

# RoboLabs

Incredible machines for fastfood & funfood

## Caramel coater

CP-20EU

## Instruction Manual



Original instructions. Read this document before use and keep it for future reference. PDF version is available on [www.robolabs.pro](http://www.robolabs.pro)

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This document (hereinafter — the manual) contains essential information on installation, intended use, and technical maintenance of CP-20EU coater (hereinafter — the machine).

The manual is intended for operators who work with the machine, and for technical personnel who conduct installation, commissioning, and technical service.

The manual must be kept during all life time of the machine in place readily available for operators, and technical personnel.

# 1 Safety requirements



This is the safety alert symbol. It is used to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

## **DANGER**



- Not grounded machine can cause electric shock. Power outlet **MUST HAVE** proper grounding to avoid electric shock.
- **DO NOT** use excessive water or water jet for machine cleaning. **DO NOT** spill water on electric panels or parts. Using excessive water during cleaning can cause short circuit and electric shock.
- **DO NOT** immerse machine and/or supply cord into water.
- **ALWAYS** unplug machine before cleaning or servicing.
- No user serviceable parts inside electric panel. **DO NOT** open electric panel unless you are qualified for this.

## **WARNING**



- Some surfaces are hot. Touching hot surfaces might cause burn. **DO NOT** touch while in operation.

## **WARNING**



- **DO NOT** touch moving parts during machine operation.

## **WARNING**



- **DO NOT** use machine in the way other than intended.
- **DO NOT** leave operating machine unattended.
- **DO NOT** modify design of the machine.

## **WARNING**



- Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury, or death. Read and understand this manual before use.
- Only instructed personnel is allowed to operate the machine.

## 2 General information

### 2.1 Designation

Coater CP-20EU (hereinafter — the machine) is intended for making caramel coated popcorn.

Commercial use only.

### 2.2 Technical specifications

Kettle volume	75 L
Rated voltage	400 V
Rated frequency	50-60 Hz
Rated current	14 A
Dimensions (LxWxH), not more	86x63x114 cm
Weight, not more	77 kg
Material	AISI 430
Design life	7 years

### 2.3 Delivery set

Machine	1 pc
Kettle lid	1 pc
Plastic bucket	1 pc
Mixer	1 pc
Mixer fixing nut	1 pc
Deflector	2 pcs
Screw M6x12	4 pcs
Plain washer 6	4 pcs
Spring washer 6	4 pcs
Cap nut M6	4 pcs
Sealing collar (spare part)	1 pc
PTFE collar (spare part)	1 pc
Electric panel key	2 pcs
Documentation set	1 pc

## 2.4 Design and operation

Main components of the machine are shown on Fig. 1:

Kettle (3), in which caramel is cooked and popcorn is mixed with cooked caramel. Kettle is closing with Lid (5). Kettle is mounted on Bearing Units (2), and can be dumped with Handle (4).

Under the Bottom Plate (7) of the kettle there are heating elements that heat up the kettle. Temp Sensor (8) measures temperature in the kettle.

Mixer (11) is fixed on Shaft (9) with Fixing Nut (10). Motor (6) drives the shaft.

Two Deflectors (12) help to mix popcorn with caramel.

Electric Panel (1) accommodates electric components of the machine, as well as control panel, which includes the following controls: Thermostat (13) that controls kettle heating process; Main Switch (14) turns the machine on and off, and also set different operating modes (caramel cooking and mixing); Emergency Stop Swtich (15).

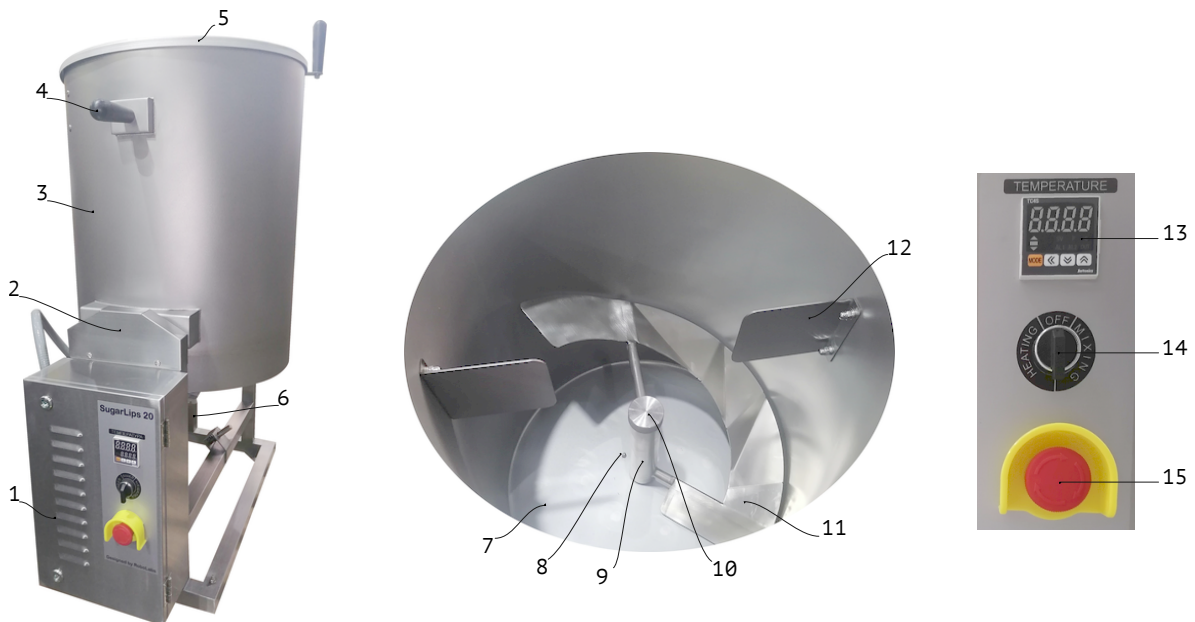


Figure 1

Operating principle is the following.

First caramel slurry is cooked in the kettle, while it is turned on in heat. Heating elements provide heating to the slurry, and intermittent operation of mixer provides even texture of the slurry.

Once caramel is ready, operator add popped popcorn in the kettle and turns on mixing mode. In this mode heating elements are not engaged, and mixer rotates constantly, providing proper coating popcorn with caramel. Once popcorn is well coated, operator tips the kettle with the handle and discharge popcorn on a cooling table<sup>1</sup>.

<sup>1</sup> To be ordered separately.

## **2.5 Packing**

The machine is supplied in packaging that protects the machine from mechanical impact and soil during transporting and storage.

## **2.6 Transportation and storage**

The machine may be transported by any kind of covered vehicle, in accordance with transportation rules for this kind of vehicle. Ambient temperature during the transportation and storage must be between minus 25 °C and plus 55 °C.

### 3 Commissioning

#### **DANGER**



- Not grounded machine can cause electric shock. Power outlet **MUST HAVE** proper grounding to avoid electric shock.
- Wall receptacle **MUST** be installed by a qualified electrician.
- If supply cord damaged, it **MUST** be replaced by manufacturer, service agent, or a skilled person in order to avoid hazard.
- **DO NOT** connect the machine to voltage inverters of any kind.

#### **WARNING**



- Installation, assembling, and electric connections must be performed by a qualified technician.

#### 3.1 Ambient requirements

This machine is designed to be operated indoors at the ambient temperature from +5 °C to +40 °C (+41 °F to +104 °F) and relative humidity not more than 45% at 40 °C (104 °F) while using at altitudes not exceeding 1000 m over the sea level. The temperature decreasing is related to RH increasing, for example, 90% of RH at 20 °C (68 °F). This machine **MUST NOT** be exposed to precipitations of any kind (rain, snow and so on).

A ventilation hood measuring 1200x1200 mm with capacity of 3000 cu.m/hour must be arranged over the machine.

The distance to closest combustible surfaces must exceed 1000 mm. It is a must to provide at least 150 mm gap between ventilation holes on the machine and any objects.

#### 3.2 Unpacking and installation

1. Unpack the machine carefully and keep packaging for future use.
2. Check the delivery set.
3. Remove protective film where applicable.
4. Put the machine on special base<sup>2</sup>.
5. Wipe all surfaces with a clean cloth dampened with a mild soap. Then remove soap residues with a cloth dampened with water. Let it dry.
6. Check to see if the PTFE Collar (1) is installed inside the Mixer (4).
7. Put the Mixer on the Shaft (2) and fix it with Fixing Nut (3). **ATTENTION!** The fixing nut has left thread.

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2 To be ordered separately.

8. Put two deflectors (Fig. 1, pos. 12) from inside the kettle, fix them with M6 screws, washers and cap nuts from the delivery set.
9. Check the supply cord if it is not damaged.
10. Connect machine to the power service.
11. Perform operation check (see corresponding section).
12. Fill in 'Commissioning Report' in the Factory Certificate.

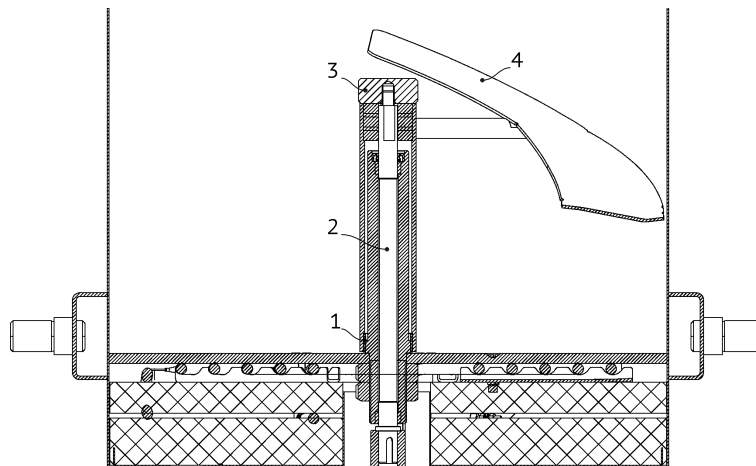



Figure 2

### 3.3 Electric requirements

The machine requires three phase 400 V 50 Hz five-wire system (L1-L2-L3-N-GND). Use 3P+N+PE 16 A 400 V pin and sleeve connector (IEC 60309). Connecting to the mains must be arranged in conformity with all requirements applicable in the country of use at the moment of commissioning. The machine has a 3P 16 A circuit breaker with rated short-circuit capacity 6 kA at its input.

Equipotential bonding wire (up to 10 sq.mm) shall be connected to screw terminal on the base frame marked with IEC 60417-5021 sign: 

Check the voltage in the receptacle. Plug the machine in. Make sure that the supply cord is not twisted, pulled, and is not mechanically impacted in any other way; and also is not in contact with hot surfaces.

### **3.4 First start (operation check)**

ATTENTION! Machine that was kept for a long time at temperatures below 0 °C must be kept in normal room temperature (20-22 °C) not less than 12 hours before first start.

1. Remove kettle lid. Set the main switch to HEATING. After few seconds current temperature is displayed on the thermostat, and mixer starts to rotate intermittently.
2. Check the mixer rotation direction. If it rotates counter-clockwise, swap any two phase wires in the plug.
3. Let the mixer operate few times, and then set the main switch to OFF. Make sure that the kettle's bottom started to heat up.
4. Set the main switch to MIXING. Make sure that the mixer rotates constantly.
5. Set the main switch to OFF.

## 4 Intended use

### **DANGER**



- DO NOT use machine if supply cord, cable plug, or wall receptacle are damaged.
- DO NOT allow supply cord to be twisted, bent, pulled, contacted with sharp edges, or to be mechanically impacted in any other way.
- DO NOT let supply cord to be in contact with hot surfaces.

### **WARNING**



- Kettle is hot. Touching hot kettle might cause burn. DO NOT touch while in operation.
- Water steam coming from kettle lid can scald. Remove lid carefully.

### **WARNING**



- DO NOT reach into kettle during operation. DO NOT touch rotating mixer during operation,
- Stay clear of dumping mechanism operation area.

### **WARNING**



- Mixer starts automatically.

### **WARNING**



- Wear appropriate slip-resistant footwear.
- Clean up spills immediately after discovery.

### **WARNING**



- DO NOT leave working machine unattended.
- DO NOT use machine in other way than intended.
- DO NOT use Emergency stop switch for normal shut down.
- DO NOT wear dangling jewelry, loose clothing, rings or have loose, long hair that could get caught up by moving conveyor.
- It is a MUST to provide free access, at any time, to wall receptacle, and switchboard to which the receptacle is connected.

## 4.1 Caramel popcorn making

1. Prepare popped popcorn, and caramel ingredients.
2. Remove kettle lid.
3. Add dry ingredients of caramel in the kettle. Set the main switch to HEATING.
4. After few cycles of mixer, add water in the kettle and close the kettle with the lid.
5. Wait for steam coming out under the lid; and then remove the lid carefully.
6. Add oil in the kettle.
7. Once set temperature is reached, sound alarm is given. Add popped popcorn in the kettle, and set the main switch to MIXING. Mixer starts to rotate continuously.
8. Once popcorn is evenly coated with caramel, take the handle and tip the kettle to discharge popcorn on cooling table or other receiving device.
9. Bring the kettle back in initial position. Set the main switch to OFF.

## 4.2 Temperature set up

Caramel quality depends on set temperature. It is necessary to find optimal set value for each recipe and machine. In the beginning, it is recommended to do few trial batches to find optimal temperature set value.

On thermostat panel (see Fig. 7) there are two display lines. The upper line (1) reads the current temperature in the kettle. The lower line (2) reads set value. In the low part, thermostat control keys (3) are located.

To change the set value, use   keys.

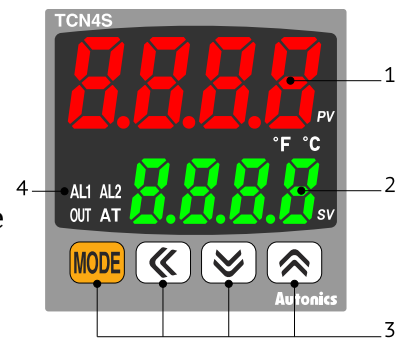


Figure 3

## 4.3 Thermal cut-out

A thermal cut-out of capillary type is installed in the kettle. Its sensing element is mounted in the heating elements area. In case of heating elements overheating, the thermal cut-out opens the power circuit for the heating elements, so to avoid kettle overheating. In this case, temperature doesn't rise up, and the thermal cut-out must be released to resume normal operation of the machine. To release, press the release pin, see Fig. 8.



Figure 4

ATTENTION! In case of frequent tripping of the thermal cut-out, stop using the machine and call for a technician.

#### **4.4 Abnormal operation**

In case of any signs of abnormal operation of the machine, such as distinctive smell, smoke formation, loud side noises, and so on, turn off and unplug the machine, and then call for a technician.

## 5 Cleaning

### **DANGER**



- DO NOT use excessive water or water jet for machine cleaning. DO NOT spill water on electric panels or parts. Using excessive water during cleaning can cause short circuit and electric shock.
- DO NOT immerse machine and/or supply cord into water.
- DO NOT keep supply cord on the floor.

### **WARNING**



- Kettle is hot. Touching hot kettle might cause burn. DO NOT touch while in operation.
- Water steam coming from kettle lid can scald. Remove lid carefully.

### **CAUTION**



- DO NOT use high alkaline cleaners, sharp items, or abrasives while cleaning.

The purpose of maintenance and cleaning is to keep machine in good condition during all the lifetime and to meet safety requirements.

### 5.1 Daily cleaning

1. Inspect supply cord, cable plug, and wall receptacle for any damages. In case of found damages DO NOT use the machine until damaged parts replaced.
2. Add not more than 3 liters of water (water must cover all kettle's bottom) in the kettle and close the lid.
3. Set the main switch to HEATING.
4. Wait for water starts to boil, and let it boil for 2-3 minutes, so the steam cleans the sidewalls of the kettle inside.
5. Set the main switch to OFF.
6. Wait for the kettle to cool down.
7. Take off the lid.
8. Take any suitable container to collect water from the kettle.
9. Take the handle and tip the kettle so to remove water out of kettle in the container.
10. Remove solid residues from the kettle. In case of severe carbon build-up on the kettle's bottom, use special solutions in accordance to their instructions for use.

11. Release the fixing nut that fixes the mixer. ATTENTION! The nut has left-handed thread (rotate clockwise to release).
12. Take out the mixer, wash it with water and let it dry.
13. Wipe internal surfaces of the bin with a soft clean cloth dampened with mild soap; then remove soap residues with a cloth dampened with water. Let it dry.
14. Put the mixer back on the shaft and fix with the fixing nut.

## 6 Technical maintenance

### **DANGER**



- ALWAYS unplug while servicing.
- Technical maintenance and repair **MUST** be conducted by a qualified technician only.
- A warning tag (DO NOT TURN ON! WORK IN PROGRESS!) must be placed at the switchboard during servicing.

### **WARNING**



- Make sure the kettle is cooled down before servicing.

### **WARNING**



- ALWAYS use safety goggles while servicing.

### 6.1 Technical maintenance

To provide good and safe operation of the machine, it is a must to conduct technical maintenance on regular basis, and operating repair, as needed.

Technical maintenance — scope of work, which goal is to maintain the machine in operable condition during intended use.

Operating repair — scope of work, which goal is to recover the machine or its parts in case of malfunction, and renewal of its resource.

- Technical maintenance Stage 1 must be conducted every 360 hours of machine's operation.
- Technical maintenance Stage 2 must be conducted every 1000 hours of machine's operation.
- Operating repair must be performed as needed.

It is a must to conduct technical maintenance while performing operating repair.

### **6.1.1 Technical maintenance Stage 1 schedule**

1. Ask the operators who work with the machine for any issues related to the machine and its operation.
2. Ensure that the machine is installed in accordance with the installation instructions (see section 3).
3. Check the voltage in the wall receptacle. The value, measured between neutral terminal and each of phase terminal, must be  $230\text{ V} \pm 10\%$ .
4. Visually inspect the machine to detect any faults or broken parts. Make photo as necessary.
5. Unplug the machine. Inspect supply cord, cable plug, and wall receptacle. Pay attention to mechanical damages, damaged insulation, and color changes. Replace damaged components.
6. Check the control panel: thermostat, Emergency stop switch, push buttons. Tighten their mountings, if necessary.
7. Check the cable gland for supply cord. Cord must be tightly secured by the gland. Tighten loosen gland.
8. Check the resistance between the grounding pin of cord plug and accessible conductive parts. The result must not exceed 0,2 Ohm.
9. Check connection and continuity of the equipotential bonding wire.
10. Make a record in the corresponding section of the Factory Certificate.

### 6.1.2 Technical maintenance Stage 2 schedule

1. Open the electric panel. Open the electric panel. Remove dust and debris from inside.
2. Inspect internal wiring and components; pay attention to mechanical damages, insulation color changing. Replace damaged wiring; restore markings on the wiring.
3. Tighten contact joints and terminals of main current conducting parts, terminal block and connectors. Face up pitted contacts as necessary.
4. Tip the kettle, release the nuts that fix the motor bracket; release two set screws in the clutch that connects mixer shaft and motor shaft; and then take off the motor with bracket from the shaft.
5. Remove lower cover of the kettle.
  - 5.1. Inspect terminal blocks, tighten the terminals if necessary.
  - 5.2. Inspect mounting brackets of heating elements. Tighten if necessary.
  - 5.3. Inspect heating elements EK1-EK3 terminals, as well as respective wiring. Tighten terminals and face up pitted contacts as necessary. In case if heating elements need to be replaced, use anti-seize electric-conductive paste while connect the wires to the terminals of the elements. Check continuity of the heating elements. There must be no short nor open circuit, as well as ground fault. Resistance of each element should be around 21 Ohm at room temperature.
  - 5.4. Inspect mounting bracket for the bulb of thermal cut-out, and inspect the bulb and capillary tube. In case of damaged bulb or capillary, replace the thermal cut-out.
6. Release Fixing Nut (4), see Fig. 5. ATTENTION! Fixing nut has left-thread. Remove Mixer (5) from the Shaft (2). Inspect Sealing Collar (3) and PTFE Collar (1). Replace worn-out components. Put the mixer back on the shaft and fix with the nut.
7. Make a record in the corresponding section of the Factory Certificate.

## 6.2 Supply cord replacing

1. Unplug the machine.
2. Open electric panel.
3. Disconnect supply cord wires from terminals.
4. Release cable gland, remove old cord.
5. Insert new cord in the cable gland; connect to the terminals.
6. Tighten cable gland; make sure the cord is secured firmly and cannot move back and forth through the gland.
7. Close electric panel.

## 6.3 Sealing collar and PTFE collar replacing

There are parts on the mixer that are subject for wear and tear. Order of replacing is the following.

1. Release Fixing Nut (4), see Fig. 5. ATTENTION! Fixing nut has left-thread. Take off the Mixer (5) from Shaft (2).
2. Remove Sealing Collar (3) and PTFE Collar (1).
3. Put new sealing and PTFE collars.
4. Put the mixer back on the shaft and fix with the nut.

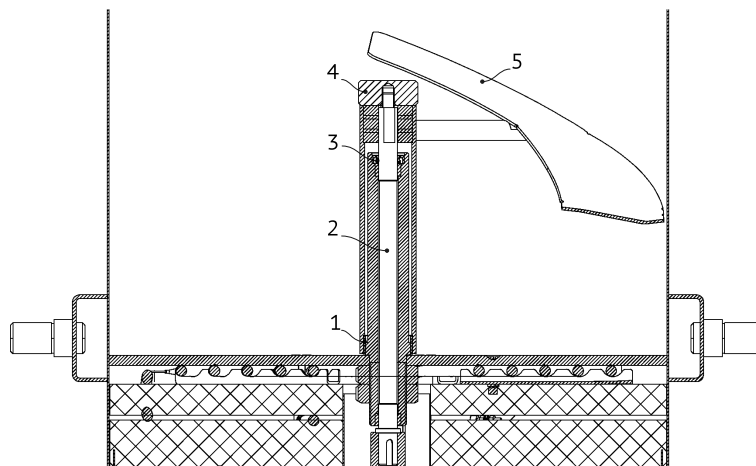


Figure 5

## 6.4 Time relay

While the machine is in HEATING mode, mixer operates intermittently. The mixer motor is controlled by two time relays. DC2 relay controls the time the motor is on. DC3 relay controls the time the motor is off.

Each time relay has the following controls, see Fig. 6:

Time range selector (1) — sets out time range.

Time unit (2) — indicator that represents different time units for different time ranges.

Operation mode selector (3) — sets out operation mode of the relay.

Factor default settings are given in Table 1.

Table 1: Time relay DC2, DC3 settings

Parameter	DC2	DC3
Operation mode	B	B
Set value	3 seconds	30 seconds

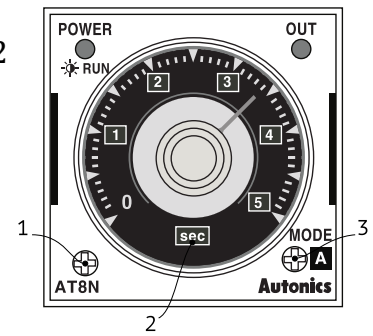
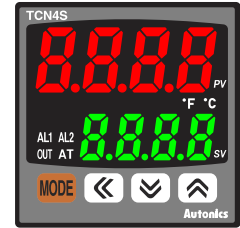


Figure 6

## 6.5 Thermostat

Thermostat DC1 (hereinafter — unit) connected to temp sensor BT that is located in the kettle.

The control output of the unit drives contactor KM1, that feeds solid-state relays VS1-VS2 and heating elements EK1-EK6. In case when temperature at heating elements exceeds 350 °C the unit opens contactor KM1, so turning off power to heating elements.



There are two setting groups in the unit, Group 1 and Group 2. To enter Group 2, press and hold **MODE** for 4 seconds; release once display reads PAR2. To enter Group 1, press and hold **MODE** for 2 seconds; release once display reads PAR1.

Press **MODE** to list parameters. Press **←**, to see current value of a parameter. Press **↓** **↑** to change the value. Press **MODE** to move to the next parameter.

When nothing pressed during 30 seconds, the unit returns back to operation mode. To return back to operation mode earlier, press and hold **MODE** few seconds. To change set value (SV) use **↓** **↑**, while the unit is in the operation mode.

It is a must to change parameters in the same order as they appear in Table 2, except parameter LoC. It must be set to oFF to unlock other parameters. Once all parameters are set up, change the value of parameter LoC in accordance with the chart.

After changing parameters In-t (sensor type), UnIt (measurement units), H-Su, L-Su, AL1, AL2, AHYS parameters are initialized and must be set again. The unit has more parameters than listed in the chart. Skip a parameter if it is not in the chart. Parameters might be locked (depending on current value of parameter LoC). Before setting up parameters, set parameter LoC to 'oFF'.

Table 2: Thermostat DC1 settings

Group	Parameter	Value	Designation
Par2	In-t	YCA.H	Sensor type
Par2	L-su	0090	SV low limit
Par2	H-su	0170	SV high limit
Par2	C-nd	PId	Control type
Par2	oUt	rLY	Control output
Par2	t	20.0	Control cycle
Par2	AL-1	An1.A	AL1 operation mode
Par2	AL-2	An6.A	AL2 operation mode
Par2	AHYS	1	Alarm output hysteresis
Par1	AL1	-5	AL1 alarm temperature set value
Par1	AL2	125	AL2 alarm temperature set value
Par1	P	050.0	Proportional band
Par1	I	0000	Integral time
Par1	d	0000	Derivative time
Par2	LoC	LoC2	Lock settings
SV	SV	155	Set value

## 6.6 Electric panel layout

Electric components designations is shown on Fig. 7. For component designations see wiring diagram.

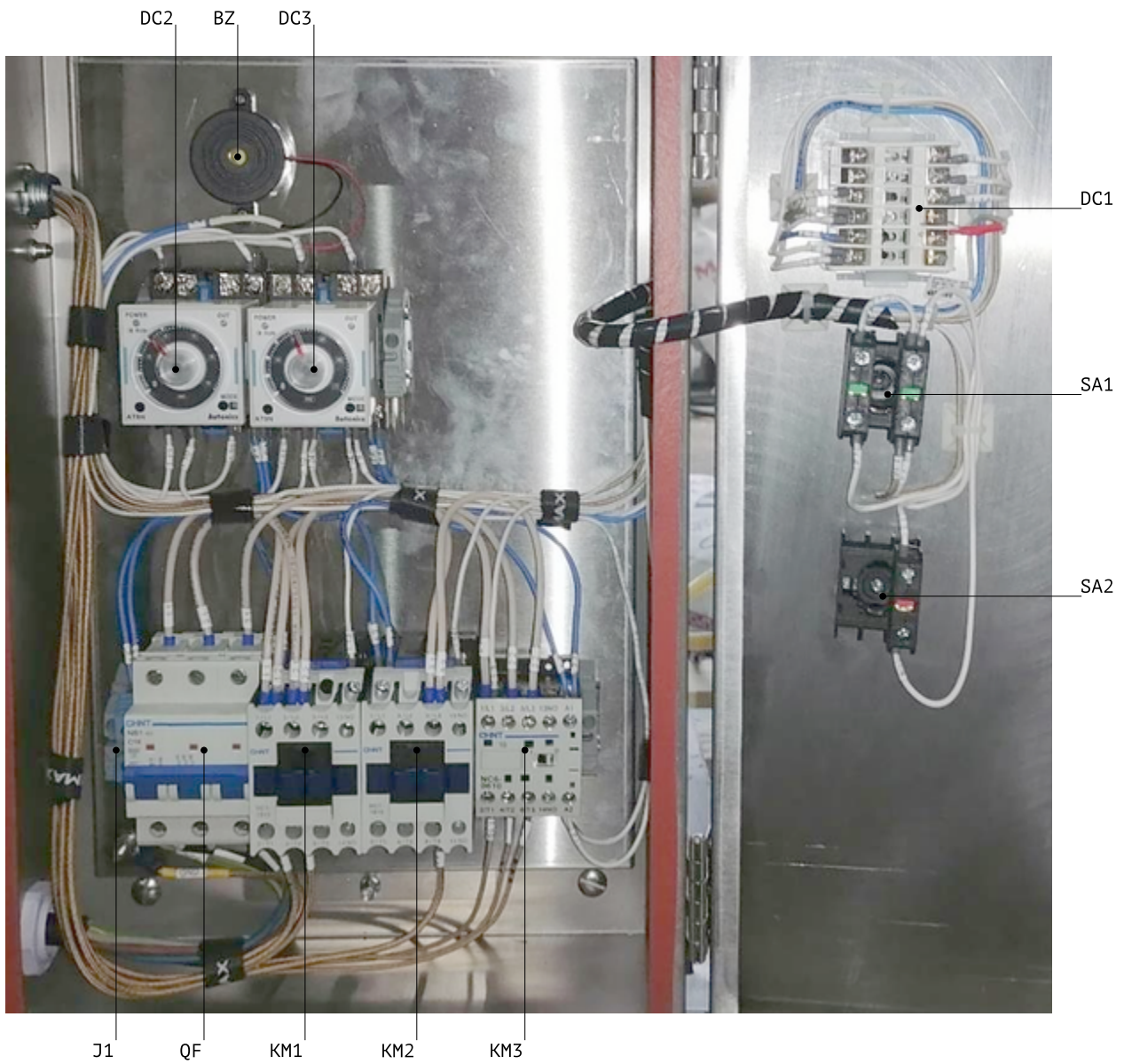


Figure 7

## **6.7 Troubleshooting**

### **6.7.1 Machine is not turning on**

1. Machine is not plugged in. Plug the machine in.
2. Emergency stop switch SA2 is actuated. Turn the switch actuator clockwise to release.
3. Emergency stop switch SA2 fault. Check the switch operation. While not actuated, its contacts should be closed. Replace fault switch.
4. No power in the wall receptacle. Check the voltage in the receptacle on all phases.
5. Switch SA1 fault. Check the switch operation. Contacts should open or close (depending on contact block type) in certain positions of the switch. Replace fault switch.
6. Supply cord fault. Check supply cord for continuity, replace fault cord.
7. Circuit breaker QF fault. Replace fault circuit breaker.
8. Open circuit. Check continuity between: QF; SA1; SA2; DC1; DC2; DC3; M. Restore connection, face up pitted contacts, tighten loosen contacts.

### **6.7.2 No indication on thermostat (while in HEATING mode)**

1. Thermostat DC1 fault. Check the thermostat. If there is no any indication on the display while 230 VAC is applied to terminals (5) and (6) of the thermostat, replace it.
2. Open circuit. Check continuity between: DC1-DC3; SA1; SA2; QF. Restore connection, face up pitted contacts, tighten loosen contacts.

### **6.7.3 Thermostat reads 'oPEn' blinking**

1. Temp sensor BT fault. Check continuity of the sensor as well as its connection to the thermostat. Tighten the terminals, replace fault sensor.

### **6.7.4 Thermostat reads incorrect temperature values**

1. Temp sensor BT connection is a wrong polarity. Check connection polarity of the sensor. Fix the wrong polarity.

### **6.7.5 Kettle does not heat, slow heating**

1. Heating element EK1-EK3 fault. Check heating elements with a tester. There should be no open or close circuit, nor ground fault. Resistance should be around 21 Ohm for each element at room temperature. Replace fault elements. While replacing, use electro-conductive anti-seize paste.

2. Thermostat DC1 RLY control output fault. Check relay output. While OUT indicator on the display is on, there should be 230 VAC on the relay output terminal. Replace fault unit.
3. Thermostat DC1 wrong settings. Set the factory settings.
4. Thermal cut-out AT tripped. Check to see if thermal cut-out is tripped. Release if needed. In case of frequent tripping, inspect heating circuit components.
5. Thermal cut-out AT fault. Check to see if capillary tube or bulb are damaged; and if it cannot be released with release pin. Replace fault thermal cut-out.
6. Open circuit. Check continuity between: EK1-EK3; J3, J4; KM1; AT; DC1; SA1. Restore connection, face up pitted contacts, tighten loosen contacts.

### **6.7.6 Mixer doesn't spin**

1. Motor M fault. Check the motor. Its rotor should spin freely. Make sure that there is no open or short circuit, nor ground fault in its windings. Resistance of each winding must be about the same. Replace fault motor.
2. Time relay DC2, DC3 fault. Check relay operation. Replace fault relay.
3. Contactor KM3 fault. Check the contactor operation. Its core should move back and forth easily, no short or open circuit in its coil. While the core pushed inside, contacts (1), (3), (5), (13) should be closed to (2), (4), (6), (14), respectively; and should be open as the core is not pushed. Replace fault contactor.
4. Open circuit. Check continuity between: M; J2; KM1-KM3; QF. Restore connection, face up pitted contacts, tighten loosen contacts.
5. Mixer shaft is stalled. Remove the motor and the mixer from the shaft. Check to see if the shaft is not rotating. Over time, it might be clogged with caramel. Replace the shaft.

### **6.7.7 No sound alarm**

1. Buzzer BZ fault. Check connection of the buzzer, and its operation. While 230 VAC is applied, it should give an audible signal. Replace fault buzzer.
2. Thermostat DC1 AL output fault. Check voltage at terminal (7) of the thermostat. While AL1 indicator on the display is on, there should be +24 VDC on terminal (7), relatively to terminal (-V) of the power supply unit. Replace fault thermostat.
3. Open circuit. Check continuity between: BZ; KM3; DC1. Restore connection, face up pitted contacts, tighten loosen contacts.

### **6.7.8 Circuit breaker trips**

1. Short circuit in the machine. Locate and eliminate short circuit in the machine. Replace fault component(s) if needed.