



**Please read this carefully before
commissioning
and keep it readily accessible!**

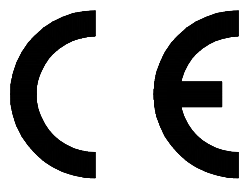


Table of contents

1	Technical data / Technical description	3
2	Safety instructions	3
2.1	General information.....	3
2.2	Hazards associated with using the machine.....	4
2.3	Intended use	4
2.4	Genuine parts and safety	4
3	Operation	5
3.1	Commissioning	5
3.2	Shutdown.....	5
4	Controls.....	6
4.1	Operating the display interface.....	6
4.1.1	Selecting elements	6
4.1.2	Entering values	6
4.2	Control system displays	7
4.2.1	Operating screen.....	7
4.2.2	Menu	8
4.2.3	Warnings and alarms	9
4.2.4	Inputs	10
4.2.5	Outputs	11
4.2.6	Configuration.....	12
4.2.7	Settings	14
4.2.8	Data logging	15
4.2.9	Information	16
4.3	Controls	19
4.3.1	Control panel elements.....	19
4.4	Messages and warnings	20
5	Maintenance and servicing.....	22
5.1	Agitator	22
6	Troubleshooting.....	22
7	Spare parts lists.....	22
8	Appendix	22
8.1	Quick Start Guide → see control cabinet.....	22

Subject to technical changes!

1 Technical data / Technical description

Motor	Single-phase electric geared motor, 0.75 kW/230 V
Agitator	Speed: 27 rpm
Heating output	10.5 kW
Connected load	230 / 400 VAC, max. 15.5 A
Material heating	Direct
Usable capacity	approx. 230 litres
<u>Dimensions/Weights:</u>	
Length	1.500 mm
Width	1.150 mm
Height	1.640 mm
Unladen weight	385 kg
Scope of delivery	E MR229 Motor-Agitator-Boiler, Spare fuses 3 x padlocks Operating instructions for the E MR229

2 Safety instructions



Everyone working with the machine must read the user manual before starting work. Anyone maintaining or servicing the machine must also have read and understood the user manual. The E MR229 must only be operated by persons aged 18 or over who are familiar with the operation of the machine and the heating system and who have been briefed on the applicable safety regulations. This does not affect the statutory regulations, accident prevention regulations and guidelines issued by the Construction Industry Accident Insurance Association and the DVGW.

2.1 General information

The E MR229 is intended for outdoor use only. When installed in enclosed spaces or below ground level, additional equipment is required and the specific safety regulations must be observed.

No flammable materials may be stored near the boiler while it is in operation. The E MR229 must be set up securely and checked to ensure that it is in safe working condition before each use. The unit must not be installed near shafts, pits, etc., nor on a flammable surface.

The E MR229 must only be filled up to the fill level mark (90% of the boiler volume). **Take care when refilling as there is a risk of burns from splashes of material.** The boiler should be topped up as and when molten material is removed. The boiler must only be completely drained when the heating system is switched off.

The VDE regulations 0100, Section 55, must be observed. The connection must be made via a dedicated supply point (usually the site distribution board) fitted with an RCD. H07RN-F **rubber-sheathed cables** approved for use on construction sites, or equivalent cable types, must be used for **flexible** connections. Cables with a conductor cross-section of at least 2.5 mm² must be used. CEE 16 A plug.

Operation using an emergency power supply (generator) is not permitted!

2.2 Hazards associated with using the machine



The E MR229 has been designed and built in accordance with the state of the art and recognised technical standards. Nevertheless, its use may pose a risk to life and limb or to property.

The machine must only be used

- for its intended purpose
- when in safe working condition
- Use only genuine parts

Any faults that could compromise safety must be rectified immediately.

Bituminous adhesives, insulating compounds and fillers are prone to spontaneous combustion if overheated. During operation, the E MR229 must be under the supervision of operating personnel.



Suitable extinguishing agents (extinguishing sand, foam or dry powder extinguishers) must be kept readily available for extinguishing burning molten material (water must not be used).



Care must be taken to ensure that no one is put at risk by escaping exhaust fumes.



Wear gloves during operation – risk of burns!



The use of an open flame to increase the heating output is prohibited.

Secure the boiler to prevent it from slipping or rolling away using suitable measures (e.g. wedges or screw fastenings).



2.3 Intended use



The E MR229 is intended exclusively for processing materials to be melted, such as bituminous adhesive, insulating and filling compounds, as well as thermoplastic compounds for road markings. Any other use of the machine, or any use beyond its intended purpose, is considered to be improper.

GRÜN accepts no liability for any resulting damage. Intended use also includes

- following all instructions in the user manual and
- compliance with the inspection and maintenance regulations.

2.4 Genuine parts and safety



Unauthorised persons are not permitted to make alterations to the design or equipment. Defective parts must only be replaced with genuine spare parts. Failure to comply may compromise the safety of the machine. GRÜN accepts no liability whatsoever for damage caused by the use of non-genuine parts.

3 Operation

- Connect the power supply, following the instructions in section 2.1.
- Fill the boiler with small pieces of bitumen, but no higher than the agitator blades.
- Ensure that the outlet slide is fully closed.

3.1 Commissioning

Switch on the machine using the 'CONTROLS' rotary switch. The display then lights up.

Set the desired temperature and heating level (1–10) on the display.

Switch on the heating using the 'HEATING ON / OFF' button. When the heating is switched on, the button lights up green.

As soon as molten material has accumulated on the bottom of the boiler, switch on the agitator at the control box using the green illuminated push-button. As soon as the button lights up, the agitator is switched on. Pressing the button again switches the agitator off.

If the agitator becomes blocked, the motor protection switch (-2F11) trips. In this case, open the control cabinet and press the 'START' button on the motor protection switch (-2F11). If the agitator cannot be restarted because the motor protection switch (-2F11) repeatedly trips, check the inside of the boiler for foreign objects (e.g. metal objects) or allow the material to melt further.

Once the agitator is running smoothly, pieces of material to be melted can be added until the boiler is about half full. Once sufficient material has melted again, add more material. Where possible, keep the agitator running to prevent the material from burning onto the base plate.

Once the preset temperature is reached, the heating is automatically reduced or switched off. If the temperature falls below the set temperature, the heating is activated automatically.

3.2 Shutdown

Switch off the agitator and heating using the respective buttons.

Switch off the control system using the switch.

Disconnect the mains plug.

4 Controls

4.1 Operating the display interface

4.1.1 Selecting elements

*Fig. 1**Fig. 2*

Any element with a grey background (Fig. 1) is an input field. These can be selected using the navigation pad. The currently selected element is highlighted in colour (Fig. 2).

Press the centre button on the navigation pad to activate the selected element and enable data entry. The element then starts flashing.

To select another element, press the centre button again.

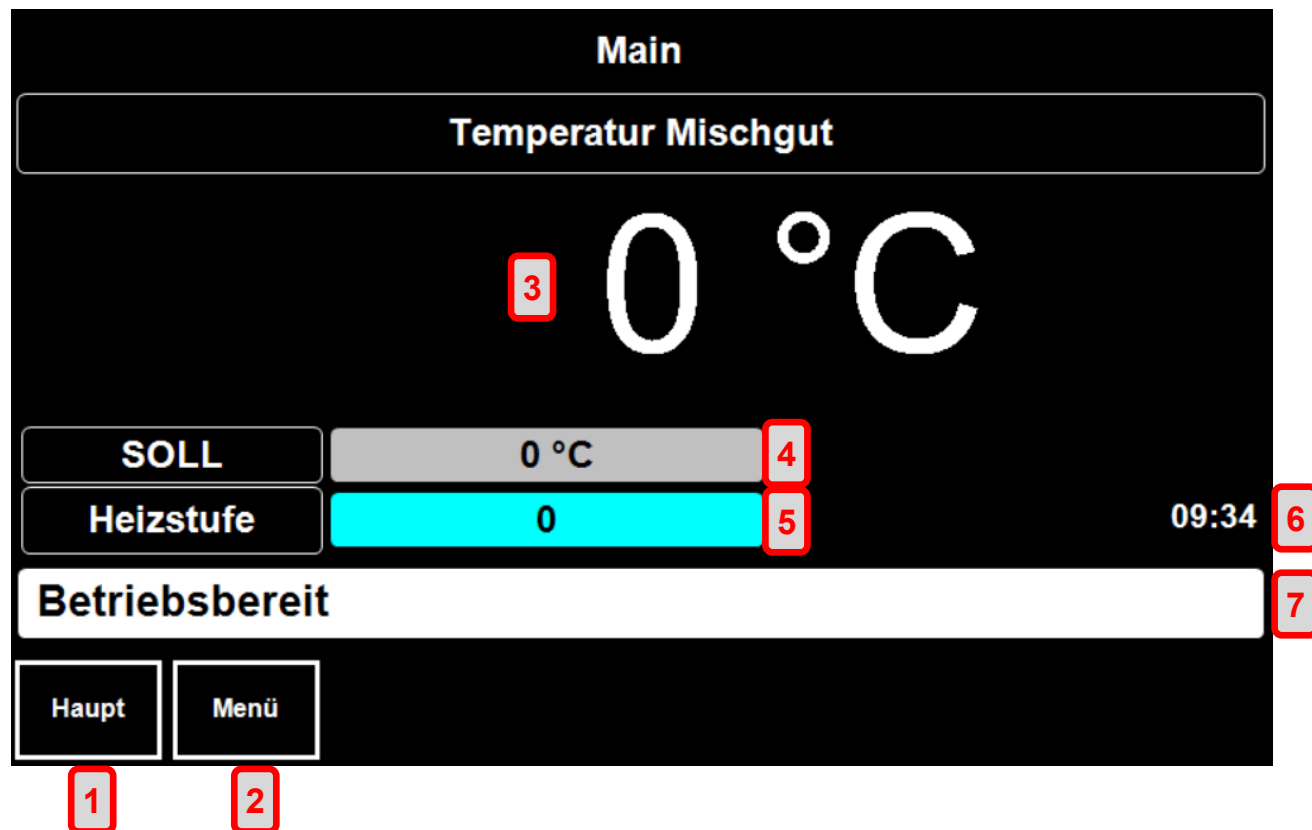
4.1.2 Entering values

*Fig. 3*

To change the value of an element, first select it (see 4.1.1). When the centre button is pressed, the input field flashes and a value entry field appears above the navigation pad (Fig. 3). Use the left/right buttons to move the cursor and the up/down buttons to change the value.

4.2 Control system displays

4.2.1 Operating screen



Temperatur Mischgut	Mixture temperature
Betriebsbereit	Ready for operation

After the control system is switched on, the machine starts with the [MAIN] screen.

Elements of the [MAIN] screen:

1: MAIN – Button to open the [MAIN] screen.

2: MENU – Button to open the [MENU] screen.

3: ACTUAL TEMPERATURE – Displays the current mixture temperature [°C].

4: SETPOINT TEMPERATURE – Enter the desired mixture setpoint temperature [°C].

5: HEATING LEVEL – Enter a heating level. This indicates how long the heating circuits remain switched on during each 30-second period.

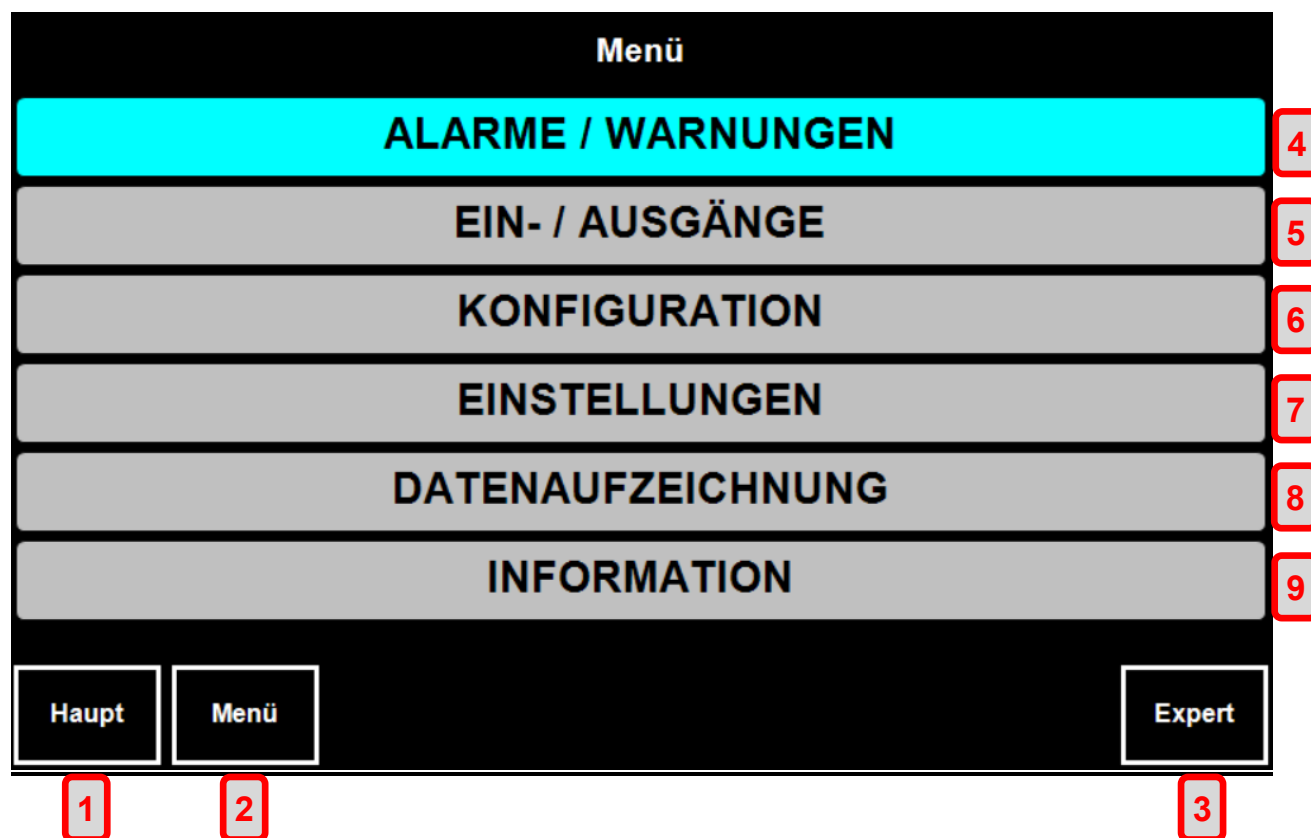
EXAMPLE: Heating level 7 → 70% duty cycle over 30 seconds → 21 sec. on; 9 sec. off.

NOTE: This function is only active until the setpoint temperature is reached.

6: TIME – Displays the current time. The time can be set via the display's internal setup menu.

7: STATUS BAR – Displays the current status of the system. Error messages are displayed in turn.

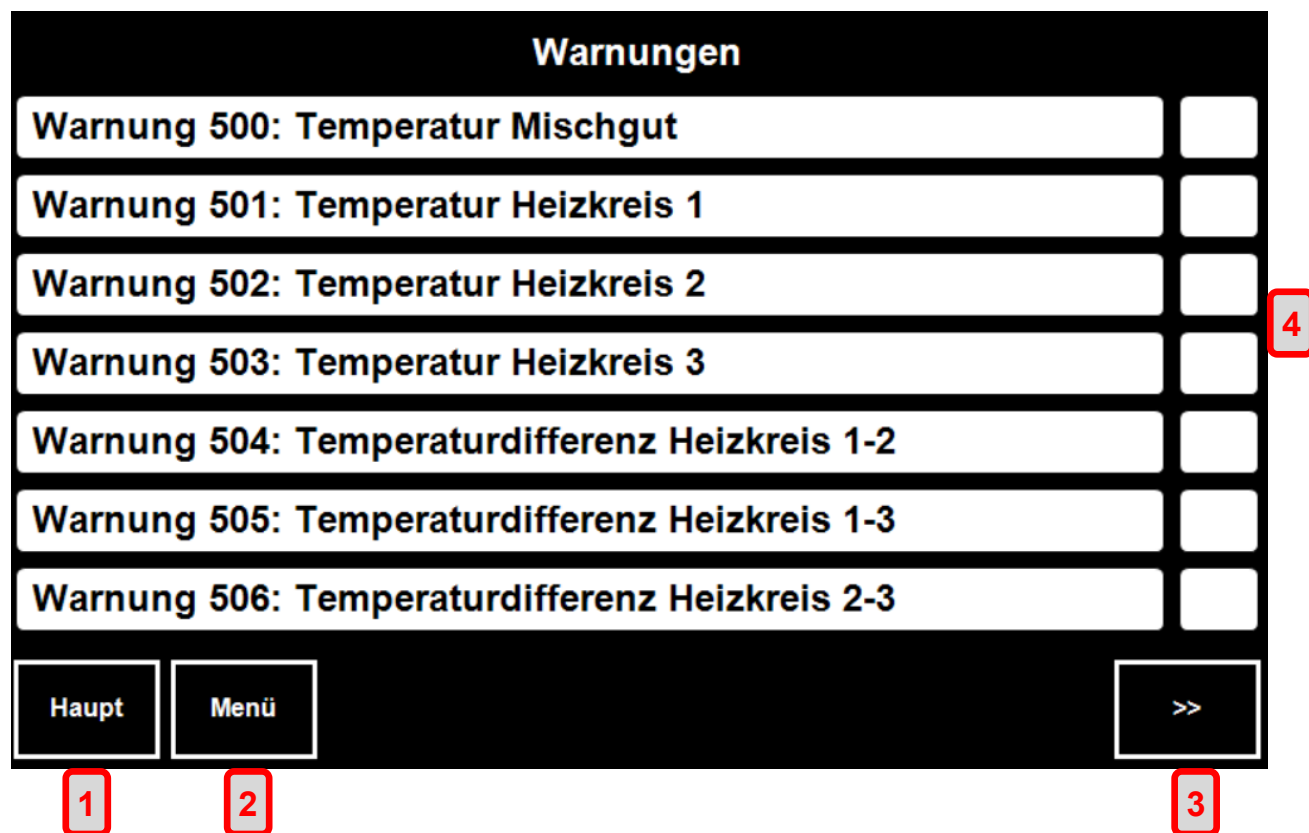
4.2.2 Menu



Elements of the [MENU] screen:

- 1: MAIN – Button to open the [MAIN] screen.
- 2: MENU – Button to open the [MENU] screen.
- 3: EXPERT – Button to open the [EXPERT] screen. The expert menu is password-protected and may only be used in consultation with GRÜN GmbH.
- 4: ALARMS / WARNINGS – An overview of all current warnings and alarms is displayed here.
- 5: INPUTS/OUTPUTS – All inputs and outputs can be checked and controlled individually here.
- 6: CONFIGURATION – All system settings can be configured here.
- 7: SETTINGS – Visual and control-specific settings can be configured here.
- 8: DATA LOGGING – Data can be saved on the display and to a USB device here.
- 9: INFORMATION – All information relating to the machine is displayed here.

4.2.3 Warnings and alarms



Warnung	Warning
Temperatur Mischgut	Mixture temperature
Temperatur Heizkreis	Heating circuit temperature
Temperaturdifferenz Heizkreis	Heating circuit temperature difference

This layout also applies to the subsequent alarm message screens.

Elements of the [WARNINGS AND ALARMS] screen:

1: MAIN – Button to open the [MAIN] screen.

2: MENU – Button to open the [MENU] screen.

3: NEXT – Button to open the additional [WARNINGS AND ALARMS] screens.

4: ALARMS / WARNINGS – Displays the possible warnings and alarms. When a message is active, the corresponding alarm text is highlighted in colour.

NOTE: Warnings are highlighted in yellow and alarms in red.

4.2.4 Inputs

Eingänge	
Not-Aus Channel 1	SPS IN0100 SAFE
Not-Aus Channel 2	SPS IN0500 SAFE
Motorschuttschalter	SPS IN0101 SAFE
Taste Heizung	SPS IN0000
Taste Rührwerk	SPS IN0001
Temperatur Mischgut Rohwert	65535
Temperatur Heizkreis 1 Rohwert	65535
Haupt	Menü
OUT	>>

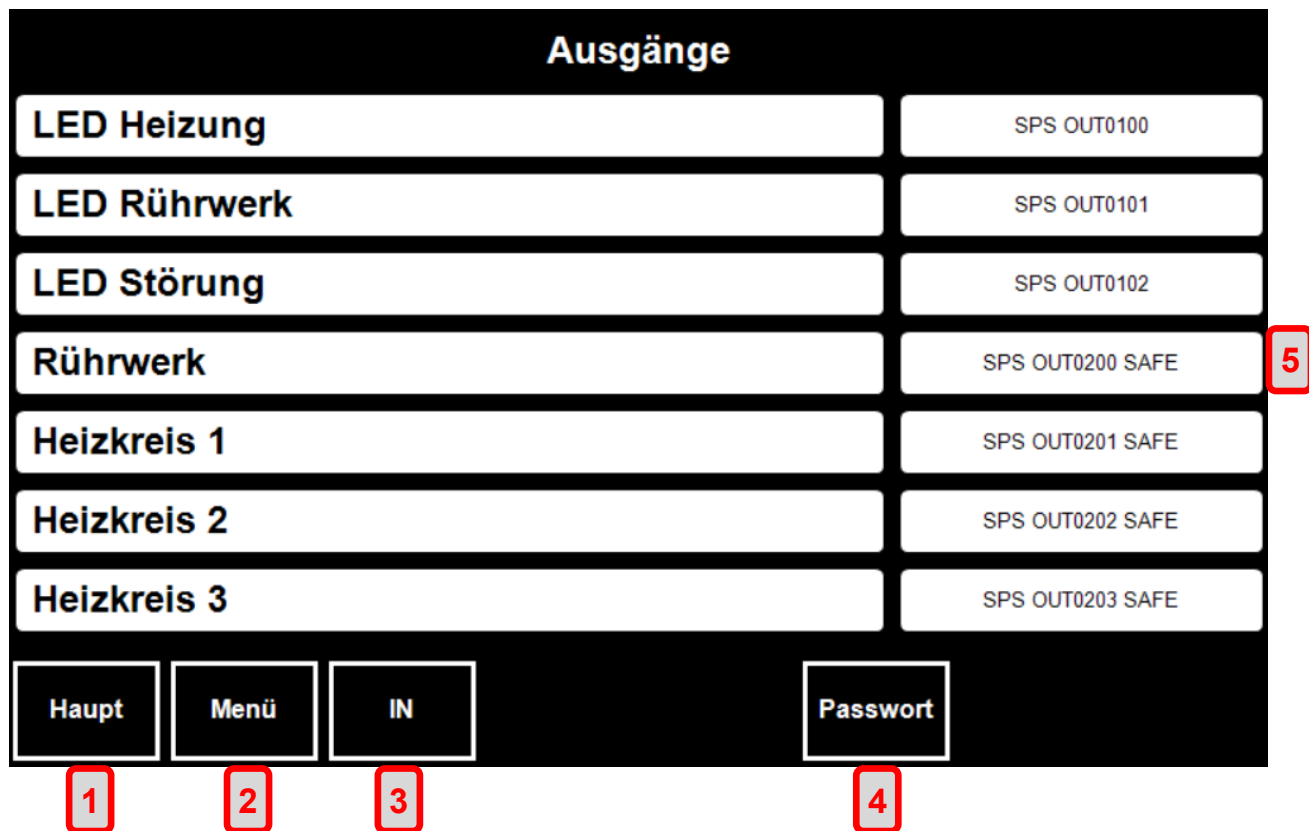
1 2 3 4 5 6

Not-Aus Channel	Emergency stop channel
Motorschuttschalter	Motor protection switch
Taste Heizung	Heating button
Taste Rührwerk	Agitator button
Temperatur Mischgut Rohwert	Mixture temperature (raw value)
Temperatur Heizkreis 1 Rohwert	Heating circuit 1 temperature (raw value)

This layout also applies to the following input screens.

Elements of the [INPUTS] screen:

- 1: MAIN – Button to open the [MAIN] screen.
- 2: MENU – Button to open the [MENU] screen.
- 3: OUT – Button to open the [OUTPUTS] screen.
- 4: NEXT – Button to open the additional [INPUTS] screens.
- 5: SWITCH INPUTS – Indicates the status of the respective input. Active inputs are highlighted in green.
- 6: SENSOR INPUTS – Indicates the status of the respective input. The raw values of the input signals are displayed here.

4.2.5 Outputs

LED Heizung	Heating LED
LED Rührwerk	Agitator LED
LED Störung	Fault LED
Rührwerk	Agitator
Heizkreis	Heating circuit
Passwort	Password
IN	IN

This display allows the individual outputs to be switched. This function is useful for troubleshooting or testing. Pressing the buttons switches the corresponding output. The outputs remain active only whilst the test menu is displayed. Once you have exited the test menu, all outputs will be automatically deactivated after 10 seconds. You must enter a password to select the outputs. This must only be carried out in consultation with GRÜN GmbH.

Elements of the [OUTPUTS] screen:

- 1: MAIN – Button to open the [MAIN] screen.
- 2: MENU – Button to open the [MENU] screen.
- 3: IN – Button to open the [INPUTS] screen.
- 4: PASSWORD – Button for entering the password. This must only be used in consultation with GRÜN GmbH.
- 5: OUTPUTS – The respective outputs can be enabled or disabled by pressing the button.

NOTE: This function is only enabled after the password has been entered.

4.2.6 Configuration

Konfiguration

Hysterese Temperatur Mischgut [°C]	5	4
Heizkreis 1 aktivieren / deaktivieren	Aktiv	
Heizkreis 2 aktivieren / deaktivieren	Aktiv	5
Heizkreis 3 aktivieren / deaktivieren	Aktiv	

Haupt

Menü

>>

1

2

3

Aktiv	Active
-------	--------

Elements of the [CONFIGURATION] screen:

1: MAIN – Button to open the [MAIN] screen.

2: MENU – Button to open the [MENU] screen.

3: NEXT – Button to open the additional [CONFIGURATION] screens.

4: HYSTERESIS – Enter a hysteresis value [°C] for the mixture temperature. Once the mixture has reached the setpoint temperature, it may cool by this hysteresis value before being reheated.

5: ACTIVATE / DEACTIVATE HEATING CIRCUIT – Individual heating circuits can be activated or deactivated here. This function may be useful in the event of a fault in a single heating circuit.

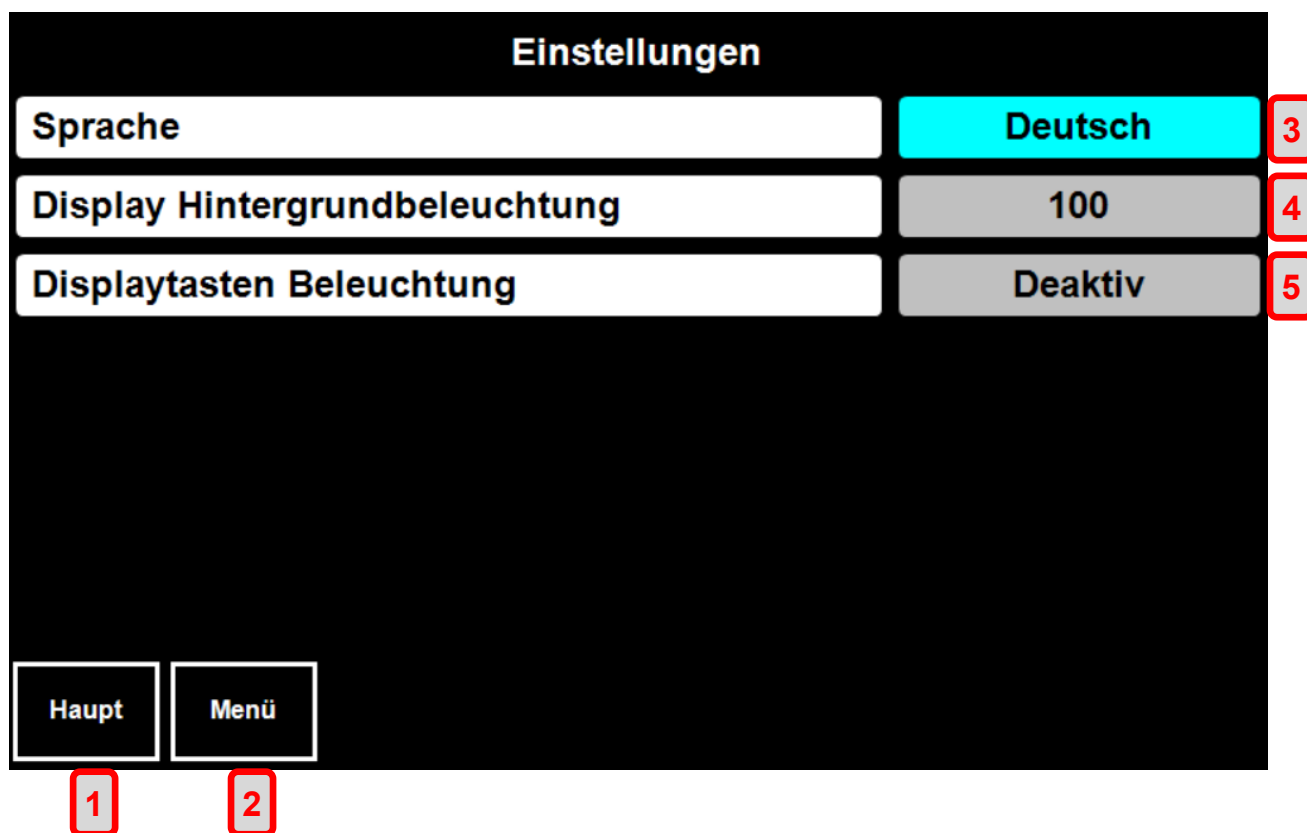
Konfiguration Alarmwerte			
Max. Mischgut [°C]	Wa.	0	4
	Al.	0	
Max. Heizkreis [°C]	Wa.	0	5
	Al.	0	
Max. Differenz Heizkreis [°C]	Wa.	0	6
	Al.	0	
Haupt		Menü	
		<<	

Here, the alarm thresholds can be set separately for warnings and alarms. A warning is only displayed and is reset automatically; an alarm must be acknowledged and causes the system to shut down.

Elements of the [CONFIGURATION – Alarm thresholds] screen:

- 1: MAIN – Button to open the [MAIN] screen.
- 2: MENU – Button to open the [MENU] screen.
- 3: BACK – Button to open the other [CONFIGURATION] screens.
- 4: MAX. MIXTURE TEMP. – Enter the alarm thresholds for the maximum mixture temperature [°C].
- 5: MAX. HEATING CIRCUIT TEMP. – Enter the alarm thresholds for the maximum heating circuit temperature [°C]. This setting applies equally to all heating circuits.
- 6: MAX. DIFFERENCE BETWEEN HEATING CIRCUITS – Enter the alarm thresholds for the maximum temperature difference [°C] between the individual heating circuits.

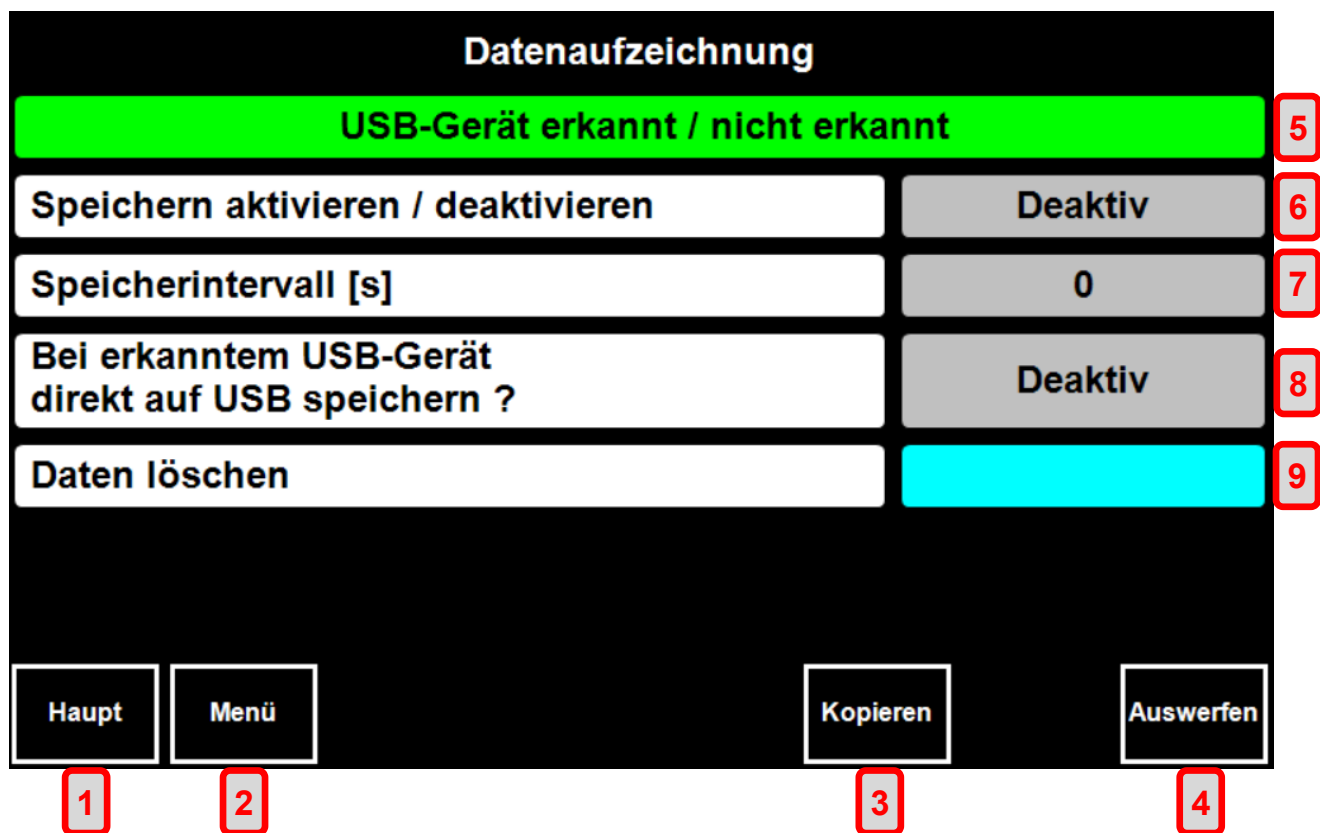
4.2.7 Settings



Display Hintergrundbeleuchtung	Display backlight
Deaktiv	Inactive
Deutsch	German

Elements of the [SETTINGS] screen:

- 1: MAIN – Button to open the [MAIN] screen.
- 2: MENU – Button to open the [MENU] screen.
- 3: LANGUAGE – Pressing this button cycles through the available languages.
- 4: BACKLIGHT – Adjusts the display backlight.
- 5: DISPLAY BUTTON LIGHTING – Pressing this button turns the display button lighting on or off.

4.2.8 Data logging

Speichern deaktivieren	Disable saving
USB-Gerät nicht erkannt	USB device not recognised

Elements of the [DATA LOGGING] screen:

1: MAIN – Button to open the [MAIN] screen.

2: MENU – Button to open the [MENU] screen.

3: COPY – Button for copying the data to the connected USB device.

NOTE: This button is hidden if no USB device is detected or automatic saving to USB is enabled.

4: EJECT – Button to eject the USB device.

NOTE: This button is hidden when no USB device is detected.

5: USB DEVICE DETECTED – Indicates that a USB device has been detected.

Green – USB device detected

Red – USB device not recognised

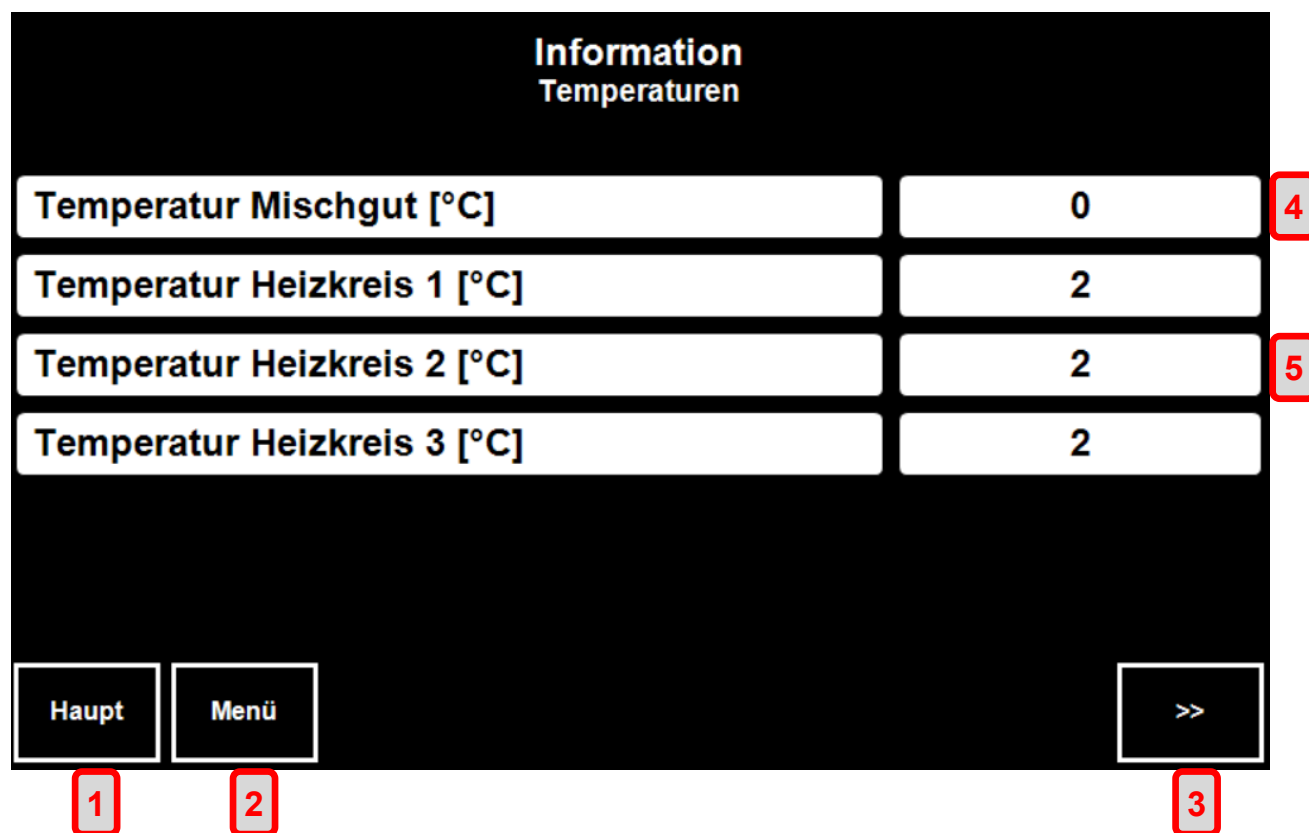
6: ENABLE SAVING – Pressing this button enables or disables saving.

7: SAVE INTERVAL – Enter the desired save interval [s].

8: SAVE DIRECTLY TO USB – Pressing this button automatically copies the data to the USB device when one is detected.

9: DELETE DATA – Pressing this button permanently deletes the data stored on the display.

4.2.9 Information



Elements of the [INFORMATION – Temperatures] screen:

- 1: MAIN – Button to open the [MAIN] screen.
- 2: MENU – Button to open the [MENU] screen.
- 3: NEXT – Button to open the additional [INFORMATION] screens.
- 4: MIXTURE TEMPERATURE – Displays the current mixture temperature [°C].
- 5: HEATING CIRCUIT TEMPERATURE – Display of current heating circuit temperatures [°C].

Information Betriebsstunden	
Betriebsstunden gesamt [Std.]	2.30
Betriebsstunden Rührwerk [Std.]	0.00
Betriebsstunden Heizkreis 1 [Std.]	0.00
Betriebsstunden Heizkreis 2 [Std.]	0.00
Betriebsstunden Heizkreis 3 [Std.]	0.00

Haupt

Menü

<<

>>

Betriebsstunden gesamt	Total operating hours
Betriebsstunden Rührwerk	Agitator operating hours
Betriebsstunden Heizkreis	Heating circuit operating hours

Elements of the [INFORMATION – Operating hours] screen:

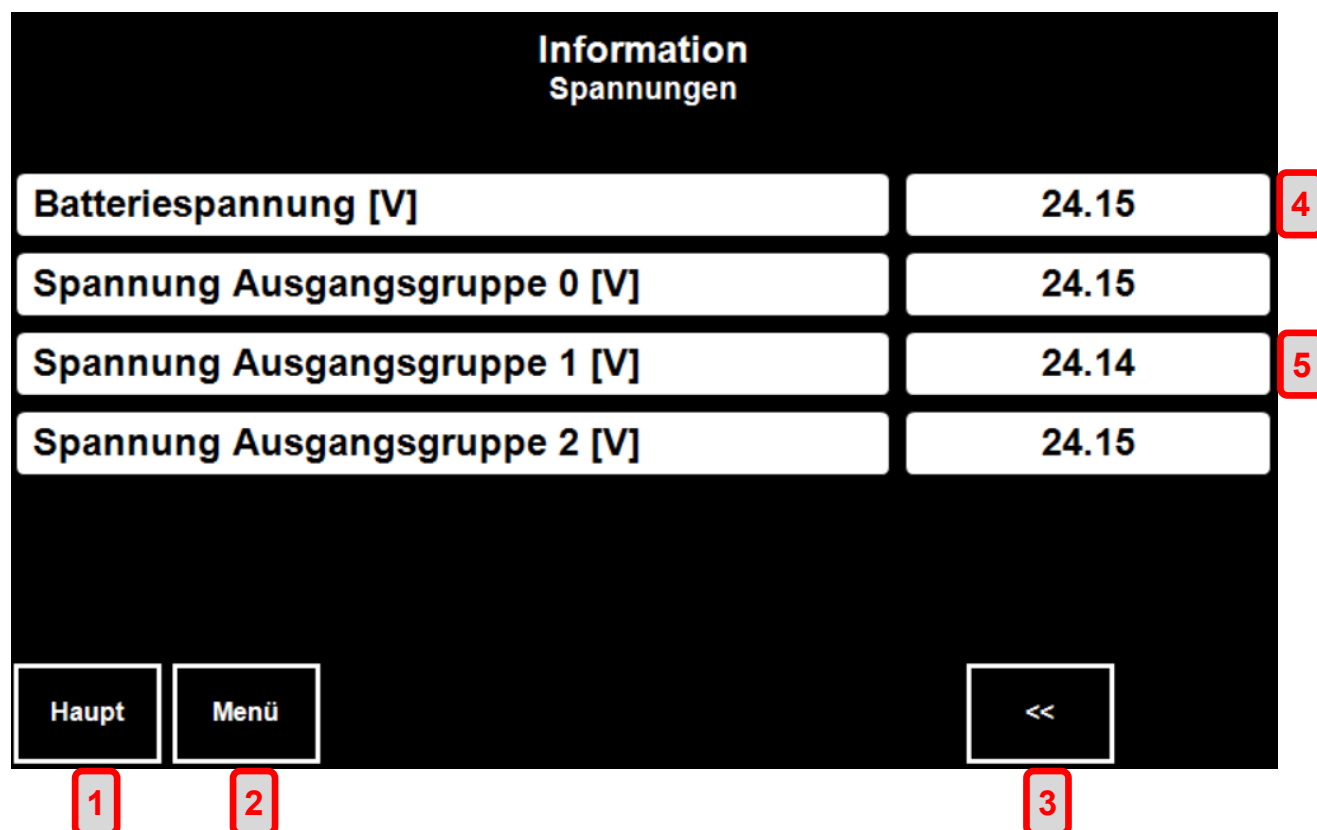
1: MAIN – Button to open the [MAIN] screen.

2: MENU – Button to open the [MENU] screen.

3: BACK – Button to open the additional [INFORMATION] screens.

4: NEXT – Button to open the additional [INFORMATION] screens.

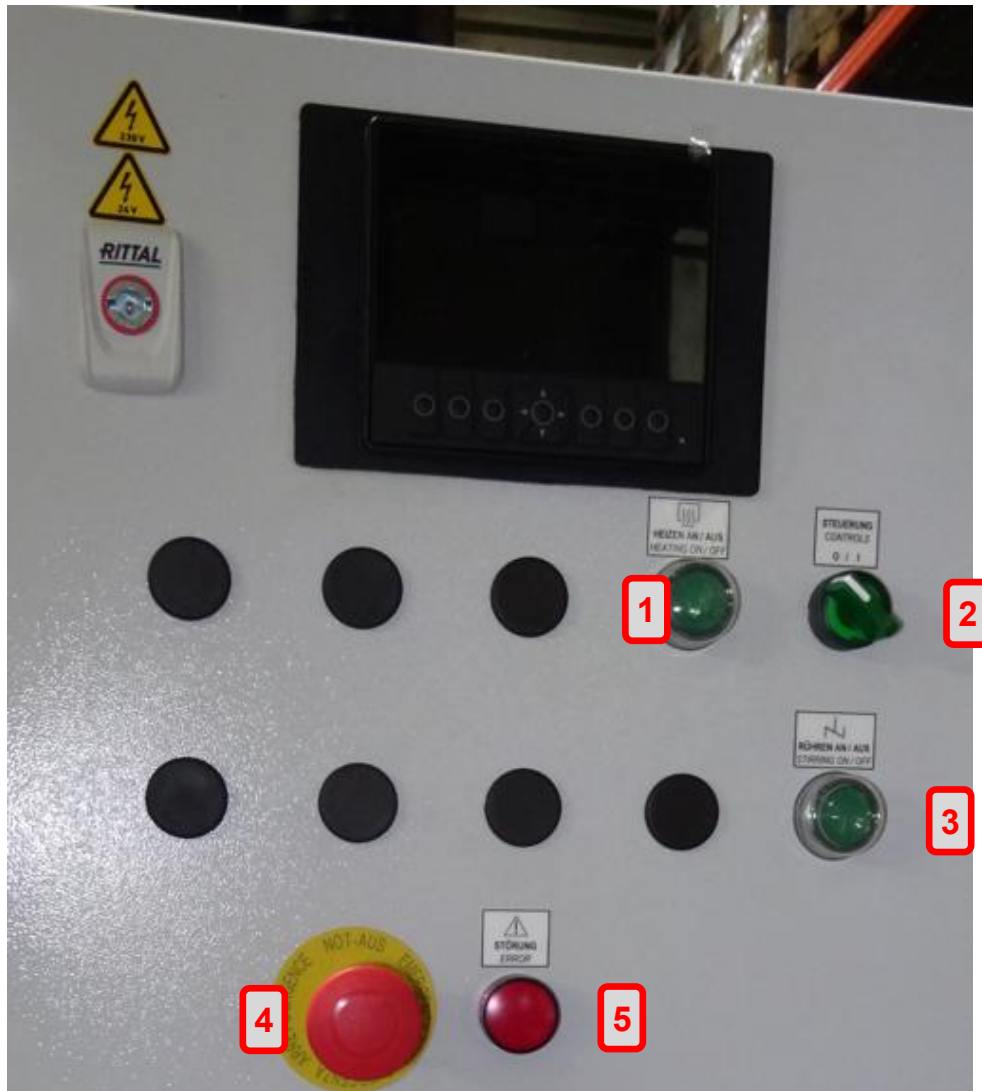
5: OPERATING HOURS – Displays the current operating hours. These are divided into groups; in this case, General, Agitator and the individual heating circuits.



Elements of the [INFORMATION – Voltages] screen:

- 1: MAIN – Button to open the [MAIN] screen.
- 2: MENU – Button to open the [MENU] screen.
- 3: BACK – Button to open the additional [INFORMATION] screens.
- 4: BATTERY VOLTAGE – Displays the current battery voltage [V] at the control system.
- 5: OUTPUT GROUP VOLTAGES – Displays the current voltages [V] available from the output groups.

4.3 Controls



4.3.1 Control panel elements

1: HEATING ON / OFF – Pressing this button switches the heating on or off. This button remains lit while heating is active and flashes once the setpoint temperature has been reached and the mixture temperature is within the hysteresis range.

2: CONTROLS – Switch for switching the entire control system on and off.

3: STIRRING ON / OFF – Pressing this button switches the agitator on or off. This button remains illuminated while the agitator is running.

4: EMERGENCY STOP – Used to shut down the machine as quickly as possible in the event of a fault.

5: ERROR – Indicator light for warnings and alarms. These are also shown on the display.

4.4 Messages and warnings

The following messages and warnings may appear:

- Ready for operation
 - The system has no faults and is ready for operation.
- Warning 500: Mixture temperature
 - The mixture temperature has exceeded the warning threshold.
- Warning 501: Heating circuit 1 temperature
 - The temperature in heating circuit 1 has exceeded the warning threshold.
- Warning 502: Heating circuit 2 temperature
 - The temperature in heating circuit 2 has exceeded the warning threshold.
- Warning 503: Heating circuit 3 temperature
 - The temperature in heating circuit 3 has exceeded the warning threshold.
- Warning 504: Temperature difference between heating circuits 1 and 2
 - The temperature difference between heating circuits 1 and 2 has exceeded the warning threshold.
- Warning 505: Temperature difference between heating circuits 1 and 3
 - The temperature difference between heating circuits 1 and 3 has exceeded the warning threshold.
- Warning 506: Temperature difference between heating circuits 2 and 3
 - The temperature difference between heating circuits 2 and 3 has exceeded the warning threshold.
- Warning 507: Heating circuit 1 deactivated
 - Heating circuit 1 has been deactivated via the configuration menu.
- Warning 508: Heating circuit 2 deactivated
 - Heating circuit 2 has been deactivated via the configuration menu.
- Warning 509: Heating circuit 3 deactivated
 - Heating circuit 3 has been deactivated via the configuration menu.
- Alarm 1000: Emergency stop
 - The emergency stop button on the machine has been pressed or a cable break has occurred.
- Alarm 1001: Transmission error
 - There is a communication fault between the display and the PLC.
- Alarm 1002: Undervoltage
 - The supply voltage has fallen below a preset threshold.
- Alarm 1003: Output group 0
 - The voltage output from output group 0 has fallen below a preset threshold value.
- Alarm 1004: Output group 1
 - The voltage output from output group 1 has fallen below a preset threshold value.

- Alarm 1005: Output group 2
 - The voltage output from output group 2 has fallen below a preset threshold value.
- Alarm 1006: Mixture temperature sensor fault
 - The mixture temperature sensor is returning an implausible reading. There may be a fault with the sensor or a broken cable.
- Alarm 1007: Heating circuit 1 temperature sensor fault
 - The temperature sensor for heating circuit 1 is returning an implausible reading. There may be a fault with the sensor or a broken cable.
- Alarm 1008: Heating circuit 2 temperature sensor fault
 - The temperature sensor for heating circuit 2 is returning an implausible reading. There may be a fault with the sensor or a broken cable.
- Alarm 1009: Heating circuit 3 temperature sensor fault
 - The temperature sensor for heating circuit 3 is returning an implausible reading. There may be a fault with the sensor or a broken cable.
- Alarm 1010: Mixture temperature
 - The mixture temperature has exceeded the alarm threshold.
- Alarm 1011: Heating circuit 1 temperature
 - The temperature in heating circuit 1 has exceeded the alarm threshold.
- Alarm 1012: Heating circuit 2 temperature
 - The temperature in heating circuit 2 has exceeded the alarm threshold.
- Alarm 1013: Heating circuit 3 temperature
 - The temperature in heating circuit 3 has exceeded the alarm threshold.
- Alarm 1014: Temperature difference between heating circuits 1 and 2
 - The temperature difference between heating circuits 1 and 2 has exceeded the alarm threshold.
- Alarm 1015: Temperature difference between heating circuits 1 and 3
 - The temperature difference between heating circuits 1 and 3 has exceeded the alarm threshold.
- Alarm 1016: Temperature difference between heating circuits 2 and 3
 - The temperature difference between heating circuits 2 and 3 has exceeded the alarm threshold.
- Alarm 1017: Motor protection switch
 - The motor protection switch for the agitator has tripped.

5 Maintenance and servicing

The **boiler** must be cleaned of residual material and checked for damage every day.

Immediately remove any molten material that has overflowed from the boiler.

5.1 Agitator

Lubricate the lubrication point on the agitator bearing daily by turning the grease cap half a turn.
Top up with special high-temperature grease if necessary.

Change the gearbox oil in the electric geared motor after approximately 1,000 operating hours.

6 Troubleshooting

In the event of problems with the molten material: Close the lid and press the emergency stop button.

7 Spare parts lists

Designation	Item no.
Lid section	81001 33 20
Solid rubber tyres	93351 00 15
Solid rubber swivel castor	93351 00 16
Outlet slide plate	0231 32 01
Geared motor	0632 00 00

8 Appendix

8.1 Quick Start Guide → see control cabinet