June 29, 2017

Original Service Manual

CalfRail

Versions: IFS 6.10 / Feeder S 2.00

CRS2-IF1-WH

Table of contents

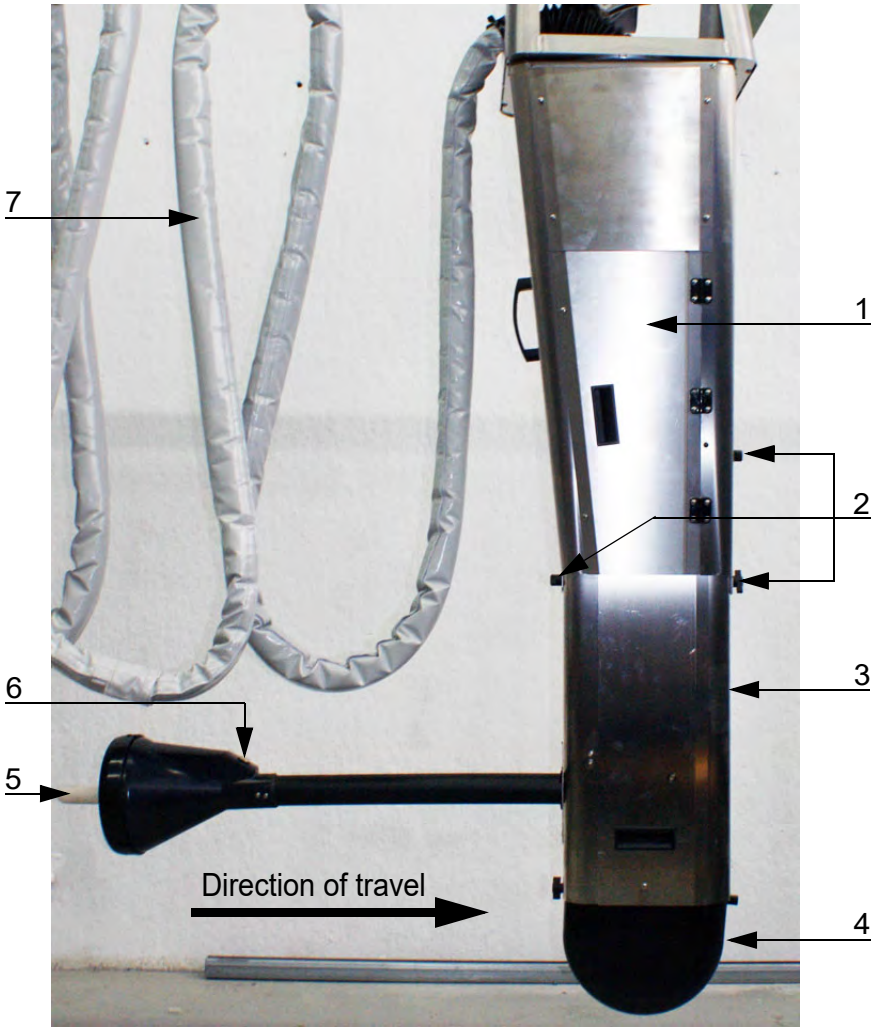
1. Introduction

This manual enables you to commission the CalfRail safely as intended.

- The end user must provide you with the operating manual of the CalfRail and the safety data sheets for the cleaning agents.
- Carefully read all operating instructions and safety data sheets before initial commissioning or recommissioning of the CalfRail.
- Observe all of the warnings and safety instructions in this operating manual at all times.
- The CalfRail is connected to an automatic feeder. You must also comply with the separate operating manuals, safety instructions and warnings for the automatic feeder.

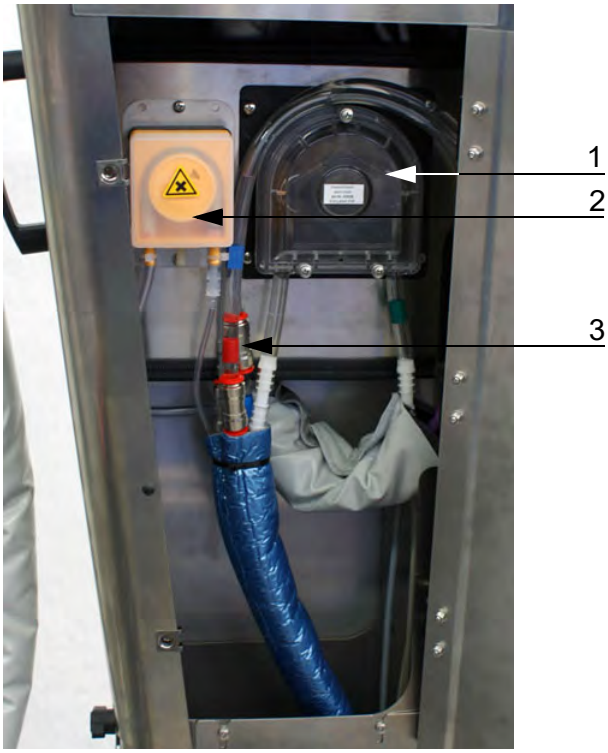
1.1 Overview of the CalfRail

1.1.1 CalfRail viewed from the right



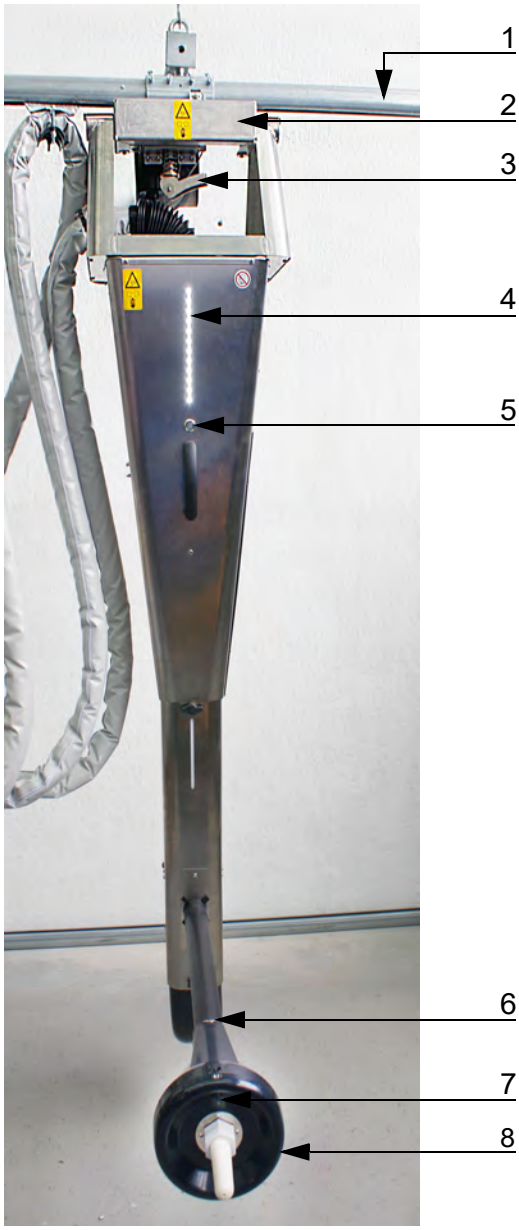
1 Service door
2 Screws to adjust teat height
3 CalfRail unit
4 Service opening for suction sensor
5 Teat
6 AFeed button with entitlement LED
7 Supply line

1.1.2 Interior view



1 Servopump
2 Pump for teat cleaning (optional)
3 Connectors for hose group

1.1.3 Front view



1 Rail
2 Drive carriage
3 Quick release
4 LED light strip
5 Continue button
6 Feed button with entitlement LED
7 Teat cleaner (optional)
8 Return valve (internal)

Continue button

If during feeding the CalfRail is in front of a box and this button is pressed, the CalfRail moves on to the next box.

Feed button

The feed button activates the servopump. The servopump makes it easier for the animals to become accustomed to automatic feed consumption and encourages weak calves to consume feed. The feed button has an integrated **Entitlement LED**:

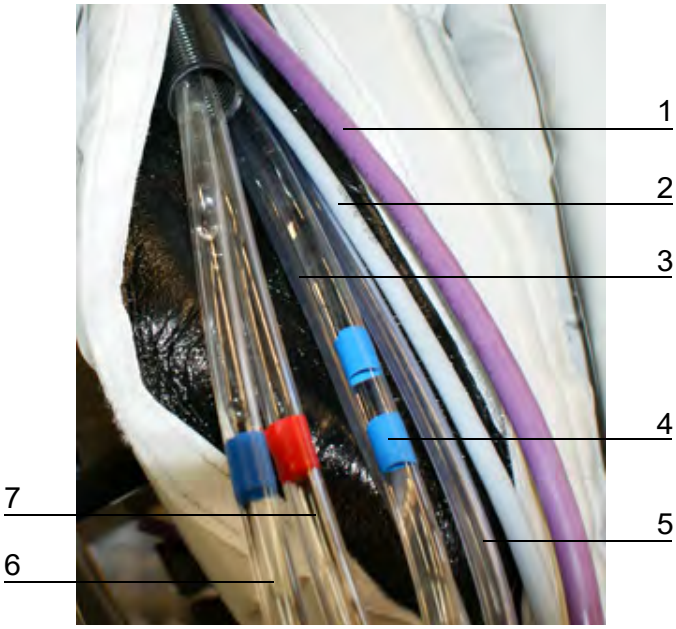
- LED lights up: The calf has a feed entitlement.
- LED flashes slowly: The calf has a feed entitlement ≤ 0.5 liters.
- LED flashes rapidly: The calf has no feed entitlement.

1.1.4 Name plate

There is a name plate on the left-hand exterior side of the CalfRail and on the rear of the control box and there is a component name plate on the rear of the heating system. They provide information about the manufacturer, type and number of the CalfRail, information for connecting the feeder to the mains as well as the certifications of the CalfRail. An example of a name plate is shown below.

1 Name and address of the manufacturer
2 Type and number of the CalfRail
3 Information for connection to the mains
4 Certifications of the CalfRail

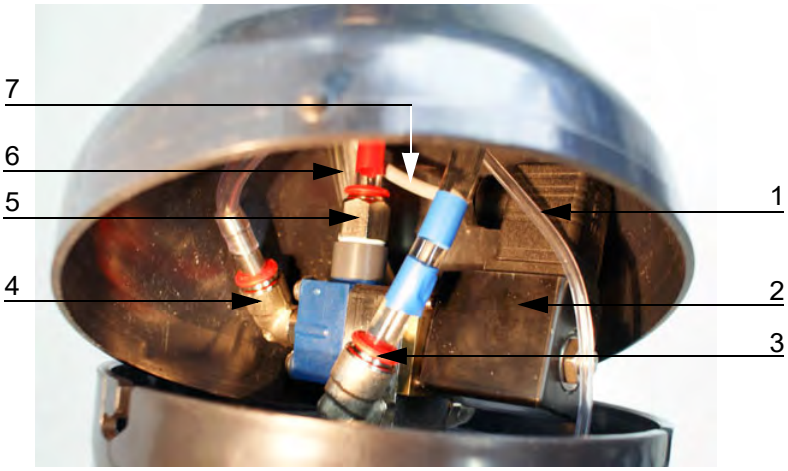
1.1.5 Supply line



1 CAN bus cable (violet)
2 CalfRail power supply (gray)
3 Suction hose return line ø7 mm (without marking)
4 Heating system return line (2 x, blue)
5 Teat cleaner ø5 mm (optional)
6 Heating system feed line (blue)
7 Suction hose (red)

1.1.6 Return valve

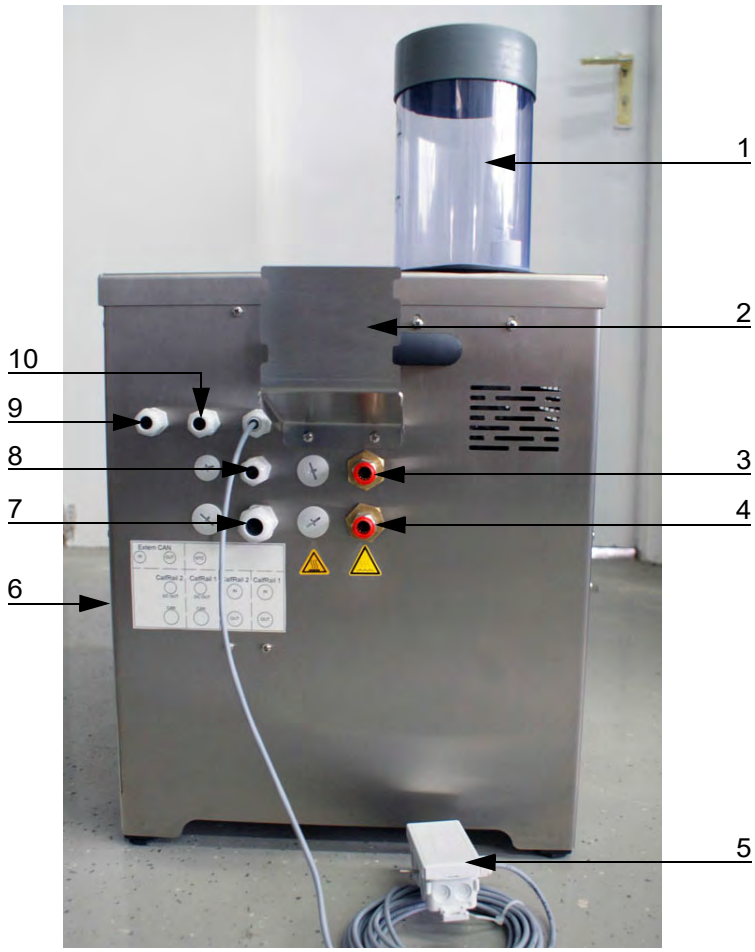
The return valve is located inside the pivot arm.



1 Teat cleaner (optional)
2 Return valve
3 Heating system return line (2 x, blue)
4 Suction hose return line (without marking)
5 Suction hose (red)
6 Heating system feed line (blue)
7 Power supply connection for return valve (gray)

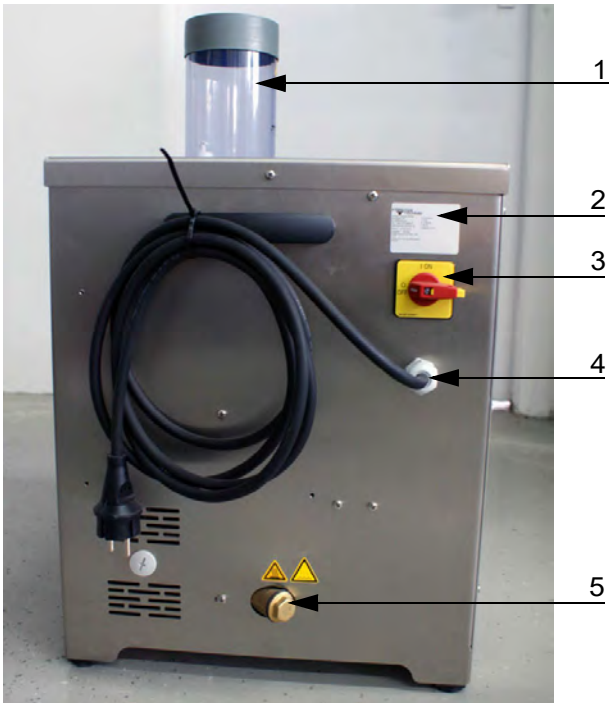
1.1.7 Heating system

Front view



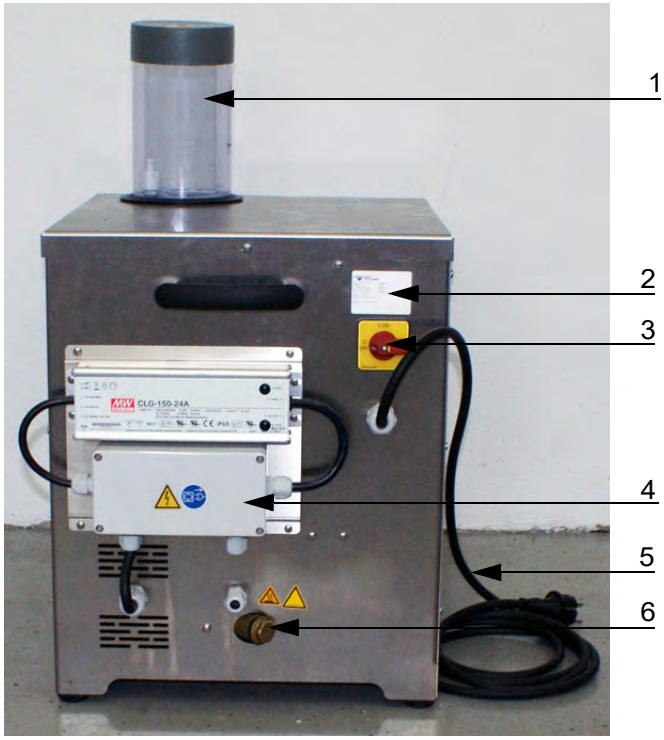
1 Expansion vessel
2 Hose holder
3 Port for return line
4 Port for feed line
5 Temperature sensor
6 Control box cover (not shown)
7 Port for CAN bus cable (CalfRail 1)
8 Port for CAN power supply (CalfRail 1)
9 Port for other CAN participants (e.g. IFS)
10 Port for CAN bus cable to automatic feeder

Single unit rear view



1 Expansion vessel
2 Component name plate
3 Main switch
4 Mains connection
5 Filter

Double unit rear view



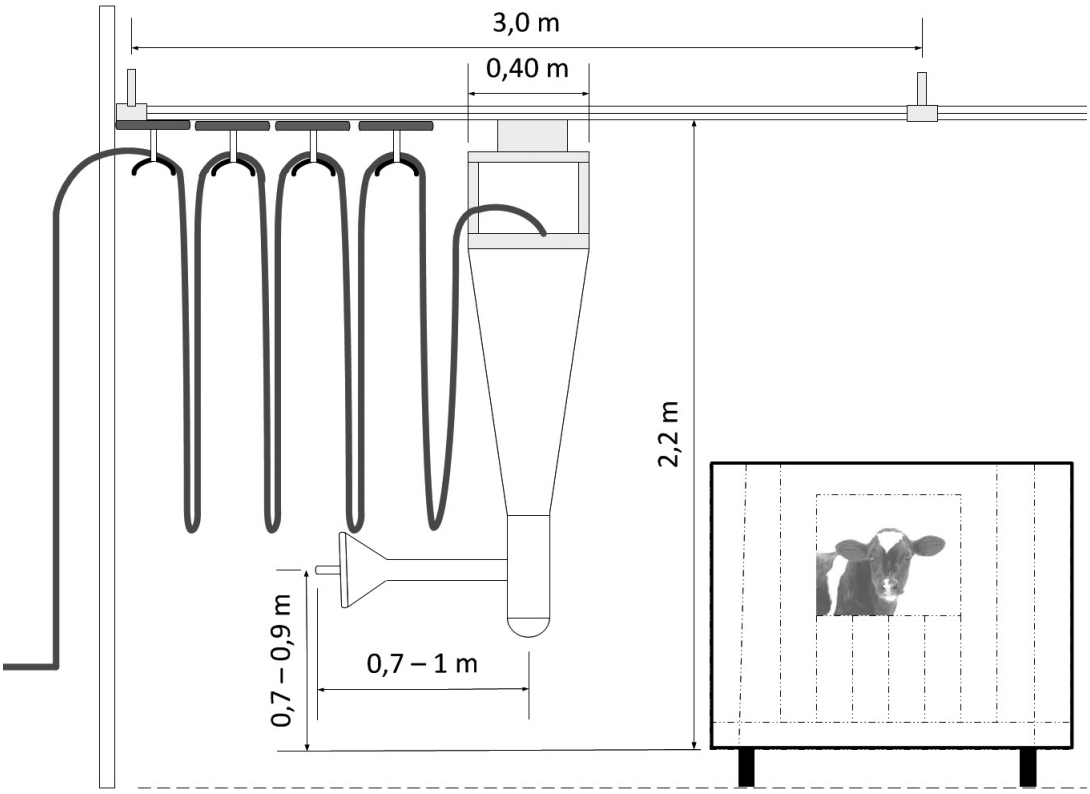
1 Expansion vessel
2 Component name plate
3 Main switch
4 Mains adapter for second CalfRail
5 Mains connection
6 Filter

1.2 Technical data

1.2.1 Electrical connection

Note: The electrical connection specifications of the CalfRail can be found on the name plate on the left-hand side of the CalfRail unit and on the component name plate of the heating system.

1.2.2 Dimensions



1.2.3 Weight

CalfRail unit: approx. 40 kg.

Water heating system: approx. 35 kg.

1.2.4 Number of feeding stations and animals

CalfRail/automatic feeder	Calves/CalfRail	Calves/side
Max. 2	Max. 32	Max. 16

1.2.5 Installation requirements

1.2.5.1 Structural integrity of the carrier system

The hanger elements for the rails on the carrier system must be designed so as to accommodate both the vertical and horizontal loads in the rail direction and perpendicular to the rail direction.

In planning the carrier system, the following hanging loads deriving from the CalfRail system must be taken into account for the carriers exposed to the greatest load:

- Vg,k = 1.0 kN (vertical hanging load resulting from the dead load)
- Vp,k = 0.10 kN (vertical hanging load resulting from the payload)
- HL,k = 0.05 kN (horizontal load in rail direction resulting from the inertial forces)
- HQ,k = 0.06 kN (horizontal load perpendicular to rail direction resulting from the transverse pull)

Note: All hanging loads include the dynamic increase factors!

The specified values apply subject to the following conditions:

- Spacing of rail fasteners $\leq$ 3.0 m
- Spacing of carriers of the carrier system on which the rail is hung $\leq$ 6.0 m

1.2.5.2 Running rail

- The running rail should be suspended at a height of 2.2 meters (measured from the calf floor level to the running rail).
- The distance between the suspension points for the running rail may not be more than 3 meters.
- The running rail must be able to carry the weight of the CalfRail unit (40 kg).
- The rail system must be installed without any inclination or tilt.
- A roof over the running rail is recommended.
- The maximum length of the hose group from the automatic feeder to the CalfRail is 30 meters for each CalfRail.
- The running rails may not be welded to the carrier system.

Note: The carrier system must be configured to suit.

1.2.5.3 Igloo/Calf box

- The calf boxes should have only a single central opening.
  - This enables easy installation as opposite-facing boxes can be set up as mirror images of one another
  - Off-center openings result in offset boxes with an individual orientation, since the teat must always come to rest in the middle of the opening. This can mean longer rail and hose lengths
- The distance from the rail to the calf box should be 0.7 - 1 meter. Therefore the feeding alley should be set up as follows:
  - At least 1 meter distance from the building wall to the calf box;
  - Minimum of 1.4 meters from calf box to calf box, up to a maximum of 2.0 meters.

1.2.5.4 Automatic feeder

As a prerequisite for operating the CalfRail, the following must be present for the installation:

- Automatic feeder VARIO smart (TA*-VS*) (with current software version)
  - Power outlet

  - Water connection
  - Drain for flushing water
- 1 x power outlet for the CalfRail
- 2 x power outlets as backup near the automatic feeder
- Ideally, a drain for flushing water at the parking position
- Space for parking position, at least 0.6 meters wide and 1.5 to 3.0 meters long

1.3 Disposal

All components, liquids and solids must be disposed of in compliance with the applicable official regulations for proper waste recycling and disposal in your country. Also comply with the corresponding safety data sheets.

1.4 Manufacturer's contact details

Please contact us if you have any questions about our products or require technical support! When you contact us, always specify the serial number of your CalfRail. The serial number is located on the name plate on the left side of your CalfRail unit.

Also specify the device type and the program version of your automatic feeder and your CalfRail so that you can obtain service tailored to your automatic feeder. The device number and model are located on the name plate on the left of the housing of the automatic feeder and the CalfRail unit.

You can call up the program version via your hand-held terminal. The relevant menu item can be found under  **> Diagnosis > Version > Peripherals > CalfRail** or **CR water heating system**.

You can note the device type, serial number and program version in the fields provided.

Device type:

Serial number:

CalfRail program version:

Water heating system program version:

Our contact details:

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2. Important safety instructions

You will learn about the following in this section:

- The hazards presented by the CalfRail and how to avoid those hazards.
- The safety signs on the CalfRail and what they mean.
- How to install the CalfRail safely.

The CalfRail has been designed in accordance with accepted rules of engineering and approved safety standards. Hazards and adverse effects may nevertheless arise during operation. These hazards are indicated by the warning signs directly on the CalfRail as well as the warning messages in this service manual.

2.1 Intended use

The CalfRail is only intended for the distribution, provision, delivery and dispensing of animal feed in liquid form for the Vario automatic calf feeder.

2.2 Required qualifications

Only trained service technicians are authorized to install the CalfRail, put it into service and subject it to maintenance and repairs.

Service technicians are specialists with appropriate qualifications. They are able to assess the work assigned to them and detect potential risks on the basis of their technical training as well as their knowledge of the relevant standards. They have knowledge of relevant accident prevention regulations, generally accepted safety regulations and country-specific standards and provisions.

2.3 Residual risks

Hazards to life and health caused by the CalfRail:

⚠ WARNING!

Hazards due to electrical power

The CalfRail is operated with electrical power.

► You must observe the general precautions for handling electrical devices.

- Read the operating manual before commissioning the CalfRail.
- Keep children away from the CalfRail.
- Do not touch any moving parts of the CalfRail, such as the drive motor.
- Use only original replacement parts made by the manufacturer.
- Always disconnect the mains plug before performing any maintenance or cleaning on the CalfRail.
- If you are operating the CalfRail outside of enclosed spaces, you must protect it against rain and moisture, for example with a roof.

- The following specific hazards are associated with the CalfRail's electrical system:
  - **Electric shock**. If there is an electrical or voltage breakdown, electric current will flow through parts of the CalfRail that are normally isolated. Touching the unit can cause a fatal electric shock. The CalfRail must be checked regularly for electrical safety in compliance with national regulations (repeated inspection) and you must install a 30mA residual current device (RCD).
  - **Short circuit, indirect contact.** A short circuit can result in currents that are many times greater than the operating current. Touching the unit can cause a fatal electric shock. Install fuse protection (provided by the customer) with the rating specified on the name plate and a residual current device (RCD) of 30 mA in compliance with local regulations.
- **Harsh environmental conditions**. In agricultural operations, water hoses or pressure washers are often used to clean areas. This can damage the CalfRail. Never spray-wash the CalfRail.
- **Risk of becoming pulled in or trapped.** The CalfRail unit is attached to the carriage by means of a slewing ring. In order to prevent injuries to fingers, do not touch the CalfRail while it is slewing.
- **Chemical burns**. The cleaning agent used to clean the CalfRail contains caustic substances. These substances can cause serious injuries to the hands or eyes. Avoid direct contact with the cleaning agent and always wear chemical-resistant protective gloves and safety glasses when using the cleaning agent.

Material damage caused by the CalfRail

The CalfRail can cause the following types of material damage:

- **Infection**. Improper cleaning or incorrect operation can result in calves becoming infected by pathogens from the CalfRail. This can result in medical costs or death of calves.
- **Corrosion**. Improper cleaning or maintenance can result in the CalfRail ceasing to function correctly.

2.4 How am I warned of hazards?

Hazards are indicated directly on the CalfRail by safety signs (warning signs, instruction and prohibition notices), and in the operating manual by specially marked hazard descriptions.

The warnings for hazards that can cause death or injury to people are given greater prominence that those for material damage, for example through the colors, hazard words or symbols used.

Safety signs are an important element of the overall CalfRail safety concept. They provide warnings about hazards and explain how to avoid them.

Make sure that all the specified safety signs are fitted to your CalfRail and that they are in a legible condition. If the safety signs are difficult to read, replace them immediately. New safety signs are available from Förster-Technik GmbH.

2.4.1 What are the components of a hazard description?

A hazard description always consists of the following elements:

- Hazard word (danger, warning, caution, attention)
- Type of hazard (what can happen?)
- Location of hazard (where can it happen?)
- Actions necessary for preventing the hazard (what should I do?).

2.4.2 Potentially fatal hazards or health hazards

A hazard symbol indicates the risk of fatal injury or detrimental effects on health. The words and symbols differ according to the severity and the likelihood of occurrence: ⚠ (Warning triangle with exclamation mark) and the following hazard words:

⚠ DANGER!

The word DANGER indicates an immediate danger that can cause loss of life or injury.

Warning signs on the CalfRail and in the operating manual: **DANGER** (white font on red background).

⚠ WARNING!

The word WARNING indicates a potentially dangerous situation that can result in loss of life or severe injury.

Warning signs on the CalfRail and in the operating manual: **WARNING** (white font on orange background).

⚠ CAUTION!

The word CAUTION indicates a potentially dangerous situation that can result in minor injuries.

Warning signs on the CalfRail and in the operating manual: **CAUTION** (white font on yellow background).

2.4.3 Material damage

The word **Attention** warns you about the risk of material damage. The CalfRail or an object in its vicinity, such as a calf, can be damaged.

NOTICE!

The word ATTENTION warns you about the risk of material damage. The CalfRail or an object in its vicinity, such as a calf, can be damaged.

Prohibitory signs on the CalfRail: A pictogram with a red line through it in a white circle with a red border indicates what you may not do.

Operating manual: white font on a blue background.

2.5 Safety signs

Different safety labels are attached at the hazardous points on the CalfRail. Warning signs, prohibition and instruction notices.

What are warning signs?

Warning signs consist of:

- A pictogram in a yellow triangle illustrating the potential hazard.

What are prohibitory signs?

Prohibitory signs have a pictogram of the prohibited action in a red circle with a line through it. See the adjacent example. They graphically depict the prohibited action. In this example, the hose with a line through it means that you may not use high-pressure cleaners.

What are instruction notices?

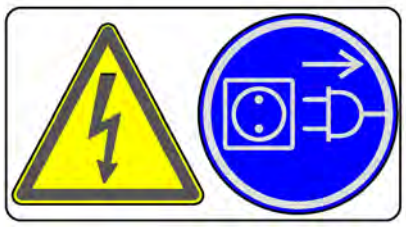
Instruction notices show a pictogram of what you are being instructed to do in a blue circle. They illustrate what you have to do. In the example, the pictogram means that you must always disconnect the plug first.

Other signs

Grounding symbol. This symbol is placed in the locations where you must perform potential equalization.

2.5.1 Warning signs on the machine

Danger of death by electric shock



Beware of hot fluids!

Danger due to hot surfaces!

Burning/scalding

Automatic startup

Never reach into the hazardous area

No spraying

Grounding symbol

2.5.2 Safety devices

The CalfRail may be operated only if the safety devices are complete and intact. The CalfRail has the following safety equipment:

- The safety signs (warning signs, mandatory signs and prohibitory signs).
- The safety temperature limiter of the heating system. The limiter switches off the heating system if it overheats (temperature exceeds 70°C). The heating system may be reactivated only by a service technician.

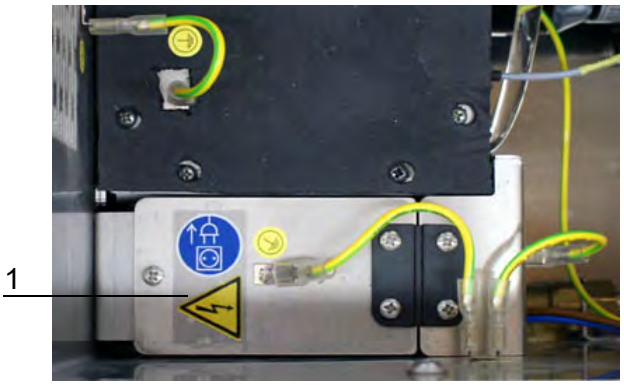
The safety devices at the machine are an important part of the safety concept and help prevent accidents.

- Do not remove or change the safety devices without observing the corresponding safety instructions.
- Put the machine into service only once all safety devices have been applied and are in the protection position!

Safety temperature limiter

The heating system of the CalfRail is equipped with a safety temperature limiter which is triggered in the event of overheating (70°C) and consequently shuts down the heating system.

The safety temperature limiter is triggered if the water is too hot or if the heating system has run dry. The safety temperature limiter can be found behind the cover shown below.



1 Cover of the safety temperature limiter

3. Commissioning

In this chapter, you will learn how to connect the CalfRail unit to an already installed carrier system.

The end user must provide you with the operating manual of the CalfRail, the separate operating manuals of the automatic feeder and the safety data sheets for the cleaning agents.

The appendix contains a check list of all instructions that you must observe during commissioning or recommissioning (see 9.1 "Initial commissioning checklist" - 72).

NOTICE!

► Inform the end user that he/she must ensure the structural integrity of the carrier system.

NOTICE!

► In order to use the CalfRail with all its functions, the automatic feeder must be updated to the latest program version.

NOTICE!

Risk of damage to health from lifting heavy loads.

► Observe the occupational safety precautions when installing the unit.

3.1 Electrical connection provided by the customer

The CalfRail requires a dedicated electrical connection.

- The rated voltage and rated frequency must be observed. The supply voltage specified on the nameplate of the heating system must correspond to that of the power supply system.
- A fault-current circuit breaker (30 mA) in the power supply provided by the customer is compulsory for the operation of the CalfRail.
- Since it is not technically possible to protect the CalfRail separately against lightning strikes, you must instruct the end-user that he is responsible for providing appropriate lightning protection (e.g. a lightning protection system for the entire building).
- Observe the local regulations and protective measures.

Potential equalization

To protect the animals and prevent electrical faults, subject all metallic objects, such as the rail system and heating system, to potential equalization.

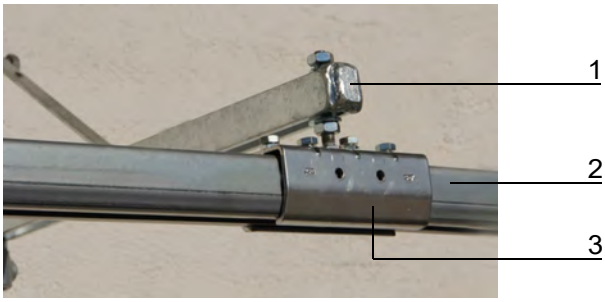
3.2 Hanging the running rail

1. Check the rails for any damage that may have occurred during shipping. The ends of the rails should be smooth. If necessary, they must be filed smooth.

   Note: Rails for curved rails may need to be bent.

2. Remove any dirt or deposits from the interior of the running rail.

3. Attach the supplied running rail holders to the previously installed hanger.



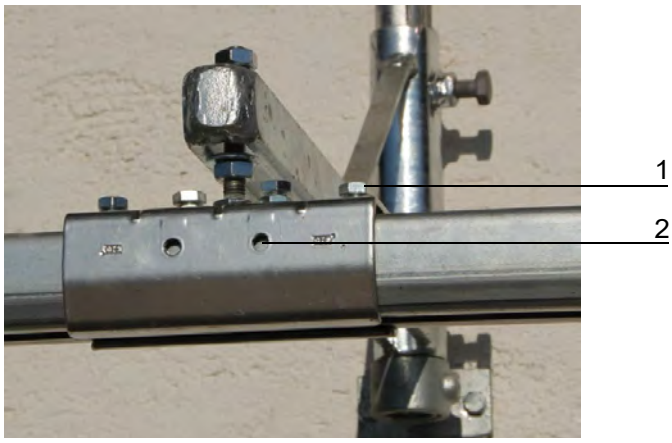
1 Hanger (example)
2 Running rail
3 Running rail holder

4. Push the individual rail pieces into the running rail holder.
5. Align the rail and ensure that the distance to the floor does not change and that the rail is installed horizontally. If not, adjust the rail using the nuts on the running rail holders.
6. Fasten the rail using the upper clamping screws provided on the holders.

NOTICE!

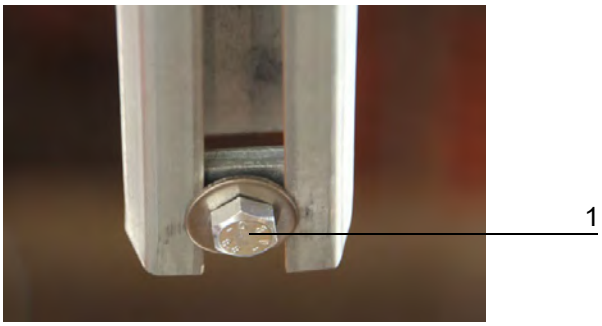
► Make sure that the rail does not slip in the holders. The transition must be smooth and even; gaps or edges should be avoided.

Note: The lateral screws on the holders are not required. Remove these screws (see illustration).



1 Clamping screws
2 Remove these screws

7. Use a spirit level to ensure that the rail is horizontal. If not, adjust the rail using the nuts on the running rail holders.
8. Attach an end stop to the end of the rail.



1 End stop

3.3 Mounting the CalfRail

1. When mounting the CalfRail unit, observe the occupational safety precautions.

⚠ CAUTION!

Risk of damage to health from lifting heavy loads.

The CalfRail unit weights 40kg.

► Never carry the CalfRail by yourself.

2. Loosen the quick release on the carriage of the CalfRail unit so that you can mount the unit.

1 Quick release

3. Threading the CalfRail unit into the running rail.

⚠ CAUTION!

Risk of damage to health from lifting heavy loads.

Use two people to thread the CalfRail unit into the running rail.

► Ensure that you have a firm stance when hanging the CalfRail unit.

Note: The teat of the CalfRail must always face the direction of travel.

4. Adjust the length of the arm to the distance between the rail and the calf box.
5. Attach the arm to the CalfRail unit and connect the hose group to the return valve (see 1.1.6 "Return valve" - 10). Adjust the length of the hoses if necessary.

6. Attach the hose of the teat cleaner (optional) to the nozzle.
7. Connect the feed button and the return valve to the control system of the CalfRail as shown in the circuit diagram.

NOTICE!

► Make sure that the hoses inside the CalfRail unit are not kinked.

8. Push all rail carriages onto the rail. If more rail carriages have been supplied than are needed, remove the surplus rail carriages.

   Note: Place the end clamp (carriage that cannot be moved) at the beginning of the rail. The end clamp must always be attached to the beginning of the rail, even if you remove rail carriages from the supply line.

   Thus at the end of the rail there is an end stop and at the start of the rail, an end clamp.

1 Rail carriage
2 End clamp

NOTICE!

The hose package must only be lightly fastened within the rail carriage

► Therefore do not tighten the screws of the rail carriage tightly, in order to avoid damaging the hose package.

9. Push the CalfRail unit onto the other end of the rail. Ensure that the supply line sags slightly between the rail carriages.

⚠ WARNING!

Risk of injury and death.

Damage to the supply line can result in significant material damage as well as serious injuries to animals and humans or even death.

► During installation, make sure the supply line is installed outside the animal area to prevent it being damaged.

NOTICE!

The supply line can be damaged if it is taut.

► Adjust the position of the rail carriages as necessary.

10. Tighten the quick release using the clamping lever. The CalfRail unit should be difficult to move by hand.

    Note: If there is too much contact pressure, the motor will be overloaded and the CalfRail will move in a jerky fashion.

    Note: You can adjust the quick release by loosening and turning the clamping lever.

3.4 Connecting the CAN bus and power

⚠ DANGER!

Fatal electric shock

The electrical components of the automatic feeder are live.

► Always disconnect the mains plug before starting work on its components.

1. Switch off the automatic feeder from the main switch and disconnect the mains plug.
2. Install the heating system on a level surface near the automatic feeder and a power outlet.

⚠ CAUTION!

Risk of damage to health from lifting heavy loads.

The weight of the heating system can result in over-exertion.

► When setting up the heating system, observe the occupational safety precautions.

3. Install the supply line from the start of the rail (parking position) to the automatic feeder, taking into account holes in walls for the line, height differences, etc.

NOTICE!

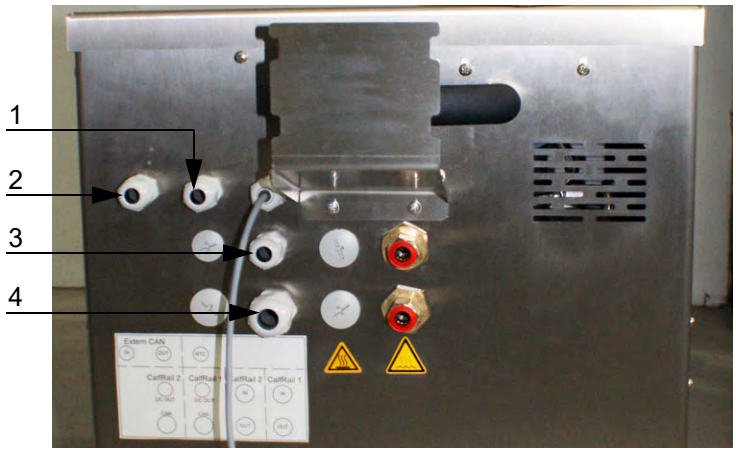
► Ensure that there are no kinks or twists in the line as these can damage the line.

4. Connect the CAN bus cable (4-wire cable) to the control unit of the heating system as shown in the circuit diagram, and attach the ferrite choke supplied to the cable.

Note: If two CalfRails are connected, connect the second CAN bus cable and attach the second ferrite choke.

5. Run a CAN bus cable (2-wire cable) from the heating system to the automatic feeder and connect it to the control box as shown in the circuit diagram.
6. Connect the power supply for the CalfRail to the control unit of the heating system as shown in the circuit diagram, and attach the ferrite choke included in the scope of supply to the cable.

   Note: Connect the cables and hoses to the ports on the right. The connectors on the left are for when a second CalfRail is connected.

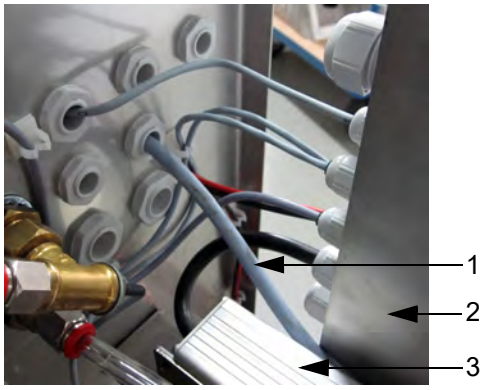


1 Port for CAN bus cable to automatic feeder
2 Port for other CAN participants
3 Port for power supply line
4 Port for CAN bus cable (CalfRail)

7. If you wish to connect a second CalfRail, proceed as follows:

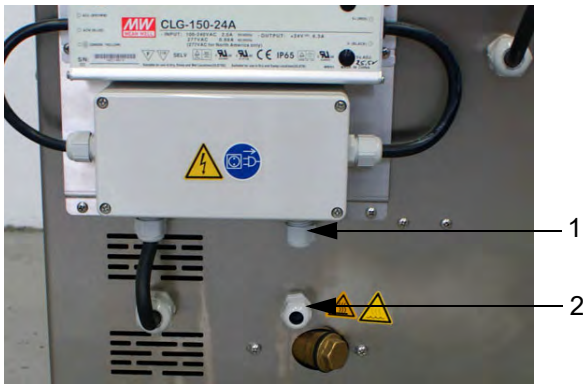
   7.1. Run the power supply through the port in the housing of the heating system.

   7.2. Run the power supply through the housing between the mains adapter and panel (see illustration) to the exterior via the opening on the rear side.



1 Power supply
2 Panel
3 Mains adapter

   7.3. Connect the power supply to the control unit as shown in the circuit diagram, and attach the ferrite choke included in the scope of supply to the cable.

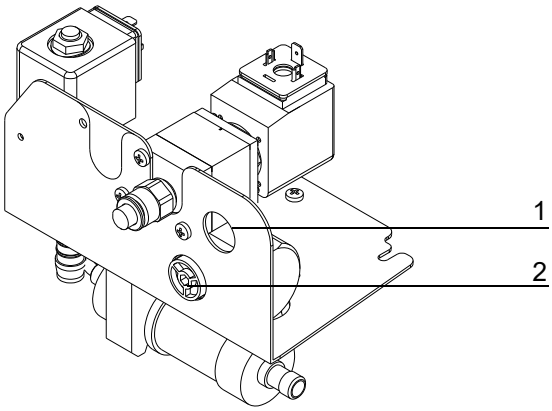


1 Mains adapter in
2 Housing out

8. Install the temperature sensor for the outside temperature at the parking position of the CalfRail and secure it in an appropriate position.

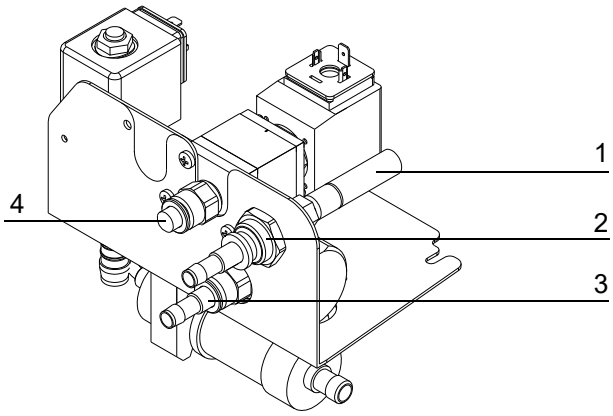
3.5 Run and connect supply line

1. Install the last clamp or fastener for the supply line so that the insulation extends behind the automatic feeder.
2. Connect the suction hose as follows:
   2.1. Break the laser-cut metal piece out of the angular sheet of the valve unit and mount the supplied partition fitting to the hose fitting.



1 Laser-cut metal piece
2 Plug

   2.2. Remove the plug used to seal the second hose fitting of the feeding box.
   2.3. Push one end of the 8 x 3 mm hose onto the fitting on the feeding box and the other end onto the fitting of the partition fitting. To do this, you must guide the hose through the hole sealed with a plug on the intermediate panel of the automatic feeder.
   2.4. If these fittings are already in use for other feeding stations, twist the plug on the left under the partition fitting (blue) out of the angular sheet and replace it with the supplied screwed fitting.

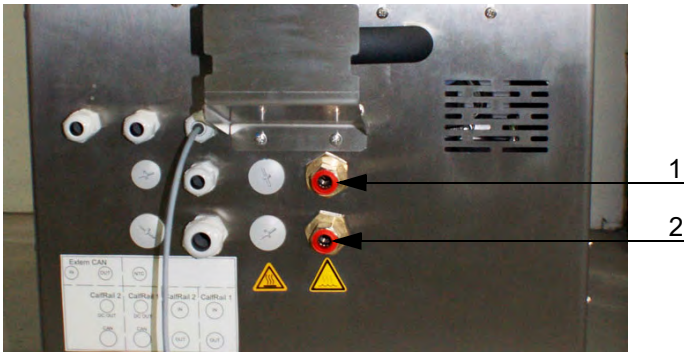


1 8 x 3 mm hose, mixer -> partition fitting
2 Partition fitting with fitting for connecting feeding stations 1 + 2
3 Screwed fitting with fitting for connecting CalfRails 1 + 2
4 Return valve sealed with a plug (no function)

2.5. Push the end of the suction hose onto the hosing fitting of the partition fitting/screwed fitting.

3. Lay the end of the return hose into the drain that is also used for the automatic feeder.

4. Connect the other two hoses (blue markings) to the connectors of the heating system.



1 Connector for return line
2 Connector for feed line

Note: Connect the hoses to the connectors on the right. The connectors on the left are for when a second CalfRail is connected.

5. If the teat cleaning feature is used (optional), place the fluid container next to the automatic feeder and insert the hose for cleaning.

3.6 Activating the heating system

⚠ WARNING!

Beware of the health hazards caused by the antifreeze used

If you swallow antifreeze it can poison you.

► Follow all the safety instructions listed in the safety data sheet for the antifreeze and wear the specified safety equipment.

⚠ WARNING!

Beware of chemical burns from the antifreeze used

The antifreeze can cause chemical burns to your eyes or hands.

► Follow all the safety instructions listed in the safety data sheet for the antifreeze and wear the specified safety equipment.

1. Raise the heating system on the side on which the expansion vessel is located, in order to vent the water tank.
2. Fill the water tank of the heating system up to the **Max.** mark via the expansion vessel.

   Up to 50% ethyl glycol can be added as antifreeze.
3. Open the heating system control box and set the **S1** hex switch to position **0** and **S2** hex switch to position **7**.
4. Plug the mains plug of the heating system into the appropriate power outlet and switch the heating system on.
5. Press the **Search Button** (S3) to activate the pump.

   5.1. Fill the water tank while the pump pumps water into the system until the water level in the expansion vessel is between the Min. and Max. mark and there is no more air in the hoses.
6. Switch off the pump again by pressing the**Search Button** (S3) a second time.
7. Switch off the heating and disconnect the mains plug.
8. Set both the switches S1 and S2 to position 1.
9. Set the heating system level again on the installation area.

3.7 Inserting the servopump hose

1. Open the service door on the right side of the CalfRail unit.
2. Undo the screws on the pump housing and remove the transparent cover.
3. Spread a thin layer of the silicone grease included in the delivery on the entire inner face of the pump housing. To do so, turn the rotor anticlockwise.

NOTICE!

► Use only the silicone grease supplied. Other silicone greases may damage the pump housing and the pump hose.

Note: If silicone grease is already present in the pump housing you can skip this step.

4. Clamp the pump hose included in the scope of supply between the housing and the rotor roller. Position the pump hose by turning the rotor anticlockwise so that it is centered on the roller.

NOTICE!

► Make sure that both ends of the pump hose have the same length to facilitate the connection of the suction hoses.

NOTICE!

► Make sure that the pump hose is not twisted and is situated in the top half of the pump housing (range of the rotor).

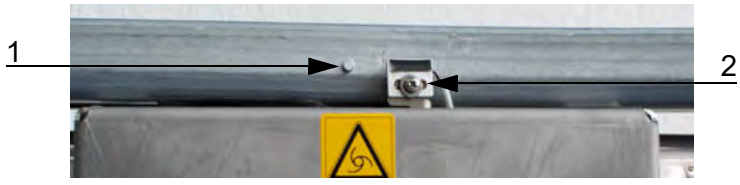
5. Refit the transparent cover and tighten the screws.
6. Connect the pump hose to the suction hoses.
7. Close the service door again.

3.8 Attaching the magnets for the stopping positions

A total of 16 magnets can be attached to the rail. The magnets determine the stopping position of the CalfRail. Therefore there should be a magnet in front of each box.

1. Attach the magnets on the right side of the rail in the direction of travel, wherever a stopping position is desired (direction of travel, see 1.1.1 "CalfRail viewed from the right" - 6).

   Note: To ensure that the sensor on the drive carriage of the CalfRail detects the magnets, they must be positioned at the level of the sensor.



1 Magnet
2 Sensor on the drive carriage

2. Attach another magnet as the end magnet after the last stopping position.
3. Open the quick release and push the CalfRail unit into parking position.
4. Place approximately 8 magnets spaced 1 to 1.5 cm apart or one large magnet on the adjacent side at the level of the sensor and close the quick release.

Note: It may be necessary to adjust the positions of the magnets later (see 3.10 "Testing the CalfRail" - 35).

3.9 Activating the CalfRail

The CalfRail must be activated in the setup for the automatic feeder.

This is how to activate the CalfRail:

1. Insert the mains plugs of the heating system and the automatic feeder into the Power outlets provided and switch the heating on.
2. Press [📖] on the hand-held terminal of your automatic feeder and hold down this key when you switch on the device.

   After a short time, the setup menu will appear on the display.
3. Select the **Stations > Feeds > CalfRail** menu item from the setup menu.
4. Use [<] [>], to select the desired CalfRail.
5. Choose the box to which you want to assign the CalfRail in **Allocation**.
6. In **Address**, choose an address that can be used to identify the CalfRail in the CAN bus system. The address range is between 71 and 79.
7. In **Stopping positions**, enter the number of magnets mounted on the rail. For feeding on one side, this is also the maximum number of calf hutches. If the hutches are installed in parallel and the calves are fed on both sides, this number is half the total number of hutches.
8. In **Hose length**, enter the actual length of suction hose in meters.

   Note: It may be necessary to adjust this value later. If water is initially dispensed during feeding (after the heat-up), the hose length setting is too short. If milk is pumped into the gully during the heat-up process, the hose length setting is too long.
9. Select the value **[yes]** in the **Return line** menu.
10. Select the value **[yes]** in the **Teat cleaning** menu.
11. Leave the value **<250 ml** set to **yes**.
12. Remove the cover from the CalfRail control unit.
13. Press the button **S2** on the main board of the CalfRail unit in order to activate search mode.
14. Wait until the green LED (H4) is flashing 10 times per second.
15. Confirm **Search?** with [Enter].

    The message **Searching for CalfRail!** appears on the display.
16. The message **CalfRail found!** appears on the display when the CalfRail unit is detected on the CAN bus.

    Note: If this message is not displayed, please check the CAN bus line.
17. Select the **Stations > Feeds > CR water heating system** menu item from the setup menu.

18. Use [<] [>], to select the desired heating system.
19. In **Unit 1**, select the desired station to be allocated to the heating system.
20. If two CalfRails are to be allocated to one heating system, select the desired station in **Unit 2**.
21. In **Address**, select an address by which the heating system can be identified in the CAN bus system. The address range is between 81 and 89.
22. Press the button **S3** on the heating system board to activate search mode.
23. Wait until the green LED (H7) is flashing 10 times per second.
24. Confirm **Search?** with [Enter].

    The message **Searching for CR water heating system!** appears on the display.
25. When the water heating system is detected on the CAN bus, the message **CR water heating system found!** appears on the display.

    Note: If this message is not displayed, please check the CAN bus line.
26. To exit setup, repeatedly press [Esc] until the message **End setup?** appears. Confirm with [Enter].
27. Screw the cover of the CalfRail control unit back on.
28. Close the control box of the heating.
29. Fill the hoses with water.
    - 29.1. Press [3] and confirm **Start water boiler?** to fill the mixer with water.
    - 29.2. Navigate via [2] **>Diagnosis > Stations** to the **Feeds** sub-menu.
    - 29.3. Use [<] [>], to select the desired CalfRail.
    - 29.4. Fill the hoses with water, by activating the command in the **Pump forward** sub-menu [Enter] until the hoses have been vented and are filled with water.

    Note: This process may take several minutes. You may have to refill the mixer with water by means of the manual function.

NOTICE!

Operating the heating system dry can damage it.

► Once the heating system is switched on, please fill the hoses as quickly as possible with water.

3.10 Testing the CalfRail

To check whether the correct settings were made at the setup, the CalfRail should be tested during commissioning.

Test the settings of the CalfRail as follows:

1. Press [3] and confirm **Start water boiler?** to fill the mixer with water.
2. Navigate via [2] **>Diagnosis > Stations** to the **Feeds** sub-menu.
3. Use [<] [>], to select the desired CalfRail.
4. Test the options in the **Feeding box** assigned to the CalfRail:
   - 4.1. **Move to park:** This function moves the CalfRail unit into the parking position. Pressing [Enter], moves the CalfRail unit into the parking position. The display shows how long the unit will remain in the parking position.
   - 4.2. **Carriage travel forward:** With this function, you can check that each magnet is in its correct position. Press [Enter], until the first magnet is detected and the CalfRail stops. Press [Enter], again until the CalfRail has reached the next magnet.

     Note: If the CalfRail stops in a position offset from the output of the box, the magnets must be moved in order to optimize the stopping position.
   - 4.3. **Carriage travel reverse:** Press and hold [Enter], until the CalfRail has reached the parking position.

     Note: When traveling in reverse, the CalfRail moves to each individual magnet and stops automatically. The CalfRail must not go past the parking position magnet. Release the [Enter] button once the CalfRail has reached the parking position.
   - 4.4. **Pump forward / reverse:** Confirm with [Enter] to run the hose pump forwards until the hose has been vented and is filled with water. The hose pump is pumping forwards when fluid squirts out of the teat. Reverse pumping delivers the fluid back into the mixer.

     Note: This process may take several minutes. You may have to refill the mixer with water by means of the manual function.
   - 4.5. **Pivot arm right / left:** Pressing [Enter], rotates the pivot arm in one direction until the corresponding limit switch is reached or the key is released.

     Note: The CalfRail must not be turned more than 180°. Instead, press “Confirm” to turn it back in the opposite direction until it reaches its initial position.

     Box / calf distance At the same time, check whether there is sufficient space between the teat and the individual calf boxes.
   - 4.6. **Teat cleaning** (option): This function allows you to fill the optional teat cleaning hose. Press and hold [Enter], until water comes out of the nozzle.
   - 4.7. **LED Entitlement:** Pressing [Enter], allows you to check whether the entitlement LED on the feed button is working.
   - 4.8. **LED Light:** Pressing [Enter], allows you to check whether the LED light strip is working.
   - 4.9. **Return valve:** Pressing [Enter], allows you to check whether the return valve is working.
   - 4.10. **Control unit:** Here you can view the CalfRail control unit to which the feeding box is assigned.
5. Check in **CR water heating system**, to check the settings. Press [Enter].
   - 5.1. In **Allocation**, you can see which heating system is allocated.

5.2. In **Boiler, Return** and **Outside**, the respective temperatures are displayed.

5.3. In **Heating system**, you can set the temperature to which the water should be heated.

5.4. In **Pump**, you can set the speed of the pump in **percent** .

5.5. In **Float**, you can see whether the float is **covered** or **free**.

5.6. In **Heating up**, you can start the heating process, confirming **start?** by pressing Enter . During heating up, **running!** is displayed.

5.7. In **search?**, you can start the search process.

3.11 Calibration

In order to ensure that the hose pump dispenses accurately, it must be calibrated at commissioning.

NOTICE!

► Please see the **Calibration chapter** in the operating manual for the automatic feeder.

Note: Calibrate the water beforehand.

3.11.1 Calibration of the hose pump

To calibrate the hose pump:

1. Press and confirm **Boiler water, start?** to fill the mixer with water.
2. Navigate to **> Diagnosis > Stations > Feeds**
3. Use < >, to select the desired CalfRail and in pump forward press Enter, until the hose is filled with water and contains no air.
4. Navigate to **> Calibration> Hose pumps**.
5. Use < >, to select the desired feed station.
6. Confirm **Start?** with Enter. The calibration procedure starts. The sequence of the procedure is automatic.

   Note: Do not intervene in the calibration process or it will be stopped.
7. When the calibration is completed, the **Calibration completed** message appears on the display.
8. Calibrate all hose pumps using the same method.

3.11.2 Automatic calibration

With automatic calibration, all pumps are automatically calibrated once a day. If one of the new automatically determined calibration values deviates greatly from the previous value, then the previous value will remain valid. The **Auto-calibration warning** then appears.

1. Navigate to **> Calibration > Settings > Hose pumps**.
2. In **Auto-calib.**, select **Yes** if you want automatic calibration to be performed.

3. Select the time at which the automatic calibration should take place at **Calibration time**. The default setting is for each automatic calibration to occur at 00:00 hours.

3.11.2.1 Setting the tolerance values

A tolerance value can be separately set for every feeding box. This defines by how many percentage points the new automatically determined calibration value can deviate from the previous calibration value and still be seen as valid and therefore be accepted as the new value.

1. Navigate to  **> Calibration > Hose pumps**.
2. Use [<] [>], to select the desired feed station.
3. Enter the desired percentage for the tolerance value in **Tolerance**.

Default value:	15 %
Permitted range of values:	5 to 50 %

Note: If the value determined by the automatic calibration is discarded, then the Auto-calibration warning is displayed (see 3.11.2 "Automatic calibration" - 37).

3.12 Cleaning the CalfRail

For hygienic reasons, any coolant and lubricant residues must be completely removed from the system prior to first putting into operation. To do so, perform the cleaning cycle (see the Cleaning chapter in the operator's manual for the CalfRail).

⚠ WARNING!

Chemical burns from cleaning agents.

The cleaning agent can burn your eyes or hands.

► Always wear safety glasses and chemical-proof protective gloves when using cleaning agents for cleaning. Follow the safety instructions in the safety data sheet of the cleaning agent and wear the safety equipment required by the instructions.

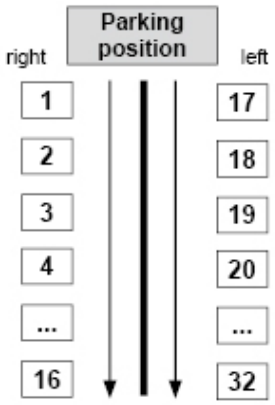
4. Transmitter and animal management

Calves are registered for the CalfRail in basically the same way as they are registered in a group with a collar. However instead of a transponder number, a box number from 999101 to 999432 is assigned. The box number is also used for the animal number.

The numbers are made up of several components:

- **999**, stands for CalfRail.
- **1 - 4**, stands for the number of the feeding box.
- **01 - 32**, stands for the box number.

If a CalfRail with two-sided feeding consists of 4 boxes, the calves are registered with the numbers 999101, 999102, 999103 and 999104. 999101 and 999102 are on the right side (direction of travel), 999103 and 999104 are on the opposite of the CalfRail.



The automatic feeder starts counting at the right-hand box closest to the parking position. The corresponding numbers must be assigned depending on how many calves are registered and to which box (see 4.1 "Manual registration of animals" - 39).

During registration, correction days, additives and weights can be entered. In doing this, comply with the operating manual for the automatic feeder.

Note: When the CalfRail is activated for the first time during setup, all box numbers are automatically created for the specified stopping positions. Delete any surplus numbers (see the transmitter and animal management chapter in the service manual for the automatic feeder).

Note: The animals must be registered before they are included in the feeding time.

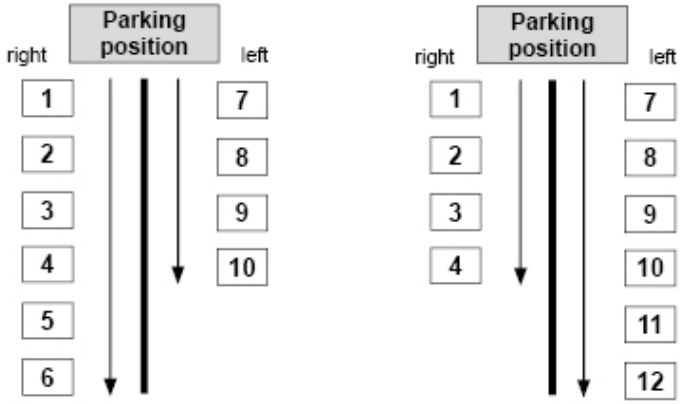
Example: Animal 999303, which is to be registered in Group B, is then included in the feeding time.

4.1 Manual registration of animals

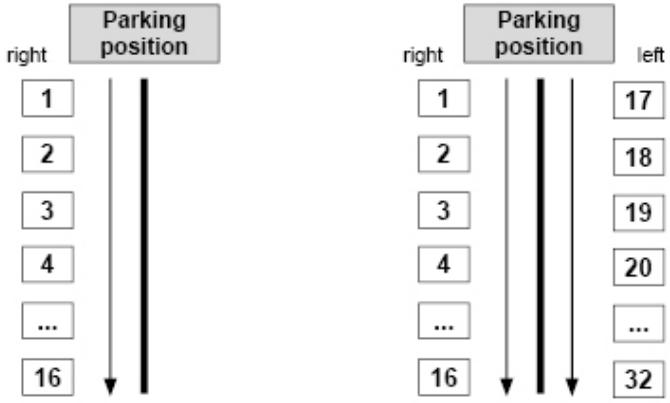
Box numbering is always on both sides, proceeding from the parking position to the rail end, and always begins on the right side (drive direction) of the CalfRail. If the boxes are arranged on one side, a maximum of 16 animals can be entered; if the boxes are arranged in two rows, up to 32 animals (16 per side) can be entered (see illustration).

Example: If 6 boxes are on one side, 6 stopping positions are entered. If the boxes are arranged on the right side of the CalfRail (drive direction), register the animals under numbers 1-6. If the boxes are arranged on the left side, register the animals under numbers 7-12.

In a two-sided arrangement (16 stopping positions), the CalfRail, starts on the right, traveling to a maximum of 16 boxes on the right side (Nos. 1 to 16), then travels back to the parking position. It then switches to the left side and serves a maximum of 16 boxes on that side (Nos. 17 to 32). After the final box, the CalfRail travels back to the parking position (see illustration).



If the number of boxes differs between the left and right sides, the number of stopping positions on the side with more positions must be entered in the setup by a service technician (see 3.9 "Activating the CalfRail" - 34).



Note: After initial installation, a magnet is attached to the corresponding box. If the boxes are subsequently moved the magnets must also be adjusted. If a box is removed, its box number must be left out during registration. Note that one magnet serves two boxes facing opposite each other.

Note: Do not remove any of the magnets, as the allocation is performed by magnet count.

Follow these steps to manually register animals for CalfRail:

1. Navigate to  **> Animal management > Registration** to the **Animal** sub-menu.
2. Select one of the available animal numbers that you wish to register.
3. Select the **group** to which the animal is to be allocated.
4. If the total feeding duration for the animal is to be shortened, you can set this under **Correction day** (see the **Feeding > Total feeding duration** chapter in the operating instructions of the automatic feeder).
5. Confirm **Register?** with Enter.
6. Confirm the prompt **Register animal xx in group X?** with Enter.

Note: On its registration day, the animal receives the exact amount of feed intended for it by the feeding plan for the first day, spread over the course of the day. If you have entered correction days, then the animal will receive the feed that is intended for the respective day.

4.2 Canceling animals or animal groups

Individual calves or a group of calves that are no longer being fed according to the plan must be removed and their registration canceled. The same applies to calves whose feeding plan has expired.

4.2.1 Canceling individual animals

Follow these steps to cancel an individual animal:

1. Navigate to  **> Animal management > Cancelation** to the **Animal** sub-menu.
2. Select the desired animal number.
3. In **End of plan**, you can check how long the animal is still to be fed according to the plan.
4. In **MP**, you can check how much milk powder the calf has consumed from the time of registration to the time of cancelation.
5. In **Milk**, you can check how much milk the calf has consumed from the time of registration to the time of cancelation.
6. Confirm **Cancel?** with Enter, to cancel a calf.

NOTICE!

There is a risk of malnutrition if calves do not receive any feed.

Malnutrition in calves can cause growth and development problems, increased susceptibility to disease or even death of the calves.

► Inform the end user that he or she must use alternative methods to feed canceled calves.

4.2.2 Canceling a group

Follow these steps to cancel a group:

1. Navigate via  **> Animal management > Cancelation** to the **Group** sub-menu.
2. Select the desired group.
3. In **Registered**, you can see how many animals are being fed in accordance with the respective plan.
4. In **Weaned**, you can see how many animals have finished the and therefore no longer get any feed.
5. Confirm **Cancel?** with Enter, if all animals in the group are to be canceled regardless of whether they are registered or weaned calves.
6. Confirm the security prompt **Cancel animals in Group X?** with Enter.

NOTICE!

There is a risk of malnutrition if calves do not receive any feed.

Malnutrition in calves can cause growth and development problems, increased susceptibility to disease or even death of the calves.

► Inform the end user that he or she must use alternative methods to feed canceled calves.

4.2.3 Canceling weaned animals

Follow these steps to cancel weaned calves:

1. Navigate via  **> Animal management > Cancelation** to the **Weaned animals** sub-menu.
2. Confirm **Cancel?** with Enter, if weaned animals are to be canceled.
3. Confirm the security prompt **Cancel animals?** with Enter.

NOTICE!

There is a risk of malnutrition if calves do not receive any feed.

Malnutrition in calves can cause growth and development problems, increased susceptibility to disease or even death of the calves.

► Inform the end user that he or she must use alternative methods to feed canceled calves.

4.3 Changing the registration of animals

You can change registered calves to another group at any time.

Follow these steps to change the group of an already registered animal:

1. Navigate via  **> Animal management** to the **Change registration** sub-menu.
2. Select the desired calf.

3. Select the desired feeding group in **Group**.
4. Confirm the prompt **Change registration of animal no. xx to Group X?** with Enter.

   Note: When registration is changed, the feeding day is retained; the animal is **not** reset to the start of the feeding plan (= to plan day 1).

4.4 Changing the box for the CalfRail

Registered animals can also have their registration changed to reflect being moved from one box to another box, or from a box to a group.

4.4.1 Box/transmitter present

Follow these steps to change the box of a calf registered on CalfRail:

1. Navigate via **> Animal management > CalfRail box change** to the **Box/transmitter present** sub-menu.
2. Use < >, to select the desired animal and confirm **change box to...** with Enter.
3. Use < >, to select the desired, free animal number.
4. Select the desired feeding group in **Group**.
5. Confirm **Change box now?** with Enter.
6. Confirm the prompt **Register animal no. xx in group X?** with Enter.

4.4.2 Resetting a transmitter

Proceed as follows to change the box of a calf for the CalfRail and create a new transmitter number:

1. Navigate via **> Animal management > CalfRail box change** to the **Reset transmitter** sub-menu.
2. Use < >, to select the desired animal.
3. In **No.**, enter the transmitter number or hold the transmitter next to the identification unit.

   Note: The transmitter numbers for the CalfRail always begin with the box number (999+) see page *39*.
4. In the Animal **No.** menu, check the suggested animal number and confirm it with Enter.

   Note: The animal number for a CalfRail calf is always the box number.
5. In **Box**, choose the feeding box at which you would like read in the transmitter.
6. In **No.**, choose **Consecutive** or **Automatic**.
7. If you have selected **Consecutive**, go to the **Next** menu and specify the animal number from which you want automatic reading of transmitters to start.
8. If you have selected **Automatic**, go to the **Range** menu and define the number range of the transmitter number that you want to use as the animal number. The animal number can have a maximum of six digits.

Example: 5-2 means that – counting from the right – the second to the fifth numeral of the transmitter number is accepted as the animal number. **6-1** means that – counting from the right – the first to the sixth numeral of the transmitter number is accepted as the animal number.

9. Confirm **Change box now?** with Enter.
10. Confirm the prompt **Register animal no. xx in Group X?** with Enter.

5. Feeding

You may only use the CalfRail to feed liquid feed.

NOTICE!

It is recommended that you use the 40FIT Plan for calves on the CalfRail.

The 40FIT Plan ensures that the calves can actually consume feed at each set feeding time.

► If you use a rationed feeding plan, note that the calves may not have entitlement during feeding and therefore may not be fed.

The standard feeding plans A and B correspond to the 40FIT feeding principle.

The CalfRail travels automatically to the registered calves with feed entitlement at specific set feeding times:

In a two-sided arrangement (16 stopping positions), the CalfRail, starts on the right, traveling to a maximum of 16 boxes on the right side (Nos. 1 to 16), then travels back to the parking position. It then switches to the left side and serves a maximum of 16 boxes on that side (Nos. 17 to 32). After the final box, the CalfRail travels back to the parking position.

⚠ **CAUTION!**

Injuries due to impact

The CalfRail unit runs along a rail system during feeding and can strike a calf.

► To avoid injury, never stand in the line of travel or behind the CalfRail.

5.1 Feeding plans

For the preparation of the feed, the following plans will be taken into consideration.

- Quantity plan
- Concentration plan
- Quantity limitation plan
- Milk ratio plan

Please consult the operating instructions of the automatic feeder for how to set and change the individual feeding plans.

NOTICE!

If you deviate form a standard quantity plan, a calf may receive too little feed.

This may result in malnutrition, which causes growth and development problems, increased susceptibility to disease or even the death of your calves.

► You must supply canceled calves with feed in some other way.

5.2 Feeding times

In this menu, you define the number of occasions of feeding and cleaning as well as the individual feed amounts.

One feeding run to a maximum of eight feeding runs can be set. When feeding times (number of feedings) are defined, the feeding runs are displayed along with proposed times of day. These times can be changed and adjusted individually and retrospectively. We recommend times that are coordinated with operating hours and overlap with milking time, for example.

You can define feeding times as follows:

1. Navigate via  **> Feeding > Plans > Feeds** to the **Feeding times** sub-menu.
2. In the **Feeding times** line, enter the number of feedings per day.
3. In the **Number of flushings** line, enter the frequency with which the suction hose will be flushed with water before and after feeding.

   Note: The setting should be 2 flushing runs. This ensures that the CalfRail is sufficiently heated before feeding and sufficiently cleaned after feeding.
4. Define the **Times of day** at which the CalfRail is to dispense feed.

NOTICE!

There is a risk of malnutrition if calves do not receive any feed.

Malnutrition can cause impaired growth and development, increased susceptibility to illness or even death of the calves.

► When defining feeding times, note the defined feeding plan. Blocked periods (feed restriction) should be in the time between feedings because the CalfRail does not move to the calves if they are not entitled to feed.

Note: The duration of the feeding run is determined based on the defined waiting times (see 5.5 "Waiting times" - 48). When specifying the intervals between feeding times, take into account the duration of a feeding run.

5.3 Feeding of additives

Additives can be fed to calves at the CalfRail.

WARNING!

Hazardous or irritating substances.

Additives that are fed to the calves may contain substances that are hazardous to human health.

► Observe the manufacturer's instructions and national regulations for the use and disposal of the additive being used.

NOTICE!

If only the calves at the CalfRail receive medicine, the calves in the group box cannot consume feed during CalfRail feeding.

NOTICE!

Medicine must always be dispensed to all CalfRail calves, otherwise the feed distribution will be disrupted.

You define the medicine prescription as follows:

1. Navigate via  **> Feeding > Additive** to the **Medicine prescr.** sub-menu.
2. In the **Dispensing** line, select **[g/l]**.

NOTICE!

If calves are fed at the CalfRail, always select g/l, otherwise the feed distribution will be disrupted.

3. For more detailed procedures, consult the **operating manual of the additive dispenser**.

Note: Calves cannot be fed electrolytes at the CalfRail.

5.4 Plan for maximum speed

This plan regulates the percent of maximum speed at which the servopumps rotate. By default, at the beginning of the feeding period the pumps run at 70% of maximum speed. This value increases continuously to 90% at the end of the feeding period. If need be, you can divide the plan for the maximum speed into up to 5 periods. You can define values between 30 and 100% for the percentage of maximum speed.

Note: The speed of the pumps can be defined for each group. By adjusting the pump speed, you can ensure that calves are fed appropriately for their age.

Note: During cleaning and calibration, the pump always operates at 100%.

Set the speed as follows:

1. Navigate via  **> Feeding > Plans > Feeds** to the **Max. speed** sub-menu.
2. Use < > to select the desired group (A, B, C or D).

   The corresponding plan for maximum speed is displayed.
3. Enter the length (number of days) of the first feeding period in **P 1** and confirm your entry with Enter.
4. In the **from** column, enter the starting value for the maximum speed and confirm your entry with Enter.
5. In the **to** column, enter the final value for the maximum speed and confirm your entry with Enter.

6. Repeat these steps as necessary for P2 to P5.
7. In **Duration**, you can check the total duration of the pump speed plan.

   Note: The total duration of the pump speed plan does not have to match the length of the feeding plan period. The speed for the last defined day is maintained until the end of the feeding plan.

5.5 Waiting times

You define waiting times as follows:

1. Navigate via  **> Device data > Stations** to the **Feeds** sub-menu.
2. Use < >, to select the desired **feed station**.

   Note: Do not make any changes in the **Delay On, Delay Off** or **Start and stop ramp** lines.
3. In the **Min. waiting time** line, specify the desired time.

   The **minimum waiting time** specifies how long the CalfRail waits at a box if the calf has not consumed any feed. If the calf does not drink within the defined time, the CalfRail moves on.

   Note: The minimum waiting time increases to the maximum waiting time if the feed button is pressed or the calf starts to drink.
4. In the **Max. waiting time** line, specify the desired time.

   The **maximum waiting time** is the time that is most critical for young calves in the training feeding phase. If the feed button is pressed or the calf has already consumed some feed, the CalfRail will remain at the calf for this period.

   Note: During commissioning, we recommend the default value of **8 min** should not be changed. The maximum waiting time can be customized later.
5. **Residual sucking** is the time available to the calf after it has consumed its maximum amount of feed.

Note: The duration of a feeding run can be calculated from the minimum waiting time and the maximum waiting time per calf.

5.6 Monitoring the first feeding

Wait until the first feeding begins or manually start a feeding (see 5.7 "Starting the CalfRail manually" - 49) and monitor the feeding sequence of the CalfRails.

First, the pre-heating phase begins in which the automatic feeder pumps warm water through the hose system. Next, the first portion is stirred and pumped to the teat. If milk is pumped into the gully or if water is still in the line, the hose length must be changed in setup (see 3.9 "Activating the CalfRail" - 34). Now the CalfRail should drive to the positions previously defined with the magnets.

During the first drive, check the magnets (stopping positions) on the running rail.

The calf must be able to drink from the teat without any problems. Adjust the position of the box or lengthy of the pipe to which the teat is attached, if necessary.

After it has stopped for the final animal, the CalfRail travels back to the parking position. The intake hose is then flushed.

Note: If a calf does not drink when the CalfRail is in front of its box, the CalfRail can be advanced to the next calf with entitlement by pressing the **Advance button**. This speeds up feeding.

5.7 Starting the CalfRail manually

If a calf has never drunk at the CalfRail before, we recommended that you use the manual start for **Feed start**.

You can choose between the following methods:

- Start feeding.
- Move feeding forward.
- Stop feeding.

To start feeding the calves, use the Feed start button (see 1.1.3 "Front view" - 8).

5.7.1 Start feeding

Feeding starts and the CalfRail moves to all selected calves. If multiple CalfRail units are connected, you can select between all units (CR1+CR2).

Start the CalfRail manually as follows:

1. In the automatic mode menu, go to **Start CR manually > Start feeding**.
2. In CR, select preheating [**yes**] if you want to pre-heat the CalfRail.
3. In **CR box**, choose **[Yes]** to select the box to which the manual start should apply.

   Note: If multiple CalfRail units are connected to the automatic feeder, you must set all other feeding boxes to [**No**] to prevent the CalfRail from stopping there.
4. Navigate to the menu item **Select boxes**. Use < > , to select the desired CalfRail station.
   - 4.1. In **deactivate all**, set all registered boxes to zero.
   - 4.2. In **all with entitlement**, the CalfRail stops at all calves with entitlement. These calves can be identified in the animal list on the display. The quantity consumed is recorded.
   - 4.3. In **activate all 2L**, the Calf Rail stops at all calves and supplies them with two liters of feed. The quantity consumed is recorded.
   - 4.4. In **Box xx**, there is also the facility to supply each box with feed individually and at your discretion. A feed quantity of **1-4 liters**, existing **entitlement** or **-** (do not feed) can be selected. The quantity consumed is recorded.
5. Press Esc, to go back to the **Start CR manually** menu item.
6. Confirm **Start now?** with Enter, to start the CalfRail run.

   Note: The most recently set values remain saved for the next start.

5.7.2 Move feeding forward.

The scheduled feeding is moved forward in time and not performed at the defined time of day. The CalfRail only stops at calves that are entitled to feed at this time of day.

You move feeding forward as follows:

1. In the automatic mode menu, go to **Start CR manually > Move feeding forward**.
2. Confirm the prompt **Start xx feeding now?** with Enter.

   Note: After feeding, ✓ is displayed in front of the defined time of day in the **CR start** line of the automatic mode menu. Feeding has already taken place.

5.7.3 Stop feeding

With this menu option, you can stop the feeding run at any time. The CalfRail unit moves to the parking position and cleaning is performed.

You can stop feeding as follows:

1. In the automatic mode menu, go to **Start CR manually > Stop feeding**.
2. In **CR box**, choose **[Yes]** to select the box for which you want to stop the run.

   Note: If multiple CalfRail units are connected to the automatic feeder, you must set all other feeding boxes to [**No**] so that they are not stopped as well.
3. In **Stop CR run**, press Enter.

   The CalfRail unit returns to the parking position and cleaning is performed.

Note: You can start another feeding after 15 minutes without preheating.

6. Maintenance work

Regular maintenance work and functional checks on the CalfRail ensure that the required hygiene standards are maintained. Maintenance includes replacing wearing parts according to the replacement schedule. Visual and functional testing of components as well as replacement of simple wearing parts, such as the teat, can be carried out by the owner/operator.

Note: For a quicker overview, see the care and maintenance schedule in the appendix (see 9.3 "Care and Maintenance schedule / routine work" - 74).

6.1 Important safety instructions

⚠ DANGER!

Fatal electric shock

The electrical components of the CalfRail are live.

► Always disconnect the mains plug of the heating system before starting work on its components.

⚠ DANGER!

Beware of injuries due to automatic starting up.

The servopump may start up automatically at any time, crushing your hand or fingers.

► Do not reach into the hazard area of the servopump. Always disconnect the mains plug of the heating system before starting work on its components.

⚠ WARNING!

Injuries due to being pulled in or trapped.

The CalfRail unit is attached to the carriage by means of a slewing ring.

► In order to prevent injuries to fingers, do not touch the CalfRail while it is slewing.

⚠ WARNING!

Risk of burns due to hot surfaces.

The return valve can reach temperatures of up to 100°C during operation or malfunctions.

► Never touch the return valve when it might be hot.

⚠ WARNING!

Scalding with hot water.

The expansion vessel and the hoses of the heating system contain hot water.

► Allow the water to cool down before starting work on the heating system.

6.2 Annual care and maintenance intervals

- Replace the pump hose of the servopump and the pump of the teat cleaning unit.
- Replace the suction hose which runs from the servopump to the teat.
- Clean the return valve and replace the diaphragm.
- Clean the suction sensor and replace the diaphragm.
- Clean the louvers and the filter of the heating system, if necessary.
- Replace the suction hose in the supply line, if necessary.

6.2.1 Replacing the servopump hose

⚠ WARNING!

Injuries due to automatic start-up

The servopump may start up automatically at any time, crushing your hand or fingers.

► Do not reach into the hazard area of the servopump. Disconnect the servopump from the mains before you replace the pump hose. Only connect the servopump to the mains with the transparent cover attached.

You replace the servopump hose as follows:

1. Switch off the heating system and disconnect the mains plug.
2. Open the service door on the right side of the CalfRail unit.
3. Undo the screws on the pump housing and remove the transparent cover.
4. Position the rotor of the servopump at right angles to the housing opening (so that only one roller is directly in contact with the housing) and remove the old pump hose by turning the rotor anticlockwise.
5. Remove the layer of silicone in the pump housing using **a dry cloth**.

NOTICE!

► Do not use any cleaning agents or other chemicals as these can damage the pump housing and pump hose.

6. Spread a thin layer of silicone grease on the entire inner edge of the pump housing. To do so, turn the rotor anticlockwise.

NOTICE!

► Use only the silicone grease supplied. Other silicone greases may damage the pump housing and the pump hose. Order the silicone grease from Förster-Technik as needed.

7. Clamp the pump hose included in the scope of supply between the housing and the rotor roller. Position the pump hose by turning the rotor anticlockwise so that it is centered on the roller.

NOTICE!

► Make sure that both ends of the pump hose have the same length to facilitate the connection of the suction hoses.

NOTICE!

► Make sure that the pump hose is not twisted and is situated in the top half of the pump housing (range of the rotor).

8. Refit the transparent cover and tighten the screws.
9. Connect the pump hose to the suction hoses.
10. Close the service door again.
11. Reconnect the mains plug of the heating system and switch the heating system on.
12. Calibrate the hose pump (see 3.11.1 "Calibration of the hose pump" - 37).

6.2.2 Replacing the hose for the teat cleaner

⚠ WARNING!

Injuries due to automatic start-up

The pump may start up automatically at any time, crushing your hand or fingers.

► Do not reach into the hazard area of the pump. Disconnect the CalfRail from the power source before you replace the pump hose. Do not connect the pump to the power mains unless the transparent cover is in place.

NOTICE!

► If cleaning additives are used, follow all safety instructions and protection measures specified on the safety data sheet.

You can replace the hose for the teat cleaner as follows:

1. Switch off the heating system and disconnect the mains plug.
2. Open the service door on the right side of the CalfRail unit.
3. Disconnect the hoses from the dosing pump by undoing the plastic union nuts.

4. Use a suitable tool to remove the pump cover.
5. Remove the impeller cover.
6. Position the dosing pump impeller at right angles to the housing opening (so that only one roller is directly in contact with the housing) and remove the bracket together with the pump hose.
7. Remove the old pump hose from the bracket and fit the new pump hose.

NOTICE!

► Make sure that the pump hose is not twisted and is situated in the top half of the pump housing (range of the rotor).

8. Attach two small cable ties to the bracket on the pressure side of the pump.
9. Place the bracket in the guide provided for it in the housing.
10. Clamp the pump hose between the housing and the impeller roller. Position the pump hose by turning the impeller in the direction of rotation so that it is central to the roller.

NOTICE!

► Make sure that the pump hose is not twisted and is situated in the top half of the pump housing (range of the rotor).

11. Fit the cover back on the impeller and fit the housing cover.
12. Reattach the hoses to the dispensing pump and tighten the plastic union nuts.
13. Close the service door again.
14. Reconnect the mains plug of the heating system and switch the heating system on.

6.2.3 Replacing the suction hose in the supply line

To replace the suction hose located in the supply line, proceed as follows:

1. Navigate via  **> Diagnosis > Stations** to the **Feeds** sub-menu.
2. Use < > , to select the desired CalfRail.
3. Choose **Move carriage forward?** to move the CalfRail to the last magnet on the rail.
4. Empty the suction hose.
5. Switch off the automatic feeder and the heating system via the main switch and disconnect the mains plug of the heating system.

NOTICE!

► Let the return valve and the heating system cool down before touching any parts.

6. Open the hook and loop fastener of the supply line.

7. Disconnect one end of the suction hose from the port of the automatic feeder and the other end from the servopump.
8. Attach a pilot wire to the end of the suction hose that was attached to the servopump.
9. Pull the suction hose out of the supply line towards the automatic feeder.
10. Remove the pilot wire from the suction hose and dispose of the suction hose.

    The pilot wire is now in the supply line.
11. Attach the pilot wire to the new suction hose and pull the it through the supply towards the CalfRail unit. Make sure the suction hose is not twisted.
12. Remove the pilot wire and close the hook and loop fastener of the supply line.
13. Connect the suction hose to the servopump and to the port of the automatic feeder.
14. Reconnect the mains plug of the heating system and switch on the automatic feeder and the heating system from the main switch.

NOTICE!

The hose package must only be lightly fastened within the rail carriage

► Therefore do not tighten the screws of the rail carriage tightly, in order to avoid damaging the hose package.

15. Press [3] and confirm **Boiler water, start?** to fill the mixer with water.
16. Navigate via [2] **> Diagnosis > Stations** to the **Feeds** sub-menu.
17. Use [<] [>], to select the desired CalfRail.
18. Fill the intake hose with water by pressing **Pump forward** in the sub-menu until [Enter] the hose is depressurised and filled with water.
19. Calibrate the hose pump (see 3.11.1 "Calibration of the hose pump" - 37).
20. Clean the hose pump by performing a cleaning cycle.

6.2.4 Cleaning the return valve

To clean the return valve:

⚠ WARNING!

Risk of burns due to hot surfaces.

The return valve can reach temperatures of up to 100°C during operation or malfunctions.

► **Never touch the return valve when it might be hot.**

1. Switch off the heating system and disconnect the mains plug.
2. Open the CalfRail arm.

3. Undo the screws on the bottom of the valve and remove the bottom part of the valve.
4. Thoroughly clean the return valve.

NOTICE!

► Do not use any sharp or sharp-edged objects, which could damage the diaphragm.

5. Replace the diaphragm and the support ring.
6. Reassemble the valve and tighten the screws.

NOTICE!

► Make sure that the hoses are seated correctly on the valve and teat holder.

7. Close the CalfRail arm.
8. Reconnect the mains plug of the heating system and switch the heating system on.

6.2.5 Cleaning the suction sensor

To clean the suction sensor:

1. Switch off the heating system and disconnect the mains plug.
2. Open the service opening.
3. Remove the insulation of the suction sensor.
4. Unscrew the cover of the suction sensor and remove the inner insert.
5. Thoroughly clean the suction sensor.

NOTICE!

► Do not use any sharp or sharp-edged objects, which could damage the diaphragm.

6. Replace the diaphragm.
7. Replace the insert in the housing. Take care that the pins are properly placed in the housing.
8. Screw the lid back on the housing.
9. Reattach the insulation to the suction sensor.
10. Close the service opening.
11. Reconnect the mains plug of the heating system and switch the heating system on.

6.2.6 Cleaning the heating system housing

To clean the heating system housing:

1. Switch off the heating system and disconnect the mains plug.
2. Clean the outside of the housing using a damp cloth.

NOTICE!

Using pressure washers can damage the housing.

► Only clean the housing by hand using a damp cloth.

3. Clean the louvers with a dry brush.

NOTICE!

► Do not use any sharp or sharp-edged objects, since these could damage the components in the housing.

4. Reconnect the mains plug of the heating system and switch the heating system on.

6.2.7 Cleaning the water filter

To clean the water filter:

⚠ WARNING!

Risk of burns due to hot surfaces.

The return valve can reach temperatures of up to 100°C during operation or malfunctions.

► Never touch the return valve when it might be hot.

⚠ WARNING!

Scalding with hot water.

The expansion vessel and the hoses of the heating system contain hot water.

► Allow the water to cool down before starting work on the heating system.

1. Switch off the heating system and disconnect the mains plug.
2. Allow the water in the heating system to cool down.

⚠ WARNING!

Chemical burns from the antifreeze used

The antifreeze can burn your eyes or hands.

► Follow the safety instructions in the safety data sheet of the antifreeze and wear the safety equipment required by the instructions.

3. Drain the water from the water tank and all hoses of the heating system.
4. Uninstall the filter and clean it thoroughly.

NOTICE!

► Do not use any sharp or sharp-edged objects, since these could damage the filter.

5. Reinstall the filter.
6. Reconnect the mains plug of the heating system and switch the heating system on.
7. Refill the heating system with water and antifreeze if applicable (see 3.6 "Activating the heating system" - 31).

7. Shutdown and recommissioning

This chapter explains how to shut down the CalfRail and recommission it.

7.1 Shutdown

You can shut down the CalfRail temporarily or permanently.

To make the procedure easier and ensure that you do not miss any points, see the checklist (9.4 "Shutdown checklist" - 76) in the appendix.

To ensure that the CalfRail does not become a breeding ground for germs, which could endanger the health and life of the calves when you recommission the feeder, you must thoroughly clean the CalfRail before shutting it down.

To shut down the CalfRail temporarily, proceed as follows:

⚠ WARNING!

Beware of chemical burns from the cleaning agents used.

The cleaning agent can cause chemical burns to your eyes or hands.

► Always wear safety glasses and chemical-proof protective gloves when disposing of cleaning agents. Follow all the safety instructions listed in the safety data sheet for the cleaning agent and wear the specified safety equipment.

1. Start the maximum number of cleaning programs (see Cleaning chapter in operating manual).
2. Drain any residual water from the servopump to prevent the CalfRail from becoming damaged by frost.

NOTICE!

► Beware of damage to the CalfRail. Frozen water expands and may therefore damage beyond repair CalfRail components such as the suction hose if they contain water.

   2.1. Drain the mixer by pressing [3] and confirm **Mixer: empty?** with [Enter].
   2.2. Navigate via [2] **>Diagnosis > Stations** to the **Feeds** sub-menu.
   2.3. Use [<] [>], to select the desired CalfRail.
   2.4. Confirm your **Pump forward?** command with [Enter] and allow the residual water to drain from all the lines.

3. If a teat cleaning unit is available (optional), drain the residual water from the pump and take the hose out of the fluid container.

NOTICE!

► Beware of damage to the CalfRail. Frozen water expands and may therefore damage beyond repair CalfRail components that contain water.

   3.1. Drain the mixer by pressing [3] and confirm **Mixer: empty?** with [Enter].

3.2. Navigate via [book] **>Diagnosis > Stations** to the **Feeds** sub-menu.
3.3. Use [<] [>], to select the desired CalfRail.
3.4. Confirm **Teat cleaning?** with [Enter] and allow the residual water to drain from the pump.

4. Cancel the CalfRail in the setup of the automatic feeder.
   4.1. Switch off the automatic feeder at the main switch.
   4.2. Press [book] on the hand-held terminal of your automatic feeder and hold down this key when you switch on the device.

   After a short time, the setup menu will appear on the display.
   4.3. Select the **Stations > Feeds > CalfRail** menu item from the setup menu.
   4.4. Use [<] [>], to select the desired CalfRail box and in **Allocation** assign the value [**none**].
   4.5. To exit setup, repeatedly press [Esc] until the message **End setup?** appears. Confirm with [Enter].

DANGER!

Fatal electric shock.

The electrical components of the CalfRail are live.

► Always disconnect the power plug before continuing.

5. Switch off the heating system and the automatic feeder, and disconnect the mains plug.
6. Disconnect the suction hose that runs from the CalfRail to the connections on the automatic feeders.
7. Disconnect the return line from the return valve and drain the return line, using for instance compressed air.

NOTICE!

Damage caused by compressed air

The hose pump and the suction sensor can be damaged by compressed air.

► Clean only the return line with compressed air, and drain the suction hose only as instructed in the Diagnosis menu.

8. Remove the teat and dispose of it.

NOTICE!

Risk of infection

► To avoid infections, use a new teat when recommissioning the unit.

9. Remove the pump hose from the servopump and dispose of it.

NOTICE!

Risk of infection

► To prevent infections, use a new pump hose when recommissioning.

10. If a teat cleaning unit is available, remove the pump hose and dispose of it.

NOTICE!

Risk of infection

► To prevent infections, use a new pump hose when recommissioning.

11. Clean the outside of the CalfRail with a damp cloth. Clean all areas that are not reached by the cleaning program.

NOTICE!

Damage caused by high-pressure cleaner.

► Clean the CalfRail only by hand, using a damp cloth.

12. Once all the CalfRails are shut down, drain the water from the water container and all the hoses of the heating system.

⚠ WARNING!

Scalding with hot water.

The expansion vessel and the hoses of the heating contain hot water.

► Allow the water to cool down before working on the heating.

⚠ WARNING!

Risk of burns due to hot surfaces.

The return valve can reach temperatures of up to 100° C during operation or in the event of malfunctions.

► Never touch the return valve while it might still be hot.

⚠ WARNING!

Beware of chemical burns from the antifreeze used.

The antifreeze can cause chemical burns to your eyes or hands.

► Follow all the safety instructions listed in the safety data sheet for the antifreeze and wear the specified safety equipment.

13. Disconnect and drain all hoses on the heating system, and plug the connectors.

Note: If several CalfRail units are connected and one CalfRail remains active, the connections for the flow and return lines of the CalfRail unit that is shut down must be connected using a hose bridge.

14. Remove the CAN bus cable of the control unit from the main board of the automatic feeder and replace it with a resistor.

    Note: If several CalfRail units are connected and one CalfRail remains active, only the CAN bus cable (4-core) on the control unit of the heating system has to be removed.

15. Cover the CalfRail with a tarp. This will protect it from dirt.

16. Store the CalfRail unit and the heating system in a dry and frost-free place.

7.2 Permanent shutdown

If you want to permanently shut down the CalfRail, you must dispose of it in accordance with the law. Consult your yellow pages or your waste disposal company to learn about the regulations that apply to you.

In the appendix of the operating manual, you will find a list of the materials used in the CalfRail (see 9.2 "Materials list" - 73).

1. To shut down the unit, perform steps 2 to 15 (see 7.1 "Shutdown" - 59).
2. Dispose of the cleaning agent residue. For information about disposal of cleaning agents, see the safety data sheet for the cleaning agent you are using.

⚠ WARNING!

Beware of chemical burns from cleaning agents.

The cleaning agent can burn your eyes or hands.

► Always wear safety glasses and chemical-proof gloves when disposing of cleaning agents. Follow the safety instructions in the safety data sheet of the cleaning agent and wear the safety equipment required by the instructions.

3. Dispose of the CalfRail as described in the **Disposal chapter in the operator's manual**.

7.3 Recommissioning after a long-term shutdown

After a long-term shutdown, the CalfRail may be reconnected and restored to service only by a service technician.

To ensure that you do not miss any points, see the checklist (see 9.1 "Initial commissioning checklist" - 72) for commissioning the CalfRail in the appendix.

Proceed as follows to restore the CalfRail to service:

1. Clean the outside of the CalfRail with a damp cloth.
2. Install a new teat.
3. Replace the suction hose that runs from the teat to the servopump and replace the servopump hose (see 6.2.1 "Replacing the servopump hose" - 52).

4. Replace the suction hose in the supply line (see 6.2.3 "Replacing the suction hose in the supply line" - 54).
5. Replace the diaphragm of the suction sensor (see 6.2 "Annual care and maintenance intervals" - 52).
6. If necessary, replace the teat cleaning hose (see 6.2.2 "Replacing the hose for the teat cleaner" - 53).
7. If necessary, connect the CAN bus cable of the control unit to the main board of the automatic feeder and enter the CAN address on the heating system circuit board (see 3.9 "Activating the CalfRail" - 34).
8. Plug the mains plug of the heating into the Power outlet that was installed during commissioning.
9. Proceed as follows to restore the heating system to service (see 3.6 "Activating the heating system" - 31).
10. Switch the heating system on.
11. Register the CalfRail in the setup for your automatic feeder.
    - 11.1. Switch off the automatic feeder at the main switch.
    - 11.2. Press [2] on the hand-held terminal of your automatic feeder and hold down this key when you switch the feeders on again.

      After a short time, the setup menu will appear on the display.
    - 11.3. Select the **Stations > Feeds > CalfRail** menu item from the setup menu.
    - 11.4. Use [<] [>], to select the desired CalfRail.
    - 11.5. Choose the box to which you want to assign the CalfRail in **Allocation**.
    - 11.6. Confirm **Search?** with [Enter].

      The message **Searching for CalfRail!** appears on the display.
    - 11.7. The message **CalfRail found!** appears on the display when the CalfRail unit is detected on the CAN bus.

      Note: If this message is not displayed, please check the CAN bus line.
    - 11.8. Select the **Stations > Feeds > CR water heating system** menu item from the setup menu.
    - 11.9. Use [<] [>], to select the desired heating system.
    - 11.10. In **Unit 1**, select the desired CalfRail to be allocated to the heating system.
    - 11.11. If two CalfRails are to be allocated to one heating system, select the desired CalfRail in **Unit 2**.
    - 11.12. In **Address**, select an address by which the heating system can be identified in the CAN bus system. The address range is between 81 and 89.
    - 11.13. Press the button **S3** on the heating system board to activate search mode.
    - 11.14. Wait until the green LED (H7) is flashing 10 times per second.
    - 11.15. Confirm **Search?** with [Enter].

      The message **Searching for CR water heating system!** appears on the display.

11.16. When the water heating system is detected on the CAN bus, the message **CR water heating system found!** appears on the display.

Note: If this message is not displayed, please check the CAN bus line.

11.17. To exit setup, repeatedly press Esc until the message **End setup?** appears. Confirm with Enter.

12. Press 3 and confirm **Start water boiler?** to fill the mixer with water.
13. Navigate via 2 **>Diagnosis > Stations** to the **Feeds** sub-menu.
14. Use < >, to select the desired CalfRail.
15. Activate the command in the **Pump forward** sub-menu Enter until the hose has been vented and is filled with water.
16. Calibrate the hose pumps (see 3.11.1 "Calibration of the hose pump" - 37).
17. Clean the CalfRail.

    Start the rinsing cycle for cleaning the suction hose (see Cleaning chapter in operating manual for the CalfRail).

    By doing so, you prevent germs that enter the CalfRail from multiplying and infecting your calves.

18. If a teat cleaning unit is available (optional), place the cleaning hose into the water tank.
19. Navigate via 2 **>Diagnosis > Stations** to the **Feeds** sub-menu.
20. Use < >, to select the desired CalfRail.
21. If necessary fill the teat cleaning hose with water, by going to the **Teat cleaning?** Sub-menu and pressing Enter until water comes out of the nozzle.
22. Check the settings of the CalfRail (see 3.10 "Testing the CalfRail" - 35) and adjust them if necessary.
23. Check the settings of the feeding (see 5. "Feeding" - 45).

8. Faults and warnings

The automatic feeder indicates CalfRail faults through fault or warning messages on the display of the hand-held terminal.

In the event of a **fault**, automatic mode is interrupted and no feed is prepared.

In the case of a **warning**, automatic mode of the automatic feeder is not interrupted, and feeder operation continues. In the case of warnings regarding the CalfRail, no feeding takes places until the warning has been remedied.

NOTICE!

There is a risk of malnutrition if calves do not receive any feed.

If feeder operation is interrupted, the calves will not receive any feed. Malnutrition in calves can cause growth and development problems, increased susceptibility to disease or even death of the calves.

► Inform the end user the he or she must use alternative methods to feed calves as long as feeder operation is interrupted.

Once you have rectified the fault, delete the fault and warning messages.

- Some fault and warning messages are automatically deleted.
- Some fault and warning messages must be deleted by pressing C 9 .
- Some fault and warning messages are deleted by confirming **Delete fault?** or **Delete warning?** by pressing Enter confirm.

Note: Also follow the instructions in the operating manual for the automatic feeder.

8.1 Warnings

8.1.1 CalfRail

If the CAN connection between the automatic feeder and CalfRail unit cannot be established, **CalfRail Warning** appears on the display.

DANGER!

Fatal electric shock

The electrical components of the CalfRail are live.

► Observe the provisions when dealing with electrical power.

To rectify the fault, proceed as follows:

1. Open the control unit of the CalfRail unit.
2. Press the round button (S2) on the main board of the CalfRail unit in order to activate search mode.
3. Wait until the green LED (H4) is flashing 10 times per second.
4. Confirm **Search?** with Enter.

The message **Searching for CalfRail!** appears on the display.

5. The message **CalfRail found!** appears on the display when the CalfRail unit is detected on the CAN bus.

   The LED will now stop blinking.

   Note: If this message is not displayed, check the CAN bus cable.

8.1.2 CalfRail pivot arm

If the CalfRail experiences a timeout while pivoting, the **CalfRail pivot arm warning** appears on the display.

To rectify the fault, proceed as follows:

1. Confirm **CalfRail pivot arm** with Enter.
2. In **pivot arm right/left?**, press Enter and check whether the CalfRail detects the positions.

   Note: The CalfRail may not be rotated more than 180°. Instead, it must be rotated back to the starting position by confirming movement in the opposite direction.
3. Once the fault has been rectified, delete the warning.

8.1.3 CalfRail travel to parking

If the CalfRail experiences a timeout while traveling to the parking position, the **CalfRail travel to parking** warning appears on the display.

To rectify the fault, proceed as follows:

1. Confirm **CalfRail travel to parking** with Enter.
2. In **Carriage travel forward/reverse?**, press Enter and check whether the motor is still working and the magnets were detected.
3. Move the CalfRail to the parking position with **CR travel to parking**.
4. Once the fault has been rectified, delete the warning.

8.1.4 CalfRail travel to box

If the CalfRail experiences a timeout during feeding, the **CalfRail travel to box warning** appears on the display.

To rectify the fault, proceed as follows:

1. Confirm **CalfRail travel to box** with Enter.
2. In **travel forward/reverse?**, press Enter and check whether the motor is still working and the magnets were detected.
3. Move the CalfRail to the parking position with **CR travel to parking**.
4. Once the fault has been rectified, delete the warning.

8.1.5 CR feeding/flushing

During a flushing run or when heating the CalfRail, if water is not pumped through the hose within a certain amount of time (usually max. 2 minutes), the **CR feeding/flushing warning** appears on the display.

To rectify the fault, proceed as follows:

1. Confirm **CR feeding/flushing** with Enter.
2. Check whether the suction hose is clogged.
3. In **Pump forward/reverse?**, press Enter and check whether air in the system is preventing the pump from delivering.
4. Once the fault has been rectified, delete the warning.

8.1.6 Automatic calibration

The **Auto-calibration warning** indicates that the value determined during the last auto-calibration was not accepted since it deviated greatly from the current calibration value.

1. Calibrate (depending on the text of the message) the box for which the warning was issued (see 3.11 "Calibration" - 37).
2. Once the fault has been rectified, delete the warning.

   Note: You can change the tolerance value for the acceptance of the determined auto-calibration value in the calibration menu for the respective box.

8.1.7 Feed deviation

If the deviation between dispensed and the consumed amount is greater than 2 liters per pump, the **Feed deviation warning** appears on the display.

1. Confirm **Feed deviation** with Enter and check the pump and the feed line between the pump and the mixer.
2. Check the hoses for clogging and air pockets.

   Note: Clogging or air pockets can cause these malfunctions. Replace damaged hoses as necessary.
3. Once the fault has been rectified, delete the warning.

8.1.8 Heating system water shortage

If there is insufficient water in the heating system, the **CR heat. water shortage** message appears on the display. The water level of the heating system is below the float switch.

⚠ WARNING!

Scalding with hot water.

The expansion vessel and the hoses of the heating system contain hot water.

► Allow the water to cool down before starting work on the heating system.

1. Check whether the water level in the expansion vessel of the heating system is between the Min. and Max. markings and add water as necessary.
2. Confirm **CR heat. water shortage** with Enter and once the fault has been rectified, delete the warning.

8.1.9 Heating system temperature

If the heating system or the temperature sensor are defective, or if the safety temperature limiter of the heating system has been triggered, the **CR heat. temperature** message appears on the display.

⚠ DANGER!

Fatal electric shock

The electrical components of the heating system are live.

► Always disconnect the mains plug before continuing.

⚠ WARNING!

Risk of burns due to hot surfaces

The housing of the heating boiler can reach temperatures of up to 100 °C. You can burn yourself by touching these parts.

► Allow the heating system to cool down before opening it.

To rectify the fault, proceed as follows:

1. Check whether safety temperature limiter has been triggered.
2. Check the temperature sensor.

   If the temperature sensor is defective, replace it.
3. Check whether voltage is applied to the heating system. Check the customer's fuses.

⚠ DANGER!

Fatal electric shock

The electrical components of the heating system are live.

► Always disconnect the mains plug before reactivating the safety temperature limiter.

You reactivate the safety temperature limiter as follows:

1. Disconnect the mains plug of the heating system.
2. Remove the cover of the control box of the heating system.
3. Open the metal cover under which the safety temperature limiter is located (see 2.5.2 "Safety devices" - 22).
4. Press the reset button in order to reset the safety temperature limiter.

5. Close the metal cover again.
6. Reattach the cover to the heating system.
7. Reconnect the mains plug.

8.1.10 Heating sensor

If a temperature sensor or float switch short circuits, or the sensors are not connected correctly, the **CR heat. sensor** message appears on the display.

⚠ DANGER!

Fatal electric shock

The electrical components of the heating system are live.

► Always disconnect the mains plug before continuing.

1. Check the temperature sensors and float sensor

   If a temperature sensor is defective, replace it.

8.1.11 Heating system pump

If the pump is activated and there is no temperature change after a certain period of time, the **CR heat. pump** message appears on the display.

⚠ DANGER!

Fatal electric shock

The electrical components of the heating system are live.

► Always disconnect the mains plug before continuing.

⚠ WARNING!

Risk of burns due to hot surfaces

The housing of the heating boiler can reach temperatures of up to 100 °C. You can burn yourself by touching these parts.

► Allow the heating system to cool down before opening it.

- Check whether safety temperature limiter has been triggered (see 8.1.9 "Heating system temperature" - 68).
- Check the temperature sensor.

  If the temperature sensor is defective, replace it.
- Check the pump.

8.1.12 CR water heating system

If the CAN connection between the automatic feeder and the water heater cannot be established, **Warning CR water heating system** appears on the display.

DANGER!

Fatal electric shock

The electrical components of the heating system are live.

► Always disconnect the power plug before continuing.

You can correct the fault as follows:

1. Open the control unit of the heating system.
2. Press the round button (S3) on the main board of the heating system in order to activate search mode.
3. Wait until the green LED (H7) is flashing 10 times per second.
4. Confirm **Search?** with Enter.

   The message **Searching for CR water heating system!** appears on the display.
5. When the water heating system is detected on the CAN bus, the message **CR water heating system found!** appears on the display.

   The LED will stop flashing.

Note: If this message is not displayed, please check the CAN bus line.

8.2 Diagnosis

The **Diagnosis** menu helps you to find faults in the event of technical problems. To reach the menu, navigate to **> Diagnosis > Stations > Feeds**.

8.2.1 Checking stations

In this menu you can perform the following settings:

- In **No. ‡** , you can check the box number at which the CalfRail has currently stopped. The parking position is number 0.
- In **Travel to parking?**, you can move the CalfRail unit to the parking position.
- In **Carriage travel forward?**, you can check whether the carriage travels forward.
- In **Carriage travel reverse?**, you can check whether the carriage travels backward.
- In **Pump forward?**, you can check whether the servopump rotates forward.
- In **Pump reverse?**, you check can whether the servopump rotates backward.
- In **pivot arm left?**, you can check whether the CalfRail unit rotates anticlockwise.
- In **pivot arm right?**, you can check whether the CalfRail unit rotates clockwise.
- In **Teat cleaning?**, you can check whether the pump for teat cleaning is working.
- In **LED Entitlement?**, you can check whether the entitlement LED on the feed button is working.
- In **LED Light?**, you can check whether the LED light strip is working.
- In **Return valve**, you can check by pressing Enter whether the return valve is working.
- In **Control**, you can view the assigned feeding box.

- In **Search?**, you can search for the registered CalfRail.
- In **CR water heating system**, you can control the settings of the heating system.
  - In **Allocation**, you can see which heating system is allocated.
  - In **Boiler, Return** and **Outside**, the respective temperatures are displayed.
  - In **Heating system**, you can set the temperature to which the water should be heated. Confirm your entry with Enter. The heating cycle will now start.
  - In **Pump**, you can set the speed of the pump in **percent** . Confirm your entry with Enter. The pump will now start to rotate.
  - In **Float**, you can see whether the float in the expansion vessel is **covered** or **free**. If it is free, the expansion vessel must be topped up (see 3.6 "Activating the heating system" - 31).
  - In **Heating up**, you can start the heating process, confirming **start?** by pressing Enter. During heating up, **running!** is displayed.
  - In **search?**, you can start the search process.

9. Appendix

Note: You must carefully read and comply with the operating manual and the safety instructions, in particular, before every initial commissioning and recommissioning of the CalfRail.

9.1 Initial commissioning checklist

Initial commissioning	OK?
Check whether the carrier system is correctly installed and is situated at a height of at least 2.20 meters above floor level.	☐
Hanging the running rail.	☐
Attach end stop.	☐
Use a spirit level to ensure the running rail is horizontal	☐
Mounting the CalfRail unit on the running rail	☐
Secure the pivot arm.	☐
Connect the feed button and return valve.	☐
Connect the hoses to the return valve.	☐
Push the rail carriage and end clamp with the supply line onto the rail	☐
Fasten the end clamp.	☐
Tighten the quick release using the clamping lever on the carriage.	☐
Place the heating system on a level surface near the automatic feeder.	☐
Install the supply line	☐
Connect the CAN bus cable to the heating system and automatic feeder.	☐
Connect the mains cable of the CalfRail to the heating system.	☐
Place exterior temperature sensor.	☐
Connect the suction hose to the automatic feeder.	☐
Place the return hose in the gully.	☐
Connect the hoses to the heating system.	☐
Fill the expansion vessel of the heating system with water and set hex switch S2 to position 7.	☐
Connect the mains plug and switch the heating system on.	☐
Start the heating system pump and completely fill the water tank via the expansion vessel.	☐
Switch off the pump.	☐
Switch off the heating system and disconnect the mains plug.	☐
Set the CAN bus address.	☐
Connect the hose of the hose pump.	☐

Insert the hose of the teat cleaning unit into the water tank (optional).	☐
Mount the temperature sensor and attach it near the parking station	☐
Attaching the magnets for the stopping positions.	☐
Connect the mains plug and switch the heating system on.	☐
Switch on automatic feeder, keeping  pressed down.	☐
Assign boxes.	☐
Find CalfRail	☐
Specify stopping positions and hose length	☐
Testing the CalfRail	☐
Calibrate the hose pumps.	☐
Check or set the cleaning settings.	☐
Clean the unit.	☐
Enter the feeding times.	☐
Enter the waiting times.	☐
Register the animals.	☐
Enter the correction days.	☐
Define plans.	☐
Monitor first feeding.	☐
Train young calves	☐

9.2 Materials list

The following materials are used in the CalfRail, among others:

- V2A, V4A
- Plastics: TPE, silicone, PVC, NBR, ABS, PUR, PA, PC, POM, PP, CR, EPDM, PE
- Rubber
- Die-cast zinc
- Bronze
- Brass
- Die-cast aluminum

9.3 Care and Maintenance schedule / routine work

Regular maintenance work and functional checks on the CalfRail ensure that the required hygiene standards are maintained. Maintenance includes calibration, additional measures to preserve hygiene that are not described in the cleaning chapter, as well as scheduled replacement of wearing parts, for example. Visual and functional testing of components as well as replacement of simple wearing parts, such as the teat, can be carried out by the owner/operator.

Note: Repair work and the replacement of wearing parts on or in the CalfRail, with the exception of the teats, may be carried out **only** by a service technician.

9.3.1 Important safety instructions

⚠ DANGER!

Fatal electric shock

The electrical components of the CalfRail are live.

► Always disconnect the mains plug of the heating system before starting work on its components.

⚠ DANGER!

Beware of injuries due to automatic starting up.

The servopump may start up automatically at any time, crushing your hand or fingers.

► Do not reach into the hazard area of the servopump. Always disconnect the mains plug of the heating system before starting work on its components.

⚠ WARNING!

Injuries due to being pulled in or trapped.

The CalfRail unit is attached to the carriage by means of a slewing ring.

► In order to prevent injuries to fingers, do not touch the CalfRail while it is slewing.

⚠ WARNING!

Risk of burns due to hot surfaces.

The return valve can reach temperatures of up to 100°C during operation or malfunctions.

► Never touch the return valve when it might be hot.

⚠ WARNING!

Scalding with hot water.

The expansion vessel and the hoses of the heating system contain hot water.

► Allow the water to cool down before starting work on the heating system.

9.3.2 Maintenance intervals and activities

	Care/maintenance interval			
	Daily	Week-ly	4 months	12 months
Suction hose • Replace all milk hoses from the automatic feeder to the teat.				✓
Servopump • Replace the pump hose.				✓
Suction sensor • Disassemble and clean the suction sensor, replace the diaphragms.				✓
Return valve • Open the return valve, clean it and replace diaphragms if necessary.				✓
Heating system • Check the filter and louver, and clean them if necessary.				✓
Teat cleaner • Replace the pump hose.				✓

9.4 Shutdown checklist

Shutdown	OK?
Run the flushing cycle.	☐
Drain residual water from the servopump and the suction hoses (if there is a risk of frost).	☐
Drain residual water from the pump of the teat cleaner, if present, and remove the hose from the water tank.	☐
The registration of the CalfRail must be canceled in setup for the automatic feeder.	☐
Disconnect the mains plug.	☐
Disconnect the suction hose from the automatic feeder and dispose of it.	☐
Disconnect the return line from the return valve and drain the hose.	☐
Disconnect and dispose of the teat.	☐
Remove the pump hose from the servopump and dispose of it.	☐
Remove the hose of the teat cleaning unit, if present, and dispose of it.	☐
Clean the outside of the CalfRail with a damp cloth	☐
If necessary, switch the hex switch for CAN bus on the PCB of the heating system to a different CalfRail.	☐
Drain the water from the water tank and hoses of the heating system.	☐
Remove the hoses on the heating system and close the connectors.	☐
Drain all the water from the hoses of the heating system.	☐
Cover the CalfRail and store it in a dry and frost-free place	☐
Remove the CAN bus cable from the control unit heating system or the automatic feeder and replace it with a resistor.	☐

9.5 Checking components for compliance with national regulations

All electrical components must be checked regularly for electrical safety in accordance with the intervals and test methods defined in the national regulations.

If any faults or damage are detected during the inspection, the faulty components must be replaced before the CalfRail can be used again.

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EC declaration of conformity

according to the EU Machinery Directive 2006/42/EG, Annex II, 1.A

Manufacturer:
Förster-Technik GmbH,
Gerwigstr. 25
78234 Engen

Person residing within the Community authorised to compile the relevant technical documentation:
Müller Barbara
Förster-Technik GmbH,
Gerwigstr. 25
78234 Engen

Description and identification of the machinery:

Make:	CalfRail
Type:	CRS2-IF1-WH
Function:	Distribution, provision, delivery and dispensing of animal feed in liquid form for the automatic calf feeder Vario.

It is expressly declared that the machinery fulfils all relevant provisions of the following EU Directives:

2006/42/EG	Directive 2006/42/EG of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EG (recast)
2014/30/EU	Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)

Reference to the harmonised standards used, as referred to in Article 7(2):

EN ISO 12100:2010-11	Safety of machinery - Electrical equipment of machines - Part 1: General requirements (ISO 12100:2010)
EN 60335-1:2012/A11:2014	Household and similar electrical appliances - Safety - Part 1: General requirements IEC 60335-1:2010 (modified)
EN 61000-6-2:2005/AC:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-3:2007/A1:2011/ AC:2012	Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments

Engen, 21.11.2016

Place, date

Signature
Markus Förster
CEO