeted opening and closing of the feed pans to change the feed relationship between the roosters and hens.

  The number of roosters per feed pan is reduced with every additionally opened feed pan in the rooster compartment.

  While the animals should eat the same feed ration during the feed chain runtime, although roosters usually eat more slowly, only the remaining volume in the feed pans, once the drives have been turn off, is significant in calculating the difference in the volume between rooster and hen.

3.3.6.2 Volume reducing shaft

The volume reducing shaft is integrated inside the **FXB** pan cylinder and is a separate part in the **Repropan** (shown right).

A minimum amount of feed in all of the feed pans is an advantage to facilitate a quick refilling of the entire feed channel and above all all of the feed pans. The amount of feed in the the pan is determined not only by the speed of the conveyor and the feeding speed but also by the maximum possible length of the circuit.

Especially because of the volume reducing shaft but also because of the trough shaped feed pan only a small amount of feed can be captured in the pan.

The low amount of feed in the feed pans also allows beginning with the "Every day" feed programme” as early as possible.

3.3.6.3 Feed grille

It is especially important to not let the weight of broiler breeders to increase excessively. This is only possible as a result of a restrictive feeding. The feed volume must be restricted in accordance with the animal’s sex.

The resulting separate rooster-hen-feeding ("separate sex feeding") can however only be realised if the roosters are prevented from gaining access to the hens’ feed pans. At the same time, the roosters must be provided a feed location to which the hens cannot gain access. This is achieved by placing the roosters’ food pans higher.

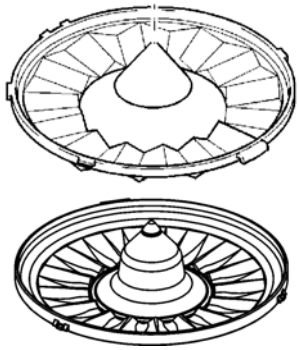
The large, inwardly directed feed saver rim prevents on the one hand feed losses and on the other hand accidents because of the softly shaped outer rim.

The height should be adjusted weekly in accordance with the growth of the animals. This is done by adjusting the upper edge of the feed saver rim to the height of the animal’s back.

The feed pan can be opened by means of a hinge for cleaning. Because the feed saver rim is a part of the grille and cannot be opened, no residual water remains in the large saver rim.

This presents a great hazard for young chicks in the next round if they ingest high concentrations of water contaminated with disinfectant.

3.3.6.4 Feed pan



The outer rim of the pan is incl. the feed saver rim only 56 mm (**Repropan**, shown top right) or 67 mm (**FXB**, shown right bottom) high. Feed pans that stand on extremely low lying litter or waste pit grills are nevertheless easily reached by 1-day old chicks.

The animals can feed directly out of the feed pans. It is therefore not even necessary to offer additional feed on chick paper or check feed plates.

The result is a better start and therefore a better early development of the animals.

The vertical, triangular surfaces of the feed pan brake the feed run-off at the outer adjustment cylinder. A constantly increasing feed fill-level caused by aggressive thronging of the animals to the feed at the start of feeding and a resulting feed loss is reduced effectively in this way.

All meal components can be easily reached through the feed troughs by the animals at the end of feeding.

All of the feed pans are equipped with a pocket shaped feed pan. This results in an extremely flat fill-level in the feed pan. The flat feed level keeps the animals from taking in too much feed in a too short a time period.

This easy form of compulsion makes it possible for each bird to take in its ration.

On the one hand, only in this way is an even distribution of the total limited feed volume to all of the feed pans possible, especially in the rearing phase, while on the other hand covering the present feed volume requirement of the animals during the feed cycle and refilling the the feed channel.

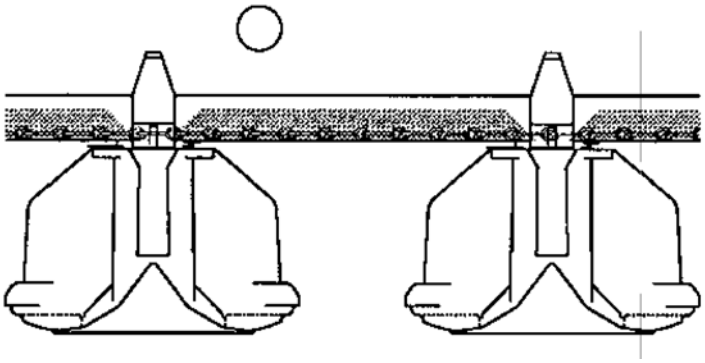
High feed levels in the pans make high feeding speeds possible and as a result an inadequate feed distribution in the coop. The reasons:

- There is too little feed available for all of the pans because the entire ration was already distributed to the first feed pans.
- There is an inadequate distribution of the the feed volume because the high feeding speed of the animals cannot be covered by the conveyor system.
- The failure of feed pans to fill in the first seconds results from the feed channel between two feed pans having been left unfilled on the previous day.

3.3.7 The feeding principle

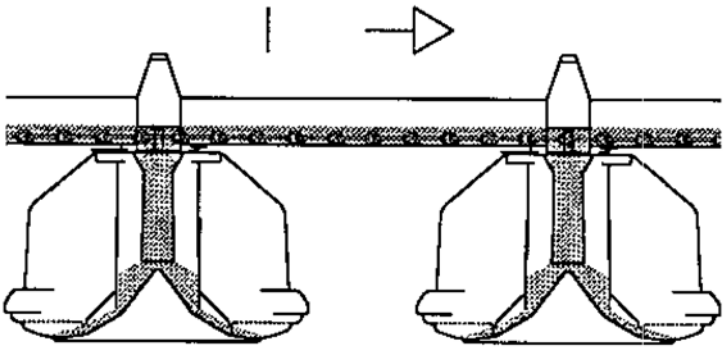
The **Repropan** feed pan with volume reducing shaft is shown here as typical example. Other variations operate on the same principle.

Phase 1



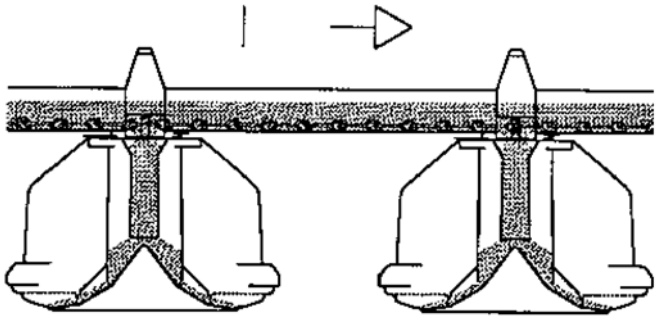
Before a feeding begins, there is already feed in the feed channel between all of the pans in the circuit with which immediately after start-up of the feed chain the subsequent feed pans can be filled. This makes it possible for all of the animals to begin feeding immediately and so prevents stress and wandering of the flock in the coop.

Phase 2



The feed pans are now completely full and the feed channel is nearly empty. At the same time, the feed channel is now fed from the feed hopper. The high feed capacity of the **Challenger** feed chain prevents the feed pans from being emptied by the animals during the chains run-time.

Phase 3



The feed channel fills again because the feed chain conveys significantly more feed than all of the animals can eat. The **Repromatic** does not turn off until the pre-weighed feed volume has been transported to the animals. This can be the entire daily ration or in the event of more feed cycles in a day the correspondingly smaller ration. At the end of the feeding, all of the feed pans and the feed channel completely filled. The animals continue feeding from the feed in the pan but the feed channel stays full and is therefore ready for the next feeding.

3.3.8 A complete feed cycle in detailed steps.

We distinguish between the following steps which run in sequence and which are in addition explained by the illustrations. On the horizontal axis, we find a number of feed pans in a circuit in sequential order. The first feed pan immediately after the feed hopper has the number 1 and the last feed pan in the circuit, in this example, has the number 233.

The feed volumes in the feed channel in grams are shown on the vertical axis (for feed with a density of 650kg/m³). The columns shown above the centre line show the maximum feed volume in the feed channel between two feed pans. The different feed pans for which the fill-levels are indicated as a percentage are shown below the centre line. The areas highlighted grey indicate the respective fill-level.

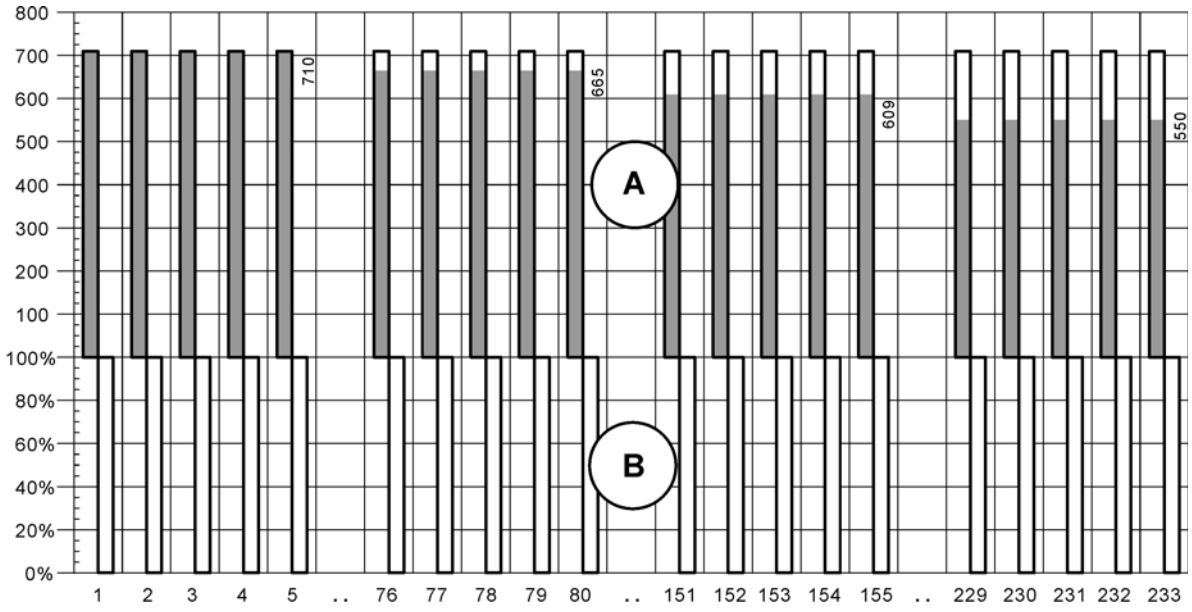
Before the start of the feed cycle:

At the beginning of a feeding, a certain amount of feed is found between all of the feed pans of the circuit in the feed channel. This volume was left over from the feed cycle of the day before (A).

It should be recognised that the feed volume in the feed channel between two feed pans immediately after the feed machine reaches a maximum value of approx. 710g. At the end of the circuit, there is only approx. 550g between the feed pans.

This explained by the fact that the feed chain turns off at a time when the animals are still feeding from the feed pans. As a result the feed volume between two feed pans at the beginning of the circuit reduces while on the way to the last feed pan by the exact volume consumed by the animals.

The feed pans have been completely emptied following the last feed cycle (B).

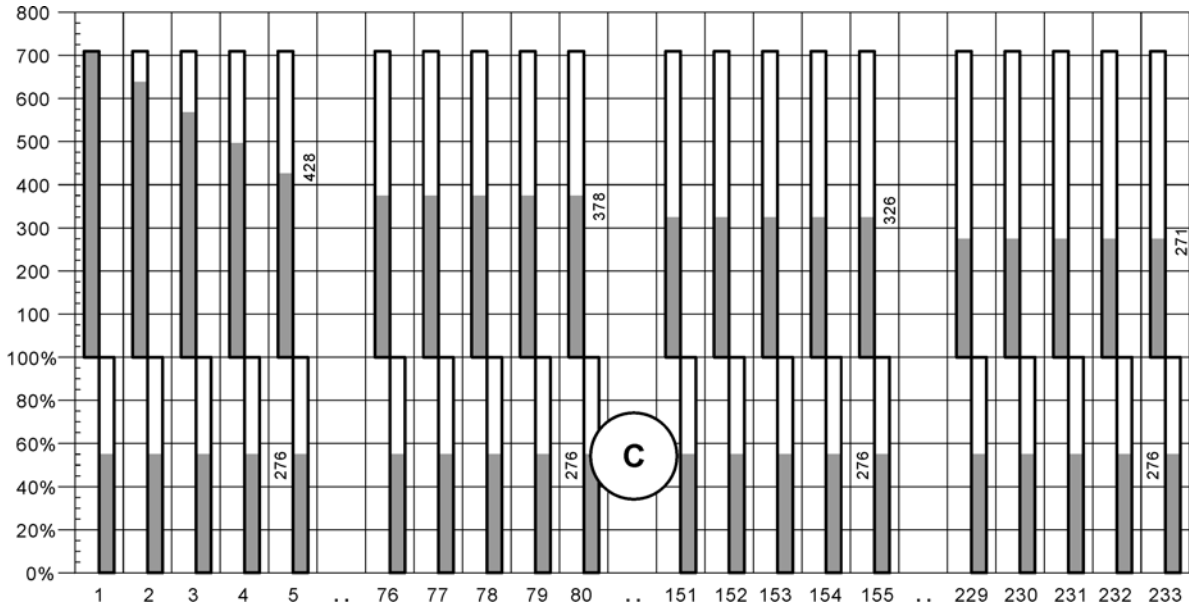


A: **RPM feed channel** between two feed pans - **filled** [g feed/ 75 cm **RPM** feed channel].

B: **Feed pans** following the last feed cycle - **emptied** [feed level position 3].

3 seconds after start:

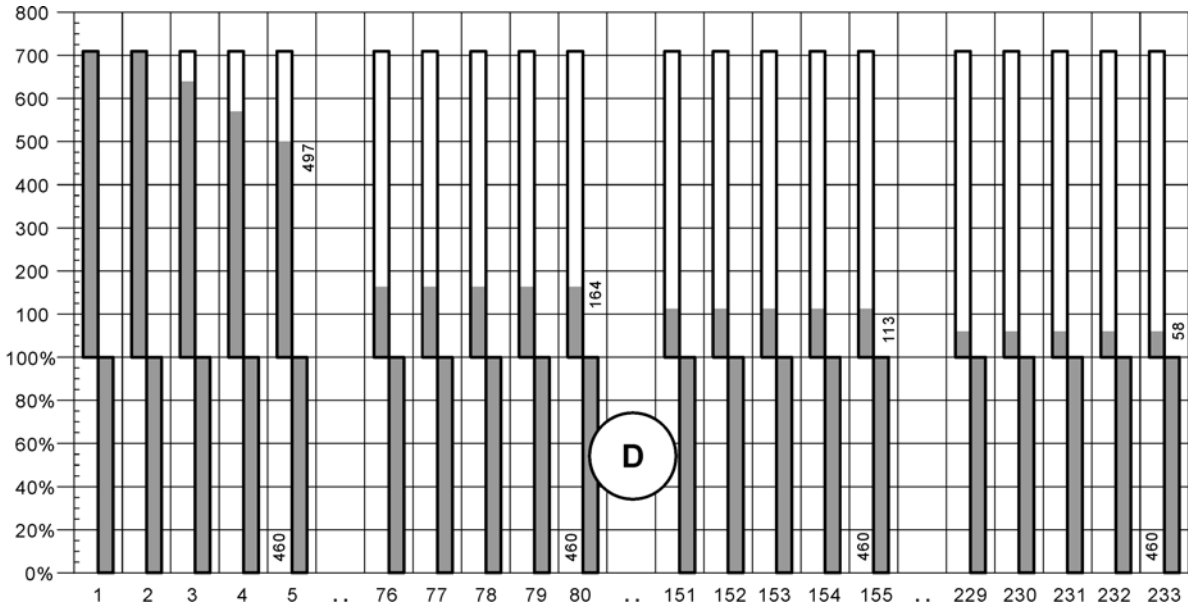
With the start of the feed chain, the feed amount lying between two feed pans in the feed channel is filled into the subsequent feed pans. As a result, every pan in the circuit is filled in the first seconds of the feed cycle. The feed pans are at this point still not yet filled to the top but same possibility exists for all of the animals in the circuit to begin with the daily ration (C).



C: Feed pans 3 seconds after start - **60% filled** [g feed/ feed pan].

10 seconds after start:

All feed pans are now completely filled. Only small residual amounts can be found in the feed channel. Beginning at the feed hopper, the feed channel is now filled again with feed. In addition, the first feed pans in the circuit are filled again by the amount consumed by the animals.

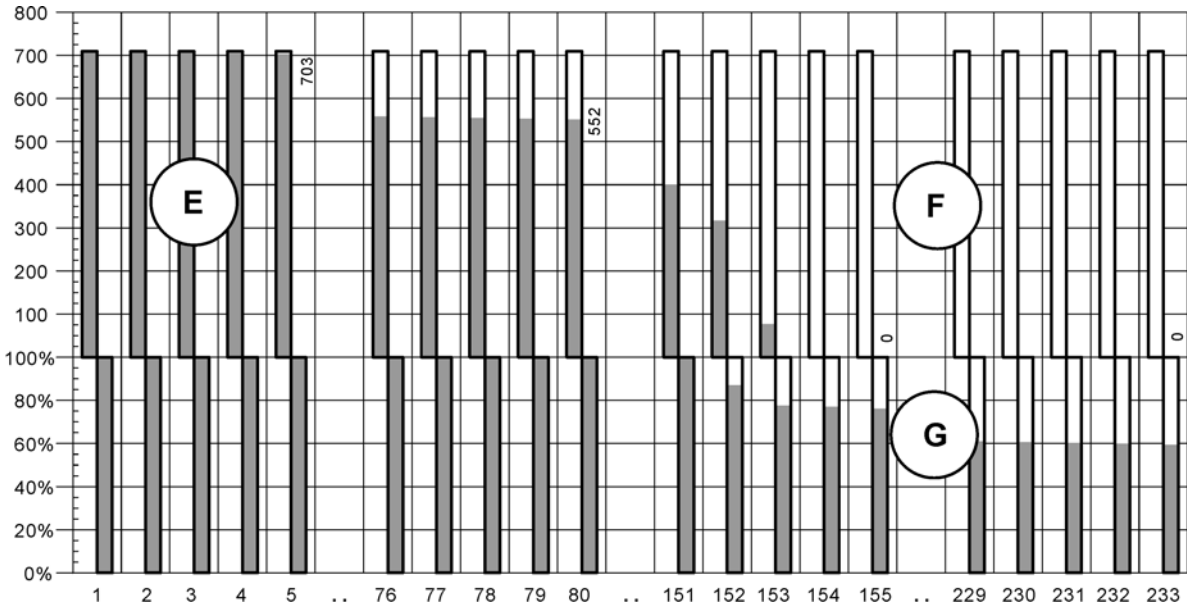


D: Feed pans. 10 seconds after start - **100% filled** [g feed/ feed pan].

3 minutes after start:

In the course of the feed cycle, the last feed pans at the end of the circuit begin to empty more and more (G).

For all of the animals in the circuit, there is still the same possibility to take up the daily ration without hindrance because of the entire amount in the pan only a very small portion lies in the feed pan. Only this amount is of importance for the feeding animals and determines the amount that each animal can eat.



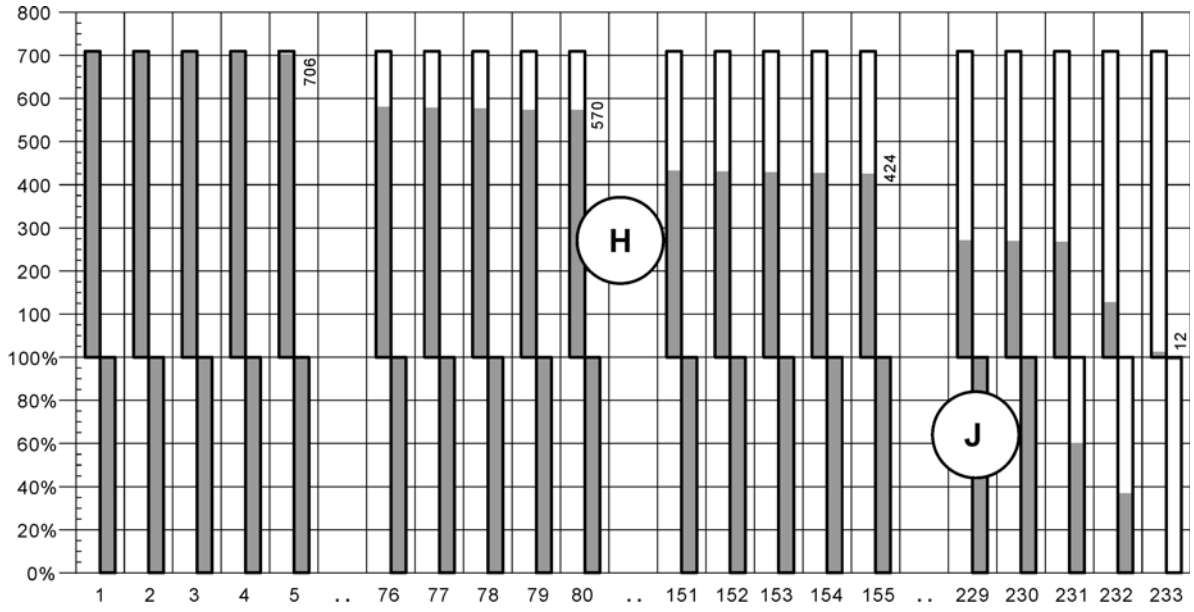
E: **RPM** feed channel - **refilled** [g feed / 75 cm **RPM** feed channel].

F: **RPM** feed channel - **not yet refilled**
[g feed / 75 cm **RPM** feed channel].

G: Constant reduction of the feed volume in the feed pan.

6-7 minutes after start:

Immediately before the last feed pan in the circuit has been fed clean, new feed was filled into the pan over the feed channel. This point at which conveyor capacity of the feed chain and the feeding capacity of the animals meet defines the maximum possible circuit volume.



H: **RPM** feed channel - **refilled** [g feed / 75 cm **RPM** feed channel].

J: **Refilling** of the last feed pans in the circuit before these are fed clean.

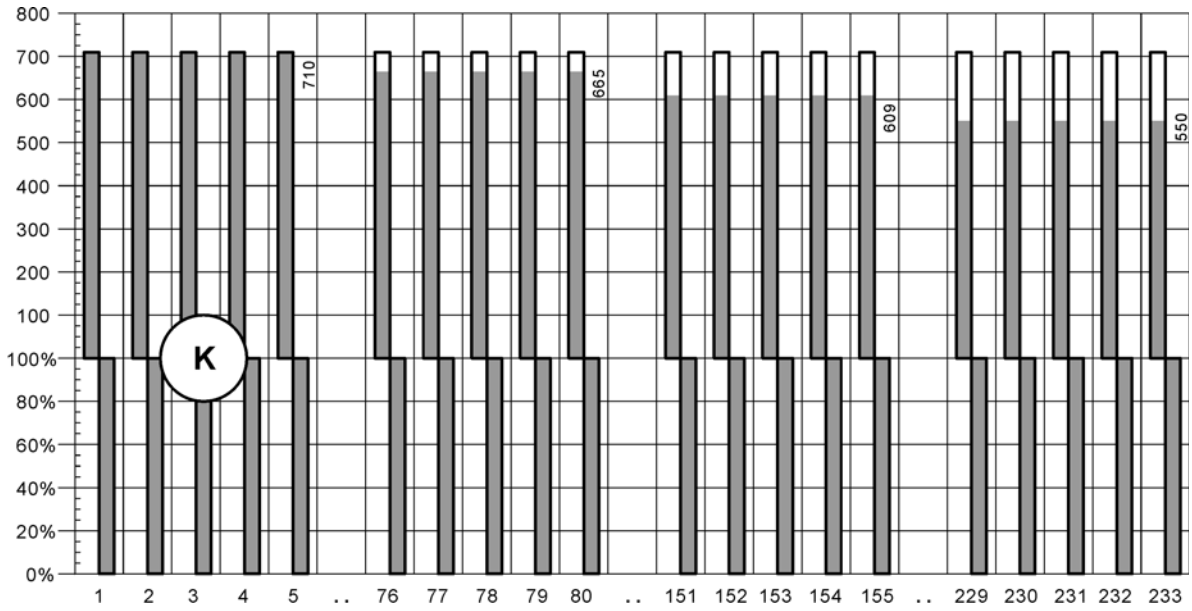
After turning off the feed chain:

The feed channel has been completely refilled. The feed volume that leaves the feed hopper at the feed level shutter is brought back to the feed hopper by way of the return less the volume currently consumed by the animals.

The **Repromatic** feed hoppers are refilled constantly by means of a conveyor auger during the entire feed cycle until the entire daily ration has been circulated.

A minimum sensor in the collective day bin or a clock timer (only in the production phase beginning with the 25th week) turns all drives off as the feed level falls off. As a result a certain amount of feed remains between two feed pans in the feed channel which is available for the next day or for the next feed cycles.

The feed volume in the feed pans is then eaten by the animals.



K: If the feed volume in the day bin has been distributed, the minimum sensor in the feed hopper stops the **Repromatic**

3.3.9 The systems limits

If the individual steps in the feed cycle are observed, it is easy to recognise that the system's limits, especially with regard to the maximum circuit length, is determined by the balance between the feeding capacity of the animals on the one hand and the capacity of the feed chain on the other hand.

Only if the animals can feed equally from all of the pans in a circuit can a uniform flock be expected.

3.3.9.1 Feeding capacity of the animals

Even with regard to the clear definition of the animals feeding capacity, one runs up against great difficulties because these depend on individual factors such as breed of chicken, age of the animal, weight, or animal output in relation to the daily feed ration, feed quality and not least of all the feed level in the pan which is determined by the shape of the feed pan.

As a trend, one can in the course of the rearing and subsequent production phases observe the following feeding speeds:

	Age	**Feeding process**	**Feeding speed**
Rearing	0 - 2 weeks	"ad libitum"	low
	2 - 6 weeks	“transition restrictive"	increasing
	6 - 18/20 weeks	“strictly restrictive"	maximum
production	18 / 20 weeks before laying begins	“restrictive"	lower but still high
	peak capacity to the end	“restrictive"	reducing

At times of maximum feeding capacity (up to 8g/min/animal) it must be made sure that the level in the feed pan is set very flat (position 2 - 3). In this way, all the animals will be forced to feed equally slowly.

3.3.9.2 The Repromatic's capacity

On the other hand, the **Repromatic's** capacity affects the equal distribution and therefore significantly the assembly's design. The capacity is determined by the conveyor speed and the feed volume in the feed channel.

Important is a maximum feed level in the feed channel of 950-1000 g/m at a conveyor speed of 36 m/min.

A conveyor capacity of 2 tonnes/h results which is sufficient with one feed hopper per circuit to feed a coop with a maximum circuit length of 185 m (**FXB**) or 200m (**RPM**). With longer coops, two feed hoppers per circuit are necessary arranged in the middle of the coop ideally.

4 Operation of the system

4.1 Important information

As already explained in the system description, the **Repromatic** feed system is distinguished by a number of features when compared with traditional chain feeding.

To fully exploit the systems capacity, it is necessary to especially take the following points into account.

- A feed cycle's run-time may never be interrupted. The result as a rule is an incomplete refilling of the feed channel. In a subsequent feed cycle, some of the feed pans would remain unfilled or be filled late. This requirement applies especially for the entire rearing period because during this time only a very small volume of feed is available per day and the animals consume the feed at a high speed.
- The **Repromatic's** conveyor input must be maximised, i.e. the feed level shutter in the feed hopper should be in the highest, maximum position. Only in this way can not only the current feed requirement of the animals be covered but also the refilling of the feed channel be achieved.
- The **RPM** feed hopper of the **Repromatic** must be kept permanently filled. This requires a feed input of up to 2 tonnes/h for the 1-track-1-direction **RPM** feed hopper and in case of the **RPM** 2-track-2-direction feed hopper of up to 4tonnes/h.
- The feed level in the feed pan must be set to the lowest possible feed level by means of the feed pan's outer cylinder. Only in this way will the feeding speed of the animals be slowed down and an even filling of the feed pans ensured.
- An electric pulse prevents the animals from steeling feed out of the feed channel. The anti ride-on wire should be inspected regularly to ensure that it is still functioning correctly.

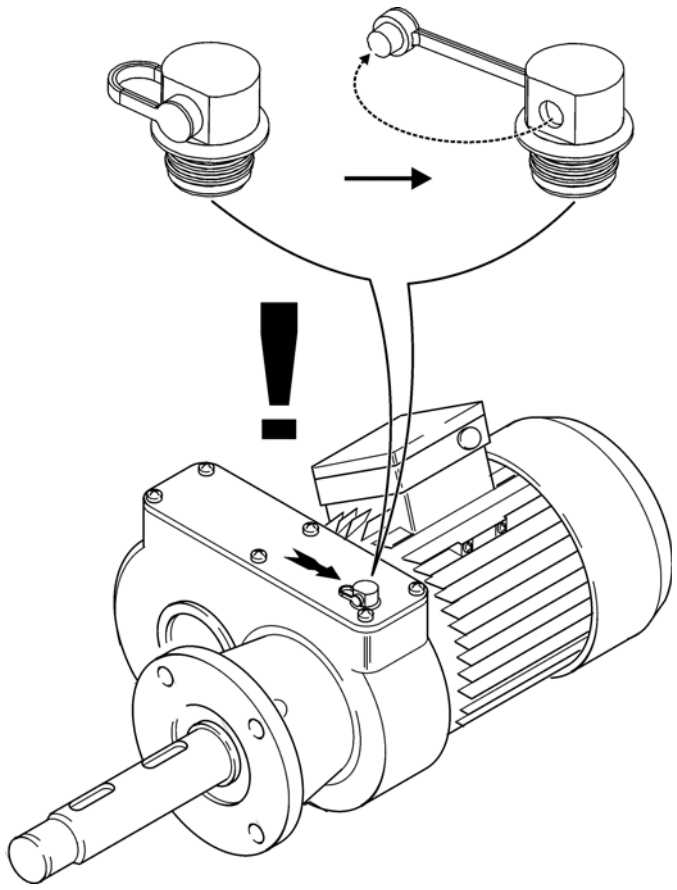
High feed levels in the pans lead to enormously high feeding speeds which in turn cause an insufficient distribution of feed in the coop. The reasons:

– There is too little feed available for all of the pans because the entire ration has already been filled into the first feed pans.

– There is an inadequate distribution of the feed volume because the high feeding speed of the animals cannot be covered by the conveyor system.

– The failure of feed pans to fill in the first seconds results from the feed channel between two feed pans having been left unfilled on the previous day.

4.2 Important instructions for putting the gear motors into operation (ventilation)



Important:

Before putting the gear motors into operation, pull the **plug out of the ventilation cap!**

This applies for all gear motors for:

- feeding,
- egg collection,
- manure removal,
- and other assemblies

if automatic ventilation is not provided.

4.3 Commissioning of the Repromatic feed assembly

4.3.1 Commissioning of the feed chain

Check the pre-tensioning of the feed chain!

The chain is correctly tensioned if, when the assembly is running, the chain links at the **RPM** drive's outlet slow slightly but do not raise by more than 10 mm.

Enough feed must be available for the chain's entire circuit.

Switch the feed chain's drive on and observe the way the chain runs. Make sure that the assembly can be shut down immediately in the event of an emergency. Play in the chain at the drive's outlet will be observed as long as the feed channel has not yet been filled with feed.

The drive must be shut down immediately if during filling of the assembly, the chain slows so much that waves form in the chain behind the U-channel. Check whether the feed chain has caught itself somewhere in the feed channel and if so remove the obstruction.

The feed chain drive and the feed chain run smoothly if the entire feed channel has been filled with feed.

Chain tension must be checked weekly for a new chain. It is important to first break in the new feed chain because of the paint and spines on the chain links.

4.3.2 Fill the Repromatic feed assembly with feed for the first time

- Feed requirement: 0.5 kg feed per feed pan + 1 kg feed per running metre of the **Challenger** feed chain + 25 kg feed for the **RPM** feed pans.
- Fill the needed feed volume per coop into the auto-limit-scale or into the day bin.
- The circuits should be filled individually, i.e. in sequence.
- Put the feed auger into operation.
- Start the **Repromatic** feed assembly for approx. 10 seconds. Now check the feed level in the open feed channel behind the drive wheel. Set the feed level to 2 - 2.5 cm using the feed outlet shutter.
- Continue filling until the feed covered feed chain has reached the **RPM** feed hopper.
- Adjust the feed hopper's feed inlet shutter so that the returning feed can be taken in without backing up.
- Now increase the feed level for the feed outlet shutter to 2.5 - 3.5 cm to continue filling for another circuit.

- Repeat this process for the further circuits in the coop.
- The feed assembly has now been prepared so that animals can be let into the coop.

4.3.3 Safety pin in the feed chain drive wheels

The pusher connected to the drive shaft drives the feed chain drive wheel by means of the safety pin (reversible toothed drive wheel).

If the feed chain catches for any reason, the safety pin will break stopping the feed chain drive wheel. This prevents further damage to the assembly.

The following safety pins are used:

99-50-3905 safety pin 5x35 pcs half-round-rivet DIN 660

Note the item “Tensioning the feed chain".

Remove broken safety pins from the assembly!

Warning!

An unintended start-up of the drive can cause serious injuries.

Always switch the drive’s main switch off when replacing the safety pin.

Never replace a safety pin without having first clarified the reason for the malfunction, i.e. why the safety pin broke.

Perform a function check on the assembly at least twice a day. Check whether all of the feed chains run correctly and whether the corner wheels rotate in the feed chain corners.

Check the feed level at the outlet to the feed column.

4.4 Rearing phase 0 - 4 weeks "ad-libitum"

4.4.1 Before letting the animals into the coop

- The coop and litter must be warmed to the correct temperature at least 24 hours before letting animals into the coop.
- The feed pan settings have been set on the outer cylinder to position 5-6 (**Repropan**) or 3-4 (**FXB**) depending on the flow characteristics of the feed. Easy access to the feed for 1-day old chicks is especially important here.
- Only the **FXB**-**A** feed pan: Lowering to the floor activates the automatic 360° flow mechanism.
- Only the **Repropan** feed pan: By a simple rotation (turning) of the feed pan on its own axis an almost 100 % feed level will be reached as a result of centrifugal forces. This moves some of the feed to the outer edge. This one-time measure significantly eases the animals' initial access to the feed. The feed pans are then completely lowered to or into the litter.
- All of the feed pans have been completely filled with feed.
- Make sure that the feed pans are evenly illuminated which also provides for even illumination of the feed. The 1-day old chicks can more easily find the feed in this way.
- Lay out paper lines and distribute feed on them in order to improve the feed consumption after the arrival of the birds in the house. This work is facilitated by the BD feed cart (code no. 10-93-1022).

4.4.2 Following adjustment and during the rearing phase

- For the daily filling of the feed pans, the feed chain should once a day, at the beginning of the day, be put into operation manually for 1-2 complete circuits. To do this, select “manual start" on the clock timer.
- Depending on the degree of feed consumption, the number of feed circuits per day increases to be able to exactly maintain control over feed consumption.
- Beginning on the 14th day, you should begin to slowly raise the level of the feed pans. Make sure that the animals can still easily reach the feed in the pans and that the animals still flock around the pans.

4.5 Rearing phase, weeks 4 - 18/20 “restrictive"

It is especially important at the latest at the beginning of restrictive feeding to lower the **Repropan** feed pan cylinder to the position 2-3.

	The **FXB** pan can stay in the position 3-4. By raising the level of the pan, the flow mechanism will be deactivated and the pan filled in accordance with the adjusted level.

On the one hand, only in this way is an even distribution of the especially in the rearing phase limited feed volume to all of the feed pans possible.

On the other hand, only in this way can both the current feed volume of the animals be covered and the filling of the feed channel be achieved.

Under certain circumstances, depending on the development of the animals, it may be necessary to set up a skip-a-day feed program for the weeks 4-10. In this way, the entire very limited feed volume can be evenly distributed to the feed pans in a circuit.

4.5.1 Switching from "ad-libitum" to “restrictive"

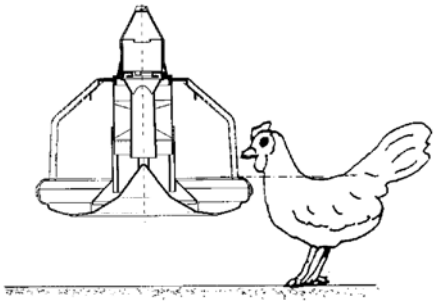
- Adjust the **Repropan** feed pans to position 2-3 on the outer cylinders.

  The **FXB** food pan can stay at the position 3-4.
- Adjust the feed outlet shutter in the feed hopper to the maximum possible feed level in the feed channel.
- Make sure that all of the feed pans, the feed augers and the feed channel are filled with feed.

4.5.2 Further rearing with “restrictive - feeding"

- The feed volume in the day bin must now be weighed daily.
- There will however still be only one feed cycle run per day. This will only be stopped again by means of the minimum sensor in the day bin.
- If individual feed pans or the feed channel at the end of feeding (minimum sensor has switched off) are not filled, either a skip-a-day feeding program should be used or individual feed pans closed.
- Until the end of rearing, only a single feeding time will be set which however depending on the feed volume and the feeding speed lasts between 10 - 20 minutes.

- Set the height of the upper edge of the feed pan rim in accordance with the growth of the animals to the height of their backs.



4.6 Production phase, week 18/20 until the beginning of laying

4.6.1 Different production methods

Two different production methods are used in the rearing of breeders.

There is on the one hand, the “day old to death", production method in which the breeders are raised in the production coop. Relocating the animals from one coop to another after the rearing phase is avoided with this method. The animals stay in one coop from the first day until the end of production phase.

In the other production method, the animals are kept in a pure rearing coop without nests until week 18-20 and then relocated to a production coop for the beginning of laying. Generally, it is this production method that is used because it allows a better utilisation of coop capacities.

4.6.2 Before letting animals into the coop or before relocating the animals from one coop to another

- Roosters should be let into the coop at least 1-2 days before the hens. The roosters have an opportunity to get used to the separate rooster feeding (if available). This leads to the roosters trying less to steel feed from the hens’ feed pans.
- The **Repromatic** feed assembly is raised before hens are let into the coop and filled with feed as previously described.

4.6.3 Feeding until laying begins or until the output peak

Until laying begins only a single feeding time will be set which however depending on the feed volume and the feeding speed lasts between 15 - 25 minutes.

4.6.4 Feeding with declining feeding speed

Once the output peak has been exceeded, the animals feed more slowly and severalfeed cycles per day can be planned. The following process should be followed:

- First determine the Repromatic's maximum run-time if only a single feed cycle perday is run. That is the duration from the point at which the feed chain starts to thepoint at which the assembly is switched off by the day bin's minimum sensor.

Reference value: Depending on the breed, age and the animals' output; approx. 25-35min. maximum run-time

- Determine the Repromatic's run-time for the first complete feed cycle. That is theduration from the point at which the feed chain starts to the point at which the feedchain, completely covered by feed, returns to the feed hopper.

Reference value: chain length [m] / 36 [m/min] x 1.5 = run-time [min]. This value mustalso be measured during feeding!

- Determine the time it takes the animals to empty a single feed pan. This value isimportant to determine the intervals between two feed cycles.

Reference value: 450 [g/feed pan] / animals per feed pan [units] / 6 [g/min] [g/feed pan]= feed pan feeding period [min]

The feed pan feeding period provides the maximum duration for the interval betweentwo complete feed cycles.

	Important: If the interval is too long, there is a risk that all of the feed pans will havebeen emptied in which case there will not be enough feed remaining in theday bin to fill all of the feed pans and the feed channel. Intervals that are longer than the feed pan feeding period are only thenpossible if after the first feed cycle at least 50% of the daily ration remainsin the day bin for a complete subsequent feed cycle. Shorter intervals keep all of the feed pans more or less continually filledso that the Repromatic could at any time be switched off by the minimumsensor. So: The run-time is always constant.Longer intervals between the individual feed cycles only at the beginningof feeding. Shorter intervals at the end of feeding.

The new feeding programme can now be set up on the basis of these results and rules.Example:

	Start time [Hours:Min]	**Run-time [Min]**	**Feed interval [Min]**
1.	06:30	6 1/2 min	
			8 1/2 min (because 50 % of the feed is still available)
2.	06:45	6 1/2 min	
			2 1/2 min
3.	06:54	6 1/2 min	
			2 1/2 min
4.	07:03	Stopped after several minutes by the minimum sensor.	

If after the 4th feed cycle, the daily ration has not yet been distributed, a further cyclemust be run.

5 The Repromatic's controls

The **Repromatic** is controlled via the time clock digital FT-24 2-channel with seconds timing. The filling of the feed hopper **RPM** is controlled with a sensor.

Basically, the feeding system should only be taken into operation via the time clock, thus either via the "manual start" or the "automatic start". Only in this way the corresponding minimum sensor is activated, thus avoiding an unintentional emptying of the feed channel.

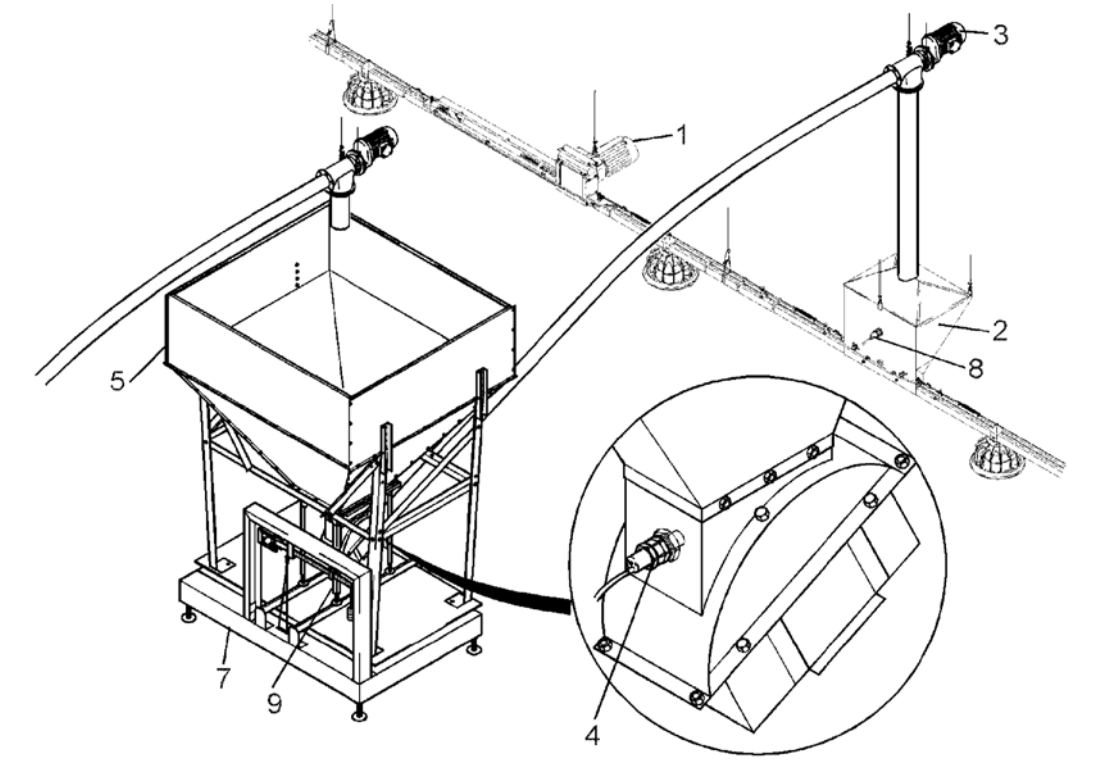
5.1 RPM feed hopper without extension column

	Make sure that the feed hoppers for the feed auger or spiral Flex-Vey (9) are not connected to the day bin (5) on the auto-limit-scale (7) or connected with the diplomat scale (6). Weighing of the feed volume is not possible with a rigid connection.

- Continuous filling of the **RPM** feed hopper (2) during the feed chain run-time using an auger or a **Flex-Vey** spiral (3) with sufficient conveyor capacity (2000 kg/h).
- Switching off the **RPM** drive (1) and the feed auger or the Flex-Vey spiral (3) by means of the minimum sensor (4) in the day bin (5) or by means of the scale (6) once the daily feed volume has been reached.
- A maximum sensor (8) controls an auger or a **Flex-Vey** (3) and in this way regulates the feed level in the **RPM** feed hopper (2).

Pos.	**Description**
1	Drive RPM
2	Feed hopper RPM
3	Feed conveyor or auger open core Flex Vey
4	Minimum sensor
5	Day silo
6	Weigher 99
7	Weigher (Autolimit weigher)
8	Maximum sensor
9	Feed hopper for feed conveyor or auger open core Flex Vey

	The installation of the maximum sensor (8) follows the run of the feed downpipe. Feed must be able to reach and activate the sensor!


3
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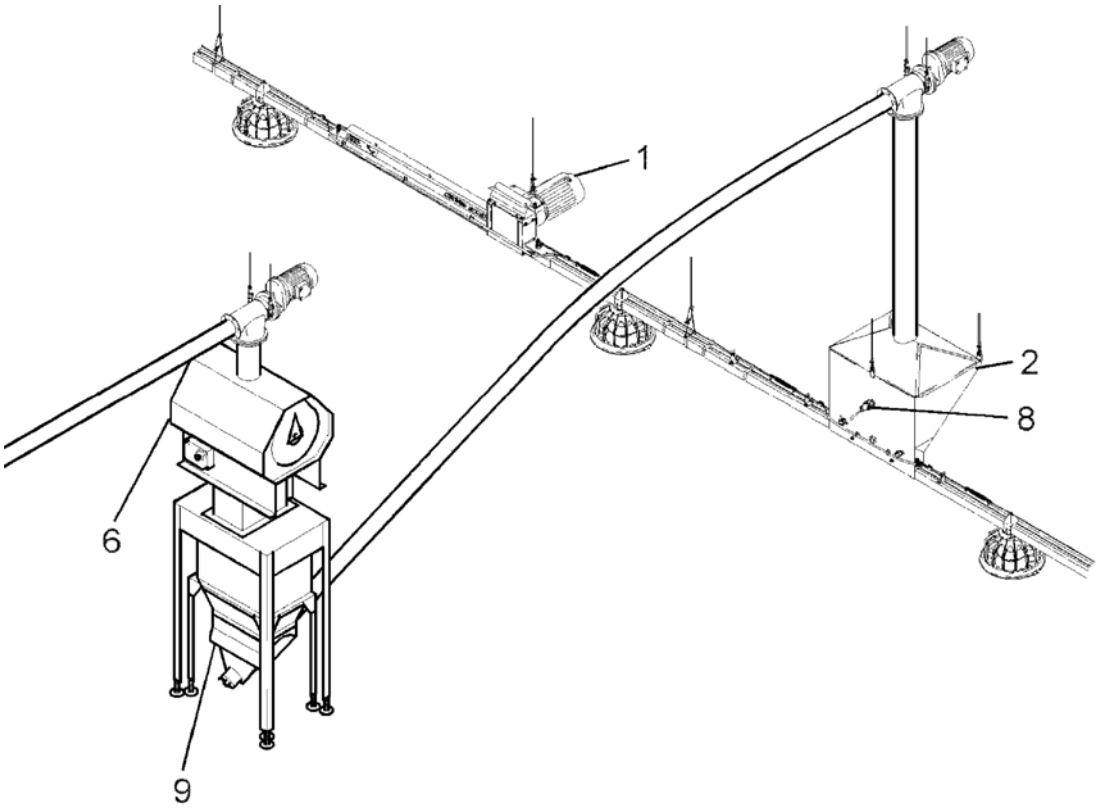

1
2
8
6
9

5.2 RPM food hopper with extension column

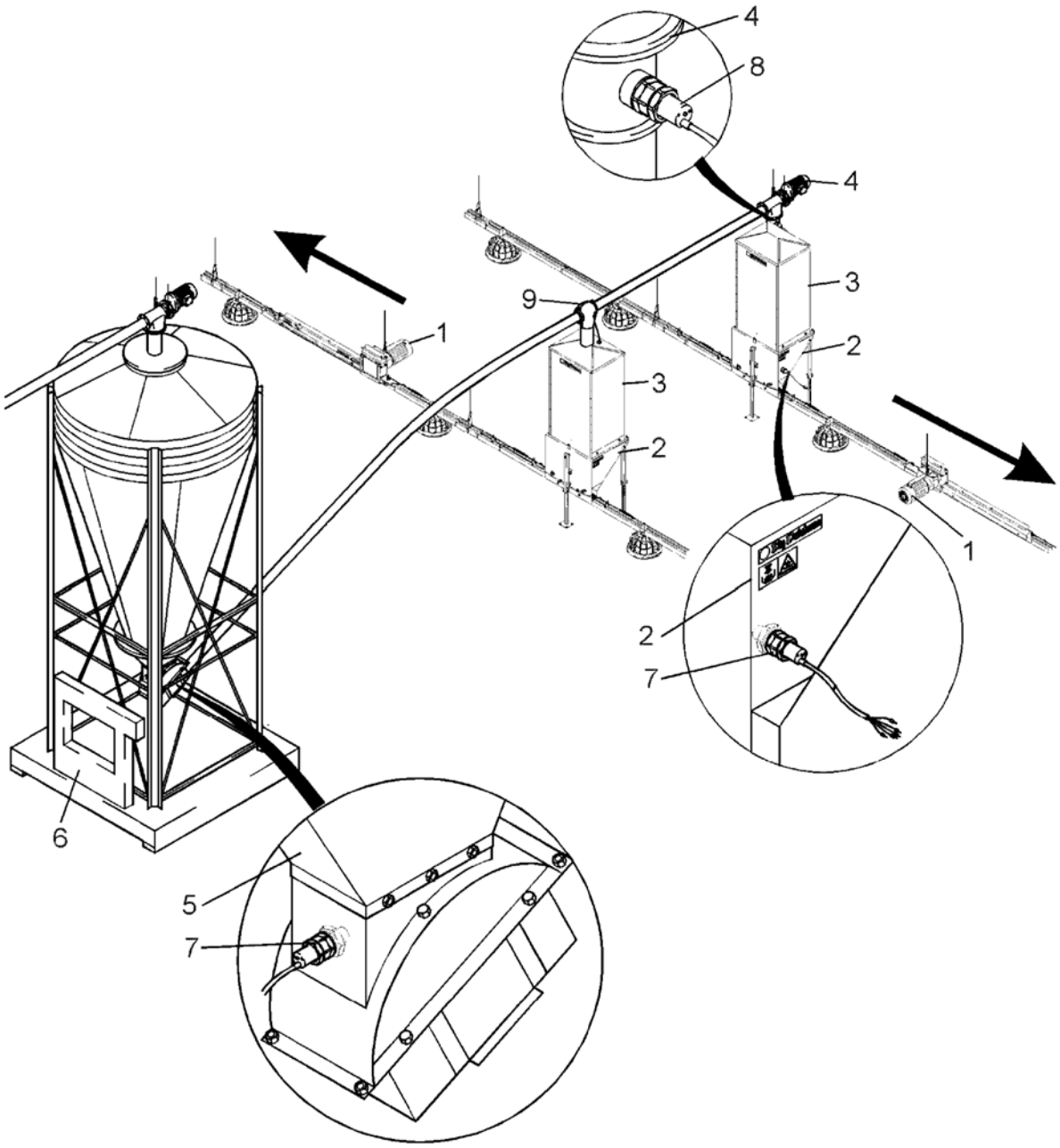
- The **RPM** feed hopper (2) with extension column (3) takes place on the previous day.
- During the feed chain run-time, a follow-up charging takes place by means of the feed auger or the **Flex-Vey** spiral (4) until the daily ration is distributed. A minimum sensor (7) in the day bin (5) only switches the feed auger or the **Flex-Vey** spiral (4) off if the daily ration has been distributed.
- A maximum sensor (8) at the feed auger's or the **Flex-Vey** spiral's outlet (3) controls this.
- A minimum sensor (7) at the **RPM** feed hopper (2) with extension column (3) switches the **RPM** drive (1) off if the extension columns (3) have been completely emptied.

The minimum sensor is found above the **RPM** feed hopper's outlet shutter.

The tap with rope activation provides that both feed hoppers are filled equally.

Pos.	**Description**
1	Drive RPM
2	Feed hopper RPM
3	Extension column
4	Feed conveyor or auger open core Flex Vey
5	Day silo
6	Weigher (Autolimit weigher)
7	Minimum sensor
8	Maximum sensor
9	Outlet cable operated

Controlling the feed level in RPM feed hoppers with extension columns

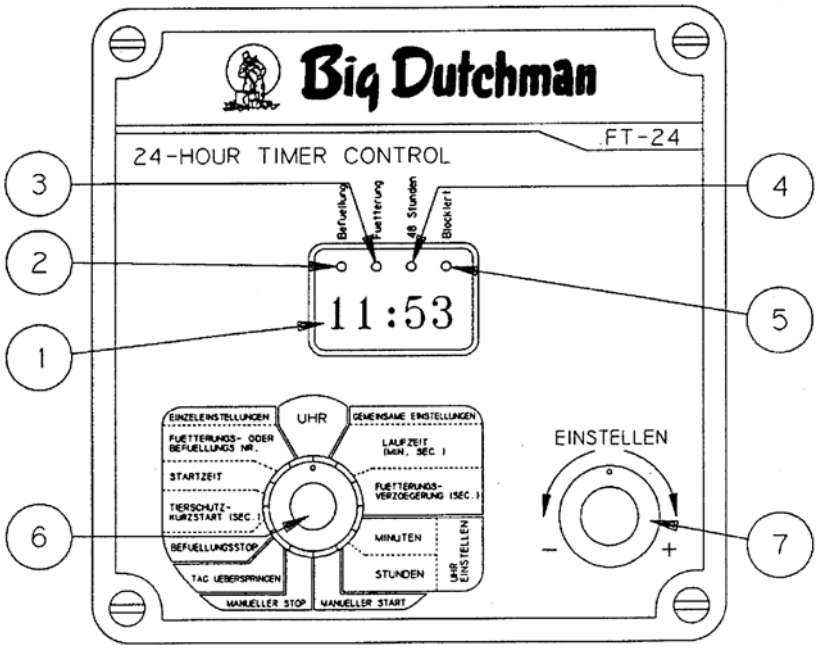


5.3 Digital time switch FT-24 2-channels

	The FT-24 2 channel digital clock timer with seconds as the smallest unit is installed in the location provided for it in accordance with installation drawings or other planning documentation and connected with the respective components. The clock timer is provided with an operating manual in English.

	Always disconnect the current supply before starting any work on the electrical system.

Item	Code no.	Description
1	91 40 1335	FT-24 2 channel digital clock timer with seconds as the smallest unit



1. Display
2. Status display channel 1 (on/off)
3. Status display channel 2 (on/off)
4. 48 hour mode display
5. Blockage input display
6. Parameter selector switch
7. Set-up switch

Technical information:	
Housing	ABS 165x165x80 (mm) IP 44
Operating tension	115/230 V (adjustable)
Frequency	50/60 Hz
Contact	potential-free, 250 VAC or 30 VDC, max. 6 A
Switch times	12 per channel
Shortest switch interval	5 minute feed time channel 2 10 minute fill time channel 1
Shortest switch duration	1 second feed time channel 2
Longest switch duration	99 min. 59 sec. feed time channel 2
Shortest switch duration	10 minute fill time channel 1
power reserve	yes, after a mains failure
Manual start/stop	yes
Display	4 digit LED display with status display for the outlets Time Feed or fill number Feeding time Feed number Feeding time (start) Fill time (end) Animal protection short start Delay time (Feeding) Manual start/stop feeding channel 2

Clocks are delivered without labels. Labels in English, French and German are found in the packaging. These must stuck on depending on the requirements.

6 Maintenance

Inspect the assembly's entire technical plant in accordance with this check list at the beginning and end of every rearing and production period as indicated.

Check the following before starting any maintenance on the assembly:

- whether the switch that controls the machine is switched off,
- whether the switch for the electrical remote control, if included with the system, (usually installed in a separate, centrally located room) is switched off and fitted with the WARNING "DO NOT SWITCH ON, DO NOT PUT INTO OPERATION".

  Provide warning labels if none are available!

Never undertake adjustments or try to correct malfunctions if the machine is in operation unless permitted by the maintenance regulations!

6.1 The REPROMATIC conveyor system

- Align the feed circuit together with the slide clamps for the individual suspension ropes to ensure that the chain runs absolutely straight over the entire length of the circuit.
- Check the horizontal run of the **RPM** corners and adjust their height relative to the feed channel.
- Adjust the height of the **RPM** drive relative to the feed channel.
- Adjust the height of the **RPM** feed hopper relative to the feed channel.
- Ensure that the run of the chain from the **RPM** feed hopper to the **RPM** drive is absolutely straight.

6.2 The feed pans

- Check the shutters and open them if necessary.
- Adjust the cylinders used to set the feed level in all of the feed pans to the same position:

  Position 5-6 for rearing from the first day "ad-libitum" = higher feed level.

  Position 2-3 for the continuing rearing and for the subsequent restrictive feeding. (Position 2-4 depending on feed quality and flow characteristics).

  The feed level is as a rule to be kept as low as possible during the entire restrictive feeding period.

6.3 RPM drive

- Check and if necessary adjust the chain tension in the open feed channel at the **RPM** drive's outlet.
- Check whether the minimum sensor in the auto-limit-scale's day bin, the **Repromatic** feed hopper and the feed spiral switch off.

6.3.1 clock time, motor, control box

- Keep these devices always clean and free of dust.
- Take precautions to prevent condensate from getting into these devices.
- Protect the motor against moisture from dripping or sprayed water.
- These devices require no lubrication.

6.3.2 Gear motor

- Before starting remove the stopper from the gear motor's bleeder screw.
- An oil or grease change is not necessary under normal circumstances.
- Perform an oil change as prescribed by the gear motor's manufacturer (see label on the gear motor).
- As an exception in case of a leak for example we recommend the following kinds of grease:

Manufacturer	**Type of grease**
ARAL	aral grease FDO
BP	BP energrease HT-EP-OO

Manufacturer	Type of grease
CALYPSOL	calypsol D 8024
ESSO	esso fibrax EP 370
MOBILOIL	mobilflex 46
SHELL	shell special reductor grease H
SHELL	shell grease S 3655
TEXACO	glissando GF 1464

- The amount of grease for gear motors of the type ESTA 1.1kW/1.5kW and 2.2 kW is approx. 280 gr.

6.3.3 Toothed drive wheel and guide shoe, reversible

- Inspect these components quarterly for wear and correct function.
- In case of wear of the teeth on the reversible toothed drive wheel and the running surface of the guide shoe for the **RPM** drive, these can be reversed effectively doubling their useful life.

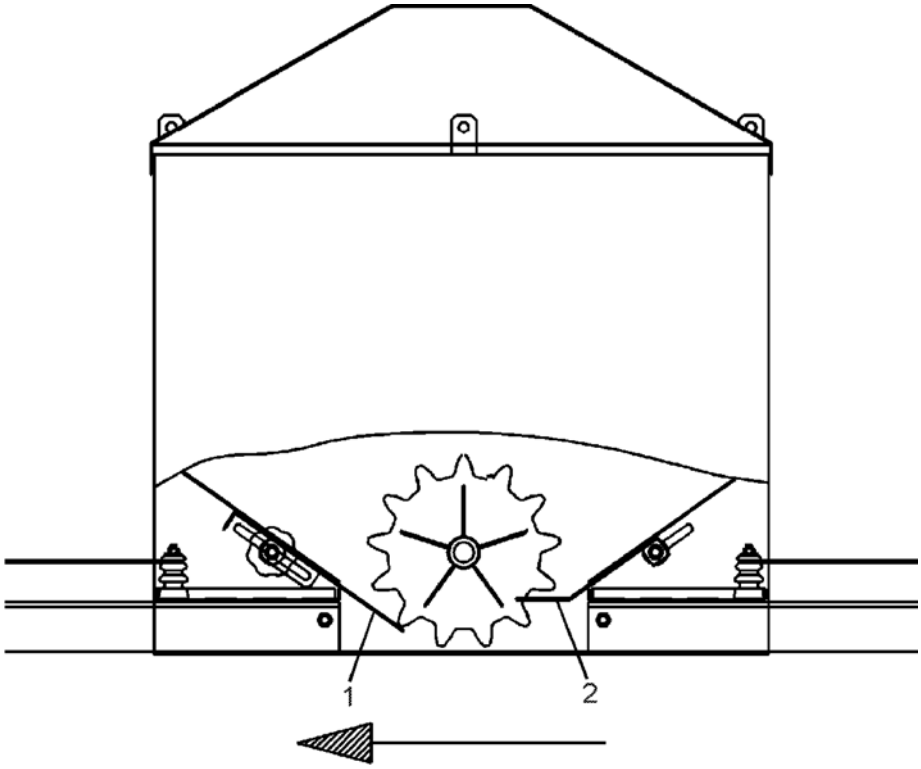
When replacing or reversing a toothed drive wheel provide sufficient grease between the working surfaces of the driver and the toothed drive wheel reversible.

Use the following kinds of grease:

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

6.4 RPM feed hopper

- Check the correct installation of the two feed level shutters.
- Set the feed input shutters to the centre position.
- Set the feed output shutters to 2/3 open.



The arrow shows the feed chain's direction of movement.

1 = feed level shutter **RPM** chain outlet

2 = feed hopper cover plate **RPM** chain inlet

- Check the feed level height on the feed level shutter daily. Remove springs, meal clumps or other foreign objects.
- Set the feed level shutter to the correct height.

6.5 RPM corners

- Inspect the plastic bearings. Replace if necessary.
- Check wear on the floors at the corners. Replace the corner housing if necessary.

Test the feed chain corner as follows:

- release feed chain,
- remove wing screw, washer, cover, retaining washer and distance washer,
- remove corner wheel together with bushing from the shaft,
- remove encrusted feed remains etc., replace the bearing if necessary,
- the corner wheel has to turn easily on the shaft,
- put the feed chain wheel together again in reverse order.

6.6 Anti-roost device

- Check the general function.
- in case of electrical malfunctions look for short circuits between the anti ride-on wire and the feed channel and correct the fault.

6.7 Notes for maintenance of the cable winch

The winch is delivered completely lubricated.

To ensure a constant easy operation and a long service life we recommend to take the maintenance instructions on the enclosed leaflet into consideration !

Immediately replace damaged or extremely worn parts !

6.8 Information regarding silicon dioxide for the mite control

We would like to explain this topic briefly in order to avoid damages to the drive units in the future due to incorrect application of silicon dioxide. Amorphous silicon dioxide is a biocide for control of harmful insects, as e.g. red mites, in the poultry production. It is also marketed under the trade name M-Ex Profi 80. Effectiveness: Silicon dioxide destroys the wax layer which surrounds the mites. Through this the mites dry out. The white agent in powder form is mixed 1:6 with water to a suspension and can easily be sprayed on the house area and the equipment by means of conventional spray technique. This agent is easy to apply, very effective and relatively inexpensive. However, practice has shown that the rough surface of the applied suspension causes extreme wear on the moving parts from plastic and metal. Lubricants as oils and fats are destroyed by silicon dioxide.

Important!

Silicon dioxide must not be applied in drive areas (on bearings, chain drives and gear wheels). Therefore, you should cover the corresponding areas of the drives when spraying with silicon dioxide.

7 Troubles and their remedies

Malfunction	Cause	Remedy
Safety pins breaks	Feed chain is too loose.	Tension the feed chain.
	The feed channel does not lie under the guide shoe correctly. The feed chain catches in the feed channel as a result.	Reinstall the feed channel with guide shoe and align.
	The feed chain catches on a coupling or corner.	Remove foreign object
	The feed chain catches between toothed drive wheel and the guide shoe.	Align coupling or corner.
	The guide shoe is worn, the feed chain catches.	Align the reversible toothed drive wheel and guide shoe, 0.5 - 1 mm play.
		Replace the guide shoe.
	Corner wheels do not run.	Check corners.
Feed return does not work.	Feed level too high, to much feed in the feed trough.	Adjust feed level on the feed level shutter for the **RPM** feed hopper.
	The **RPM** drive runs longer than necessary for the feeding process. The feed channel overfills as a result.	Redefine the feeding duration.
Feed back-up in the corners.	Feed level in the feed trough too high.	Adjust feed level on the feed level shutter for the **RPM** feed hopper.
	Water in the feed, feed backs up in the corners.	Remove wet and swollen feed from the feed channel.

Malfunction	Cause	Remedy

Excessive heat build up in the gear motor.	Incorrect lubrication. Feed chain tension too high or too low.	Check quantity and characteristics of the oil. Perform oil change if necessary Adjust feed chain tension.

Corner wheels do not run.	Feed chain tension too high or too low. Foreign objects stick under the corner wheels	Check and correct feed chain tension. Check corners for foreign objects and remove them.

Motor does not start.	Fuse burned through. Motor protection has triggered. Motor protection does not trigger.	Replace fuses. Adjust motor protection correctly. Check and adjust the motor protection control.

Motor does not start easily.	380 V laid out for the delta connection but 220 V switched for the star. Current or frequency deviate sharply when starting.	Adjust switching correctly Provide for better mains.

The motor builds up too much heat.	Motor switches in the delta connection rather than in the star. Cold air volume too low. Cool paths blocked.	Set motor controls correctly. Provide for unobstructed in and outflow of cold air.