User Manual

for up to 80 L / 110 kg

Heating machines

Combino-Jet 0800 e/f

Combino-Jet glaze 0800 g

Original operating instructions in German (D)

Product name	**Combino-Jet 0800 e/f** **Combino-Jet Cast 0800 g**
Year of manufacture	2026
Identification	Control cabinet nameplate
Date of creation / Revision	2026-04 / V.001.00
Manufacturer and address	**Frisch Spritzmatic GmbH** Ramminger Straße 4 D- 89129 Öllingen

Tel: +49 (0)7345 20095 0

Web: www.frisch-spritzmatic.de
Email: info@frisch-spritzmatic.de

1 Important Safety Instructions

Use the heating unit only for the purpose described in this manual. Otherwise, you may endanger yourself or damage parts of the system.

You put yourself and others at risk if you operate the system incorrectly or fail to observe the safety or warning instructions. This can result in serious injury or significant property damage.

1.1 About this Operating Manual and Other Important User Information

This manual contains important descriptions and instructions, as well as safety and warning notices regarding potential residual risks during handling and use. This operating manual is essential for the safe and effective operation and handling of the heating machine and the entire system.

However, this operating manual does not contain redundant information regarding modules or optional accessories that can be combined with the heating unit. Separate, project-specific manuals are provided for this purpose.

Furthermore, this manual provides guidance on troubleshooting operational malfunctions and informs you about necessary maintenance intervals.

1.2 Terms Used

Heating machine
Loading station, usually in conjunction with a fresh sheet glazing system. Here usually abbreviated as HZ.

Water injection system WIS
Continuous programming and supply of water to preserve and stabilize the material

Continuous glazing line
The conveyor system is used to coat pastries with apricot glaze, dry them, glaze them, and, if desired, decorate them.

Apricot Coating/Spray Bridge
The glazing or spraying bridge is a device for the even application of a heated medium (e.g., apricot glaze or icing) onto baked goods. The medium is conveyed from the heating machine and applied precisely to the product via the spraying bridge.

Glazing box
The glazing box is a device for evenly coating baked goods with a heated medium (e.g., fondant or glaze). The medium is conveyed from the heating machine and applied to the product in the form of a veil or thread (extrusion).

P&R Cleaning Agent
Maintenance concentrate with cleaning properties. For internal cleaning of material-handling parts of machines and systems.
Available from the manufacturer Frisch Spritzmatic GmbH

1.2.1 Scope of these operating instructions

These operating instructions apply exclusively to the **heating machines (1+2)** listed on the cover page.

Furthermore, these operating instructions describe the control-related interactions between the heating machines and the conveyor system.

Figure 1: Example combination of heating machines and a Combino conveyor system

1 Combino Jet Apricot

2 Combino Jet Fondant

3 Combino Conveyor Glazing System

Refer to other operating manuals

This operating manual does not replace the separate manuals for the **conveyor system (3)** and/or other combinable modules.

1.2.2 Applicable documents and additional manuals

In addition to this manual, supplementary documents were provided to the operator. These supplementary documents provide important, additional information regarding project-specific

- operational restrictions as well as
- descriptions and instructions for any necessary maintenance and servicing work.

Cross-references in this manual

This manual contains several references to related documents.

► In such cases, please also observe the safety and warning notices as well as the descriptions and instructions in the respective documents:

- **Electrical Schematic**
- **Pneumatic circuit diagram**
- **Operating instructions** for the combinable modules, e.g., conveyor system

1.2.3 Storage, Provision, and Transfer

Storage and Provision

► Keep

- this operating manual as well as
- all applicable documents

readily available in the operating environment at the system.

Transfer to Others

If the system is ever moved to another location or transferred to another operator:

► Please provide

- this operating manual as well as
- all applicable documentation

to subsequent operators and users.

1.2.4 What This Operating Manual Cannot Do

Ensure that operating and maintenance personnel are qualified

Requirements regarding qualifications and technical knowledge for specific tasks are specified in this manual and in the applicable documentation.

However, this manual cannot impart this necessary expertise.

If you do not possess the required qualifications for certain tasks:

- ► Have tasks that require specialized knowledge performed exclusively by qualified personnel with the appropriate training.
- ► Never attempt to perform tasks yourself for which you do not have the necessary qualifications.

Research operating regulations

Depending on the country and state in which the system is operated, there are different operating regulations that the operator and user must observe.

Due to these differences, the requirements of the regulations cannot be listed in this operating manual.

In addition, the rules and regulations applicable at the site of use regarding accident prevention and environmental protection, as well as any work and operating instructions from the operator/facility, must be observed.

- ► Please familiarize yourself with any additional company regulations that apply.

Internal Instructions

Operational or accident prevention regulations may require internal operating and work instructions.

These may specify additional safety and warning instructions as well as necessary additional personal protective equipment.

In addition to these operating instructions, necessary conduct requirements for persons working on or with the system may also be specified here.

- ► Supplement these instructions, if necessary, with your internal instructions.

Training and Instruction

These operating instructions provide step-by-step guidance for safe and effective work on and with the system.

Nevertheless, it is essential to thoroughly instruct and train any person who is to work on or with the system.

Operating and accident prevention regulations also require the operator to follow this procedure.

- ► As the operator, you must train and instruct any person who is to work on or with the heating machine.
- ► To do so, follow these instructions and, if applicable, any existing operating and work instructions.
- ► In particular, make sure to inform them of all safety and warning instructions.

1.3 Symbols and Signal Words Used

All safety and warning notices in these instructions have been clearly highlighted. The following symbols and signal words are used for warning notices.

⚠ WARNING

Warns you of hazards that **can result** in **death or serious** injury if you do not follow these instructions.

or

⚠ **WARNING**, directly in the context of an instructional section of this user manual

⚠ CAUTION

Warns you of hazards that **can result** in **minor**, usually reversible **injury** to persons if you do not follow these instructions.

or

⚠ **CAUTION**, directly in the context of an instructional section of this operating manual

CAUTION

Warns you of situations that can lead to **property damage and operational disruptions** if you do not follow these instructions.

or

CAUTION, directly in the context of an instructional section of this operating manual

Safety chapter

Safety chapters are entire sections containing safety-related information that is essential for safe and effective operation and handling.

Hazards are also specified by the **following pictograms**:

Warning of hazards, which are further specified in the warning note

Hazards caused by electric current

Warning of hot surfaces

Warning of rotating parts

Warning of pinch and entanglement hazards

Mandatory symbols used in this manual**:**

Wear **a hair net**

Wear **protective clothing**

Wear **safety shoes**

Wear **protective gloves**

Other **signs and symbols** used in this manual**:**

Tip
Note on useful information regarding the use of the sealing tape.

Cross-references
Cross-references in this operating manual are marked with this symbol or in *italics*.

► **Action**
Instructions are marked with this symbol.

a) **Action step**
b) Step
c) …
Step-by-step instructions are listed in lowercase letters according to the sequence of actions.

✓ **Interim or final result of an action or a series of actions**
This information makes it easier to determine whether the procedure in a step-by-step guide has been successfully .

■ **Bullet points**
are used to indicate lists in both descriptive and instructional sections of this manual.

Shipping Agent

Operator

Installer/Maintenance Technician

Qualified electrician

1.4 Authorized persons must ensure

Ensuring a qualified workforce – Schools and training

Insufficiently qualified personnel can cause personal injury and property damage due to operating errors.

Only operate the system if you

- have read and understood the contents of this operating manual and
- have received additional training on safe operation.

The descriptions and instructions contained herein assume the technical knowledge of a trained operator.

Where the use of a qualified specialist is required for a specific task, this person must, based on their training and professional experience, be demonstrably capable of recognizing the hazards and risks associated with or arising from the respective task.

- ► Always comply with the applicable requirements regarding permitted groups of people.
- ► Observe the qualification requirements listed below.
- ► Also comply with the relevant accident prevention regulations and environmental protection regulations.

The necessary qualifications of the operating personnel, as well as descriptions of the permitted and prohibited activities, are summarized in the following subsections.

Warning against improper operation due to the influence of drugs, medication, or alcohol

- ► Never work on or with the system if you
  - under the influence of alcohol,
  - drugs, or medication.

1.4.1 Freight forwarder and warehouse clerk

Transport and Storage	
Person in these instructions	**Freight forwarder / warehouse worker** who has received training and instruction and holds a valid driver's license for the vehicles to be used. 
Required Qualifications	■ Operating instructions, section *on transport and storage,* read and understood. ■ Familiar with all basic regulations regarding occupational safety, accident prevention, and environmental protection. ■ Driver's license for the vehicles to be used, as well as regular training and instruction in the safe operation of industrial trucks.
Permitted activities	■ Lifting ■ Lowering ■ Lashing ■ Transport
Prohibited activities	■ Operating ■ Cleaning and maintenance ■ Identifying and resolving malfunctions ■ Maintenance ■ Rectifying faults and defects ■ Repair

1.4.2 Operator

Use	
Person in this manual	**Operator / user** with training and instruction 
Required qualifications	■ Operating instructions read and understood ■ Familiar with all basic regulations regarding occupational safety, accident prevention, and environmental protection ■ Trained and instructed in the safe operation of the system and its components
Permitted activities	■ Establish power supply ■ Operate ■ Identify malfunctions ■ Cleaning and maintenance work ■ Inspection tasks
Prohibited activities	■ Maintenance ■ Troubleshooting ■ Repair

1.4.3 Installation, repair, and maintenance personnel

Repair and Maintenance – Electrical Equipment	
Person in this manual	**Qualified electrician** 
Required training	Same as the operator, plus: ■ Completed training as a qualified electrician or ■ advanced training (electrical technician, master electrician, electrical engineer) with practical experience
Permitted activities	■ Troubleshooting electrical equipment ■ Repairing electrical equipment ■ Maintaining electrical equipment

Installing, Repairing, and Maintaining Mechanical and Pneumatic Equipment	
Person in this manual	Maintenance technician 
Required training	Same as the operator, as well as ■ Completed training as a mechanic, pneumatic technician, or mechatronics technician with practical experience, or ■ advanced training (mechanical engineering technician, master craftsman, engineer) with practical experience
Permitted activities	■ Troubleshoot mechanical and pneumatic equipment ■ Repairing mechanical and pneumatic equipment ■ Maintaining mechanical and pneumatic equipment

2 Requirements for safe operation

Follow basic safety procedures

- Use the heating machine only for the intended purpose described in this operating manual.
- Never attempt to tamper with or bypass safety functions or protective devices.
- Never operate the heating machine if safety functions have been triggered, protective devices are missing, or you can detect a defect.
- In such cases, ensure that the system is restored to a safe condition or repaired before attempting to restart it.
- Always keep your work area clean and tidy.
- Ensure that the floor is non-slip and level and that there is adequate lighting at your workstations.

✓ This will help you avoid unforeseen safety risks when operating the system.

2.1 Intended Use

The heating machine is built in accordance with the state of the art and recognized safety regulations. Nevertheless, improper or unintended use may result in danger to the life and limb of the user or third parties, or damage to the system or other property.

The heating machine is intended exclusively

- to heat food-grade media and
- conveying them.

The heating machine must only be operated in accordance with the instructions in this manual

- operations,
- operating modes
- operating modes described in this operating manual.

The heating machine must always be kept in

- technically sound condition and
- maintained in accordance with the maintenance intervals specified in this operating manual, and
- installed and operated with due regard for safety and potential hazards.

In particular, malfunctions that could compromise safety must be rectified immediately.

Any other use is not in accordance with the intended purpose and is therefore prohibited.

2.2 Improper and unintended use

The following are not intended uses

- Operation outside the environmental and operating conditions specified in this manual, or
- any operation outside the specified intended and permissible use, or
- the operation and/or handling of the system at any stage of its life cycle by personnel who are not sufficiently qualified.

It is expressly prohibited to

- the operation of individual or all system components within explosive atmospheres.

2.3 Operator's Obligations

Overall responsibility for safe operation

The operator bears overall responsibility for the safe operation of the heating machine throughout all phases of its life cycle and establishes the rules and conditions for the necessary organization.
The operator ensures compliance with all necessary operating, usage, and environmental conditions.

All operating and maintenance personnel must be properly trained and instructed by the operator in accordance with the operating manual, and must be informed of the local, site-specific hazards.

The operator must ensure that

- these operating instructions are kept readily available near the heating machine and
- any damaged or illegible operating manual is replaced immediately.

The operator undertakes to

allow only persons to work on or with the heating machine who

- have read and understood this operating manual,
- are familiar with the basic regulations regarding occupational safety, accident prevention, and environmental protection, and
- have been instructed in the safe handling of the heating machine (training) and thus
- meet the requirements and qualifications specified in this manual.

Furthermore, the operator undertakes

ensure that maintenance work is performed only by qualified personnel who

- have read and understood these operating instructions,
- are familiar with the basic regulations regarding occupational safety, accident prevention, and environmental protection, and
- have been specifically trained for the respective task.

2.4 Obligations of Operating and Maintenance Personnel

Every person working on or with the heating machine is obligated to

- read and follow these operating instructions, as well as
- Follow all safety and warning instructions without exception,
- Follow all warnings and instructions affixed to or noted on the heating machine itself,
- familiarize yourself with the operation, functions, and all safety and protective devices,
- use the system only when it is in perfect technical condition and in accordance with its intended purpose, with due regard for safety and potential hazards, and in compliance with the operating instructions, and
- immediately rectify any malfunctions that could compromise safety, or have them rectified if necessary.

2.5 Space requirements around the heating machine when connected to a conveyor system

The installation site must be selected so that all minimum clearances required for safe access to equipment and control components can be maintained. The clearances listed below from all other objects and building components are minimum dimensions for workstations, passageways, and escape routes.

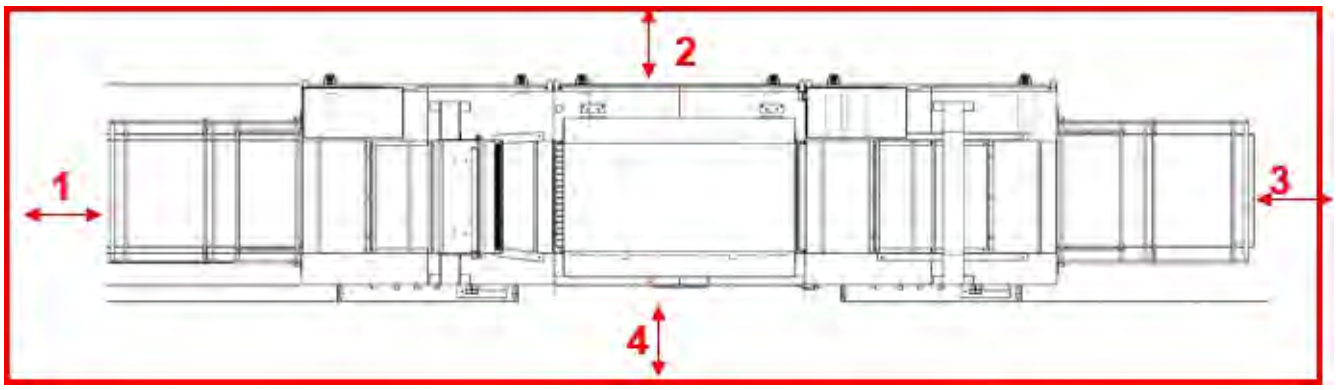


Figure 2: Space requirements around the heating machine in conjunction with a continuous glass glazing line

Accessibility

1 Left – Workstation

Minimum distance: 800 mm

2 Rear – Access to utility connections

Minimum distance: 800 mm

3 Right – potential escape route

Minimum clearance: 800 mm

4 Front – operator workstation

Minimum clearance: 800 mm

3 Technical data and power ratings

Dimensions and weights			
*Please note the additional total weight of the combined conveyor systems			
Combino Jet 0800			
Height in mm	Length in mm	Width in mm	Total weight in kg
800	680	720	140

*Combino conveyor system**			
Height in mm	Length in mm	Width in mm	Weight in kg
1808	4571	800	350

**Total dimensions may vary depending on the use of optional modules

*Strip mill casting line**			
Height in mm	Length in mm	Width in mm	Weight in kg
1808	3568	800	230

**Total dimensions may vary depending on the use of optional modules

Permissible environmental conditions	
Temperature during transport	-15°C to +50°C
Temperature during storage / operation	-15°C to +50°C
Relative humidity	Max. 85% within the specified temperature range
Floor conditions	The quality of the hall floor must meet the requirements for a food-processing industrial floor in terms of concrete quality, concrete thickness, coating, and levelness.

Noise level at the HEATING UNIT	
Normal operation	Continuous sound pressure level Average max. 70 dB(A)

Performance and load capacity of the HEATING MACHINE	
Usage	(8 hours/day, 2,920 hours/year)
Cycles/year ($_{nop}$)	700,800

Rated power of the heating machine	
Mains – electrical power	3/PE/N
Rated voltage	400 V
Frequency range	50/60 Hz
Rated current	16 A
Compressed air supply and quality	8 bar, filtered, oil-free
Water	Drinking water quality

4 Main components and functions of the HEATING MACHINE

Descriptive sections of the manual do not contain instructions

This chapter is a descriptive section of the operating manual. It is intended to help you understand the system and does **not** yet contain **any** instructions for use.

Figure 3: Combino Jet front and rear view

1 Front view of the heating machine with control panel

2 Material hose

3 Rear Heating machine with Supply connections

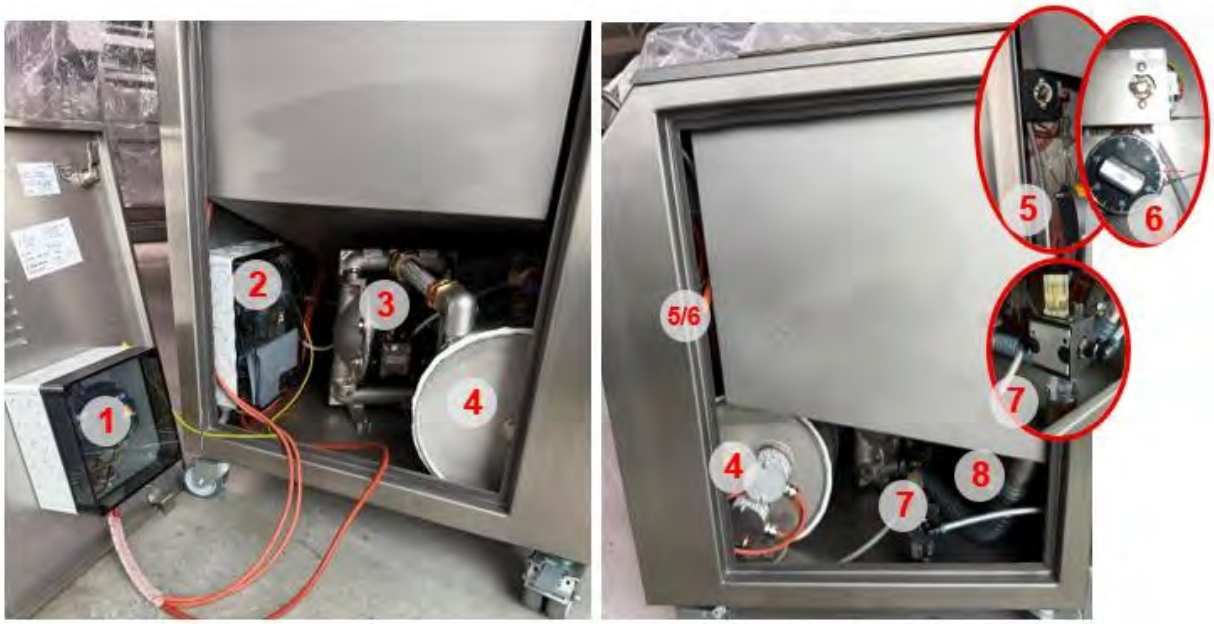


Figure 4: Combino Jet interior

1 Logo

2 Control cabinet

3 Double-diaphragm pump

4 Heat exchanger

5 Temperature limiter

6 Temperature controller (Combino Jet Guss only)

7 Oiler

8 Material joint, tank

4.1 Functions of the heating machine

The heating machine is a feeding station designed primarily for use on a conveyor system. A high-performance double-diaphragm pump conveys the medium through a heat exchanger into the interchangeable equipment mounted on the conveyor system, such as a spray bridge, misting box, and/or decoration station.
The medium is applied evenly to the baked goods via this equipment. Excess material is collected in the tank and subsequently returned to the processing cycle.
Alternatively, the heating machine can also be operated with a hand spray gun via an adapter

4.2 Differences between Combino Jet Aprikotur/Fondant and Combino Jet Guss

The heating machines for Aprikotur and fondant are identical in design on the front side.
The Aprikotur heating machine has an additional compressed air outlet on the rear for supplying the apricotizing station.
The heating machine for casting, on the other hand, has design and functional differences. It features two selector levers for controlling material flow. It is also equipped as standard with a direct connection for operation with a hand gun.
For the heating machines for Aprikotur and fondant, an additional adapter is required for operation with a hand gun.
The heating machines for Aprikotur and fondant each have one heating circuit.
The heating machine for casting is equipped with two heating circuits:

- Heating circuit 1 is used to bring the medium to a boil,
- Heating circuit 2 is used to maintain the lower processing temperature.

There are also differences in the maximum permissible temperatures: The heating unit for fondant is limited to 60 °C, while the heating units for apricotur and glaze are each designed for temperatures up to a maximum of 110 °C.

4.3 Heating machine with water injection (optional)

A heating machine with the optional water injection feature automatically adds water to the water-containing medium at regular intervals to ensure the medium's stability through evaporation or vaporization over an extended period. The feed rate is preset based on empirical values but can be continuously adjusted during operation, as factors such as high humidity and room temperature can affect the consistency of the medium being processed. Water is supplied via a connection on the back of the heating machine. A brief interruption in the injection indicator light indicates when water is being added to the medium.

4.3.1 Changing the settings of the water injection system

The Logo control panel is located in the door of the heating machine.

Figure 5: Logo start screen

Accessing parameter settings with water injection enabled

► Press ESC

Figure 6: Setup

► Press the ↓ arrow

✓ The program is highlighted in dark.

► Confirm OK

Figure 7: Selecting parameters

► Confirm with OK

✓ The Pause and Delay selection menu appears

► Select Pause with ↓ and OK

Figure 8: Selection menu

TH = Injection time (0.12 sec) (Valve opening time) TL = Pause (Time between injections)
Ta = Interval time (Time until the next injection)

Injection time (TH) = 0.12 seconds = 4 grams of water = 200 g of water/hour

5 Combination options with the HZ

Refer to the applicable documentation

The **conveyor system** manual is included in the applicable documentation. See *Section 1.2.2 Applicable Documentation and Additional Manuals.*

This operating manual does not contain redundant descriptions or instructions.

5.1 Combination with a conveyor system

Figure 9: Modules that can be combined

Combination options for conveyor system

1 Apricotizing conveyor

2 Glazing conveyor

The heating machines can be combined with the corresponding spray systems for individual processes or with additional modules to form an automatic conveyor system. The processes of “apricoting,” “drying,” and “glazing” are performed in a single operation.

5.2 Combination with a hand-held spray gun (Combino Jet Apri / Fondant)

Figure 10: Adapter for hand spray gun

Combination option with a hand spray gun

The material hose can be connected to a hand spray gun using an adapter.

6 Control panel of the heating machine

Descriptive sections of the manual do not contain instructions for use

This chapter is a descriptive section of the operating instructions. It is intended to aid understanding and does **not** yet contain **any** instructions for use.

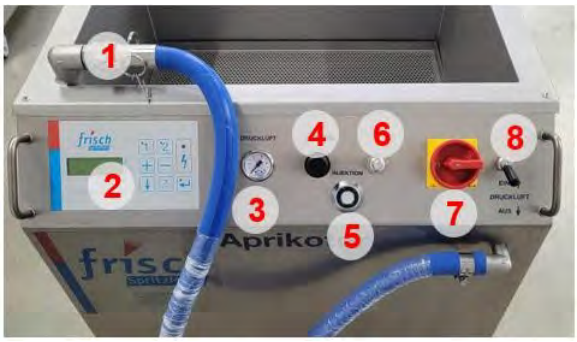


Figure 11: Front of HZ

1 Material inlet
2 Control
3 Compressed air pressure gauge
4 Compressed air regulator
5 WIS pushbutton with indicator light (optional)
6 Pump speed throttle
7 Main switch
8 Compressed air switch

Figure 12: Front of Guss Jet

Included only in the Combino Jet Cast (0800 g)

9 Control lever for gun
10 Control lever for tank
11 Material outlet, gun

6.1 Control (2)

Figure 13: Control

1 LCD display
2 Heater 1 / Function key F3
3 Heater 2/ Function key F4
4 Plus key/F1 function key
5 Minus key/Function key F2
6 Alarm indicator
7 Selection button
8 Clean
9 Return key

The **+, -, 1**, and **2** keys are assigned the dual functions **F1, F2, F3,** and **F4**.

Chapter 19.1 contains the control circuit diagram.

6.1.1 Control functions (1)

Descriptive sections of the manual do not contain instructions

This chapter is a descriptive section of the operating instructions. It is intended to aid understanding and does **not** yet contain **any** instructions for use.

Figure 14: Membrane keypad

Figure 15: Home Screen

Home screen

Figure 16: Operating display 1

Operating Display

The system supports one heating circuit. Either the display for apricot glaze or pour-over.

Figure 17: Operating display 2

Or the display for fondant or fat glaze.

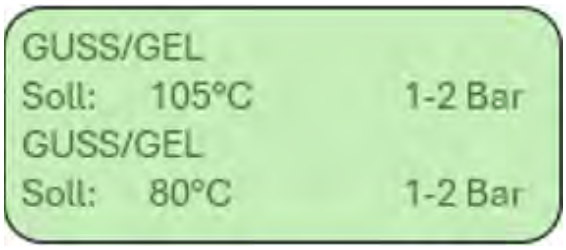


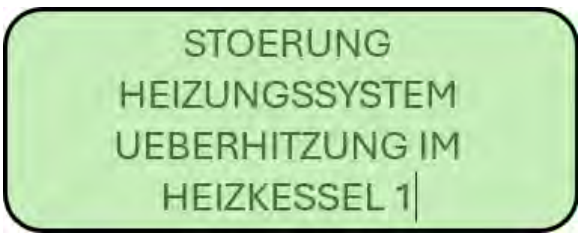
Figure 18: Casting heating machine

A heating machine for casting has two heating circuits.
Heating circuit 1 shows the boiling temperature.
Heating circuit 2 shows the processing temperature.

The setpoint temperature for the heating system for apricot glaze and pour-over glaze can be preselected between 20°C and 110°C. The setpoint temperature for the heating system for fondant or fat glaze is limited to a maximum of 60°C. By pressing the + buttons
(4) or (5) allows you to change the value.

If a change is made, this is indicated by a red flashing LED in the Return button (9). Pressing the Return button (9) confirms the value.

Pressing button 1 (2) or 2 (3) turns on the respective heater.



Overheating protection

To protect the heaters, a safety thermostat is installed in the heat exchanger of the heating system. This limits the temperature to the set value.

In the event of overheating, it trips and switches off the heater for the respective heating circuit. It cannot be switched on again until the fault is rectified.

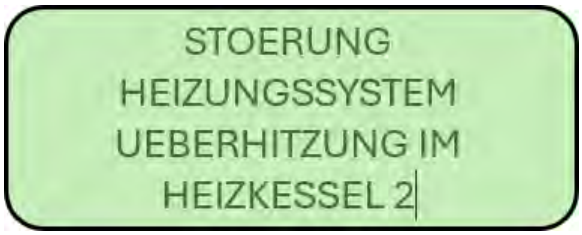


Figure 19: Overheating fault

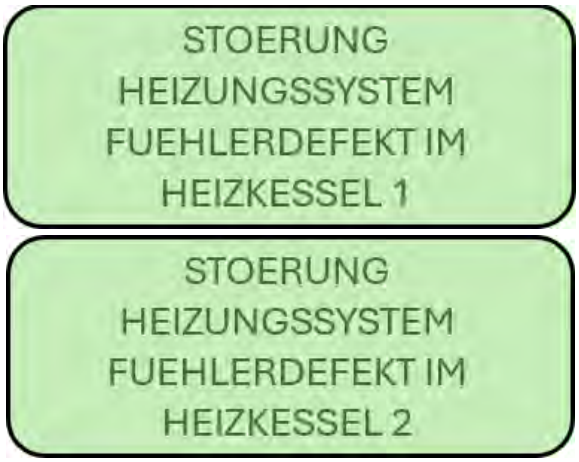


Figure 20: Sensor Defect Fault

Temperature sensor monitoring

The temperature sensor measures the temperature in the heat exchanger. It is continuously monitored for short circuits and open circuits.

In the event of a short circuit or other faults, the heating for the respective heating circuit shuts off and cannot be turned back on.

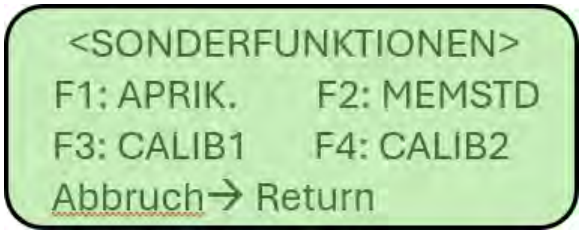


Figure 21: Special Functions 1 Display

Special functions

The control panel includes a number of special functions that are not necessary for everyday use.

To access these, use the following key combination while the heating unit is turned off

Hold down **Return** (9), **+** (4), and **–** (5) and turn on the main switch at the same time.

F1:

Use the **F1** (4) **key** to switch your heating machine from apricot glaze to cast glaze or fat glaze.

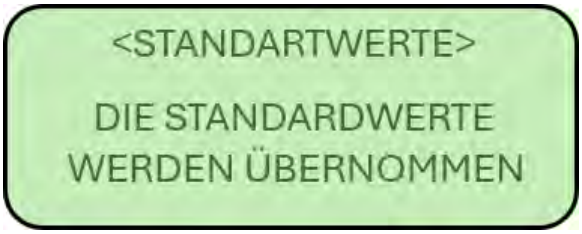


Figure 22: Special functions display 2

F2:

The **F2 function** takes you to the memory. The parameters required for the function are stored here. Pressing the **F2 key** resets the parameters.

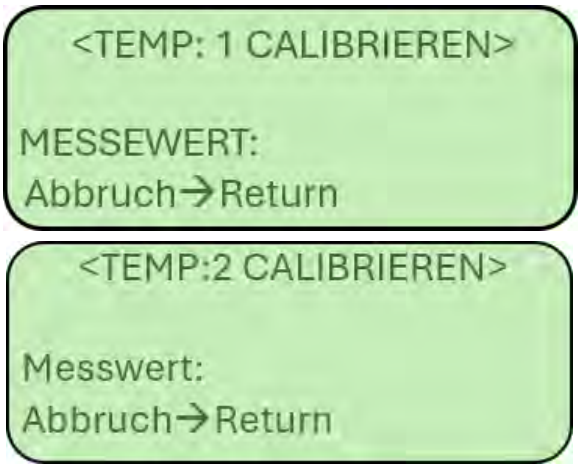


Figure 23: Special functions display 3

F3 and F4:

The control system measures temperature via a PT 100 sensor connected to an integrated signal amplifier. For optimal temperature measurement, the electronics must be calibrated (performed at the factory).

6.1.2 Display Messages German - English

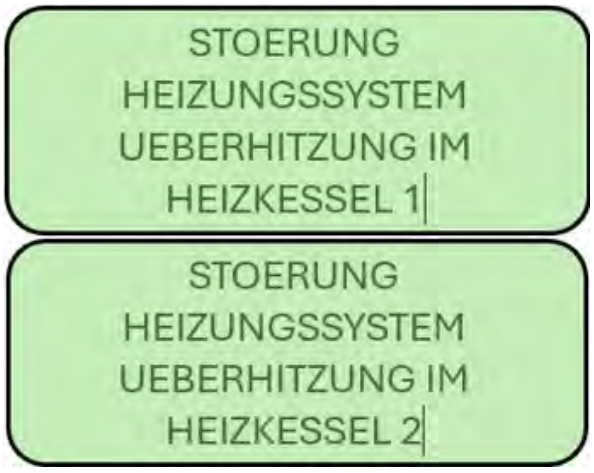


Figure 24: Overheating error message DE

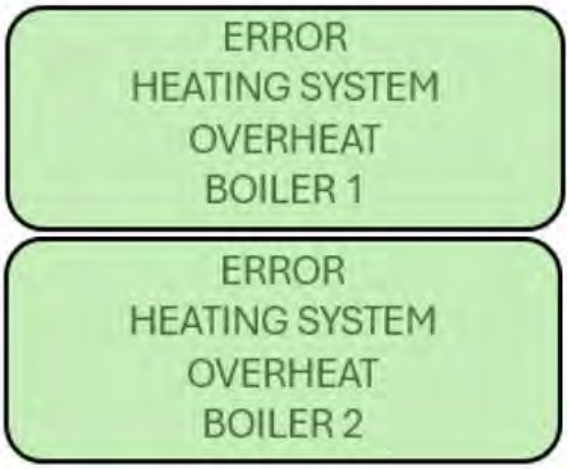


Figure 25: Overheating error message EN

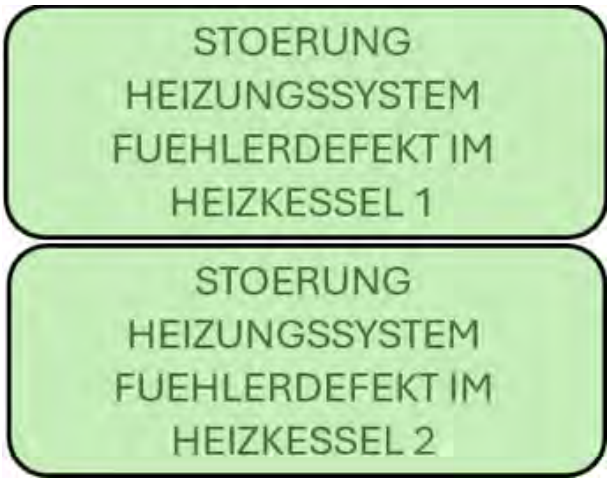


Figure 26: Sensor defect error message DE

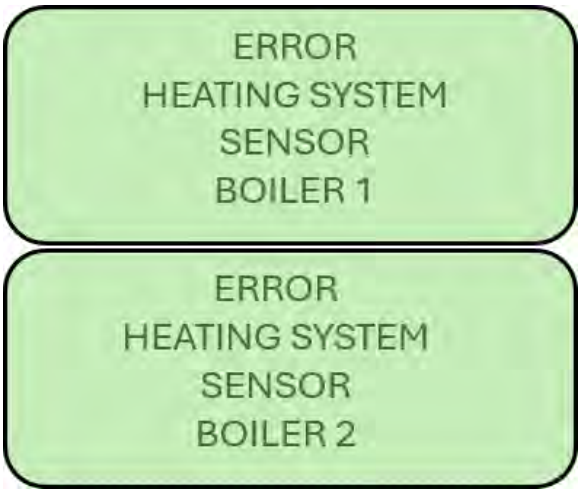


Figure 27: Sensor defect error message EN

Figure28:DisplayDefault valuesDE

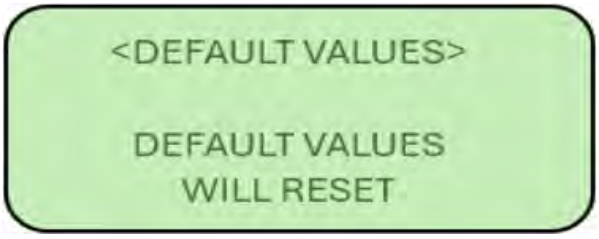


Figure 29: Display of default values EN

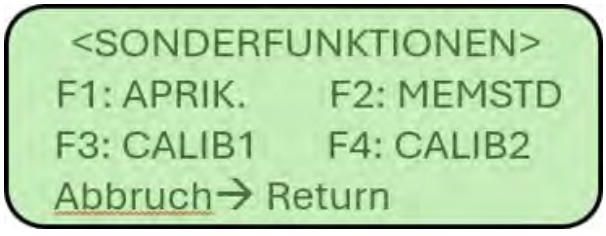


Figure 30: Special Functions Display DE

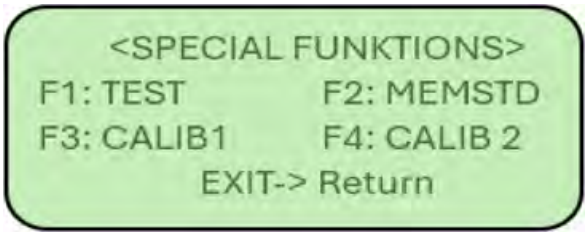


Figure 31: Special Functions Display EN

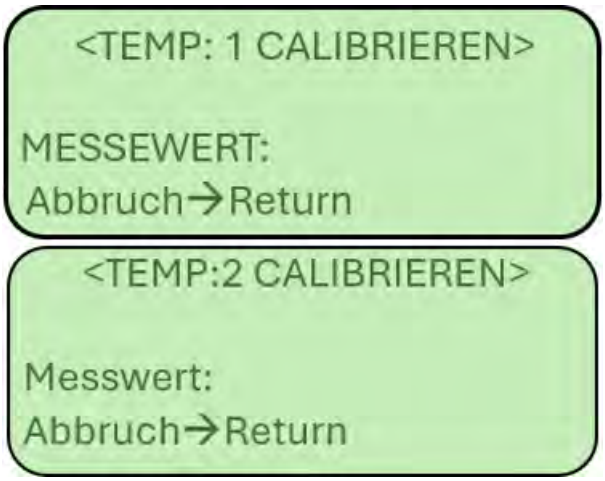


Figure 32: Calibrate Temp. Display DE

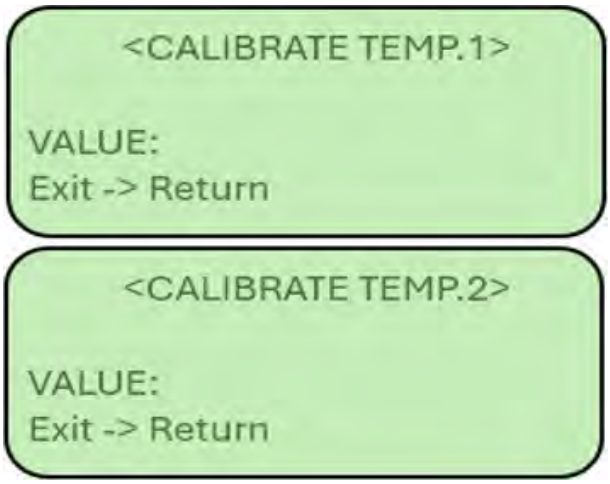


Figure 33: Calibrate Temp. Display EN

6.2 Control unit rear view

Figure 34: Rear of controller

1	Power plug X1
2	DIP switch
3	Connector X2

6.2.1 Connections and Settings

Figure 35: Rear view of connector X1

Connector/power plug X1

1,4,7,10	Mains connection 230 V or 2 x 115 V
	Depending on the operating voltage, jumpers may be required; see *Chapter 19.1 Circuit Diagram.*
9.12	Protective conductor
	A protective conductor must be connected.
2	Relay heater 1 (L1)
5	Relay output for cleaning valve (L1)
8	Relay output for heater 2 (L1)
11	Relay output (not assigned)
3	Safety thermostat 1

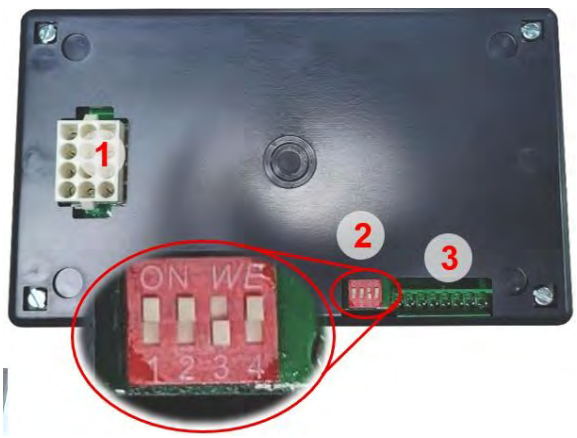


Figure 36: Rear view of DIP switches

DIP switch settings 2

	Switch position up = on / down = off **O**
	Aprikotur heating circuit
N	Fondant heating circuit
W	German/English
E	Water Flushing
	At least 1 heating circuit must be switched on; otherwise, an error message appears on the display

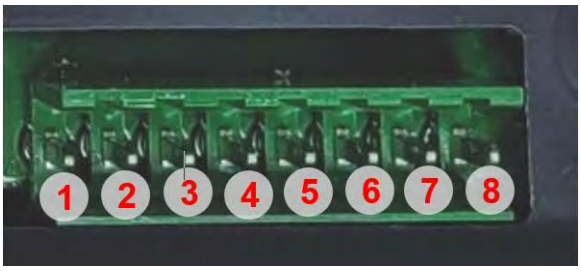


Figure 37: Rear view of connector X2

Connector X2

1,2,3 PT 100 sensor for heating circuit 1 (red, red, white) **4,5,6** PT 100 sensor for heating circuit 2 (red, red, white) **7,8** Ground connection possible

6.3 Heating unit power connections (rear)

Figure 38: Rear of Combino Jet

1 Power supply
2 Compressed air inlet
3 Compressed air outlet (only on Combino Jet Aprikotur/Guss)
4 Injection (optional)

6.4 Control lever for Guss heating unit (only on Combino Jet Guss)

Note:
The current switch position is indicated by the long side of the lever. The direction in which the long side of the lever points is decisive—not the handle design.

Gun control

1 OFF

In this position, the material supply is completely interrupted. The shut-off valve is closed. No material can escape from the gun.

2 Operate

In this position, the system is ready for intended operation. Material (casting) is conveyed through the gun and can be applied.

3 Cleaning

In this switch position, compressed air is directed through the system. The compressed air is used to remove material residues from the hose and gun (blowout).

Figure 40: Tank control

Tank control

1 Gun

In this switch position, the material is fed to the gun. The material is dispensed and processed via the gun.

2 Tank

In this switch position, the material is fed into the pan. The outlet to the gun is closed.

3 OFF

In this switch position, material conveyance is interrupted. No material is conveyed**.**

7 Workstations

Descriptive sections of the manual do not contain instructions

This chapter is a descriptive section of the operating instructions. It is intended to aid understanding and does **not** yet contain **any** instructions for action.

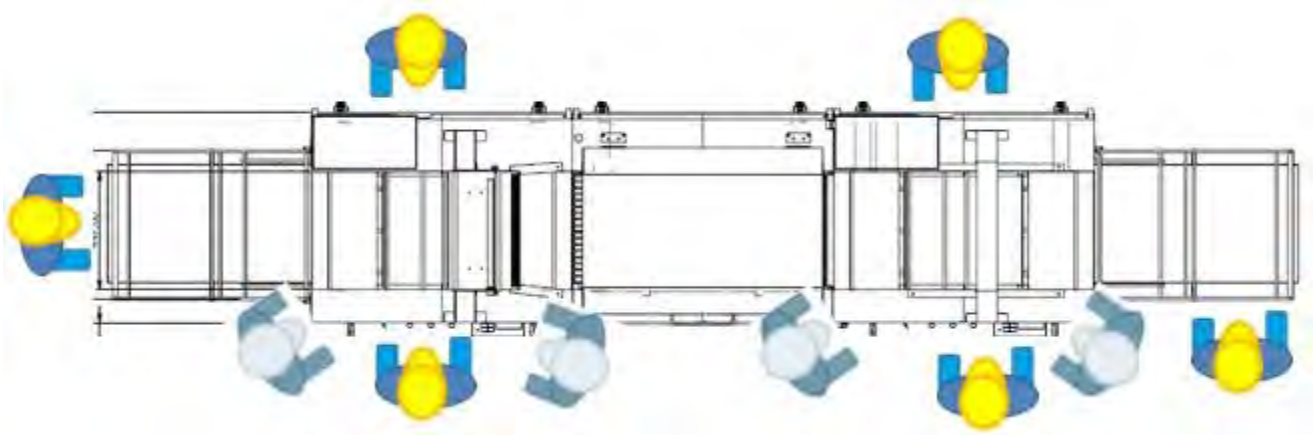
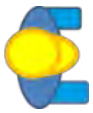


Figure 41: Workstations



Workstations during operation

To start the heating unit, the operator must connect the power supply cables at the rear, turn on the heating unit at the front, and adjust the settings as needed.

Adjustment Options

During maintenance and cleaning work, the operator must be able to access virtually all system components.

8 Safety and protective devices

Descriptive sections of the manual do not contain instructions for use

This chapter is a descriptive section of the operating instructions. It is intended to aid understanding and does **not** yet contain **any** instructions for action.

8.1 Design and technical safety measures

Design measures

Design measures to prevent hazards were already taken into account and integrated during the design phase.

Technical Measures and User Information

Although the facility was designed and constructed using state-of-the-art technology, residual risks cannot be completely ruled out.

For this reason, in addition to design measures, technical safeguards have been implemented to further reduce exposure to hazards, and user information has been provided to enable the rapid and improved identification of residual risks.

8.2 Safety functions

Safety function and event	Risk reduction and ✓ Response	Safety level according to EN ISO 13849-1
SF001 Temperature limiter has tripped	**Prevent overheating** ✓ Heater is off and cannot be turned on	PL d
SF002 Temperature limiter has not tripped (risk of rupture) The 3.5 bar pressure relief valve on the heat exchanger is releasing pressure	**Prevent overpressure in the heat exchanger** ✓ If the pressure is too high, the pressure relief valve opens	PL d

8.3 Main switch

Figure 42: Main switch

Main switches are used to switch on the power supply for the respective heating machine or control cabinet and to safely disconnect the system component from the power supply.

8.4 Fixed protective barriers

Various protective devices, such as the design itself, provide protection against access to hazardous areas. These must always be intact, closed, and fully installed on the system.

9 Transport and Storage

Transport and Storage	
Person in this manual	**Freight forwarder/warehouse worker** who has received training and instruction and holds a valid driver's license for the vehicles to be used. 
Required training and permitted activities	See *Section 1.4.1, "Freight Forwarder and Warehouse Clerk,"* in this operating manual.

Before transport

- ▶ Have all system components taken out of service by trained specialists before you begin transport.
- ▶ Transport all system components separately.
- ▶ Protect all system components from moisture, dirt, and dust.

⚠ WARNING

Warning of danger to bystanders

During transport, bystanders may be injured due to lack of awareness.

- ▶ Assign additional personnel to provide instructions during loading and transport operations.
- ▶ Cordon off the danger zone to prevent access by bystanders.

9.1 Transporting the heating unit

⚠ WARNING

Warning: Heavy parts may tip over or fall

- ▶ Observe the weight specifications for the system in the technical data,
- ▶ Use an appropriate material handling device or
- ▶ Carefully slide it into the space you have designated.
- ▶ When connecting the unit, observe the connection ratings in *Chapter 3, Technical Data and Connection Ratings.*

Warning: Heavy parts may fall during internal transport

System components may tip over during transport.

- ▶ Transportation must only be carried out by trained personnel.

Figure 43: Lifting the heating machine with a pallet jack or industrial truck

- ▶ Use a suitable industrial truck.
- ▶ Secure the heating machine against any unintended movement—even during internal transport.
- ▶ Avoid subjecting the heating unit to shocks and collisions with other objects.

✓ This is the only way to ensure safe transport of the heating unit

9.2 Transporting combinable modules

⚠ WARNING

Warning: Heavy parts may tip over or fall

- ► Observe the weight specifications for the system in the technical data and
- ► use an appropriate material handling vehicle.

Warning: Heavy parts may fall during internal transport

System components may tip over during transport.

- ► Transportation must only be performed by trained personnel.

Figure 44: Lifting conveyor belts with a pallet jack or industrial truck

- ► Transport all system components exclusively in a horizontal position and
- ► use an appropriate industrial truck.

CAUTION: The system components may have an off-center center of gravity.

- ► Secure all system components to prevent any unintended movement—including during internal transport.
- ► Avoid vibrations of the system components and collisions with other objects.

✓ This is the only way to ensure safe transport of the system components.

9.3 Storage Location

Always maintain the ambient conditions at the storage location in accordance with *Chapter 3, Technical Data and Connection Values*

Protect all system components by taking appropriate measures before, during, and after storage against

- damage,
- water ingress, dirt, dust, or other substances,
- significant fluctuations in temperature and humidity,
- frost,
- direct sunlight,
- contact with chemicals, and
- condensation.

The subfloor must have sufficient load-bearing capacity at all times.

10 Setup and Installation

The instructions in this chapter are intended for specially trained personnel	
Person in this manual	Depending on the task to be performed: ■ **Qualified electrician** and/or **maintenance technician** 
Required training and authorized tasks	See *Section 1.4.3, "Installation, Repair, and Maintenance Personnel*," in this operating manual.
Wear personal protective equipment	

⚠ WARNING

Insufficiently qualified personnel can cause personal injury and property damage. The assembly and installation of the heating unit require the expertise of a trained specialist. The heating unit must only be assembled and installed by personnel specifically trained for this purpose .

Such knowledge cannot be imparted through these instructions.

- ▶ Have all system components assembled and installed only by trained specialists.
- ▶ Have any assembly or installation work performed by the **manufacturer** itself or by a **specialist company authorized** by the manufacturer.

Danger from electric current

The system operates at high voltage.

- ▶ **Never** open control cabinets, control units, or other electrical equipment unless you are **a qualified electrician**.

10.1 Setting up system components

- ▶ Observe site requirements
- ▶ Ensure that the ambient and site conditions listed in *Chapter 3* are met.
- ▶ Install the system components according to the installation plan; refer to *Section 2.5 Space Requirements* in this operating manual.
- ▶ Also note the specific number of optional system components for your heating machines with conveyor system components.
- ▶ When installing the system, refer to the applicable documentation for the optional system components. See *Section 1.2.2, “Applicable Documentation and Additional Instructions*.”
- ▶ When connecting the unit, observe the connection ratings in *Chapter 3, Technical Data and Connection Ratings.*

10.2 Integrate the heating unit into the conveyor system

Ensure compliance with standards

The interface between the heating machine and the optional conveyor system is intrinsically safe as designed by the manufacturer and meets all standard-based, safety-related requirements.

If a conveyor system other than the optional conveyor system from the manufacturer Frisch Spritzmatic GmbH is to be used, the interface must be re-evaluated for potential hazards throughout the entire lifecycle of the system.

Integrating the heating machine into the conveyor system

- Slide the heating unit into the designated position under the conveyor system.
- Secure all roller brakes on the positioned modules.

  Refer to the pneumatic circuit diagram in *section 1.2.2, "Applicable Documents and Additional Instructions."*

10.3 Connect electrical power

⚠ WARNING

Prevent electric shock

The system operates at life-threatening voltages.

- ► Work on electrical equipment only if you are a trained electrician.

Risk of electric shock due to defective cables or plugs

- ► Check cables and plugs for damage.
- ► Use only undamaged cables and plugs.

Figure 46: Connecting the power supply

The power supply connections for the individual modules are located on the rear of the heating machine or on the rear of the control cabinet.

⚠ CAUTION: Tripping hazard

- ► Lay the electrical connection cable so that it is protected from mechanical damage and always away from walkways.

- ► Plug the CEE plug leading out of the heating machine into the designated 400V, 16 A outlet.

  Be sure to observe the current consumption specified in *Chapter 3*, *Technical Data and Rated Values*.

10.4 Establish the compressed air supply

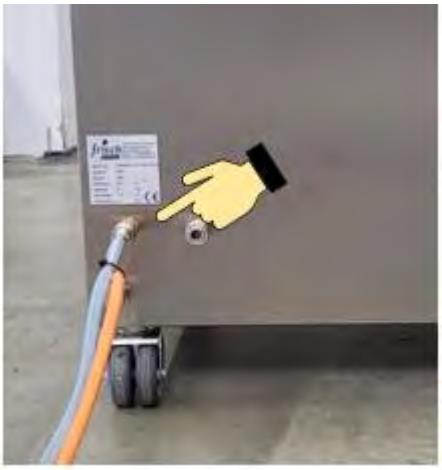


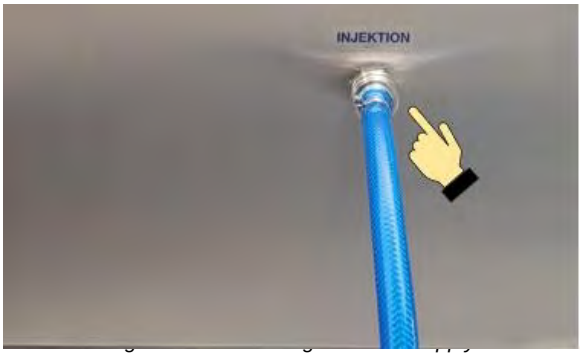
Figure 47: Establishing the compressed air supply

Establishing the compressed air supply ⚠ **CAUTION**

Tripping hazard

- ► Lay the compressed air line so that it is protected from mechanical damage and always away from walkways.
- ► Connect the compressed air supply to the heating machine.

10.5 Establish water supply for water injection system (WIS) (optional)



Establish water supply on the Combino Jet

The injection connection is located on the rear of the heating machine.

⚠ **CAUTION: Tripping hazard**

- ► Use a pressure vessel for this purpose or
- ► Lay the water line so that it is protected from mechanical damage and always away from walkways.
- ► Connect the water supply to the heating unit

Figure 49: Example of a pressure tank

11 Integrate the heating unit

The instructions in this chapter are intended for the operator	
Person in this manual	**Operator(s)** who have received training and instruction 
Required training and permitted activities	See *Section 1.4.2 "Operator" in* this operating manual.

11.1 Preparing apricot purée/fondant

11.1.1 Manufacturer’s recipe suggestions

Tip
The quality of the final product depends largely on the raw materials used. The information provided here is intended as a guide. All products used previously may continue to be used.

Aprikotur: 12.5 kg apricot jam (35% fruit content) approx.
1.8 liters water

Fondant: 15 kg block fondant
Approx. 1.2 liters of
water Approx. 0.2 kg
glucose

15 kg Frankenfondant, spreadable
Approx. 0.3 liters water
Approx. 0.2 kg glucose

- ► Mix the medium according to the manufacturer’s instructions and
- ► pour the mixture into the heating machine

11.2 Heat the apricot purée/fondant

Tip
Heating phase for fondant heating machine: approx. 45 minutes (45°C water bath temperature)
Heating phase for Apri heating machine: approx. 10 minutes (95°C water bath temperature)

► Work on the **heating machines** of the conveyor system

Figure 50: Heating machine position

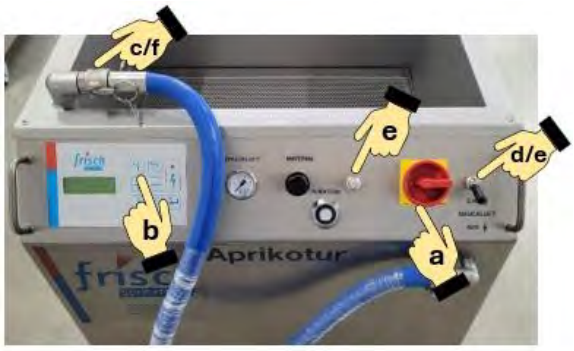


Figure 51: Setting the pump speed

Preheat the heating machine

a) Turn on the main switch

b) Turn on the heating on the “Display.”
For the heating machine for apricot paste (1), for the heating machine for fondant (2)

c) Disconnect the material hose from the heating unit and hold it over a bucket.

d) Set the air pressure switch to “On.”

✓ The heating unit begins to pump.

► Pump the medium into the bucket until fresh medium comes out of the material hose.

e) Set the air pressure switch to “Off” and

f) Reconnect the material hose to the heating machine.

This procedure must be performed after every cleaning!

During the heating process

- the apricot fondant, the medium **does not need** to be circulated.
- of the fondant, the medium **must** be circulated.
  To do this, proceed as follows:

► Set the air pressure switch to “On” and

► use the throttle to set the pump speed very slowly.

✓ The medium is slowly circulated.

✓ The fondant will warm up.

► Close the lid.

11.3 Prepare the heating machine for pouring

Tip

Heating phase when bringing the casting heating unit (Heating 1) to a boil: approx. 45 minutes (95°C water bath temperature)

The processing temperature of heating element 2 must not exceed 70°C. Follow the product manufacturer's instructions.

- Mix all the sugar and the cake glaze powder in a **separate container**, otherwise lumps will form.
- Work on the **heating units** of the conveyor system

Figure 32: Combino set casting lever position

Make sure that both control levers are set to "Off" and that the material hose is connected to the heating unit.

Figure 53: Preparing the Combino Jet Guss

a) Turn on the main switch.

b) Turn on heater 1 (1) on the “Display.”

► Fill the heating machine with 2/3 water, as hot as possible.

► Add the sugar-based cake glaze powder mixture to the heating machine’s tank while stirring constantly.

c) Set the tank control lever to **“Tank**.”

d) Disconnect the material hose from the heating machine and hold it over a bucket.

e) Set the vacuum switch to “On.”

✓ The heating machine begins to pump

► Pump the fluid into the bucket until fresh fluid comes out of the supply hose.

f) Set the compressed air switch to “Off” and

g) reconnect the material hose to the heating machine.

This procedure must be performed after every cleaning!

h) Set the compressed air switch to “On” and

i) adjust the pump speed very slowly using the throttle.

✓ The medium is slowly circulated.

✓ The material is heated to boiling.

► Close the lid.

When the mixture becomes clear, it has reached the dissolution temperature.

► Then add the remaining 1/3 of cold water.

► Use the throttle to increase the pump speed.

► Turn **off** heater 1 and

► **turn on** heater 2**.**

► Circulate the material at high speed for about 5–10 minutes.

✓ The medium cools to processing temperature and is ready for use.

You can reuse the cake glaze from the previous day. To do this, proceed as follows:

- ► At the end of the workday, remove the strainer from the tank.
- ► Turn on the main switch.
- ► Turn on heating element 1.
- ► Stir the melted casting thoroughly with a whisk until a smooth, even consistency is achieved.
- ► Turn on the air compressor and
- ► reduce the pump speed using the throttle.
- ► Circulate the casting until it boils or becomes clear.

- ► Turn off heater 1 and
- ► turn on heater 2.
- ► Increase the pump speed using the throttle.

✓ The casting is circulated more quickly.

✓ The molten metal cools to processing temperature.

11.3.1 Operate the casting heating machine with a hand gun

⚠ WARNING

The gun must be connected to the heating machine.
If the control lever is accidentally moved, hot material may escape. There is a risk of burns.

► Prepare the Guss heating machine as described in *Chapter 11.3*.

Figure 54: Combino Jet Guss with gun

a) Connect the gun to the claw coupling.
b) Set the pan control lever to **“Gun**.”
c) Set the gun control lever to **“Operate**”.

The heating machine is now ready for spraying and/or flooding.

Be sure to pay attention to the operating pressure. Operating pressure during priming: approx. 1 – max. 2 bar Working pressure during spraying: approx. 3 – max. 5 bar

During longer breaks or at the end of the workday:

► Set the selector lever to “Cleaning”

✓ The remaining material will be blown out of the hose

11.4 Connect the HZ Aprikotur/Fondant to the conveyor system

Refer to the applicable documentation

The **conveyor system** manual is included in the applicable documentation. See *Section 1.2.2 Applicable Documentation and Additional Manuals.*

This operating manual does not contain redundant descriptions or instructions.

Figure 55: Connecting the Combino Jet to the conveyor system

Connecting the heating unit with the apricot bridge to the misting box

a) Turn **off** the compressed air switch.

b) Disconnect the material hose at the Kamlok coupling from the heating unit and connect it to the misting box or the apricot coating bridge.

c) Turn **on** the air switch**.**

11.5 Connect the Combino Jet casting machine to the conveyor system

- ► Set the gun control lever to “Off” and
- ► set the tank control lever to “Tank”.

Figure 56: Connecting the Combino Jet Guss to the conveyor system

Connect the heating unit to the spray bridge and/or curtain box

a) Turn **off** the compressed air switch.

b) Disconnect the material hose at the Kamlok coupling from the HZ and connect it to the mist box or the spray bridge.

c) Turn **on** the compressed air switch**.**

✓ The heating machine conveys the cast material to the spray bridge/curtain box.

12 Start finishing

The instructions in this chapter are intended for the operator	
Person in this manual	**Operator** with training and instruction 
Required training and permitted activities	See *Section 1.4.2, "Operator," in* this operating manual.

Observe applicable documents

The **conveyor system** manual is included in the applicable documents. See *Section 1.2.2, "Applicable Documents and Additional Manuals."*

These operating instructions do not contain redundant descriptions or instructions.

- Establish the compressed air and power supply for the conveyor system.
- To do this, follow the original operating instructions for the conveyor system.
  Also observe the *media connection diagram* in accordance with *Section 1.2.2 Applicable Documents and Additional Instructions.*

13 Disconnect the heating unit from the conveyor system

The instructions in this chapter are intended for the operator	
Person in this manual	**Operator** with training and instruction
Required training and permitted activities	See *Section 1.4.2, "Operator," in* this operating manual.

If the heating machine is to be taken out of service for an extended period:

- ► Ensure that the heating machine is completely drained.
- ► Then clean the heating machine as described in *Section 15.3*

13.1 Disconnect modules

Observe applicable documents (optional)

The instructions for **the conveyor system** are included in the applicable documentation. See *Section 1.2.2 Applicable Documentation and Additional Instructions.*

► Work on the heating unit

Figure 57: Disconnect HZ

Disconnect the heating unit c o n n e c t e d to the spray bridge

a) Turn off the compressed air switch.

- ► Disconnect the material hose from the misting station or the apricot/spray bridge and
- ► Connect it to the Kamlok coupling on the HZ.
- ► Pull the HZ forward slightly and
- ► **CAUTIOUSLY** open the ball valve on the spray bar's filter housing.

Risk of scalding!!

✓ Pressure and residual material will drain from the filter into the pan.

- ► Turn the compressed air switch back on so that the medium is kept at temperature.
- ► Close the heating unit with the lid.

13.2 Turn off the heating machine and secure it against being turned back on

If the HEATING UNIT is to be taken out of service for an extended period:

- ► Make sure the heating unit is completely drained.
- ► Then clean all modules.

► Work at **the control panel** of the HEATING MACHINE.

Figure 58: Turn off the main switch on the control panel

Disconnect the power supply

- ► Turn off the main switch on the control panel.
- ✓ The power supply is now disconnected.

Secure against accidental restart

- ► Secure the main switch against being switched back on with a padlock.
- ✓ The system is safely shut down.

14 Error and fault messages – taking action

The instructions in this chapter are intended for the operator	
Person referred to in this manual	**Operator / user** who has received training and instruction 
Required training and permitted activities	See *Section 1.4.2, "Operator," in* this operating manual.

Some instructions in this chapter are intended for qualified personnel	
This chapter describes various tasks that require specialized knowledge which cannot be conveyed in this manual. ► Consult a qualified technician trained for the respective task if the instructions require it. ► Never attempt to perform these tasks yourself if you lack the necessary expertise and training. ► Make sure that any technical personnel you consult have read and understood these instructions before attempting to troubleshoot any issues.	
People in this manual	Depending on the task to be performed: ■ **Qualified electrician** and/or **maintenance technician** 
Required training and authorized activities	See *Section 1.4.3, "Installation, Repair,* and Maintenance Personnel," in this operating manual.

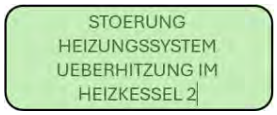
Read and understand all subsections of this chapter

Often, a fault is already detected by a malfunction,
e.g., when the double-diaphragm pump no longer delivers material.

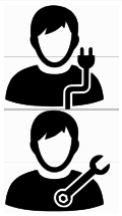
The following instructions may be **necessary** for **various** measures and troubleshooting.
► Read this chapter and its subheadings in their entirety before taking any action.
► Never attempt to perform these tasks yourself if you lack the necessary expertise and training.
► Never open any parts of the electrical equipment unless you are a qualified electrician.

14.1 Know the faults, causes, and possible measures

Malfunction/Fault	Possible cause	Remedial actions
Heater will not turn on	■ No power	▶ Check the power cord for breaks and, if necessary, contact a qualified electrician
Double-diaphragm pump is not pumping	■ No compressed air	▶ Proceed as described in *Section 10.4 to establish a compressed air supply.* ▶ Check the rocker arm
	■ Foreign object in the pump (no strainer at the suction point)	▶ Contact the customer service department at Frisch Spritzmatic GmbH; see *Chapter 17, Emergency Service, Customer Service*
	■ Diaphragms have ruptured due to age	▶ Contact the customer service department at Frisch Spritzmatic GmbH; see *Chapter 17, Emergency Service, Customer Service.*
Material leakage in the heating unit	■ Material hoses/pump leaking	▶ Contact the customer service department at Frisch Spritzmatic GmbH; see *Chapter 17, Emergency Service, Customer Service.*
Leakage noises/hissing	■ Compressed air hoses are porous	▶ Replace the affected pneumatic component or contact the customer service department at Frisch Spritzmatic GmbH; see *Chapter 17, Emergency Service, Customer Service.*
	■ Control elements are stuck	▶ Clean the affected control elements and replace them if necessary.
Control lever (3-way ball valve) is leaking	■ Screw loose	▶ Tighten the sealing screw.
Fluid is not getting warm/hot	■ Residues/burn marks in the heat exchanger	▶ Clean the heat exchanger or contact the customer service department at Frisch Spritzmatic GmbH; see *Chapter 17, Emergency Service, Customer Service.*
	■ Insufficient water in the heat exchanger	▶ Fill the heat exchanger as described in *Chapter 15.4.2 Filling the Heat Exchanger* or contact the customer service department at Frisch Spritzmatic GmbH; see *Chapter 17 Emergency Service, Customer Service.*
The medium is too liquid	■ Injection was switched on during the heating phase	▶ Turn off the injection and circulate the medium. Excess water evaporates

Display message: Call customer service	■ Operating hours limit has been reached	▶ Contact the customer service department at Frisch Spritzmatic GmbH; see *Chapter 17, Emergency Service, Customer Service.*
Display fails.	■ Cable break at the control unit	▶ Check the cable leading to the display for a break and, if necessary, contact a qualified electrician.
Display  *Figure 59: Error message* or boiler 1 temperature limiter has tripped	■ Boiler is overheating	▶ Check the fill level of the heat exchanger. If necessary, refill the water as described in *Chapter 15.4.2 Refilling the heat exchanger* and ▶ Push the green pin of the limiter back in  ▶ or contact the customer service department at Frisch Spritzmatic GmbH; see Chapter 17, Emergency Service, Customer Service. *Figure 60: Temperature limiter*

15 Cleaning, Maintenance, and Servicing

The instructions in this chapter are intended for the following individuals		
Person in this manual	**Operator / operator** with training and instruction	
Required training and permitted activities	See *Section 1.4.2, "Operator,"* in this manual.	
Person in this manual	Depending on the specific task to be performed: ■ **Qualified electrician** and/or **maintenance technician**	
Required training and authorized activities	See *Section 1.4.3 Installation, Repair,* and Maintenance Personnel in this operating manual.	
Wear personal protective equipment		

⚠ WARNING

Personnel who are not sufficiently qualified may cause personal injury or property damage due to incorrect operation

A qualified professional trained for the specific task must, based on their training and work experience, be demonstrably capable of identifying hazards and risks that arise from or may arise during the performance of that task.

► Maintain or repair system components only if you are a qualified specialist trained for the specific task.

Prevent contact with live parts

Control cabinets and electrical equipment of the system operate at life-threateningly high voltages.

► Never open control cabinets and/or electrical equipment of the system for cleaning purposes if you are not a qualified electrician.

CAUTION

Protect materials

► **Never** use **corrosive** cleaning agents.

► Never spray electrical equipment or components with a water jet.

✓ This prevents short circuits and protects sensitive parts from damage.

15.1 Prepare the necessary conditions

Turn off the heating unit and secure it against being turned back on

Cleaning, maintenance, and servicing work must be performed when the system is safely shut down.

► Make sure the heating unit is turned off and secured against being turned back on.

15.2 Intervals

Cleaning, maintenance, and servicing intervals are safety-critical

Performing the cleaning, maintenance, and servicing tasks described in this manual ensures safety in your workplace.

► Always perform the tasks described in this operating manual within the intervals specified below.

✓ This prevents dangerous situations when using the heating machine that could arise from failure to observe the care, cleaning, and inspection intervals.

Observe applicable documents

These system-wide operating instructions contain only a summary of the necessary cleaning, maintenance, and servicing intervals for the heating machine.

However, further instructions for cleaning, maintenance, and servicing activities are also provided in the applicable original operating manuals for the conveyor system.

These are not listed redundantly in this operating manual.

► Perform the cleaning, maintenance, and servicing activities exactly in accordance with the instructions in this operating manual **and** the applicable original operating manuals.

See *section 1.2.2*, *“Applicable Documents and Additional Instructions.”*

The following list of intervals also provides information on the respective references from which you can obtain the operating instructions.

If you discover a defect in any system component during the cleaning, maintenance, and servicing work described below:

► Always consult a properly trained specialist for any necessary repair or maintenance work.

► Have any defect repaired immediately.

► Only operate the heating unit if you can confirm that all parts are in proper condition and functioning correctly.

Minimum requirements for regular inspection and maintenance **Operator**	Intervals: As needed	Daily	2–3 times a week	Every 6 months	Every 2 years or every 2,500 operating hours	Every 4 years or every 5,000 operating hours	Related documents and additional instructions:
Cleaning of the apricot bridge/veil box	**X**	**X**					in accordance with the respective original operating instructions
Deep cleaning of the Hz			**X**				in accordance with *Chapter 15.3 Cleaning.*
Clean combinable modules	**X**	**X**					in accordance with the respective original operating instructions
Trained specialist							
Refill pneumatic oil				**X**			*Refill pneumatic oil* as described in *Section 15.4.1.*
Fill heat exchanger	**X**				**X**		*Fill the heat exchanger* according to *Section 15.4.2.*
Replace the pressure relief valve						**X**	*Replace the pressure relief valve* as described in *Section 15.4.3.*

15.3 Cleaning

Observe applicable documents

The **belt conveyor** instructions are included in the applicable documentation. See *Section 1.2.2 Applicable Documentation and Additional Instructions.*

Tip

To ensure consistent hygiene and functionality, it is recommended to clean the heating units regularly.

Cleaning should be performed every 2 days.

If there are multiple heating units, it is recommended to clean them one at a time to avoid interrupting the production process.

Drain the heating machine

- ▶ Turn off the compressed air.
- ▶ Disconnect the material hose from the apricot or veil station and
- ▶ hold this end over a bucket or drain.
- ▶ Turn on the compressed air.

✓ The pump will draw the medium out of the tank.

- ▶ Turn off the pump when air comes out of the material hose.
- ▶ Turn off the compressed air.
- ▶ Connect the material hose to the pump.
- ▶ Fill the tank with enough warm water and
- ▶ start the pump.
- ▶ Clean the tank and the outside of the heat exchanger using a suitable low-pressure cleaning system.
- ▶ Use a suitable cleaner to remove scale buildup in the heat exchanger.

CAUTION: Never use corrosive cleaning agents.

We recommend P & R cleaning agent. This is available from Frisch Spritzmatic GmbH.

- ▶ Turn off the compressed air and let the cleaning agent sit for about 5 minutes.
- ▶ Repeat this process about 3 times.
- ▶ Turn off the compressed air and
- ▶ disconnect the material hose from the top of the HZ.
- ▶ Hold the material hose over a drain and
- ▶ Pump the cleaning agent out of the tank as described in this chapter.
- ▶ Rinse the tank and pump with plenty of fresh water so that no cleaning agent residue remains in the HZ.
- ▶ Prepare the HZ as described in *Chapters 11.2 and 11.3, "Preparing the Heating Machine*."

15.4 Maintaining the heating unit

The instructions in this chapter are intended for specially trained personnel	
This chapter includes instructions for various tasks that require specialized knowledge which cannot be covered in this manual. ► Consult a qualified professional trained in the specific task when the manual instructs you to do so. ► Never attempt to perform these tasks yourself if you lack the necessary expertise and training. ► Ensure that any specialist personnel you consult have read and understood these instructions before attempting to troubleshoot any issues.	
Persons in this manual	Depending on the task to be performed: ■ **Qualified electrician** and/or **maintenance technician** 
Required training and authorized tasks	See *Section 1.4.3, "Installation, Repair, and Maintenance Personnel*," in this operating manual.

15.4.1 Refill the pneumatic oil

► Work inside the heating machine

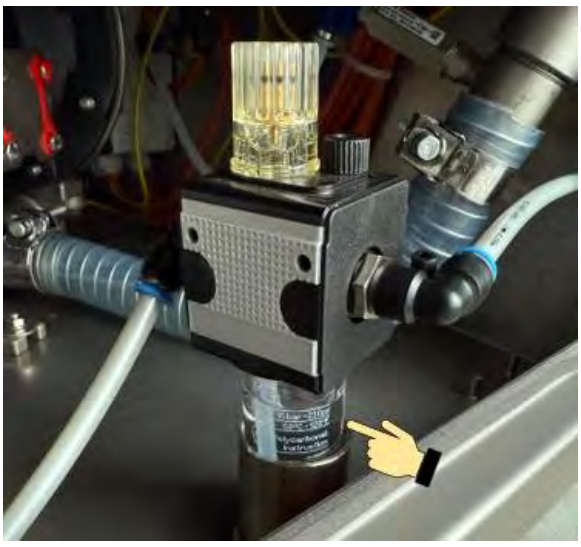


Figure 61: Protective cover 1

Disconnect the heating machine from the compressed air

► Unscrew the oil reservoir from the oiler and
► fill it ¾ full with food-grade special pneumatic oil.
► Screw the oil reservoir back into the oiler. Make sure the sealing ring is seated properly.

15.4.2 Fill the heat exchanger

⚠ WARNING

The heat exchanger contains high-temperature water.
Only open the heat exchanger when it has cooled down.
Hot water may escape during heating. This can cause severe burns.

Figure 62: Heat Exchanger Safety Valve

- ▶ Remove the pressure relief valve.
- ▶ Fill the heat exchanger with water.
- ▶ Seal the pressure relief valve thread with Teflon tape and
- ▶ screw it back into the thread.

- ▶ Heat the heater to maximum temperature so that the excess water can escape.

Wrap a cloth around the pressure relief valve to prevent burns.

- ▶ Let the heater run at maximum temperature for about 2 hours with the doors open.

15.4.3 Replace the pressure relief valve

⚠ WARNING

The heat exchanger contains high-temperature water.
Only open the heat exchanger when it has cooled down.
Hot water may escape during heating. This can cause severe burns.

- ▶ Proceed as described in *Section 15.4.2,* “Filling *the Heat Exchanger*.”
- ▶ To do this, install a new pressure relief valve.

16 Disassembly and Disposal

The instructions in this chapter are intended for specially trained personnel	
Person in this manual	Depending on the task to be performed: ■ **Qualified electrician** and/or **plumber** 
Required training and authorized activities	See *Section 1.4.3, "Installation, Repair, and Maintenance Personnel*," in this operating manual.
Wear personal protective equipment	

⚠ WARNING

Danger from electric current

The system operates at high voltage.

► **Never** open the control cabinet, the control system, or other electrical equipment unless you are **a qualified electrician**.

Meet the requirements

Disassembly must be performed only after the system has been safely shut down.

► Turn off the system and secure the main switches against being turned back on.
To do this, follow the instructions in *Section 13.2, "Shut Down the Heating Unit and Secure It Against Re-energization."*

► Disconnect
- all supply connections to the system and
- the combinable modules from one another.

To do this, follow the instructions in *Chapter 13* of this operating manual.

⚠ WARNING

Personnel who are not sufficiently qualified can cause personal injury and property damage.
Disassembly work requires the expertise of a trained specialist and must only be performed by personnel specifically trained for this purpose.
Such knowledge cannot be imparted through these instructions.

Disposal

Be familiar with the rules and regulations regarding disposal

- After separating the materials, have the components recycled.
- Have the materials separated into their components
  - steel,
  - non-ferrous metals,
  - plastics, and
  - electronic waste.
- Ensure that industry-specific and local regulations are followed when disposing of the various materials.
- When handling oils and greases,
  - the safety data sheets applicable to the product as well as
  - environmental protection regulations.

Logo: Recycling

Dispose of parts safely

- Have the materials disposed of in accordance with local regulations or
- return the components to the manufacturer.
- Never dispose of electrical or electronic components in household waste.

17 Emergency service, customer service

To resolve technical issues and malfunctions with the HEIZMASCHINE, please contact the service team at Frisch Spritzmatic GmbH.

Frisch Spritzmatic GmbH
Ramminger Straße 4
D- 89129 Öllingen

Tel: +49 (0)7345 20095 0

Web: www.frisch-spritzmatic.de

Email: info@frisch-spritzmatic.de

18 EC Declaration of Conformity

in accordance with the **EC Machinery Directive 2006/42/EC, Annex II 1 A,** OJ L 157/24 of June 9, 2006

We, the manufacturer, hereby declare under our sole responsibility that the equipment listed below, in its design and construction as well as in the version we have placed on the market, complies with the provisions and requirements of the above-mentioned Directive and thus with the relevant Union harmonization legislation.

We further declare the conformity of the equipment listed below with the safety objectives of the EU

Directive

Electrical Equipment "Low Voltage" 2014/35/EU, Annex I OJ L 96/357 of March 29, 2014, as well as compliance with the essential requirements of the EU Directive

Electromagnetic Compatibility "EMC" 2014/30/EU, Annex I, OJ L 96/79 of March 29, 2014.

Continue explain we the the of the listed attachment with the safety objectives of the EU Directive on

Electrical Equipment "Low Voltage" **2014/35/EU, Annex I**, OJ L 96/357 of March 29, 2014

All parts of the machine that come into contact with **food** also comply with the requirements of the EU regulations on **food contact materials** and **plastics**

REGULATION (EC) No. 1935/2004, OJ L 338/4 of November 13, 2004,

REGULATION (EU) No. 10/2011, OJ L 12/1 of January 15, 2011

and their amending regulations, as well as on good manufacturing practices for food contact materials and articles

REGULATION (EC) No. 2023/2006, OJ L 384, p. 75, of December 29, 2006

System name	**Combino Jet**
Identification	Nameplate on the control cabinet
Year of manufacture	2026
Manufacturer and address	**Frisch Spritzmatic GmbH** **Ramminger Street 4** **D- 89129 Öllingen**
Authorized representative for documentation	Jürgen Frisch
applied harmonized standards, in particular	**Safety of machinery and equipment** EN ISO 12100:2010 – Risk assessment EN ISO 13849-1:2023 – SRP/CS EN ISO 13849-2:2012 – SRP/CS EN ISO 13850:2015 – Emergency stop EN ISO 13854:2019 – Minimum distances EN ISO 14118:2018 – Unexpected start-up EN ISO 14120:2015 – Separating protective devices EN ISO 19353:2019 – Fire protection EN ISO 4414:2010 – Pneumatic systems EN 415-7:2006+A1:2008 – Packaging machines, Sections 5.2.2.1.2, 5.3.2 EN 619:2022 – Continuous conveyors and systems EN 1672-2:2005+A1:2009 – Food processing machinery EN 60204-1:2018 – Electrical equipment **Electromagnetic Compatibility EN 61000-6-3:2011-09 – Emission EN 55011:2018-05 – Immunity** **Technical documentation** EN IEC / IEEE 82079-1:2021 – Requirements User manual

Jürgen Frisch - Managing Director

The original document, signed by hand, is part of the product documentation.

19 Attached information

19.1 Control Circuit Diagram (6.1)

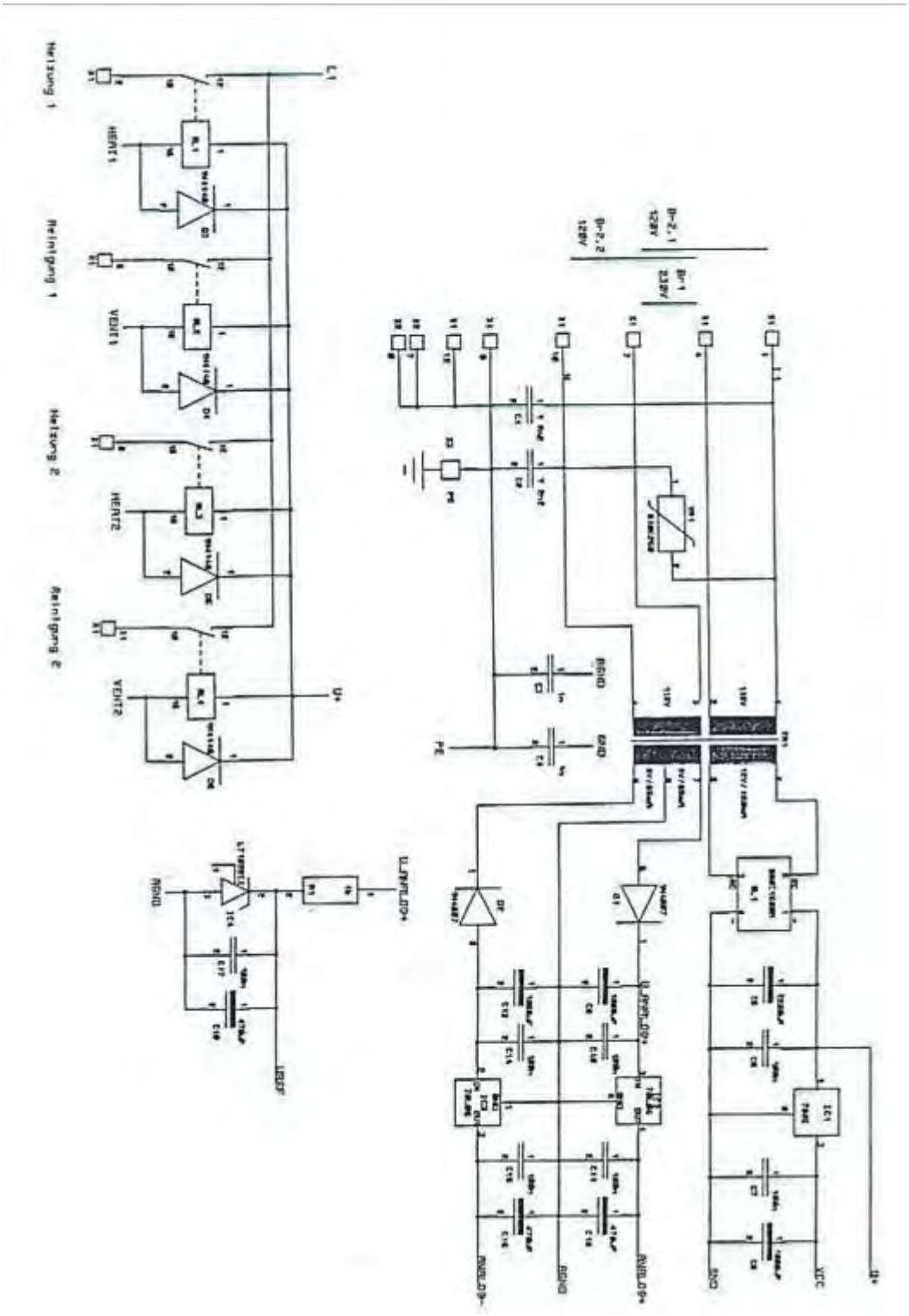


Figure 63: Control Circuit Diagram 1

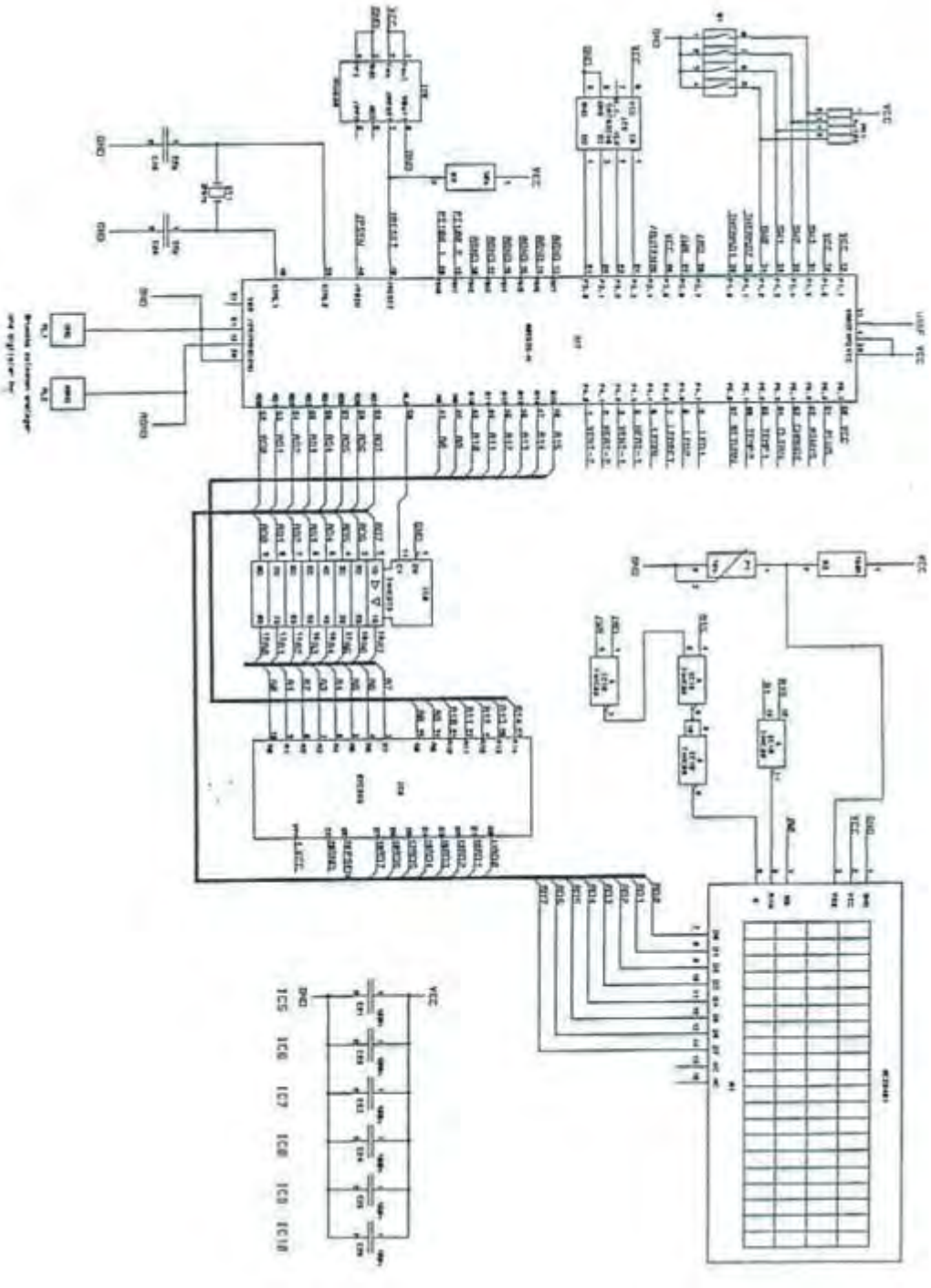


Figure 64: Control Circuit Diagram 2

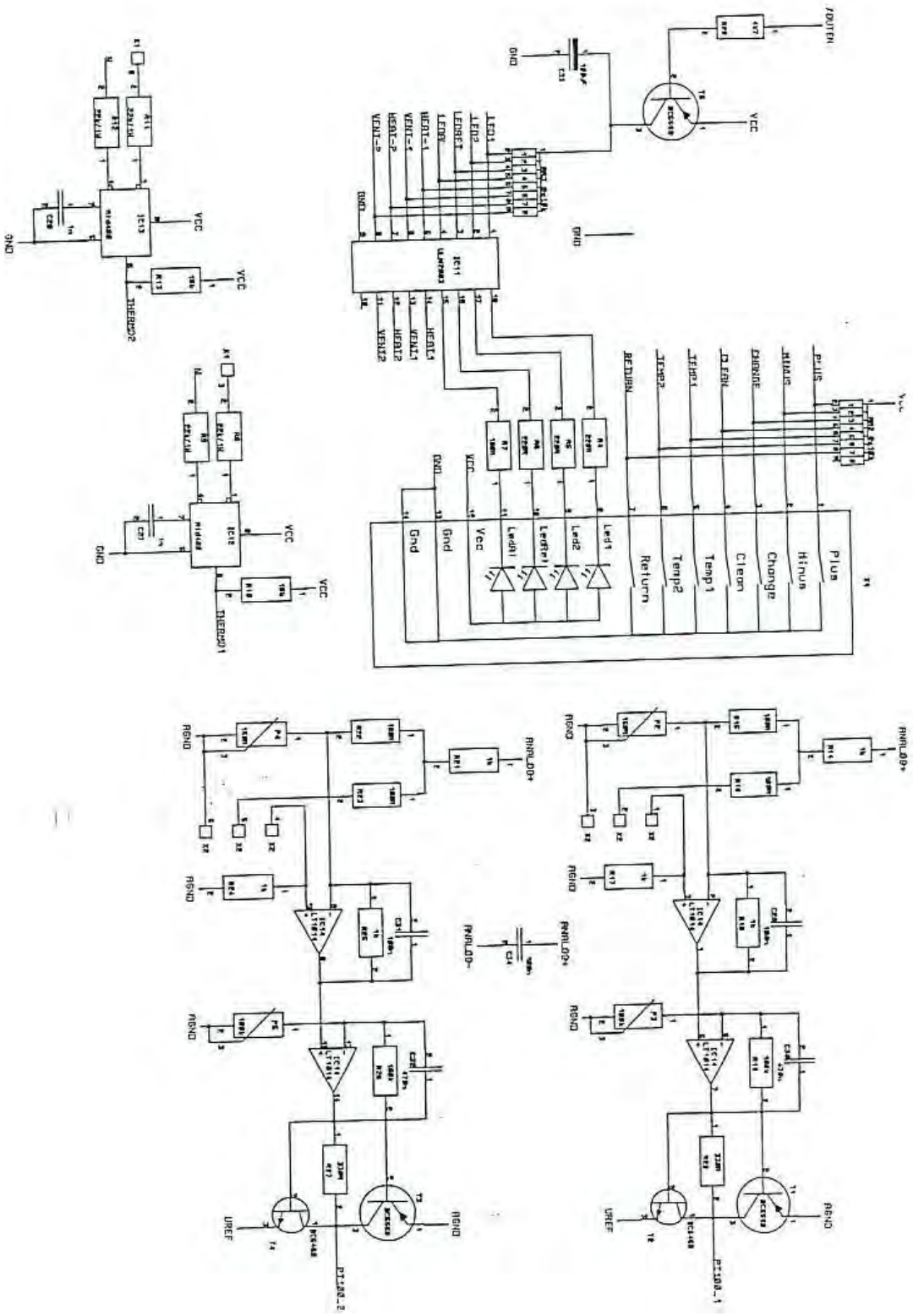


Figure 65: Control Circuit Diagram 3

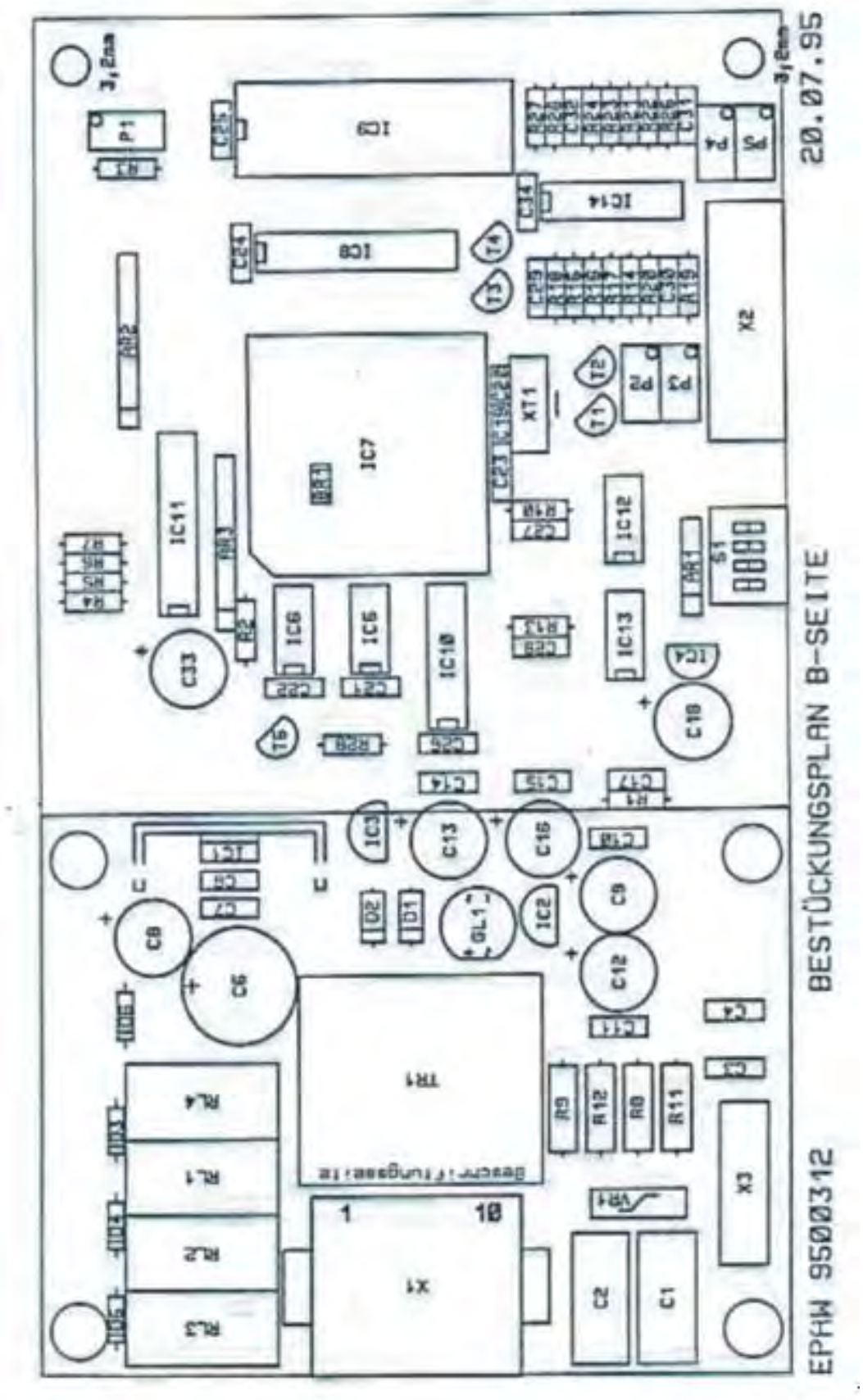


Figure 66: Control Circuit Diagram 4

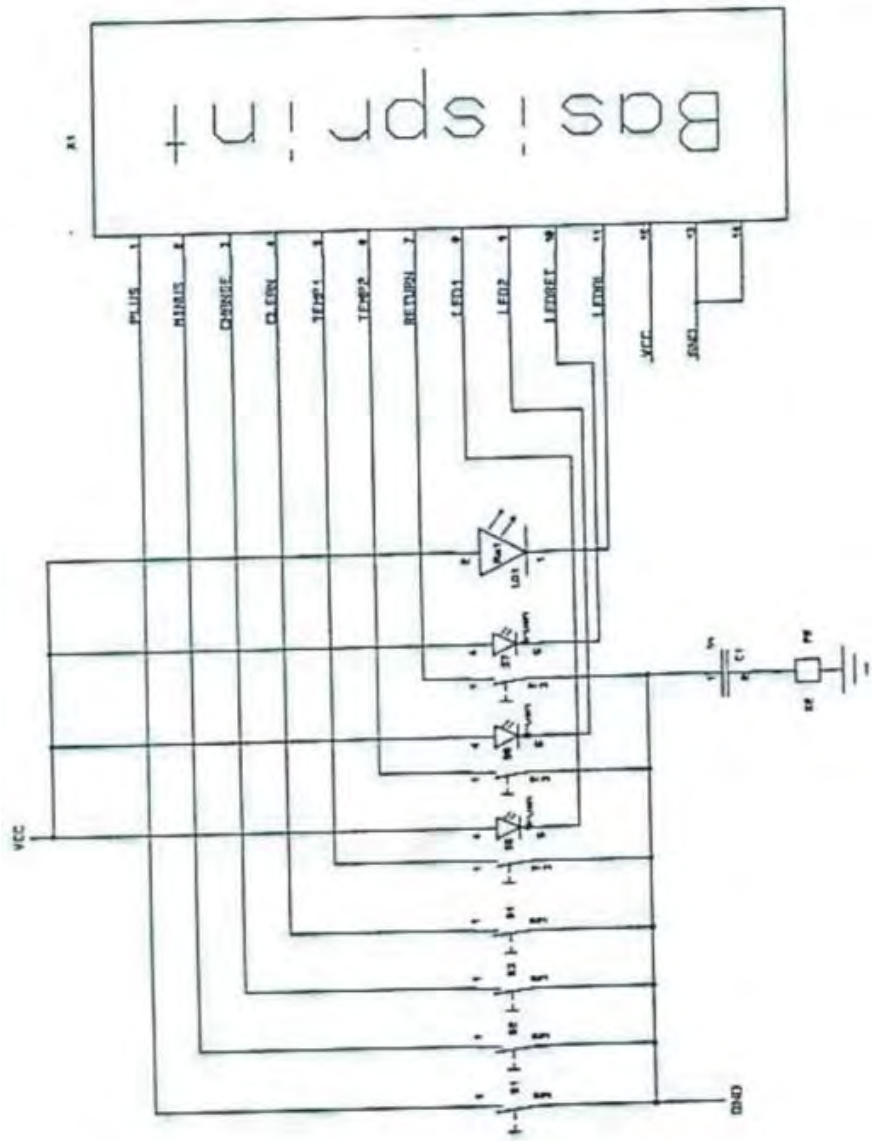


Figure 67: Control Circuit Diagram 5