User Manual
Urban MilkShuttle Pasteurizer
Calf feed mixer



MS_UserManual_ MilkShuttle_Pasteurizer_EN (Edition II/05-2025)

LEGAL INFORMATION

Translation of the original user manual for the Urban MilkShuttle

Valid for all sizes of the Urban MilkShuttle Pasteurizer.

Valid for versions of the Urban MilkShuttle Pasteurizer delivered on or after Feburary 1st, 2024.

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CE

INTRODUCTION

Thank you for choosing the Urban MilkShuttle Pasteurizer. This product was developed from practical experience for practical use. All our devices are extensively tested at our plant and we cooperate closely with selected farms that field-test our products.
The information contained in this manual has been compiled with the greatest care. Urban is not liable for errors or defects in this manual. The recommendations provided are intended as a guide only. The instructions, illustrations and specifications in this manual are based on the most up-to-date information available at the time of publication. Your device may contain enhancements, equipment or options not covered in this manual.
For more support or information, please contact your service partner or Urban GmbH & Co. KG. For questions, always include the product type and serial number. The serial number can be found on the rating plate of the device; for more details see in Chapter 1.8 „Safety and information sign stickers on the device“ on page 12. We suggest that you enter this information in the following lines so that it is always readily available:

Type and serial number

Type: _____

Serial number: _____

Your service partner

About this user manual

These instructions are intended for all users of the MilkShuttle and will enable them to properly and safely use the Urban MilkShuttle calf feed mixer. Make sure that

- all employees who work with the device have completely read and understood this user manual,
- these instructions are always accessible and kept near the device,
- all of the warning and safety instructions given in these instructions are complied with.

Chapters **1 "For your safety", 2 "Technical Data"** and **3 "MilkShuttle at a glance"** provide the background knowledge necessary to operate the MilkShuttle according to chapters **4 "Commissioning"** and **5 "Operation"**. Chapter **6 "Programming and calibrating"** supplies the information required to adapt the MilkShuttle to your needs in the best possible way.
Chapter **7 "What if"** lists all fault messages and helps you to eliminate malfunctions. Chapter **9 "Maintenance/Repairs"** provides an overview of all necessary maintenance work and describes how to replace wearing parts. These are followed by chapters **10 "Spare parts"**, **11 "Mixing table"** for milk replacers and an "**Index"** which allows a search for specific keywords.

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1 Safety precautions

1.1 General safety instructions

To avoid the risk of accidents or damage to this product, read the user manual carefully before commissioning the device. The instructions contain important safety notes and information regarding use and maintenance.
The device has been designed and manufactured meeting the state-of-the-art and the laws, standards and guidelines stated in Chapter 1.6 “Laws, standards and guidelines“ on page 10. However, improper use may present a risk of both personal injury and material damage. The manufacturer assumes no liability for damages resulting from failure to observe these safety instructions, for improper use of the device or incorrect operational settings. Keep the user manual in a safe place and pass them on to any future user or new owner.

1.2 Intended use

The MilkShuttle is used to prepare and transport liquid feed for livestock.

Any other use, such as
- transporting persons and animals,
- filling with combustible substances (e.g. fuels),
- heating other substances (e.g. foods for human consumption)

is not permitted.
The transport of objects (e.g. buckets) is only permitted when the available accessories (details in „10.2 Accessories“ on page 90) are used appropriately.
No changes to the device are permitted (e.g. fixing the controllers).

1.3 Authorized Personnel

CAUTION

Risk of injury. The MilkShuttle can have a considerable weight depending on the load. It must therefore only be operated by personnel with the physical, mental and technical capabilities to assess the resulting risks.

Task	Requirement
Commissioning	Skilled personnel
Installation/Modification	
Operation	Trained personnel
Electrical maintenance/repairs	Skilled electrical personnel
Mechanical maintenance/repairs	Skilled personnel

1.3.1 Skilled personnel

Skilled personnel means persons who are knowledgeable in a specific field due to their technical training and experience and are familiar with the pertinent occupational safety and accident prevention regulations as well as the general acknowledged rules of technology.

1.3.2 Trained personnel

Trained personnel means persons who received instructions from a skilled person about their assigned tasks and the possible dangers of improper behaviour and were trained as necessary and instructed on the necessary protective equipment and protective measures.

1.4 Possible hazards on sloping ground

WARNING

Risk of injury. There is a risk of being run over or run into when the break is released, especially on sloping ground (more than 3% slope).

- Walk behind the device (against the direction of travel, see „Illustration 1: Adapt direction of travel on sloping terrain“ on page 10).
- Grasp the drawbar handle with both hands.
- Never travel along routes with slopes of more than 10%!

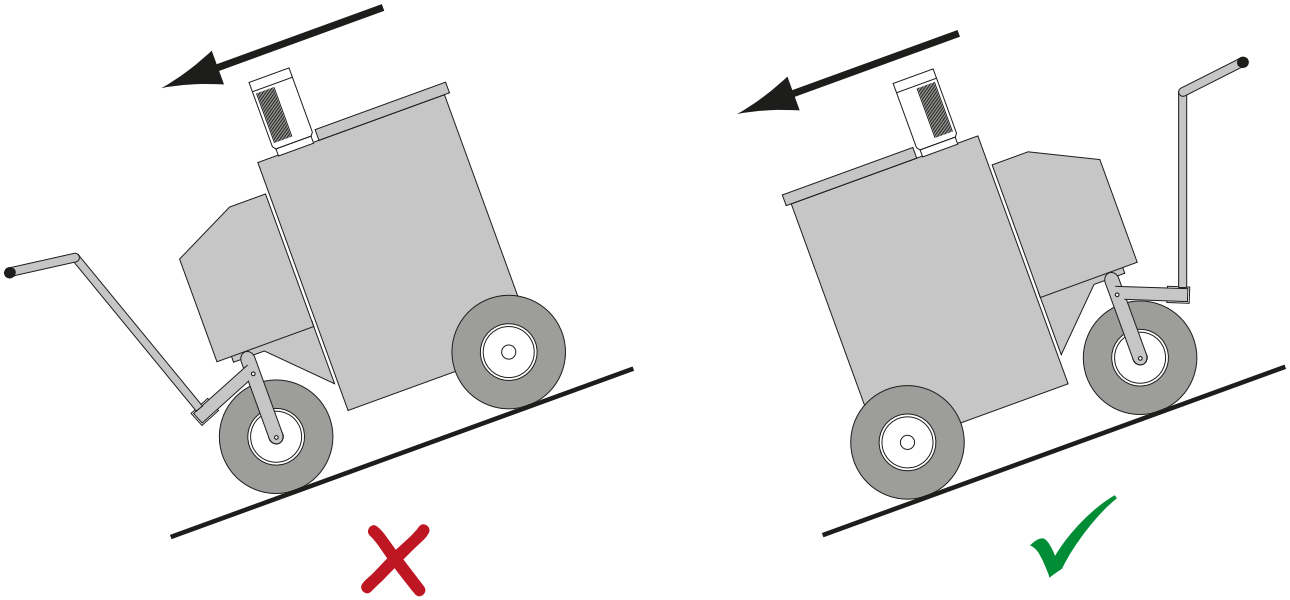


Illustration 1: Adapt direction of travel on sloping terrain

1.5 Emergency procedures

1. Immediately pull the power plug.
2. Switch off the device at the operating panel.
3. Only start up the device again after the emergency situation has been eliminated.
4. If there are obvious signs of damage to the device, have a specialist check and repair the device as necessary before recommissioning.

1.6 Laws, standards and guidelines

The device was developed in compliance with the following laws, standards and guidelines:

2006/42/EC	EC Machinery Directive
DIN/EN/ISO 12100	Safety of machinery
ProdSG	German Product Safety Act

1.7 Signs and symbols used in this user manual

	This sign with the signal word **DANGER** indicates a hazardous situation that, if not avoided, will result in death or serious injury.
	This sign with the signal word **WARNING** indicates a hazardous situation that, if not avoided, could result in death or serious injury.
	This sign with the signal word **CAUTION** indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.
	This sign with the signal word **NOTICE** indicates a hazardous situation that, if not avoided, could result in damage of property and equipment.
	This sign with the signal word **CRUSH HAZARD** indicates a risk of crushing body parts in moving mechanical parts of equipment.
	This sign with the signal words **self-starting equipment** indicates danger due to self-starting machine equipment. Keep hands, loose clothing and long hair away from moving parts.
	This sign with the signal words **ELECTRICAL HAZARD** indicates the danger of electric shock due to high voltage.
	This sign labelled **INFO** provides advice and information that are not hazard-related but may be helpful.

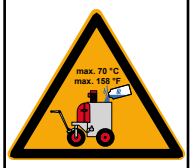
1.8 Safety and information sign stickers on the device

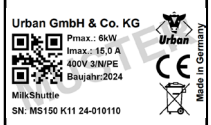
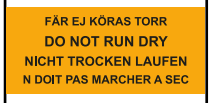
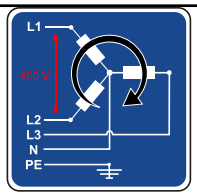


Illustration 2: Stickers front side



Illustration 3: Stickers front side

Caption Illustration 2: Stickers front side		
	Sign stickers	**Explanation**
1		**Caution: Crush hazard** The lid and closing mechanism pose a risk of crushing your fingers. Mind where you place your hands during operation.
2		**Caution: Maximum permissible temperature for liquids.** Do not fill with liquids exceeding a temperature of 70 °C (158 °F).
3		**Caution: Self-starting equipment.** Keep hands, loose clothing and long hair away from moving parts.

Caption Illustration 3: Stickers back side		
	Sign stickers	**Explanation**
4		**Rating plate** The rating plate provides detailed information about your MilkShuttle. Please enter the type and serial number in the spaces provided for this purpose on of these instructions in order to keep this information handy and to be able to clearly match these instructions with your device
5		**Instruction label for the dosing pump** The dosing pump may be damaged if it is operated without liquid.
5		**Instruction label for the mains voltage (only for 400 V)** Please observe the notes on electrical connections in Chapter 4.5 “Electrical connection“ on page 29.
7		**Caution: Electrical hazard.** Stickers can be found on both sides at the housing closures and at the control electronics inside the housing.

2 Technical data

2.1 Overview

	Type 100	Type 150	Type 200	Type 250	Type 350
Dimensions					
Length (without drawbar) [cm]	106	117			
Length (with drawbar) [cm]	143	154			
Width [cm]	80	82/92			92
Height [cm]	98	98	110	123	112
Weight fully equipped [kg]	164	179	182	185	231
Power supply [V~]	240	240/400			
Power consumption max. [VA	3.000	3.000/6.000			
Current consumption max. [A]	13	15			
Protection class	I				
Mixing volume max./min. [l]	100/15	150/30	200/30	250/30	350/40
Transport volume max. [l]	Depending on slope of covered distance (see Chapter 1.4 “Possible hazards on sloping ground“ on page 9)				
Noise emission	<72 dbA				

2.2 Dimensioned drawing

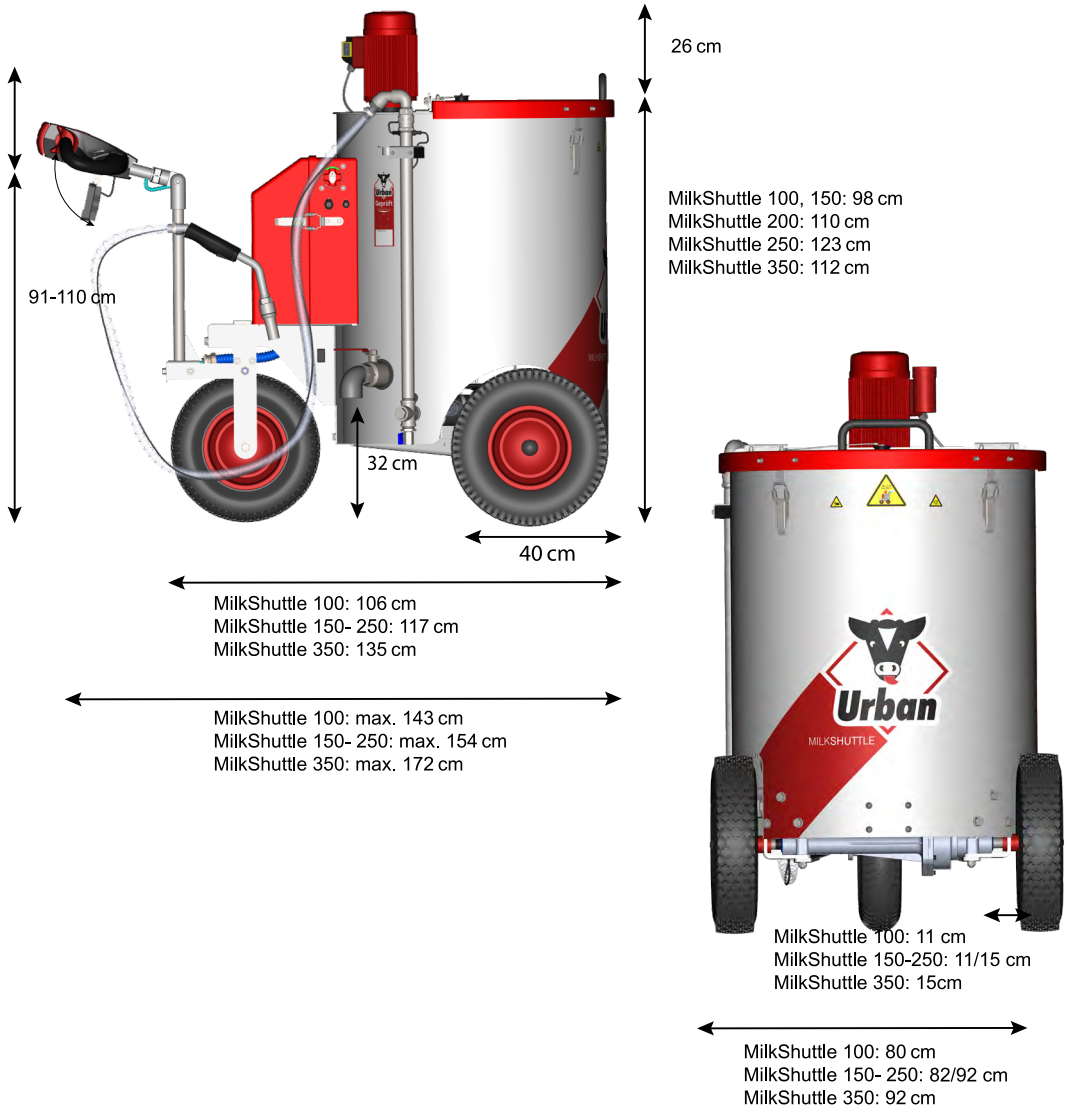


Illustration 4: Dimensions MilkShuttle Type 350, 150, 200, 250, 350

3 MilkShuttle at a glance

3.1 Variants

	Type 100	Type 150	Type 200	Type 250	Type 350
Heater 2,500 W (230 V)	✓				
Heater 5,500 W (400 V)		✓	✓	✓	✓
Agitator with 2 different speed levels (700 / 1400 RPM)	✓	✓	✓	✓	✓
Drain valve 1.5"	✓	✓	✓	✓	✓
Dosing nozzle with pump and quantity preselection	✓	✓	✓	✓	✓
Cleaning programme	✓	✓	✓	✓	✓
Propelling drive (rechargeable battery, 24 V)	✓	✓	✓	✓	✓
Working light	✓	✓	✓	✓	✓
Flow rate sensor	optional				

3.2 Available languages

The user interface of the MilkShuttle can be set to a variety of different languages. The number of available languages is constantly increasing. Older variants of the MilkShuttle have a limited language pack installed ex-works. Please contact the service department or your dealer if the language you require is not available in the user menu. (For information about language settings please see Chapter 7.1.2 "Changing the language settings“ on page 56.)

3.3 Components

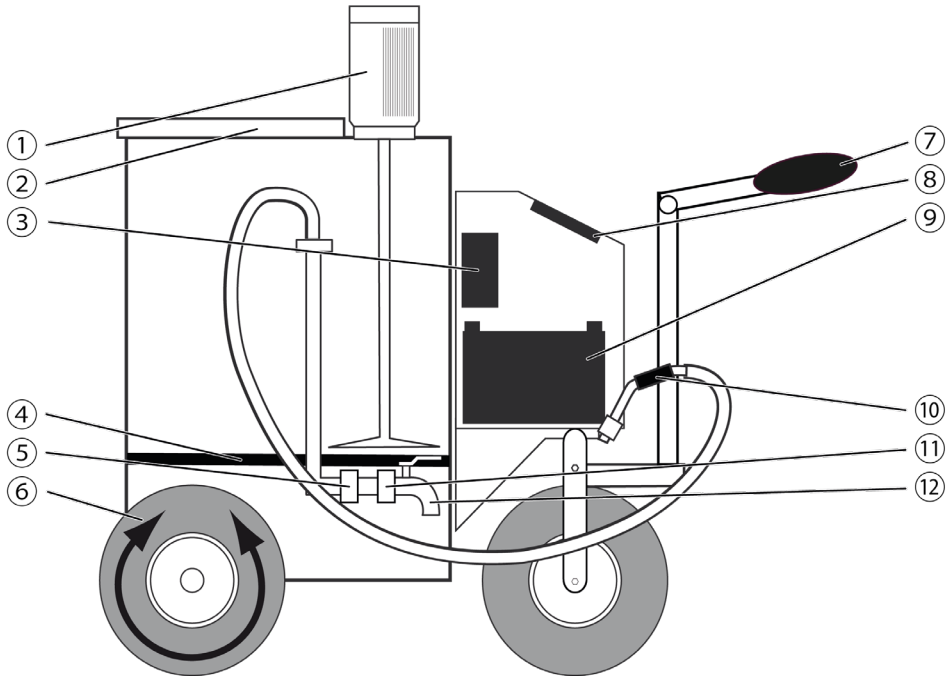


Illustration 5: Schematic layout

1	Agitator
2	Container lid with seal
3	Power and control electronics
4	Bottom heating
5	Flow rate meter (optional)
6	Propelling drive

7	Drawbar head with controller
8	Operating panel
9	Battery
10	Dosing nozzle
11	Dosing pump (battery-operated)
12	Drain valve

3.4 Operating and display elements

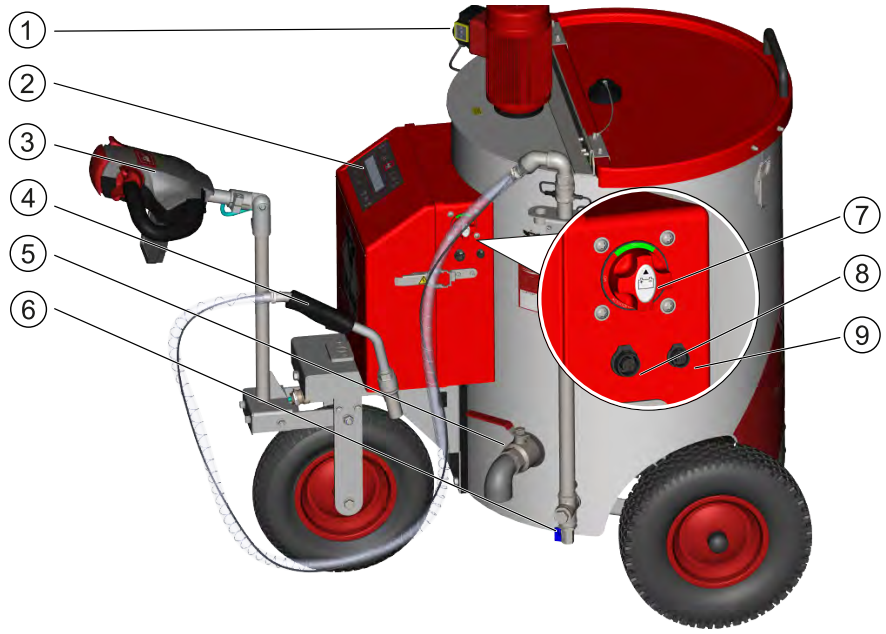


Illustration 6: Operating and display elements

1	Agitator switch
2	Operating panel
3	Drawbar head with controller
4	Dosing nozzle
5	Drain valve

6	Drain valve riser pipe
7	Battery isolator switch
8	Accessory plug-in EcoProtector (optional)
9	Accessory plug-in work lamp (optional)

3.4.1 Battery isolator switch

From version 3.0, the MilkShuttle has a battery isolator switch located laterally on the control housing. To connect to power, turn the switch clockwise until the arrow above the battery symbol points upward to the green “ON” area (A). To disconnect power, turn anti-clockwise until the arrow points to “OFF” on the left (B). To remove the actuator, continue turning anti-clockwise (C).

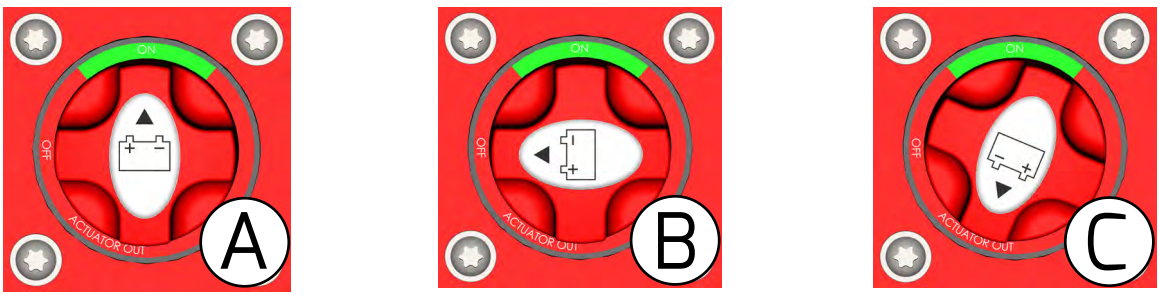


Illustration 7: Switch positions

3.4.2 Propelling drive brake lever

CAUTION

Risk of injury from being run over or run into by the vehicle.

Only deactivate the brake lever if you want to move the MilkShuttle with discharged batteries. Once the batteries are recharged, activate the brake lever. Otherwise, the device may start moving in an uncontrolled manner, especially on sloping ground.

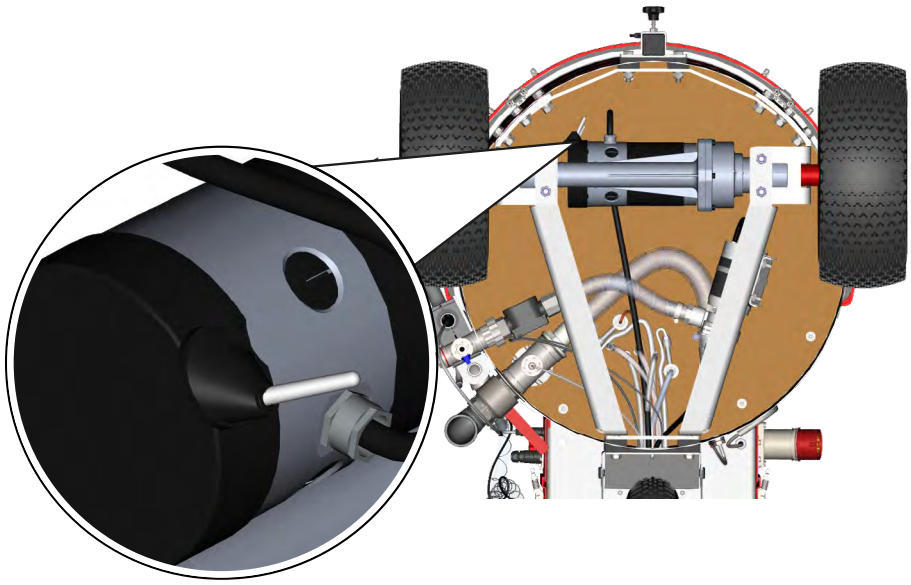


Illustration 8: Bottom view with detail of brake lever

The propelling drive brake lever is under the feed container at the drive motor. The brake lever releases the brake of the drive motor. The MilkShuttle can therefore be moved even with discharged batteries.

- Brake lever up: Brake released.
- Brake lever down: Brake engaged (normal operation) - the brake is released via the propelling drive.

NOTICE

Risk of damage to the device and property

Only deactivate the propelling drive brake lever in case of defective propelling drive or discharged batteries. With the brake released, the MilkShuttle must only be driven at half speed or lower.

3.4.3 Operating panel

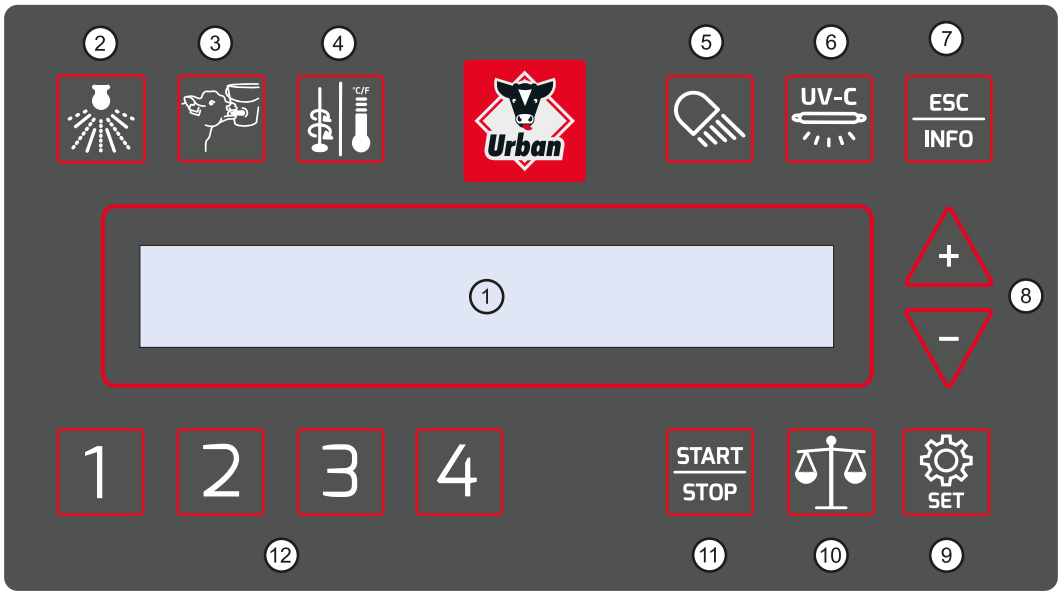


Illustration 9: Operating panel

ELECTRICAL HAZARD

Danger of injury due to electric shock.

The operating panel and the electronic units located below the control housing must be protected from moisture. It is therefore not permitted to hose these components down with a high-pressure cleaner.

The keys on the operating panel „Illustration 9: Operating panel“ only react when they are pressed for a sufficiently long time. This is a safety feature that allows you to wipe the operating panel clean without triggering a function. Press the menu keys (Cleaning, Feeding, Heating/Agitating, Calibrating) until the desired menu opens.

The keys 2-5 light up in white as soon as the respective menu (Rinse, Feed, Temperature, Calibrate) is active. Key 6 (EcoProtector, optional) lights up in blue, and key 7 (ESC/INFO) in red.

Nr.	Symbol	Function	Explanation
1		Display	Text display of functions
2		Menu: Cleaning	Select cleaning programme
3		Menu: Feeding	Select feeding programme
4		Menu: Heating/	
5		Work lights On/Off	Turn on/turn off the work lights.
6		EcoProtector On/ Off	Select EcoProtector programme (only with accessory EcoProtector)
7		ESC/INFO	Close fault message message/warning, exit function/ menu, flashes red in case of faults
8		Increase/decrease	Programming mode: Increase/decrease current value by one step
9		SET	Press briefly: Programming mode / Continue to next setting Press longer: Switch to programming mode
10		Menu: Calibrating	Select calibrating programme, calibrate pump for the feeding programme, calibrate temperature
		Start/Stop	Starts or ends selected operations
12		Preselection keys 1, 2, 3, 4	Call up stored programmes 1-4

3.4.4 Drawbar head



Illustration 10: Drawbar head

1	Start/Stop for the pump/dosing nozzle
2	Safety stop button
3	Speed and direction controllers

WARNING

Danger of injury caused by uncontrolled machine movements.

- Never fix the controllers in any position.
- Ensure free movement of the controllers.
- Check the safety stop function before every drive.

Use the controllers (①) to choose the direction of travel and the driving speed. Both controllers have the same functions and may be used equivalently. The further you turn the controller in one direction, the faster the MilkShuttle moves. When a controller is released, it returns automatically to the central position and the MilkShuttle is braked until standstill.

Turn controller down: Forwards driving direction (“pull” MilkShuttle).
Turn controller up: Backwards driving direction (“push MilkShuttle”).

In dangerous situations, the safety stop button (②) immediately brakes the MilkShuttle to a complete standstill and then lets it roll back a few centimetres in the opposite direction. This feature prevents potential injury (e.g. being trapped by the moving MilkShuttle).

3.4.5 Agitator motor switch

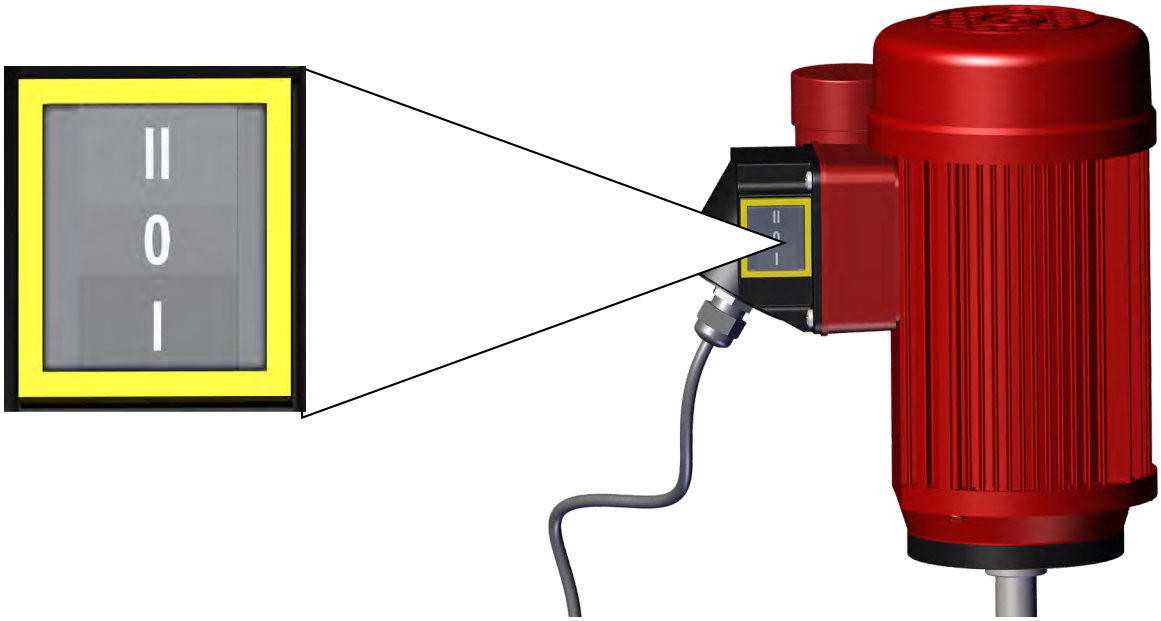


Illustration 11: Agitator motor switch

II	Quick stir (fast mode)
0	Agitator off
I	Slow stir (slow mode)

SELF-STARTING EQUIPMENT

Danger of injury due to self-starting agitator.

Never reach into the container when the device is on! Keep hands, loose clothing and long hair away from moving parts.

Select the desired speed level using the flip switch on the agitator motor.
Always adapt the speed of the agitator to the type of feed used:

- slow (level I): whole milk, heating phase
- fast (level II): milk replacer

3.4.6 Housing closures

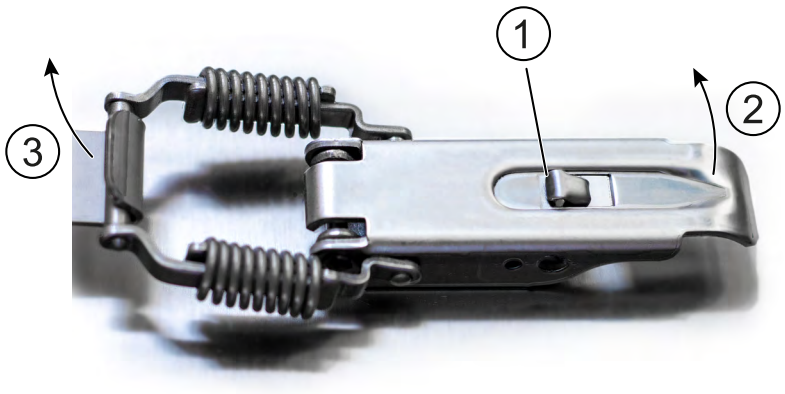


Illustration 12: Housing closure

The lid of the feed container and that of the control casing are equipped with self-locking snap closures.

To open a snap closure, proceed as follows:

1. Remove the safety pin.
2. Press down safety lever ①.
3. Fold up closing lever ②.
4. Open closure fully ②.

Closing is carried out in reverse order. Make sure the safety lever engages audibly.

INFO

The lid closures of the feed container must be opened when extracting the feed. Otherwise, negative pressure could develop in the feed container which would make extraction difficult. The lid should not be removed from the container but loosely remain on top to avoid contamination of the feed. The lid can only be opened once the cotter pins have been removed.

3.4.7 Dosing nozzle

The dosing nozzle dispenses pre-set amounts of feed. It can also be used to freely dispense an amount of feed that has not been determined previously. Cleaning the dosing nozzle is part of the automatic cleaning process for the device.

There are three options for starting the feed delivery:

- Start/Stop button on the dosing nozzle①
- START/STOP button on the operating panel
- Start/Stop button on the drawbar head

(see „Illustration 13: Dosing nozzle“ on page 25 and „Illustration 14: Position of start/stop options“ on page 25)

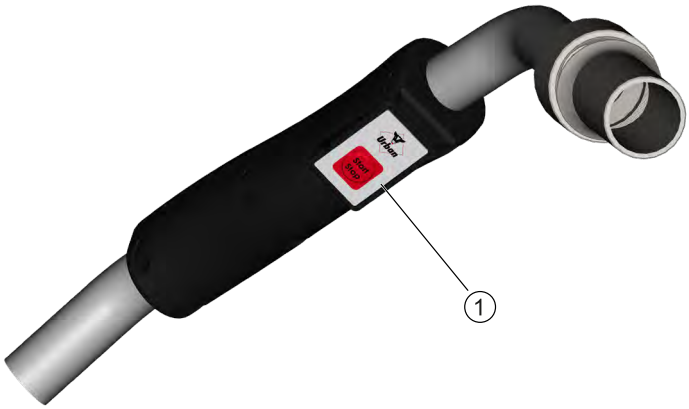


Illustration 13: Dosing nozzle

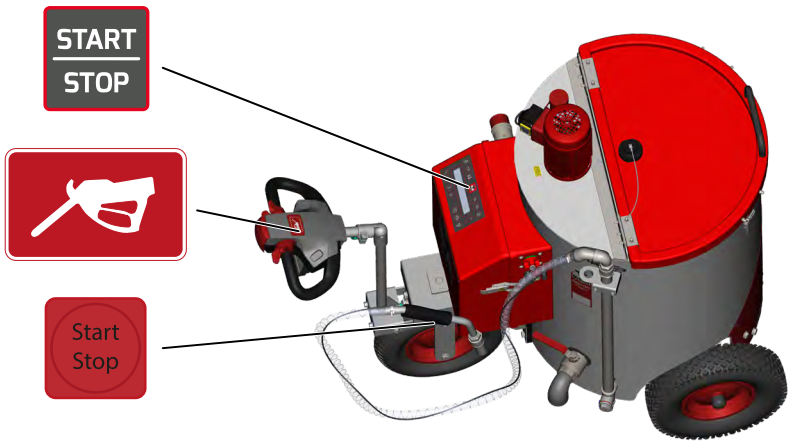


Illustration 14: Position of start/stop options

INFO

To ensure that accurate delivery of feed, make sure that the dosing pump is calibrated correctly (Chapter 7.2 "Calibration“ on page 57). Impurities in the dosing nozzle can lead to inaccurate dispensing. Unscrew the dosing nozzle and clean it. Wear of the seals can also lead to inaccurate dosing quantities (Chapter 9.1 "Maintenance plan“ on page 83).

4 Commissioning

4.1 Scope of delivery

Please check the delivery for completeness before installation. The following items are included in the delivery:

- MilkShuttle calf feed mixer,
- hexagon key, 6mm (for adjusting the drawbar height),
- glass fuse 6.3 A, 5 x 20 MT,
- blade-type fuse 15 A,,
- wheel nut spanner (for replacing wheels),
- Water filter,
- MilkShuttle Quick Guide (2 pages, laminated).

4.2 Transport

Apart from being moved on its own wheels, the MilkShuttle may only be transported in an upright position on a stable support, such as a pallet.
To prevent the device from overturning and rolling away during transport, secure it with lashing straps.

4.3 Unpacking

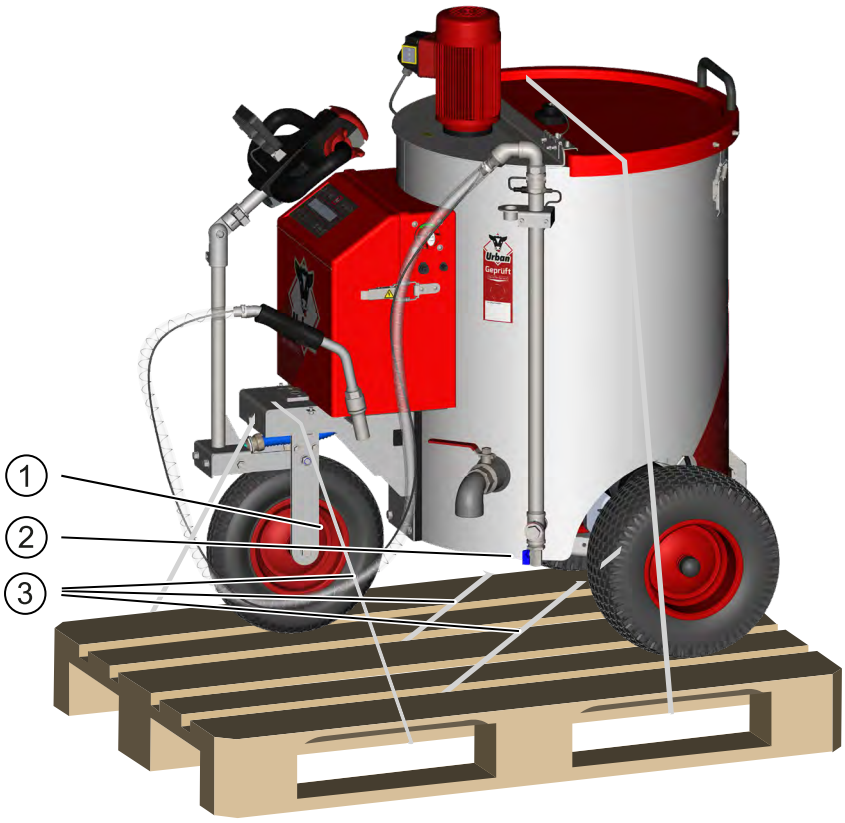


Illustration 15: Unpacking the MilkShuttle

Required tools: knife/cutter

Carry out the following steps to unpack:

1. Carefully cut the packaging film, then remove it.

CAUTION
Danger of injury due to high weight. Involve a second person to assist with the next steps.

2. Cut the tension straps and cable ties ③ and remove them as well.
3. Involve a second person to assist with the next steps. One person will tilt the MilkShuttle slightly over one of the rear wheels, while the second person will remove the transport block under the wheel axle as far as possible.
4. One person will lift the MilkShuttle by the drawbar ① and the second person will remove the transport lock under the feed container ②.

WARNING

Danger of injury caused by uncontrolled machine movements.

Familiarize yourself with the operation of the controllers Chapter 5.6 “Moving the MilkShuttle“ on page 52.

5. Make sure that you have read and understood the operating instructions for the electric propelling drive Chapter 5.6 “Moving the MilkShuttle“ on page 52 in full.
6. Slowly move the MilkShuttle off the pallet. Make sure that both rear wheels set down at the same time.

4.4 Adjusting the drawbar head

Required tools: hexagon key, 6 mm

NOTICE

Possible damage of property. Movable drawbar head can damage the cable.

1. Loosen the hexagon socket screw ② with the hex key.
2. Take care not to pinch or overstretch the cable ① by moving the drawbar head.
3. Adjust the drawbar head to the required height.
4. Retighten the hexagon socket screw ②.

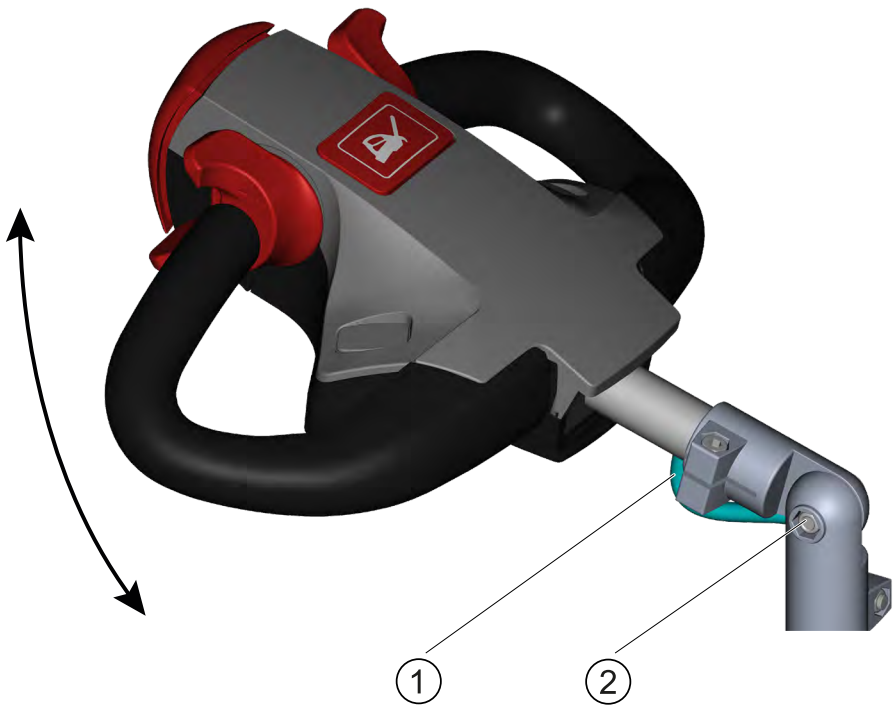


Illustration 16: Adjusting the drawbar head

4.5 Electrical connection

DANGER

If the device is operated without a residual current circuit breaker, dangerous electrical voltage can be present at the housing.

A residual current circuit breaker must be installed in the power supply network. Danger to life in case of contact with unprotected body parts or tools. Never operate the device in a power network without a residual current circuit breaker.

4.5.1 Requirements

Make sure that the connection meets the following requirements. The connection:

- must be secured by a separate fuse (16 A),
- must be protected by a residual current circuit breaker (FI, 30 mA),
- must be wired as per IEC 60364-7-705; in particular, ensure that the rotary field direction is clockwise for an operating voltage of 400 V (see Chapter 4.5.3 “Fault message: Fault code 60“ on page 31).

Depending on the type of heater, the following electrical connections are required:

Electricity supply systems 230 V/400 V (EU)

	Heater 2,500 W	Heater 5,500 W
Operating voltage [V]	230, L/N/PE	400, L1/L2/L3/N/PE
Fuse, minimum [A]	16	3 x 16
Plug connector (EU)	CEE 16 A (blue), 3-pin/ Schuko	CEE 16 A (red), 5-pin
Plug connectors in other countries	according to local standard	according to local standard

4.5.2 Connecting to the power supply

To connect the device to power, you will need a connecting cable with the appropriate plug

CAUTION

Fire hazard.

Make sure that supply cables are completely unwound.

connectors (CEE blue or red, not within the scope of delivery).

1. If you use a cable reel, make sure that it is completely unwound.
2. Plug the cable into a mains power socket.
3. Make sure that after laying the connection cable does not pose a tripping hazard.
4. Plug the other end of the connecting cable into the MilkShuttle socket ① (see Illustration 17 Connection Example, CEE Red, 5-Pole (400 V AC).).
5. Leave the MilkShuttle connected to the power supply for approx. 12 hours to charge the batteries.

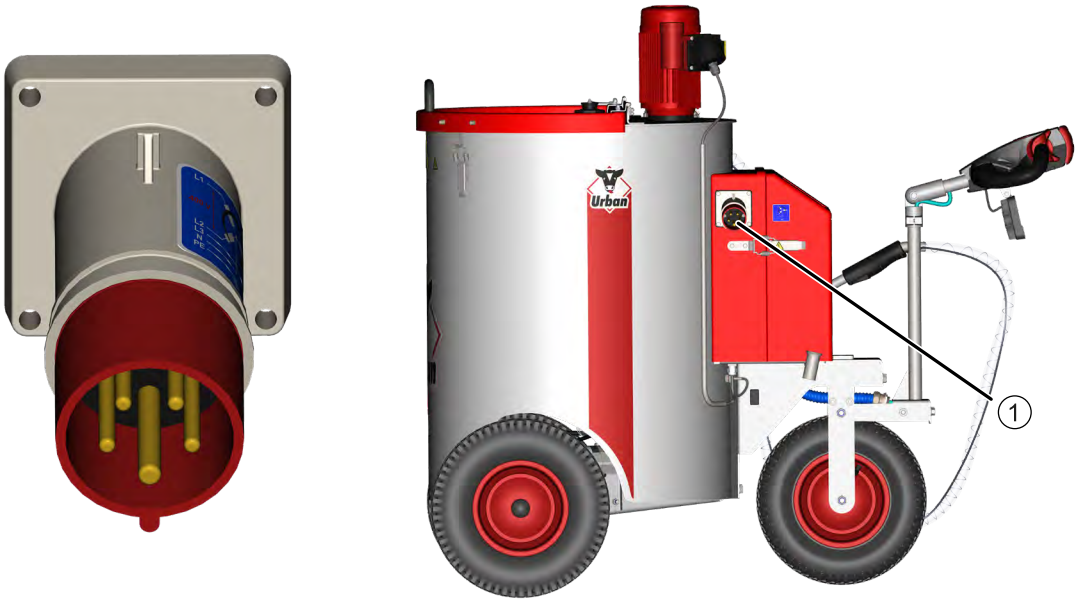


Illustration 17: Connection Example, CEE Red, 5-Pole (400 V AC).

4.5.3 Fault message: Fault code 60

The fault message with fault code 60 (Fault mains voltage) may be due to various causes. A protective mechanism prevents the device from being switched on. For more fault codes, see Chapter 8.2 “Display messages“ on page 77.

Neutral line not connected

- For 400 V power supply (red CEE 5-pin plug (400 V AC)), ensure that the neutral line (N) of the device socket and of the extension cord is connected.
- Contact a qualified electrician to check the connections.

Under - or overvoltage

Make sure that the voltage is neither too high nor too low.

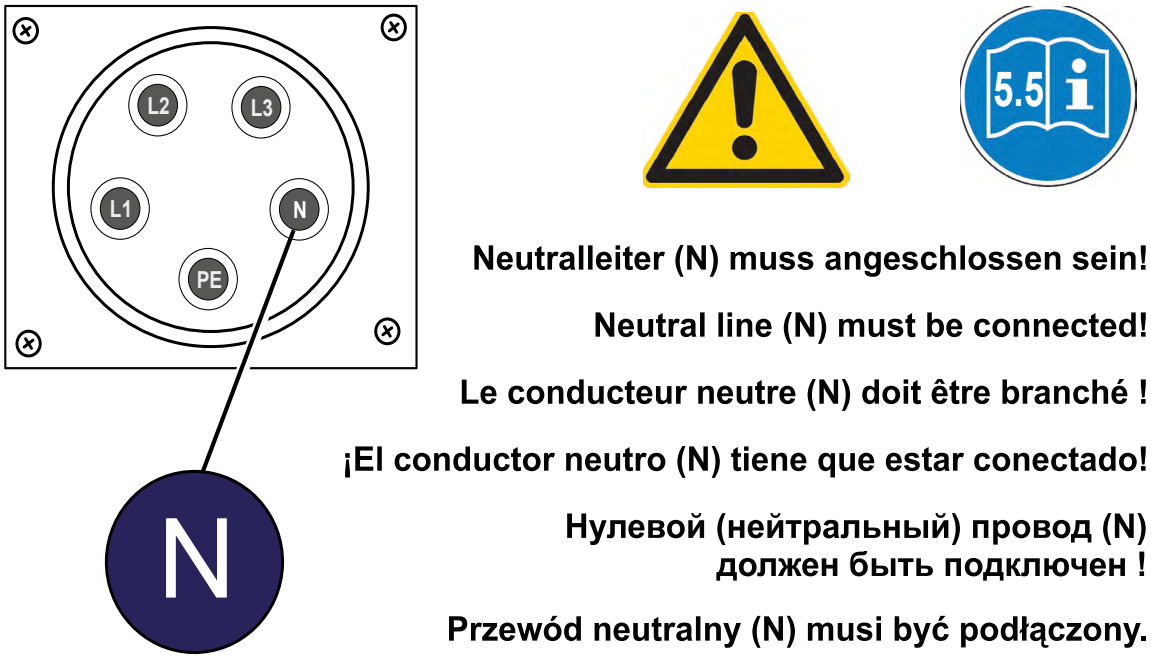


Illustration 18: Warning Sign Neutral Conductor

4.6 Rinsing before first use

Flush the MilkShuttle with at least 30 L of water before first use. (Proceed as described in .Chapter 5.5 “Cleaning“ on page 47.)

4.7 Calibrating

Calibrate the dosing pump to ensure correct volume delivery. (Proceed as described in Chapter 7.2 “Calibration“ on page 57.)

5 Operation

Details on the individual operating and display elements can be found in Chapter 3 "MilkShuttle at a glance“ on page 16. Most of the functions described in this section are controlled via the operating panel, see also Chapter 3.4.3 "Operating panel“ on page 20.

5.1 Battery charge level

INFO

When not in use, connect the device to the power supply. The shorter charging cycles prolong the battery life and ensure that the MilkShuttle is always ready for use. To check the charge levels, unplug the power plug in order for the correct value to be displayed.

The battery charge level is displayed within the “Feeding” function (see Chapter 5.4 "Feeding/ removing feed“ on page 42). The voltages are shown as a bar graph on the right-hand side. Chapter Illustration 19 "Examples of charge levels“ on page 33 depicts examples of charge levels:

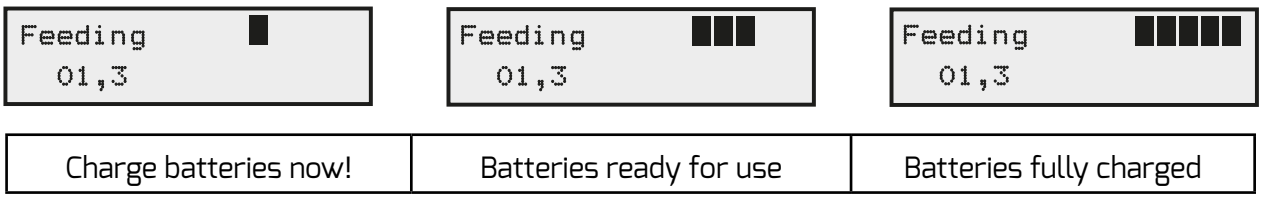


Illustration 19: Examples of charge levels

NOTICE

Insufficient charge levels may damage the batteries.

- Avoid over-discharging the batteries
- Charge the batteries immediately when the charge level drops to two bars
- Note that the batteries discharge faster at temperatures below 0 °C (32 °F)

5.2 Switching on and off

The MilkShuttle can be switched on and off via the battery isolator switch. (See also Chapter 3.4.1 "Battery isolator switch“ on page 18.)

Display info/keys	How to proceed
	1. Turn the battery isolator switch clockwise to the “ON” position. (See Chapter 3.4.1 "Battery isolator switch“ on page 18.)
13.01.23 10:44:10 MilkShuttle U22Z31	2. After switching on, the display in the centre of the control panel shows the start screen.
	3. The display backlight is activated automatically and switches off again when inactive. Press any key to reactivate the display backlight.
	4. When the MilkShuttle is connected to the power supply, only the display backlight turns off, the display itself and the control remain active.
	5. After each use, turn the battery isolator switch anti-clockwise to the “OFF” position. (See Chapter 3.4.1 "Battery isolator switch“ on page 18.)
	6. After each use, turn the battery isolator switch anti-clockwise to the “OFF” position. (See Chapter 3.4.1 "Battery isolator switch“ on page 18).

INFO

The electric propelling drive is only active when the MilkShuttle is on. When the MilkShuttle is off, the brake is engaged.

More information can be found in Chapter 5.6 "Moving the MilkShuttle“ on page 52. If the batteries are fully discharged, release the brake as described in Chapter 3.4.2 "Propelling drive brake lever“ on page 19.

5.3 Heating/Mixing



SELF-STARTING EQUIPMENT

Danger of injury due to self-starting agitator.

Never reach into the container when the device is on! Keep hands, loose clothing and long hair away from moving parts.

The Heating/Mixing menu heats the water or feed in the container to a preset target temperature or pasteurizes it. The following values are factory defaults:

- Target temperature: 40 °C (104 °F)
- Mixing: 15 seconds
- Break: 30 seconds

See Chapter 7.3 "Programming Heating/Mixing values“ on page 64 to learn how to adjust these values to your needs. The factory default settings should not be significantly altered in order to prevent the milk from scorching and to ensure efficient heating and effective pasteurization. The agitator initially pulses three times for safety reasons. Shorter stir and break times can lead to insufficient stirring results.
If no start times have been defined, the MilkShuttle starts heating/mixing as soon as you call up the Heating/Mixing menu. Start times are only called up if the MilkShuttle is on and the Heating/Mixing menu is activated.

The Heating/Mixing functions can only be used while the MilkShuttle is connected to the electricity supply. It is not possible to heat up milk using the batteries installed in the shuttle.

INFO

When the amount of liquid in the container falls below the minimum fill level, the heating mode is suspended by a safety mechanism. The minimum quantity required to use the heating mode is 30 L (MilkShuttle 150, MilkShuttle 200, MilkShuttle 250) or 15 L (MilkShuttle 100).

INFO

Always match the agitator speed with the type of feed used:

- slow (level I): whole milk, heating phase
- fast (level II): milk replacer

5.3.1 Preparative steps for heating and pasteurizing

NOTICE

Possible damage to the heating elements! Never operate the device without connecting it to water!

Display info/keys	How to proceed
	1. Make sure that the MilkShuttle is connected to the power supply. In battery mode, the heating function is not available; in this case, the display shows the fault message “60 Mains voltage error”.
	2. Fill the desired amount of feed into the container (note the minimum filling quantity, see „INFO“ on page 35).
	3. Connect the hose for the water outlet ① („Illustration 20: Water Inlet and water outlet“ on page 37).
	4. Connect the hose for the water inlet ② („Illustration 20: Water Inlet and water outlet“ on page 37).
	5. Open the water tap.
	6. Switch on the MilkShuttle as described in Chapter 5.2 "Switching on and off“ on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	7. The displays shows the start screen.
	8. Press the Heating/Mixing menu key.
Please select 1: Heating	9. The Heating/Mixing key lights up. The display prompts you to select between heating, pasteurizing or cooling.
	10. Using the flip switch on the agitator motor, start the agitator in level I (slow mode). (See also: Chapter 3.4.5 "Agitator motor switch“ on page 23.)

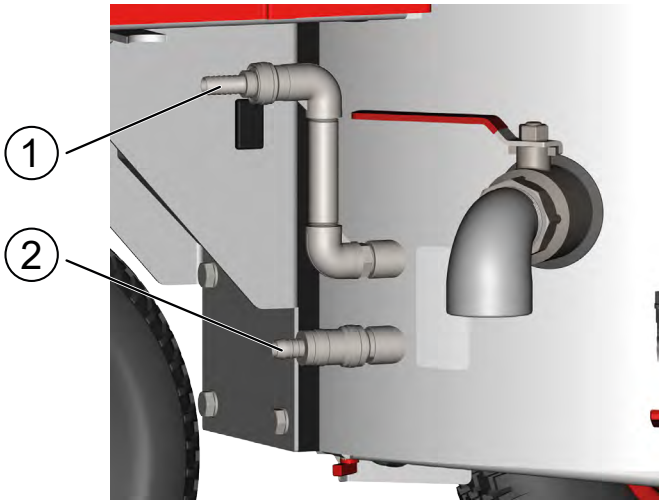


Illustration 20: Water Inlet and water outlet

5.3.2 Preparing

Use the mixing mode to set the agitator to continuous operation. The factory setting for continuous operation is a duration of 5 minutes. This duration can be adjusted as described in Chapter 7.3 "Programming Heating/Mixing values“ on page 64.

Display info/keys **How to proceed**

1. Follow the preparative steps outlined in Chapter 5.3.1 "Preparative steps for heating and pasteurizing“ on page 36.



2. Press preselection key “1” to switch to heating mode.

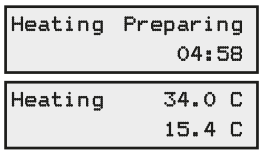


3. The Heating/Mixing key lights up. The display shows the Heating/Mixing menu with a set start time, if applicable. Without programmed start times, the MilkShuttle starts heating/mixing immediately.



4. Press the Start/Stop key to start the “Mixing” function.

5. The agitator is switched on for 5 minutes (fast or slow mode can be selected on the agitator motor, as described in Chapter 3.4.5 "Agitator motor switch“ on page 23).

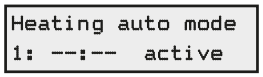


6. The display alternately shows the target and actual temperatures and the remaining stir and break times.



7. If necessary, press the Start/Stop key again if you want to abort the Mixing function.

5.3.3 Mixing calf milk replacer

Display info/keys	How to proceed
	1. Follow the preparative steps outlined in Chapter 5.3.1 "Preparative steps for heating and pasteurizing“ on page 36.
	2. Press preselection key “1” to switch to heating mode.
	3. The Heating/Mixing key lights up. The display shows the Heating/Mixing menu with a set start time, if applicable. Without programmed start times, the MilkShuttle starts heating/mixing immediately.
	4. Heat the feed to a temperature that is approx. 5 °C / 10 °F above the recommended feeding temperature, i. e. if the desired feeding temperature is 38 °C / 100 °F, you should heat the feed to 43 °C / 110 °F.
	5. Using the agitator switch on the agitator motor, set the agitator to level II (fast mode) once the desired temperature has been reached.
	6. Press the Start/Stop key on the control panel to start the agitator in mixing mode.
	7. Slowly add the required amount of milk replacer.
	8. Wait until the required temperature is reached, if necessary.
	9. Use the feed immediately (details in Chapter 5.4 "Feeding/removing feed“ on page 42).
	10. After feeding, start the cleaning programme (details in Chapter 5.5 "Cleaning“ on page 47).

INFO

- Comply with the specifications of your milk replacer manufacturer regarding optimal mixing temperature.
- The mixing temperature should be higher than the desired feeding temperature to compensate for heat loss during transfer (see Chapter 7.3.2 "Target temperature of the heater" on page 66).
- When hot water is used for mixing, the heating time can be shortened or may possibly not be required.
- A mixing table to facilitate feed preparation can be found on the inside of the MilkShuttle lid and in Chapter 11 "Mixing table“ on page 92.

5.3.4 Warming up whole milk

Display info/keys	How to proceed
	1. Follow the preparative steps outlined in Chapter 5.3.1 "Preparative steps for heating and pasteurizing“ on page 36.
	2. Press preselection key “1” to switch to heating mode.
	3. The Heating/Mixing key lights up. The display shows the Heating/ Mixing menu with a set start time, if applicable. Without programmed start times, the MilkShuttle starts heating/ mixing immediately.
	4. Heat the feed to the required temperature.
	5. Use the whole milk immediately (details in Chapter 5.4 "Feeding/removing feed“ on page 42).
	6. After feeding, start the cleaning programme (details in Chapter 5.5 "Cleaning“ on page 47).

5.3.5 Pasteurizing

The pasteurization process consists of three phases:

- Heating up (P1)
- Pasteurizing (P2)
- Cooling down (P3)

For the pasteurization process, the feed is first heated to 65 °C / 149 °F (P1). This temperature is maintained for 30 minutes (P2) before the feed is cooled down to the feeding temperature of 42 °C / 108 °F (P3).

It is possible to fill the milk into the MilkShuttle directly after feeding (A) to cool the milk down to 10 °C / 50 °F (B), keep it chilled and to pasteurize it automatically with the help of a pre-programmed start time (C) for the next feeding. (See „Illustration 21: Pasteurization process“).

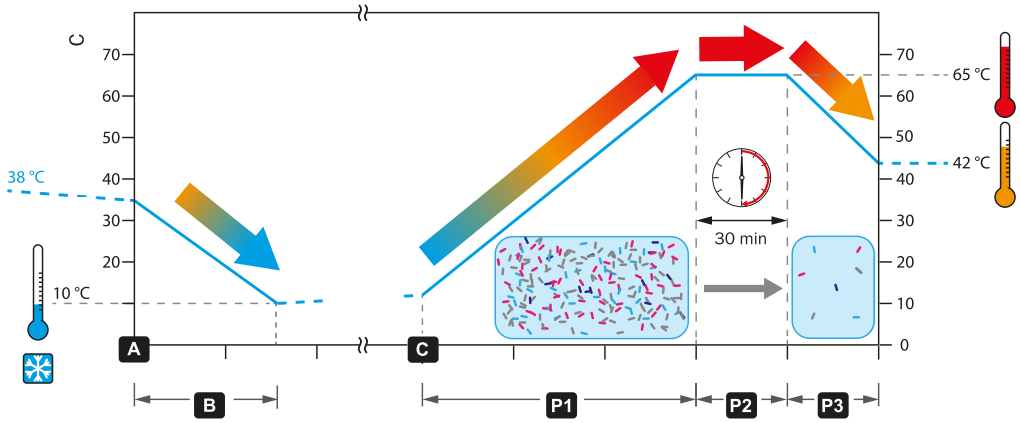


Illustration 21: Pasteurization process

INFO

Pasteurized milk is not sterile. Remaining germs can potentially multiply (during long storage periods or at too high storage temperatures).

For this reason, feed the milk immediately after cooling.

The pasteurization process reduces the microbial content of the milk, but has no influence on possible antibiotic residues. Thus, despite pasteurization, the discard milk of treated cows is not suitable for feeding.

CAUTION

Risk of burns caused by hot liquids and machine parts.

Both the feed and the container reach considerably high temperatures during the pasteurization process. Avoid direct skin contact with the feed and container. Keep children away during the pasteurization process.

Display info/keys	How to proceed
	1. Follow the preparative steps outlined in Chapter 5.3.1 "Preparative steps for heating and pasteurizing" on page 36.
	2. Press preselection key "2" to switch to pasteurizing mode.
Pasteuriz. Auto 1: Start in 02:08	3. If a start time was pre-set, the timer is started and shown in the display; otherwise the MilkShuttle immediately starts heating up to holding temperature (P1).
Pasteuriz. 65.0 C Heating 24:0 C Pasteuriz. Break Heating 00:04 C	4. During the heating process (P1), the display alternately shows the target and actual temperatures and the remaining stir and break times.
Pasteuriz. 30:00 Holding 15:48 Pasteuriz. Mixing Holding 00:10	5. The holding phase (P2) starts once the target temperature has been reached. The display alternately shows the total and remaining time as well as the stir and break times.
Pasteuriz. 42.0 C Cooling 59.6 C Pasteuriz. Mixing Cooling 00:10	6. When the holding phase (P2) time has come to an end, the cooling phase (P3) begins. The display alternately shows the target and actual temperatures and the remaining stir and break times.
Pasteuriz. 40.0 C Feeding 39.7 C Pasteuriz. Mixing Feeding 00:10	7. As soon as the target temperature is reached, the Heating/Mixing key flashes and the display shows that the feed is ready for use.
	8. Use the feed immediately (details in Chapter 5.4 "Feeding/removing feed" on page 42).
	9. After feeding, start the cleaning programme (details in Chapter 5.5 "Cleaning" on page 47).

5.3.6 Cooling down

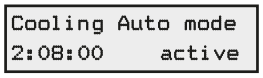
The cooling function is part of the pasteurization process and allows for feeding soon after pasteurization. It can also be used for keeping the feed cool until the next feeding.

Display info/keys **How to proceed**

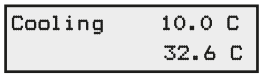
1. Follow the preparative steps outlined in Chapter 5.3.1 "Preparative steps for heating and pasteurizing“ on page 36.

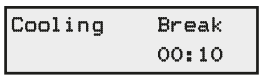


2. Press preselection key “3” to switch to cooling mode.



3. If a start time was pre-set, the timer is started and the remaining time is shown in the display; otherwise the MilkShuttle immediately starts cooling the content down to target temperature.





4. During the cooling process, the display alternately shows the target and actual temperatures and the remaining stir and break times.

5. If necessary, the temperature is maintained by cooling again.

5.4 Feeding/removing feed

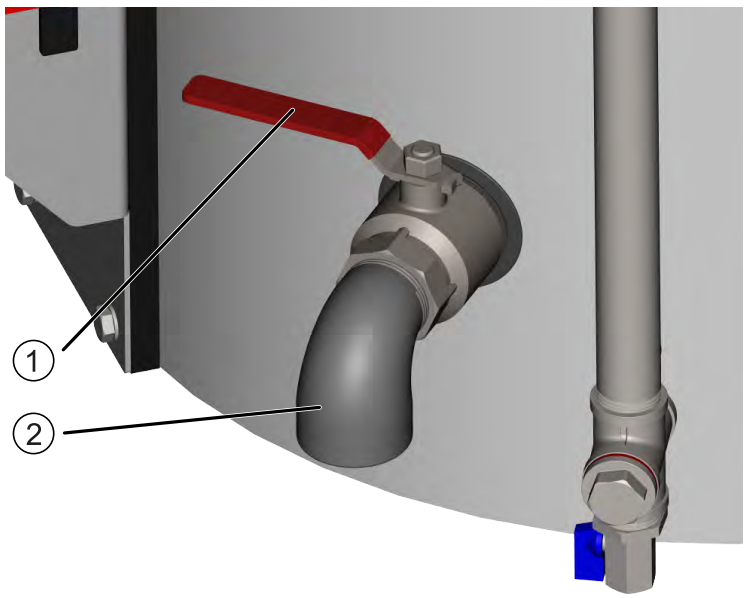


Illustration 22:Drain valve

INFO

Before the device is used for the feeding of animals for the first time, make sure that you have calibrated the MilkShuttle to the desired unit (litres or gallons). Otherwise, the dosing amount can deviate considerably from the desired quantity. See Chapter "INFO" on page 39 for details regarding calibration.

5.4.1 Removal via the drain valve

Display info/keys	How to proceed

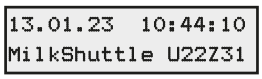
1. Open the lid closures of the feed container to prevent vacuum formation during feeding (see „Housing closures“ on page 24).
2. Place a suitable receptacle underneath the outlet ② of the drain valve (see „Illustration 22: Drain valve“).
3. Open the drain valve by turning the valve lever ① anti-clockwise. (See „Illustration 22: Drain valve“).
4. Remove the desired amount of feed.
5. Close the drain valve by turning the valve lever ① clockwise back to its original position.

5.4.2 Removing feed with preset quantity dosing

See Chapter 3.4.7 "Dosing nozzle“ on page 24 for an overview of the dosing nozzle.

Display info/keys **How to proceed**

1. Open the lid closures of the feed container to prevent vacuum formation during feeding (see „Housing closures“ on page 24).
2. Switch on the MilkShuttle as described in Chapter 5.2 "Switching on and off“ on page 34.



3. The displays shows the start screen.



4. Press the Feeding key.



5. The Feeding key lights up and the display shows the Feeding menu with the quantity last used (1.3 in the example shown) and the battery charge level.



6. Use the preselection keys 1, 2, 3 or 4 to select pre-set feeding quantities. For details on saved settings and on how to adjust the programmed values, refer to Chapter 7.4 "Programming feed amounts“ on page 72.



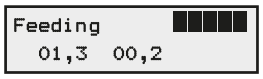
Optional: Use the Increase/Decrease keys to adapt the dosing amount individually during feeding. These changes are saved temporarily. When you exit the Feeding menu, the last set quantity will be retained. It is only overwritten when you call up one of the saved settings.

7. Take the dosing nozzle out of the bracket on the drawbar and hold it over the receptacle to be filled.
8. Press one of the three buttons to remove feed:



- START/STOP button on the operating panel
- Start/Stop button on the drawbar head
- Start/Stop button on the dosing nozzle

(See Illustration 23: Locations of the Start/Stop buttons).
The dosing pump starts and pumps the required feed amount into the receptacle.



9. On the display, to the right of the set dosing quantity, the already dosed amount is displayed (0.2 in the example shown).

10. Press one of the three buttons again to abort feed removal if required:



- START/STOP button on the operating panel
- Start/Stop button on the drawbar head
- Start/Stop button on the dosing nozzle

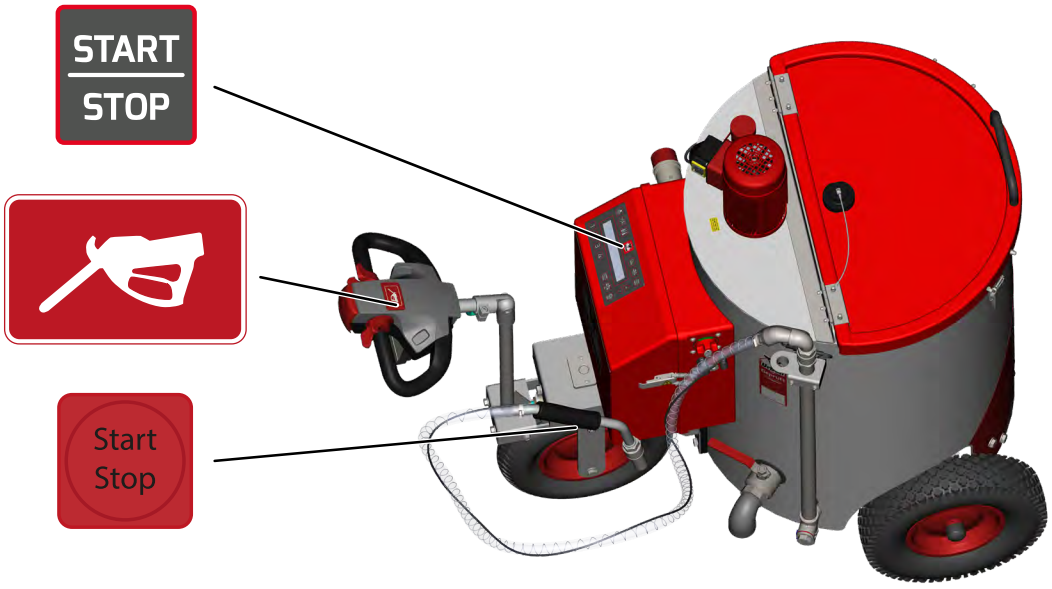


Illustration 23:Locations of the Start/Stop buttons

INFO

The hose may not contain any or may have cold feed. Fill approximately one dose into a container before starting feeding.

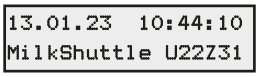
5.4.3 Removing feed with free quantity dosing

Using the start/stop function, it is possible to remove feed independently of preset quantity specifications.

Display info/keys **How to proceed**

1. Open the lid closures of the feed container to prevent vacuum formation during feeding (see „Housing closures“ on page 24).

2. Switch on the MilkShuttle as described in Chapter 5.2 "Switching on and off“ on page 34.



3. The displays shows the start screen.



4. Press the Feeding key.



5. The Feeding key lights up and the display shows the dosing settings last used.



6. Use the Decrease key until the dosing amount drops below 1 L to display the option of the Start/Stop function.

7. Start and stop feed removal with one of the three buttons:



- START/STOP button on the operating panel
- Start/Stop button on the drawbar head
- Start/Stop button on the dosing nozzle

INFO

If there is no flow sensor present, the pump stops after 50 litres to protect it from running dry. The pump also stops if the flow sensor does not detect any flow.

INFO

Press and hold one of the preselection keys for at least 2 seconds to permanently assign the Start/Stop function to the selected key.

5.5 Cleaning

INFO

Clean the MilkShuttle after each use to prevent germ formation in the container as well as in the conveying system.

5.5.1 Preparative steps for the cleaning process

Display info/keys	How to proceed
	1. If you wish to use the Heating function to heat up the water for the cleaning process, make sure that the MilkShuttle is connected to the power supply since this function is not available in battery mode.
	2. Switch on the MilkShuttle as described in Chapter 5.2 "Switching on and off“ on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	3. The displays shows the start screen.
	4. Fill in the minimum amount of water. (The same values apply as for Heating/Mixing, see „INFO“ on page 35).
	5. Use the Start/Stop function (see Chapter 5.4.3 "Removing feed with free quantity dosing“ on page 46) to roughly clean the inside of the container with the dosing nozzle.
	6. Drain the water via the drain valve (analogous to manual feed removal, see Chapter 5.4 "Feeding/removing feed“ on page 42).
	7. Refill with water until the agitator blades are approximately half covered.
	8. If necessary, add a detergent: • to every 4th cleaning in case of feeding with whole milk, • to every 6th cleaning in case of feeding with milk replacer.

5.5.2 Cleaning using the dosing nozzle

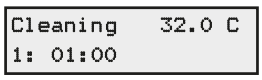
Please observe the preparative steps in Chapter 5.5.1 "Preparative steps for the cleaning process“ on page 47.

Display info/keys **How to proceed**

1. Insert the dosing nozzle into the sleeve of the cleaning device (Illustration 24: Insertion of the dosing nozzle into sleeve of cleaning device).



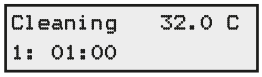
2. Press the Cleaning menu key to switch to the cleaning programme.



3. The Cleaning key lights up and the display shows the last selected settings.



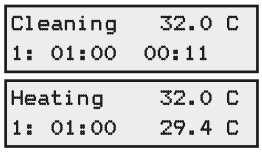
4. Use the preselection keys 1, 2, 3 or 4 to select one of four cleaning durations. (For details on saved settings and on how to adjust the programmed values, refer to Chapter 7.5 "Programming cleaning durations“ on page 74.)



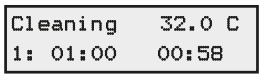
5. The display shows information on the selected cleaning programme at the bottom left and, if applicable, the target temperature at the top right.



6. Press the Start/Stop key to start the cleaning programme.



If a temperature has been programmed for the cleaning water, the heater will first heat the cleaning water to the set temperature. The pump and the agitator run intermittently for better heat distribution. The display shows “Cleaning” and “Heating” alternately on the left. The target and actual temperatures are shown on the right, the target value at the top, the actual value at the bottom. When the agitator starts, the remaining stir time is displayed at the bottom right.



7. If no temperature has been programmed for the cleaning water, the display shows the total rinse time as well as the remaining rinse time during the programme.

8. Drain the water via the drain valve (see Chapter 5.4.1 "Removal via the drain valve“ on page 43).

9. Empty the milk hose.

10. Clean the lid separately.



11. Press the ESC/Info key if you want to abort the process.

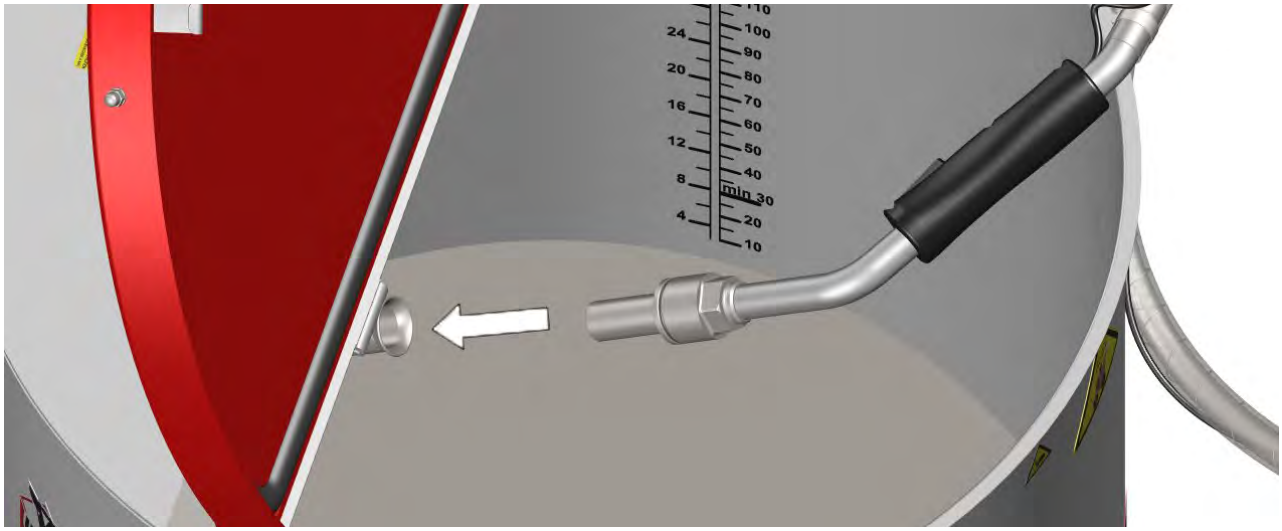


Illustration 24:Insertion of the dosing nozzle into sleeve of cleaning device

INFO

Optional: Use the Increase/Decrease keys to change the rinse time for this cleaning cycle without saving this value. This step disables the heating function.

5.5.3 Cleaning using the tank cleaning nozzle (optional)

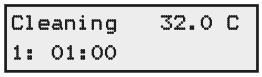
Please observe the preparative steps in Chapter 5.5.1 "Preparative steps for the cleaning process“ on page 47.

Display info/keys **How to proceed**

1. Take the stopper ② out of the lid to provide access to the tank cleaning nozzle.
2. Insert the dosing nozzle ① into the opening of the tank cleaning nozzle. (see „Illustration 25: Insert the dosing nozzle“ on page 51).



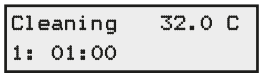
3. Press the Cleaning menu key to switch to the cleaning programme.



4. The Cleaning key lights up and the display shows the last selected settings.



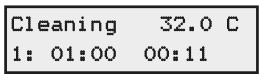
5. Use the preselection keys 1, 2, 3 or 4 to select one of four cleaning durations. (For details on saved settings and on how to adjust the programmed values, refer to Chapter 7.4 "Programming feed amounts“ on page 72.)

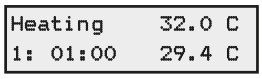


6. The display shows information on the selected cleaning programme at the bottom left and, if applicable, the target temperature at the top right.

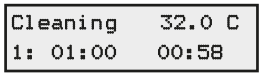


7. Press the Start/Stop key to start the cleaning programme.





8. If a temperature has been programmed for the cleaning water, the heater will first heat the cleaning water to the set temperature. The pump and the agitator run intermittently. The display shows “Cleaning” and “Heating” alternately on the left. The target and actual temperatures are shown on the right, the target value at the top, the actual value at the bottom. When the agitator starts, the remaining stir time is displayed at the bottom right.



9. If no temperature has been programmed for the cleaning water, the display shows the total rinse time as well as the remaining rinse time during the programme.
10. Drain the water via the drain valve (see Chapter 5.4.1 "Removal via the drain valve“ on page 43).
11. Empty the milk hose.



12. Press the ESC/Info key if you want to abort the process.

INFO

Optional: Use the Increase/Decrease keys to change the rinse time for this cleaning cycle without saving this value. This step disables the heating function.

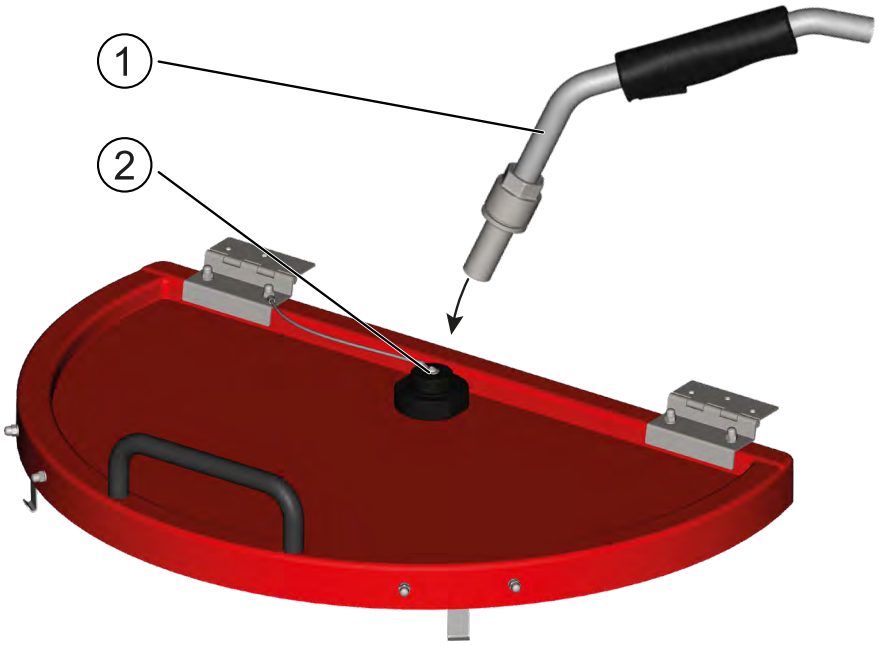


Illustration 25:Insert the dosing nozzle

5.6 Moving the MilkShuttle

WARNING

Danger of injury caused by uncontrolled machine movements.

- Never fix the controllers in any position.
- Ensure free movement of the controllers.
- Check the safety stop function before every drive.

1. Make sure that you have disconnected the MilkShuttle from the power supply. Otherwise, the propelling drive is blocked by a safety mechanism.
2. Select the desire driving direction using one of the controllers on the drawbar head.
   - Turn controller down: forwards driving direction (pulling the MilkShuttle)
   - Turn controller up: backwards driving direction (pushing the MilkShuttle)
3. The travel speed is determined by the position of the controllers: The further you turn a controller in one direction, the faster the MilkShuttle will drive.

Further information regarding the drawbar head can be found in Chapter 3.4.4 "Drawbar head“ on page 22.

INFO

When the batteries are discharged, the MilkShuttle can be moved by releasing the brake, as described in Chapter 3.4.1 "Battery isolator switch“ on page 18.

Secure the MilkShuttle against rolling when the brake is released!

Observe safety instructions and direction of travel on sloping ground when the brake is released!
(See Chapter 1.4 "Possible hazards on sloping ground“ on page 9).

6 Decommissioning

NOTICE

Risk of property damage from frost.

Do not keep the MilkShuttle in rooms where temperatures can drop below 0 °C / 32 °F. This can damage the dosing pump.

If you will not be using the MilkShuttle for an extended period of time or cannot ensure that the temperatures remain above 0 °C / 32 °F, you must take the MilkShuttle out of operation to avoid damage to the device.

1. Clean the MilkShuttle thoroughly (see Chapter 5.5 “Cleaning“ on page 47)
2. Drain the dosing pump via the drain valve ① under the container (see Illustration 26: Position drain valve dosing pump).Make sure that there is no liquid left in the feed container.
3. Disconnect the MilkShuttle from the power supply. Note that you should charge the batteries about every 4 weeks to avoid complete discharge.
4. Turn the battery isolator switch anti-clockwise to the “OFF” position. (See Chapter 3.4.1 „Battery isolator switch“ on page 18.)



Illustration 26: Position drain valve dosing pump

7 Programming and calibration

7.1 General settings

INFO

In this chapter, you will use the programming mode. You can recognize this programming mode by the fact that the setting to be programmed is framed by angle brackets:

>VALUE<

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	2. The displays shows the start screen.
SET	3. Press the SET key to open the “General Settings” menu. You can change the following settings in this menu: • Time • Date • Language • Temperature unit • Temperature warning level You can display the following information: • Serial numbers • Version numbers
+ / −	4. Use the Increase/Decrease keys to select the different menu items.

7.1.1 Setting the time and date

INFO

The clock must be manually changed from summer time (daylight saving time) to winter time (standard time). The seconds cannot be set.

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	2. The displays shows the start screen.
SET	3. Press the SET key to open the “General Settings” menu.
Date Time 01.01.23 08:15:03	4. The display shows the date and time.
SET	5. Press the SET key again.
Time hh:mm:ss >08<15:03	6. The display switches to programming mode and shows the set time.
+ / −	7. Use the Increase/Decrease keys to adjust hours and minutes.
SET	Use the SET key to move to the next item.
Date dd:mm:yy >01<01.23	8. Press the SET key until the display shows the date in programming mode.
+ / −	9. Use the Increase/Decrease keys to adjust day, month and year.
SET	Use the SET key to move to the next item.
ESC / INFO	10. Press the ESC/Info key to return to the “General Settings” parent menu.

7.1.2 Changing the language settings

INFO

The language used in the display is set to your country's language before delivery. You can change the language at any time to any of the available options. If your preferred language is not available, please contact the service department.

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 "Switching on and off" on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	2. The displays shows the start screen.
	3. Press the SET key to open the "General Settings" menu.
	4. Press the Decrease key to select the "Language" function.
	5. Press the SET key to switch to programming mode.
Language >English<	6. The displays shows the Language menu in programming mode.
	7. Use the Increase/Decrease keys to select the desired language.
	8. Press the SET key to confirm the language selection.
	9. Press the ESC/Info key to return to the "General Settings" parent menu.

7.1.3 Changing the temperature unit (°C/°F)

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	2. The displays shows the start screen.
	3. Press the SET key to open the “General Settings” menu.
	4. Press the Decrease key to select the “Temperature” function.
	5. Press the SET key to switch to programming mode.
Temperature >Celsius<	6. The display shows the Temperature menu in programming mode.
	7. Use the Increase/Decrease keys to select the desired unit.
	8. Press the SET key to confirm the unit selection.
	9. Press the ESC/Info key to return to the “General Settings” parent menu.

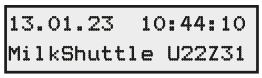
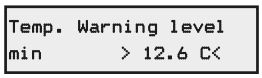
7.1.4 Setting warning values for minimum and maximum temperature

The MilkShuttle will alert you with a display message as soon as the temperature of the feed falls outside the tolerance range for the feeding temperature. If the temperature drops below the specified minimum, the dosing pump is disabled in the feeding mode (see also Chapter 5.3 „Heating/Mixing“ on page 35).

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	2. The displays shows the start screen.
	3. Press the SET key to open the “General Settings” menu.
	4. Press the Decrease key to select the “Temperature warning level minimum” function.
	5. Press the SET key to switch to programming mode.
Temp. Warning level min > 12.6 C<	6. The display shows the Temperature warning level minimum menu in programming mode.
	7. Use the Increase/Decrease keys to select the desired temperature warning level.
	8. Press the SET key to confirm the minimum temperature selection.
	9. Press the Decrease key to select the “Temperature warning level maximum” function.
	10. Press the SET key to switch to programming mode.
Temp. Warning level max > 50.5 C<	11. The display shows the Temperature warning level maximum menu in programming mode.
	12. Use the Increase/Decrease keys to select the desired temperature warning level.
	13. Press the SET key to confirm the maximum temperature selection.

7.1.5 Deleting warning values for minimum and maximum temperature

To delete the warning values, proceed in the same way as when setting the warning values. Deletion is triggered by setting values below 10 °C / 50 °F (minimum value), or above 55 °C / 131 °F (maximum value).

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
	2. The displays shows the start screen.
	3. Press the SET key to open the “General Settings” menu.
	4. Press the Decrease key to select the “Temperature warning level maximum” or “Temperature warning level maximum” function.
	5. Press the SET key to switch to programming mode.
	6. The display shows the menu for the selected Temperature warning level in programming mode.
	7. Use the Increase/Decrease buttons to set the temperature warning for the minimum level below 2 °C / 36 °F, or above 55 °C /131 °F for the maximum level.
	8. Press the SET key to confirm the temperature selection. This deletes the warning level and the display shows dashes instead of a value.

INFO

The warning levels ensure that feeding always takes place at the desired feed temperature and that there can be no scalding due to excessively high temperatures. Deleting the warning levels is therefore not recommended.

7.1.6 Display of version and serial numbers

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	2. The displays shows the start screen.
	3. Press and hold the SET key to open the “General Settings” menu.
Date Time 01.01.23 08:15:03	4. The displays shows the date and time.
	5. Use the Increase/Decrease keys to select either the menu item “Serial Number” or “Version Number”.
	6. Press the SET key to open the selected menu item.
Serial number DIMA 0500	7. The display shows the version and serial number.
	8. Use the Increase/Decrease keys to select the desired sub-assembly.
	9. Press the ESC/Info key to return to the “General Settings” parent menu.

7.2 Calibration

In the Calibration menu, you can calibrate both the pump and the temperature settings.

7.2.1 Calibrating pump (time-controlled)

During the calibration of the time-controlled pump, feed is delivered for 5 seconds. The delivered quantity is measured by the user and entered as a reference value in the control system.



INFO

You can measure the amount of feed in the unit of your choice, but you must choose one unit and use it for all functions. Accordingly, you cannot, for instance, calibrate in litres but dose the feed in gallons.

The precision of time-controlled dosing depends on several factors, such as:

- Fill level of the feed container
- Height of the withdrawal position of the dosing nozzle
- Contamination or porous seals in the dosing nozzle
- Charge level of the batteries
- Ambient temperature

Therefore, ensure that the following conditions are met during the calibration process for the best possible results:

- **The batteries are fully charged**
- **During measurement, the dosing nozzle is held at average withdrawal height**
- **The feed container is filled to 50% capacity**

Display info/keys	How to proceed
	1. Make sure that the MilkShuttle is **not** connected to the power supply.
	2. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	3. The displays shows the start screen.
	4. Press the Calibrating key to open the “Calibrating” menu.
1:Pump 02.400	5. The Calibrating key lights up and the display shows the last used calibration menu.
	6. Press pre-selection key 1.
1:Pump 02.400	7. The displays shows the Calibration menu for the pump.
	8. Press the SET key to switch to calibrating mode.
SET Pump >02.400 <	9. The Calibrating key flashes and the display shows the Calibration menu for the pump in programming mode.
	10. Make sure that the measuring container is positioned at average withdrawal height.
	11. Press one of the three buttons to remove feed:
	• Start/Stop button on the dosing nozzle • START/STOP button on the operating panel • Start/Stop button on the drawbar head
	12. The MilkShuttle will pump feed for 5 seconds.
SET Pump >02.400 <	13. Meanwhile, the display shows the currently stored reference value (02,400 in the example shown) in programming mode.
	14. Measure the delivered quantity of feed.
	15. Use the Increase/Decrease keys to enter the measured quantity of feed.
	16. Press the SET key to save the new value.

7.2.2 Calibrating temperature

The temperature control of the MilkShuttle is calibrated at the factory before delivery. Recalibration is only necessary if you notice a deviation between the displayed actual temperature and the true temperature of the feed.

Display info/keys	How to proceed
	1. Make sure that the MilkShuttle is **not** connected to the power supply.
	2. Fill the container with liquid, taking into account the minimum amount („INFO“ on page 35).
	3. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	4. The displays shows the start screen.
	5. Heat the liquid to the required temperature (as described in Chapter 5.3 „Heating/Mixing“ on page 35).
	6. Press the Calibrating key to open the “Calibrating” menu.
1:Pump 02.400	7. The Calibrating key lights up and the display shows the last used calibration menu.
	8. Press pre-selection key 2.
2: Temperature 32.2 C -1.5	9. The displays shows the Calibration menu for the temperature.
	10. Measure the temperature of the feed with a thermometer.
	11. Press the SET key to switch to programming mode.
SET Temperature 32.1 C >-1.5<	12. The Calibrating key flashes and the display shows the Calibration menu for the temperature in programming mode.
	13. Use the Increase/Decrease keys to change the displayed temperature by the measured deviation.
	14. Press the SET key to save the new value.

7.3 Programming Heating/Mixing values

In the Heating mode, the heater installed in the MilkShuttle heats the feed in the container to the required (target) temperature. The heater turns off as soon as the target temperature is reached. Due to the inertia of thermal systems, the actual temperature may briefly exceed the target temperature. During pasteurization, the heater is only turned off once the duration of the holding phase has come to an end and the cooling phase begins.
The agitator ensures even temperature distribution in the feed. The stir and break times of the agitator should be adapted to the type of feed used.

You can adjust the settings in the "Heating/Mixing" menu by sequentially accessing and potentially modifying individual settings. Press the ESC/Info key to abort the respective process. Access the menu as described in Chapter 7.3.1 „Accessing the Heating/Mixing settings" on page 65. Then navigate to the desired subitem and adjust the setting.

Programmable settings	Default settings
Target temperature of the heater	40 °C / 104 °F
Operating time of the agitator	15 sec.
Break time of the agitator	30 sec.
Target temperature for pasteurization	65 °C / 149 °F
Holding time during pasteurization	30 min.
Target temperature for cooling (pasteurization cycle)	38 °C / 100 °F
Target temperature for cooling (storage)	15 °C / 59 °F

INFO

Residues on the bottom of the container indicate that operating times are too long or break times too short. Adjust both values until no residues form.

7.3.1 Accessing the Heating/Mixing settings

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	2. The displays shows the start screen.
	3. Press the Heating/Mixing key to open the “Heating/Mixing” menu.
Please select 1: Heating	4. The Heating/Mixing key lights up. The display prompts you to select between heating, pasteurizing or cooling.
	5. Use the Increase/Decrease keys to select the desired menu item.

INFO

The following shows the sequence of menu items when using the Increase key; the Decrease key reverses the order accordingly:

- Target temperature of the heater
- Target temperature for pasteurization
- Duration of holding phase
- Target temperature after pasteurization cycle (feeding temperature)
- Target temperature for cooling (storage)
- Operating time of the agitator
- Break time of the agitator
- Operating time for mixing
- Start time heating
- Start time pasteurization
- Start time cooling

7.3.2 Target temperature of the heater

Display info/keys **How to proceed**

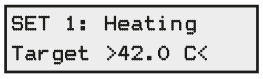
1. Follow steps 1-5 as outlined in Chapter 7.3.1 „Accessing the Heating/Mixing settings“ on page 65.



2. The display shows the current settings.



3. Press the SET key to switch to programming mode.



4. The Heating/Mixing key flashes and the display shows the Heating/Mixing menu in programming mode.



5. Use the Increase/Decrease keys to set the desired target temperature.



6. Press the SET key to confirm the new target temperature.

7.3.3 Target temperature for pasteurization

Display info/keys **How to proceed**

1. Follow steps 1-5 as outlined in Chapter 7.3.1 „Accessing the Heating/Mixing settings“ on page 65.



2. The display shows the current settings.



3. Press the SET key to switch to programming mode.



4. The Heating/Mixing key flashes and the display shows the pasteurization temperature in programming mode.



5. Use the Increase/Decrease keys to set the desired temperature for the holding phase of the pasteurization process.



6. Press the SET key to confirm the new pasteurization temperature.

INFO

Changing the pasteurization temperature is not recommended. If you do make changes, the holding time must be adjusted for effective pasteurization.

7.3.4 Holding time during pasteurization

Display info/keys	How to proceed
	1. Follow steps 1-5 as outlined in Chapter 7.3.1 „Accessing the Heating/Mixing settings“ on page 65.
SET 2: Pasteuriz. Hold 30 min	2. The display shows the current settings.
	3. Press the SET key to switch to programming mode.
SET 2: Pasteuriz. Hold >30< min	4. The Heating/Mixing key flashes and the display shows the holding time in programming mode.
	5. Use the Increase/Decrease keys to set the desired holding time for the pasteurization process.
	6. Press the SET key to save the new holding time.

7.3.5 Target temperature after pasteurization

Display info/keys	How to proceed
	1. Follow steps 1-5 as outlined in Chapter 7.3.1 „Accessing the Heating/Mixing settings“ on page 65.
SET 2: Pasteuriz. Cooling 38.0 C	2. The display shows the current settings.
	3. Press the SET key to switch to programming mode.
SET 2: Pasteuriz. Cooling >38.0< C	4. The Heating/Mixing key flashes and the display shows the temperature in programming mode.
	5. Use the Increase/Decrease keys to set the desired target temperature for the cooling phase of the pasteurization process.
	6. Press the SET key to save the new target temperature for the cooling phase (feeding temperature).

7.3.6 Target temperature cooling (storage)

Display info/keys	How to proceed
	1. Follow steps 1-5 as outlined in Chapter 7.3.1 „Accessing the Heating/Mixing settings“ on page 65.
SET 3: Cooling 15.0 C	2. The display shows the current settings.
	3. Press the SET key to switch to programming mode.
SET 3: Cooling >15.0< C	4. The Heating/Mixing key flashes and the display shows the temperature in programming mode.
	5. Use the Increase/Decrease keys to set the desired target temperature for cooling.
	6. Press the SET key to confirm the new temperature.

7.3.7 Operating time of the agitator

Display info/keys	How to proceed
	1. Follow steps 1-5 as outlined in Chapter 7.3.1 „Accessing the Heating/Mixing settings“ on page 65.
SET Mixing 00:10	2. The display shows the current settings.
	3. Press the SET key to switch to programming mode.
SET Mixing >00:10<	4. The Heating/Mixing key flashes and the display shows the Mixing menu in programming mode.
	5. Use the Increase/Decrease keys to set the desired operating time of the agitator.
	6. Press the SET key to save the new operating time.

7.3.8 Break time of the agitator

Display info/keys	How to proceed
	1. Follow steps 1-5 as outlined in Chapter 7.3.1 „Accessing the Heating/Mixing settings“ on page 65.
SET Break 00:15	2. The display shows the current settings.
	3. Press the SET key to switch to programming mode.
SET Break >00:15<	4. The Heating/Mixing key flashes and the display shows the break time menu in programming mode.
	5. Use the Increase/Decrease keys to set the desired break time of the agitator.
	6. Press the SET key to save the new break time.

7.3.9 Operating time for mixing

Display info/keys	How to proceed
	1. Follow steps 1-5 as outlined in Chapter 7.3.1 „Accessing the Heating/Mixing settings“ on page 65.
SET Preparing 05:00	2. The display shows the current settings.
	3. Press the SET key to switch to programming mode.
SET Preparing >05:00<	4. The Heating/Mixing key flashes and the display shows the Mixing menu in programming mode.
	5. Use the Increase/Decrease keys to set the desired mixing time.
	6. Press the SET key to save the new mixing time.

7.3.10 Setting start times (cooling, pasteurizing, heating)

INFO

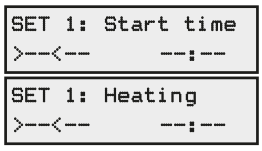
For the Heating, Pasteurizing and Cooling (storage) functions, 2 start times can be set, one for the morning and one for the evening feeding. At the pre-determined time, the MilkShuttle automatically starts the function with the closest start time. The MilkShuttle can only call up the start times when it is on and the Heating/Mixing menu is active. Ensure that the following conditions are met for the use of start times:

- The MilkShuttle is connected to the power supply
- The MilkShuttle is on
- The Heating/Mixing menu has been called up (Heating/Mixing key is lit)

Start time 1 (heating) must always be assigned first. It is not possible to assign times start time 2 and/or 3 while not assigning a time to start time 1.

Display info/keys **How to proceed**

1. Follow steps 1-5 as outlined in Chapter 7.3.1 „Accessing the Heating/Mixing settings“ on page 65.



2. The display alternately shows “Start time” and the selected function (Heating, Pasteurizing, Cooling) for the menu items related to start times.



3. Press the SET key to switch to programming mode. Press the SET key again to skip a value.



4. The Heating/Mixing key flashes and the display shows the start time for the morning in angle brackets on the left.



5. Use the Increase/Decrease keys to set the desired start time (hour) for the morning on the left.



6. Press the SET key to confirm the hour.



7. Use the Increase/Decrease keys to set the minutes.



8. Press the SET key to confirm the minutes.

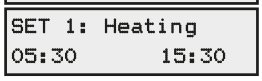
9. Repeat steps 5-8 to set the start time for the evening on the right.

7.3.11 Deleting start times

Display info/keys **How to proceed**

1. Follow steps 1-5 as outlined in Chapter 7.3.1 „Accessing the Heating/Mixing settings“ on page 65.





2. The display alternately shows “Start time” and the selected function (Heating, Pasteurizing, Cooling) for the menu items related to start times.



3. Press the SET key to switch to programming mode. Press the SET key again to skip a value.



4. The Heating/Mixing key flashes and the display shows the start time for the morning in angle brackets on the left.



5. Press the Decrease key until the value for the hour drops below zero.



6. The display now shows “--” instead of a numerical value.



7. Press the SET key to confirm the value and proceed to the minute value.



8. Press the Decrease key until the value for the minutes drops below zero.



9. Press the SET key to confirm the deletion and proceed to the start time for the evening.

10. Repeat steps 3-9 to delete the start time for the evening.

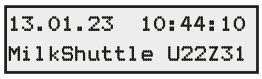
7.4 Programming feed amounts

Frequently used feed quantity settings can be assigned to the pre-selection keys 1, 2 and 3.

In the default state, the following quantities are pre-set:

- Key 1: 2.0 L (or kg)
- Key 2: 3.0 L (or kg)
- Key 3: 4.0 L (or kg)

7.4.1 Defining feed quantities

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
	2. The displays shows the start screen.
	3. Press the Feeding menu key.
	4. The Feeding key lights up and the display shows the feeding settings last used.
	5. Press the pre-selection key (1, 2, 3 or 4) whose values you wish to adjust.
	6. Press the SET key to switch to programming mode.
	7. The Feeding key flashes and the display shows the feed quantity in angle brackets.
	8. Use the Increase/Decrease keys to set the desired quantity on the left.
	9. Press the SET key to save the value.

INFO

You can save quantity changes made during feed removal by pressing and holding down the desired pre-selection key (1, 2, 3 or 4).

7.4.2 Feed dosing without pre-set amounts (Start/Stop)

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	2. The displays shows the start screen.
	3. Press the Feeding menu key.
Feeding 01,3	4. The Feeding key lights up and the display shows the feeding settings last used.
1 2 3 4	5. Press the pre-selection key (1, 2, 3 or 4) whose values you wish to adjust.
	6. Press the SET key to switch to programming mode.
SET Feeding 1: >02,4<	7. The Feeding key flashes and the display shows the feed quantity in angle brackets.
	8. Press the Decrease key until the dosing amount drops below 1 L to display the option of the Start/Stop function.
SET Feeding 1: >START/STOP<	9. The display shows the Start/Stop function.
	10. Press the SET key to save the value.

7.5 Programming cleaning durations

Frequently used cleaning duration settings can be assigned to the pre-selection keys 1, 2 and 3.

In the default state, the following durations are pre-set:

- Key 1: 2 minutes
- Key 2: 3 minutes
- Key 3: 5 minutes

Display info/keys	How to proceed
	1. Switch on the MilkShuttle as described in Chapter 5.2 “Switching on and off” on page 34.
13.01.23 10:44:10 MilkShuttle U22Z31	2. The displays shows the start screen.
	3. Press the Cleaning key.
Cleaning 32.0 C 1: 01:00	4. The Cleaning key lights up and the display shows the last selected cleaning settings.
	5. Press the pre-selection key (1, 2, 3 or 4) whose values you wish to adjust.
	6. Press the SET key to switch to programming mode.
SET Cleaning 1:>01:00< 32.0 C	7. The Cleaning key flashes and the display shows the cleaning duration in angle brackets.
	8. Use the Increase/Decrease keys to set the desired duration.
	9. Press the SET key to save the value.
	10. Use the Increase/Decrease keys to set the desired temperature.
	11. Press the SET key to save the value.

8 What if

8.1 General errors

Description	Possible cause	Solution approach
Agitator runs rough/ rattles	The bearing bushing of the agitator is worn out.	Replace the wear parts set (Art. No. 101404)
No text in the display	Device not switched on/in power-saving mode	Switch on the MilkShuttle as described in Chapter 5.2 „Switching on and off“ on page 34.
	Fuse defective (F1 15A 24 V, for devices with dosing pump)	Replace fuse (see Chapter 9.2 „Replacing fuses“ on page 84)
	Battery discharged/ defective	Charge/replace battery (see Chapter 9.3 „Replacing batterie“ on page 86)
	Display defective	Call customer service
Date and time are displayed incorrectly	Circuit board battery discharged/defective	Charge/replace battery (see Chapter 9.3.2)
Agitator does not work	Switch in centre position	Set switch to position I or II
	Defective fuse in sub-assembly AC 230L31 (6.3 A)	Replace fuse (see Chapter 9.2)
	Motor defective	Call customer service
	Sub-assembly AC 230L31 defective	
Battery is not fully charged	Charging time too short	Leave device connected to the power supply for a longer period
	Battery defective	Call customer service
	Charger defective	

Description	Possible cause	Solution approach
Propelling drive not functioning	Power plug is connected	Disconnect the power plug
	Control blocked due to overload	Switch off the MilkShuttle as described in Chapter 5.2 „Switching on and off“ on page 34, wait 10 seconds to turn on again.
	Propelling drive fuse blown	Replace fuse (see Chapter 9.2 „Replacing fuses“ on page 84)
	Controller defective	Call customer service
Propelling drive operates with reduced power	Overload	Allow the MilkShuttle to cool down for 15 min.
Dosed out feed quantity incorrect	Faulty calibration	Recalibrate the dosing pump (Chapter 7.2.1 “Calibrating pump (time-controlled)” on page 57)
	Dosing nozzle contaminated	Clean the dosing nozzle (see Chapter 3.4.7 “Dosing nozzle” on page 24)

8.2 Display messages

In order to be able to detect and eliminate faults occurring on the MilkShuttle more quickly, the device is equipped with electronic monitoring units.

There are three types of fault messages:

1. The ESC/INFO key flashes: The key flashes in the event of faults that affect the system. These faults affect the functions of the MilkShuttle, but the device can still generally perform the function. Press the key to display the message. Example: A 230 V fuse is defective. The MilkShuttle can still heat if it is equipped with dual heating.

2. The ESC/INFO key flashes and a message appears in the display: The key flashes and a message appears in the display if the function is not performed further, and the user has to resolve the message. Example: During “Heating/Mixing”, it is detected that there is no liquid in the feed container. Fill the MilkShuttle with water or milk. Press the ESC/INFO key to close the message.

3. The message appears in the display and is shown alternately with the function text: This message appears when the function

- is not or cannot currently be performed or
- will soon no longer be performable

The issue will either resolve itself after diagnostic measurements or be eliminated by you.
Example: During “Feeding”, it is detected that the battery is low. The device is still functioning, but you should connect it to the power supply for charging as soon as possible.
A message consists of two digits and text. Using the two digits, known as the message code, you can narrow down the fault. The text provides important supplementary information.
The following tables provide explanations for each fault. These faults are displayed in this format starting from version 5.00. Minor deviations may exist in older versions.

- Column 1: The message code is given in the top row, the type of fault message is given below (1, 2 or 3)
- Column 2: Presentation in the display
- Column 3: Message description
- Column 4: Troubleshooting options

No.	Display message	Message description	Message resolution
11 1	11 Fault AC1 mains voltage	There is no mains voltage present in a heating control unit fitted in the MilkShuttle (heating control board, sub-assembly AC230L31 or AC2). AC1 ⇨ left heating control board with address 1 is affected (Type AC230L31) AC2 ⇨ right heating control board with address 2 is affected (Type AC230L31)	Check the supply line for damage. Check the fuse in the electrical installation. Check the micro fuse on the heating control board (sub-assembly AC1 or AC2) and replace if necessary (see Chapter 9.2 „Replacing fuses“ on page 84).
12 1	12 Fault AC2 mains voltage		
15 1	15 Fault AC1 TS	The temperature fuse of a heating element is defective. TS ⇨Temperature fuse AC1 ⇨ Temperature fuse of heating element 1 is affected, controlled by heating control with address 1 (sub-assembly AC230L31) AC2 ⇨ Temperature fuse of heating element 2 is affected AC4 ⇨ the temperature fuses of both heating elements are affected	Contact customer service.
16 1	16 Fault AC2 TS		
18 1	18 Fault AC4 TS		

No.	Display message	Message description	Message resolution
21-27	21 Fault Temperature 22.9 199.0 52.3 (example)	Depending on the error code, one or more temperature sensors are either not connected or have an open cable break. The second line of the message displays code 199, indicating which temperature sensor is defective.	Contact customer service.
31-37	31 Fault Temperature 22.9 198.0 52.3 (example)	Temperature sensor has a cable break with short circuit. The second line of the message displays code 198, indicating which temperature sensor is defective.	
41 1	41 Fault Battery 20,9V	Battery 1 and/or 2 have insufficient voltage.	Connect the MilkShuttle to the power supply for at least 8 hours. Contact customer service if the issue persists

NOTICE

Insufficient charge levels may damage the batteries.

- Avoid over-discharging the batteries.
- Charge the batteries immediately when the charge level drops to two bars.
- Note that the batteries discharge faster at temperatures below 0 °C (32 °F).

INFO

The electric propelling drive is only active when the MilkShuttle is on. When the MilkShuttle is off, the brake is engaged. If the batteries are fully discharged, release the brake as described in Chapter 3.4.2 “Propelling drive brake lever” on page 19.

No.	Display message	Message description	Message resolution
502	50 Error Fill level???	Fault messages with codes 50 to 52 indicate insufficient heat dissipation from the container bottom of the MilkShuttle. This fact has caused the central control to deactivate the heating of the MilkShuttle to prevent the heating element from overheating.	When this error occurs, check the fill level of the MilkShuttle container: If the fill level in the MilkShuttle container is below the minimum quantity, fill milk or water into the container until the minimum level is reached. If the fill level in the MilkShuttle container is above the minimum quantity: Turn on the agitator to ensure that the content of the container is mixed well and thus achieve even heat distribution inside the container. Check the agitator for proper functioning. Contact customer service if the issue persists.
512	51 Error Fill level???		
522	52 Error Fill level???		
602	60 Error Mains voltage	Function cannot be performed as there is no mains voltage.	Connect the MilkShuttle to the power supply. Check fuses and residual current circuit breaker in the electrical installation. Ensure that neither too high nor too low a voltage is present.
703	70 Battery weak!	The battery voltage is below 24.4 V	Connect the MilkShuttle to the power supply for charging as soon as possible.
72	72 Sensor?	Faulty measurement of the flow sensor.	The feeder container is empty; fill it with feed or water up to the minimum level. Flow sensor is contaminated; clean the sensor.

No.	Display message	Message description	Message resolution
73 3	73 Pump???	The pump is drawing too much current and the control output for the pump is being shut off. Error message 81 also appears, see message 81 on "„81 Error Pump???" on page 82.	Press the "ESC/INFO" key to view error 81. Press the "ESC/INFO" key again to reset the message.
74 3	74 Temperature min	The temperature of the medium in the MilkShuttle (milk, water) has dropped below the user-defined minimum value. In this case, the dosing pump will not start to prevent the dosing out of milk that is too cold.	Decrease or delete the limit you have programmed for the minimum temperature of the medium. Heat the medium (feed, water) above the user-defined minimum temperature. Add warm water or warm milk until the temperature of the mixture is above the user-defined minimum temperature.
75 3	75 Temperature max	The temperature of the medium in the MilkShuttle (milk, water) has risen above the user-defined minimum value. In this case, the dosing pump will not start to prevent the dosing out of milk that is too hot.	Increase or delete the limit you have programmed for the maximum temperature of the medium. Allow the medium in the MilkShuttle to cool down below the user-defined maximum temperature. Add cold water or cold milk until the temperature of the mixture is below the user-defined maximum temperature.

No.	Display message	Message description	Message resolution
81 1	81 Error Pump???	The pump is drawing too much current and the control output for the pump is being shut off. There could be two reasons for the high power consumption: Sluggish pump due to contamination or cable damage or breakage in the cable to the pump	Press the “ESC/INFO” key to view error 81. Press the “ESC/INFO” key again to reset the message. Clean pump. Repair cable damage or breakage.
92 1	92 Error Temperature	The medium in the MilkShuttle (milk, water) is hotter than 70 °C / 158 °F). The dosing pump does not start to avoid material damage and to prevent scalding.	Add cold water or cold milk until the temperature of the mixture is below 70 °C / 158 °F.
93 1	93 Error Battery weak!	The voltage of the batteries is too low. Drive and dosing are locked.	Immediately connect the MilkShuttle to the power supply for charging. If necessary, release the brake lever of the propelling drive (see Chapter 3.4.2 “Propelling drive brake lever” on page 19) to be able to push the device to a power outlet.

9 Maintenance and servicing

9.1 Maintenance plan

Frequency	Part number	Designation
Yearly	Type 100L: 100120 Type 150-250L: 101375 Type 350L: 104014	Hose maintenance kit
Yearly	Type 100-350L: 101373	Dosing nozzle maintenance kit, check valve • O-rings • Spring
As needed	Type 100-350L: 101404	Agitator maintenance kit • Bearing bushing • Slip clutch • Agitator shaft wear part • Two-ear clamp

9.2 Replacing fuses

ELECTRICAL HAZARD

Danger of injury due to electric shock.

Unplug the connecting cable before opening the control housing. A voltage of 12-24 V remains even when the connecting cable is unplugged.

NOTICE

Possible damage to the electronics!

Replace defective fuses only with spare parts identical in design and ensure that the rating is correct. Makeshift repairs and replacement fuses are not permitted.

1. Open the control box by releasing the snap closures on both sides of the housing lid (see Chapter 3.4.6 “Housing closures”, on page 24).
2. Loosen the hexagon socket screw of the touch guard (see Illustration 27 “Touch Guard”, on page 84).
3. Remove the touch guard.
4. Locate the defective fuse (see Illustration 28 “Overview fuses”, on page 85).

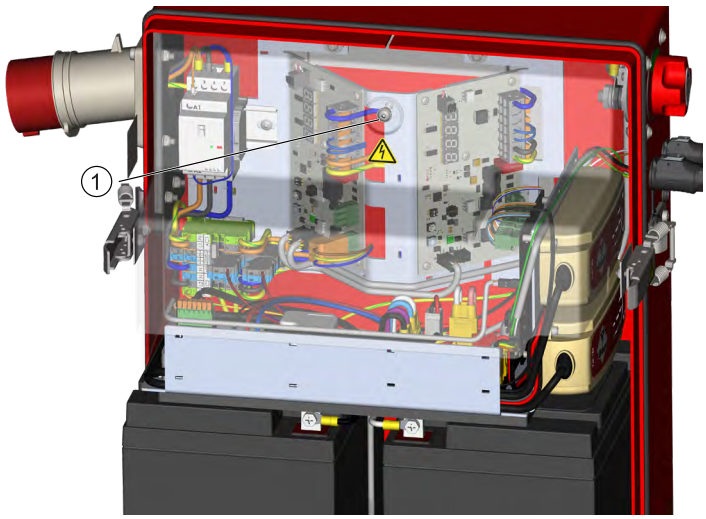


Illustration 27: Touch Guard

NOTE

The positioning or construction of the circuit boards themselves may vary, so the fuses may be located at a different position or in a different design.

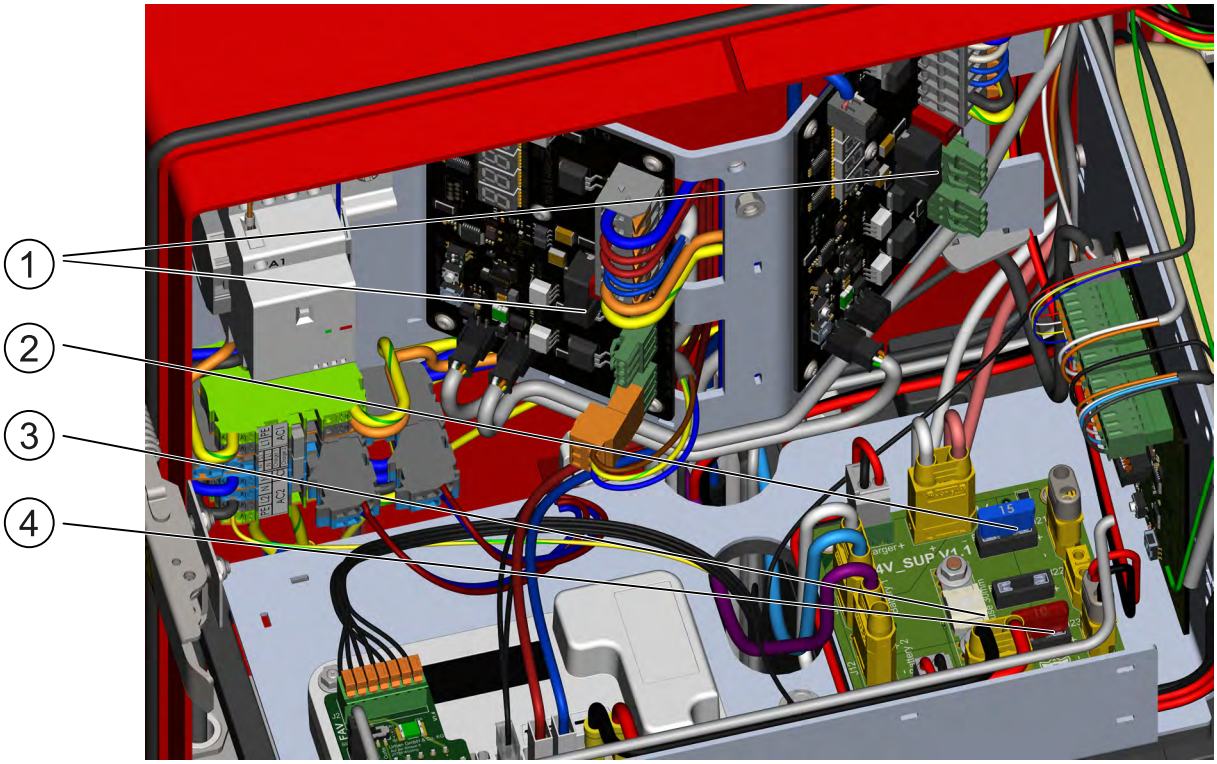
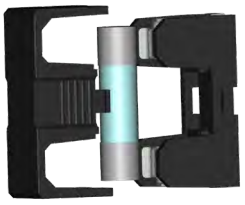
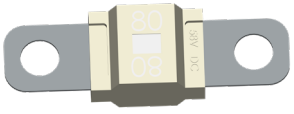


Illustration 28: Overview fuses

Nr.	Value	Fused circuit	Configuration
1	6,3A	Agitator, glass fuse 230 V	
2	10A	EcoProtector (optional) 24V	
3	15A	Main fuse, battery power 24V	
4	80A	Drive Fuse 24V	

9.3 Replacing batterie

CAUTION

Risk of injury.

- Do not use metallic tools to replace the battery.
- Use only batteries of the type 3 V lithium CR 2032.

9.3.1 Replace battery for date/time

If the display shows an incorrect date and time, the battery of the circuit board ② on the underside of the operating panel ① must be replaced (see Illustration 29 “Replace battery for date/time”, on page 87).

1. Make sure that the MilkShuttle is switched off and disconnected from the power supply.
2. Open the control box by releasing the snap closures on both sides of the housing lid (see Chapter 3.4.6 “Housing closures”, on page 24).
3. With a slight twist, press the battery against the bottom spring bracket and pull it upwards to remove it.

NOTICE

Possible battery damage through skin contact!

- Avoid touching the battery with bare skin.

4. Insert the new battery with the battery’s negative pole against the spring bracket of the battery holder.
5. While inserting it, hold the battery at a slight angle until it reaches the lower edge of the battery holder.
6. Press the battery into the final position.
7. Close the housing.
8. Switch on the device.
9. Programme to the correct date and time as described in Chapter 7.1.1 „Setting the time and date“ on page 55.

INFO

Due to the battery change, the feeding data entered for the last 24 hours may have been lost. When restarting the MilkShuttle, check the settings in the display. Older feeding data are retained.

Dispose of spent batteries according to the applicable local provisions.

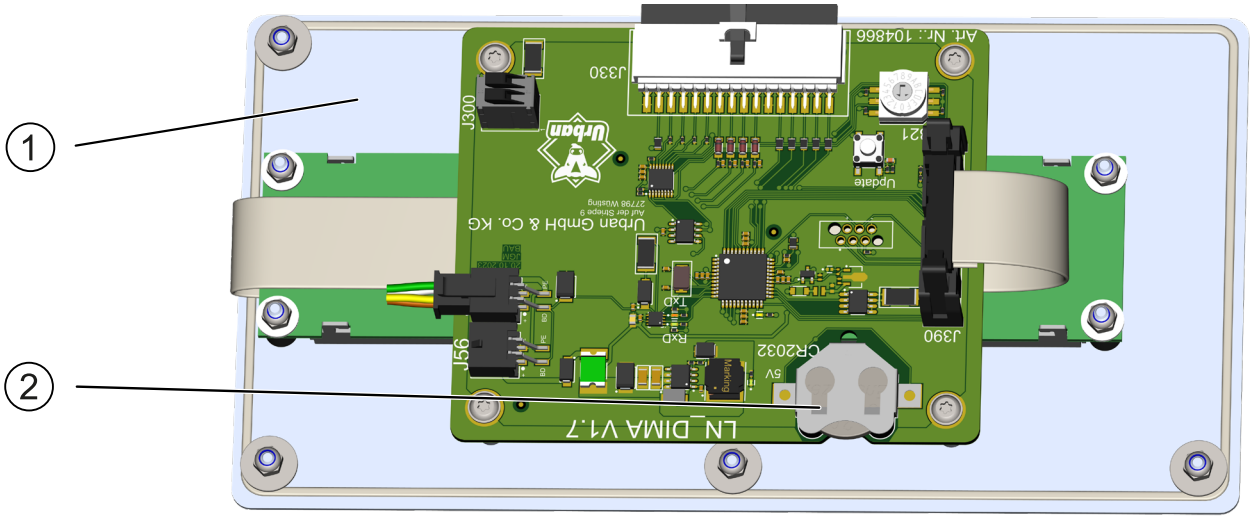


Illustration 29: Replace battery for date/time

9.4 Changing the wheels

CAUTION

Danger of injury due to high weight.

Make sure that the MilkShuttle is stable during the wheel change and secured against rolling.

Secure the drawbar against falling before removing the front wheel!

9.4.1 Changing the front wheel

Required tools: ring end/open end spanner SW 19 mm

1. Jack up the MilkShuttle.
2. Make sure that the MilkShuttle is stable and secured against rolling.
3. Unscrew the wheel nut.
4. Remove the axle bolt.
5. Remove the wheel.
6. Mount the spare wheel in reverse order.

9.4.2 Changing the rear wheel

Required tools: ring / open-end spanner 19 mm, wheel nut spanner M16 (included in the delivery)

1. Jack up the MilkShuttle.
2. Make sure that the MilkShuttle is stable and secured against rolling.
3. Remove the protective cap from the wheel nut.
4. Unscrew the M10 wheel nut.
5. Screw in the pull-off device M16 until the wheel comes off the axle.
6. Remove the wheel.
7. Fit the spare wheel with the tube sleeve onto the stub axle.
8. Tighten the M10 wheel nut.

10 Spare parts and accessories

10.1 Spare parts (selection)

Part number	Designation
104014	Agitator maintenance kit • Bearing bushing • Slip clutch • Agitator shaft wear part • Two-ear clamp
103349	solid tyre 400 rear drive
103351	solid tyre 400 rear axle (asymmetric)
103350	solid tyre 400 front axle (symmetric)
103352	Solid tyre, wide, rear axle drive
100853	tyre end caps rear drive
100120	hose maintenance kit 100L
101375	hose maintenance kit 150L-250L
104014	hose maintenance kit 350L
102256	Micro-fuse 6.3 A medium time-lag 5x20
102295	Blade-type fuse 10 A
104908	Blade-type fuse 15 A
105176	MidiOTO fuse, 80A, 58 V
101373	Dosing nozzle maintenance kit, check valve: seals/spring

10.2 Accessories



Vacuum lid for easy filling with fresh milk

The milk is drawn from milk cans or milk tanks into the Urban MilkShuttle.



Tank cleaning nozzle

The lid of the MilkShuttle will automatically be cleaned too, saving an additional manual operation.



EcoProtector UV-C

Reliable disinfection for a germ-free environment for your calves.



Removable accessory holder

Handy carrier for milk cans, feed bowls or teat buckets.

Caddy – everything at one go

Take teat buckets and accessories along. This trailer provides space for up to 24 teat buckets, milk cans and many other accessories such as water, feed or medication.

The teat buckets can be hung upside down on hooks to dry directly after cleaning.





● Bracket for the bucket carrier

Bucket carrier

Up to 16 teat buckets can be transported with the bucket carrier and hung up to dry.



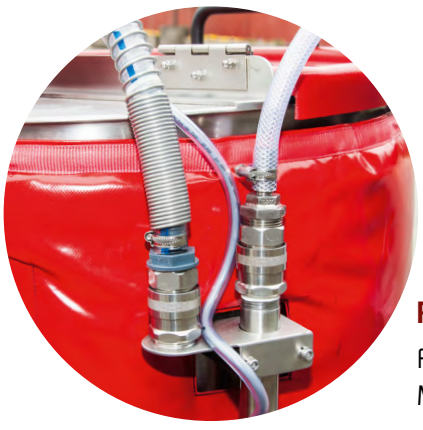
Trailer coupling

With the trailer coupling you can easily attach a trailer – for example the URBAN Caddy – to the MilkShuttle.



Toolbox - everything included!

In the practical toolbox, you always have the additional tools you need at hand.



Plug-in connector for a drencher

For attaching a cow drencher to the MilkShuttle.

11 Mixing table

Target quantity (in litres))	30	40	50	60	70	80	90	100	120	140	160	180	200	220	240	250	260	280	300	320	340	350
Solids content (in %)	Required milk powder amount (in kilogramm) / Required water amount (in litres)																					
10	3	4	5	6	7	8	9	10	12	14	16	18	20	22	24	25	26	28	30	32	34	35
	27	36	45	54	63	72	81	90	108	126	144	162	180	198	216	225	234	252	270	288	306	315
11	3,3	4,4	5,5	6,6	7,7	8,8	9,9	11	13,2	15,4	17,6	19,8	22	24,2	26,4	27,5	28,6	30,8	33	35,2	37,4	38,5
	26,7	35,6	44,5	53,4	62,3	71,2	80,1	89	107	125	142	160	178	196	214	223	231	249	267	285	303	312
12	3,6	4,8	6	7,2	8,4	9,6	10,8	12	14,4	16,8	19,2	21,6	24	26,4	28,8	30	31,2	33,6	36	38,4	40,8	42
	26,4	35,2	44	52,8	61,6	70,4	79,2	88	106	123	141	158	176	194	211	220	229	246	264	282	299	308
13	3,9	5,2	6,5	7,8	9,1	10,4	11,7	13	15,6	18,2	20,8	23,4	26	28,6	31,2	32,5	33,8	36,4	39	41,6	44,2	45,5
	26,1	34,8	43,5	52,2	60,9	69,6	78,3	87	105	122	139	157	174	191	209	217	226	244	261	278	296	305
14	4,2	5,6	7	8,4	9,8	11,2	12,6	14	16,8	19,6	22,4	25,2	28	30,8	33,6	35	36,4	39,2	42	44,8	47,6	49
	25,8	34,4	43	51,6	60,2	68,8	77,4	86	103	120	138	155	172	189	206	215	224	241	258	275	292	301
15	4,5	6	7,5	9	10,5	12	13,5	15	18	21	24	27	30	33	36	37,5	39	42	45	48	51	52,5
	25,5	34	42,5	51	59,5	68	76,5	85	102	119	136	153	170	187	204	213	221	238	255	272	289	298
16	4,8	6,3	8	9,6	11,2	12,8	14,4	16	19,2	22,4	25,6	28,8	32	35,2	38,4	40	41,6	44,8	48	51,2	54,4	56
	25,2	33,6	42	50,4	58,8	67,2	75,6	84	101	118	134	151	168	185	202	210	218	235	252	269	286	294
17	5,1	6,8	8,5	10,2	11,9	13,6	15,3	17	20,4	23,8	27,2	30,6	34	37,4	40,8	42,5	44,2	47,6	51	54,4	57,8	59,5
	24,9	33,2	41,5	49,8	58,1	66,4	74,7	83	100	116	133	149	166	183	199	208	216	232	249	266	282	291
18	5,4	7,2	9	10,8	12,6	14,4	16,2	18	21,6	25,2	28,8	32,4	36	39,6	43,2	45	46,8	50,4	54	57,6	61,2	63
	24,6	32,8	41	49,2	57,4	65,6	73,8	82	98	115	131	148	164	180	197	205	213	230	246	262	279	287
19	5,7	7,6	9,5	11,4	13,3	15,2	17,1	19	22,8	26,6	30,4	34,2	38	41,8	45,6	47,5	49,4	53,2	57	60,8	64,6	66,5
	24,3	32,4	40,5	48,6	56,7	64,8	72,9	81	97	113	130	146	162	178	194	203	211	227	243	259	275	284
20	6	8	10	12	14	16	18	20	24	28	32	36	40	44	48	50	52	56	60	64	68	70
	24	32	40	48	56	64	72	80	96	112	128	144	160	176	192	200	208	224	240	256	272	280

Requiered Range

Note: Due to the solubility of the milk powder, you might have to add some water after the mixing process in order to reach the target volume.

Bild 30: Mixing Table, Type 150-350

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