

# RoboLabs

Incredible machines for funfood & fastfood

## OPERATION MANUAL

### ROBOSUGAR CPA-10, CPA-10A



2018

# SAFETY REQUIREMENTS



DO NOT DISASSEMBLE CARAMELIZER OR REMOVE SEPARATE COMPONENTS WHILE EQUIPMENT IS CONNECTED TO THE MAINS!



READ CAREFULLY THE MANUAL BEFORE START!  
ONLY INSTRUCTED PERSONNEL ARE ALLOWED TO OPERATE THE MACHINE!



IT IS PROHIBITED TO RUN THE MACHINE WITH EMPTY KETTLE! IT WILL LEAD TO MACHINE OVERHEATING AND FAILURE!



DO NOT USE THE MACHINE FOR MIXING HEAVY OR ABRASIVE PRODUCTS!



MANY PARTS ARE HOT WHILE IN OPERATION!  
BURN HAZARD!



BEWARE OF MOVING PARTS OF THE MACHINE WHILE IN OPERATION!

	<b>WARNING</b> RISK OF FIRE OR ELECTRIC SHOCK DO NOT OPEN	
WARNING, TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK) NO USER-SERVICEABLE PARTS INSIDE REPAIR SHOULD BE DONE BY AUTHORIZED SERVICE PERSONNEL ONLY		

# 1. OVERVIEW

## 1.1 DESIGNATION

RoboSugar CPA-10A and RoboSugar CPA-10 caramelizers are intended for making caramel coated popcorn.

## 1.2 TECHNICAL SPECIFICATIONS

Productivity <sup>1</sup>	up to 14 kg/h
Operating volume	37,5 L
Rated voltage	Single phase 208... 240 Vac
Rated frequency	50/60 Hz
Rated power	5.5 kW
Dimensions <sup>2</sup> (LxWxH)	(CPA-10) 1650x810x1500 mm (CPA-10A) 1800x810x1650
Weight	(CPA-10) 160 kg (CPA-10A) 170
Ingress protection	IP22

CE certificate №161299117 dated 20.06.2016

## 1.3 DELIVERY SET

Delivery set includes:

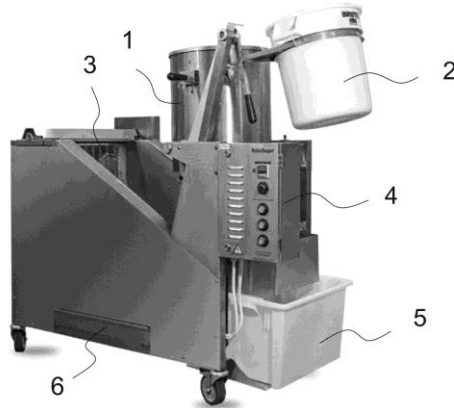
RoboSugar CPA-10(A) machine	1 pc
Popcorn container	1 pc
Discharge container	1 pc
Kettle lid	1 pc
Protection paddle	1 pc
Documentation set	1 set

<sup>1</sup> Depending on recipe and ingredients used

<sup>2</sup> See Appendix B for more details

## 1.4. OVERVIEW

General view of RoboSugar CPA-10A machine is shown on the Fig.1 below. RoboSugar CPA-10 (semi-automatic) doesn't have pulling mechanism for popcorn container. Apart from that, machines have the same design.



*Puc.1 RoboSugar CPA-10A general appearance*

*(1) – kettle; (2) – popcorn container; (3) – cooling belt; (4) – controls; (5) – ready-to-eat container; (6) – scrap tray*

## 2. INTENDED USE

### 2.1 PROTECTORS AND LOCKUPS

The machine can be turned off in any time with the main switch on the front panel.

There is an emergency temperature regulator located in heating elements area. In case of excessive or uncontrolled heating it will cut off power supply to the heaters.

### 2.2 AMBIENT CONDITIONS

The equipment must be operated at the ambient temperature from +5° to +40°C and relative humidity not more than 45% at 40°C. The

temperature decreasing related to RH increasing, for example, 90% of RH at 20°C. Altitude above sea level should not exceed 1000 m. Ingress protection rating IP22 (IEC 60529).

While in operation, kettle of RoboSugar CPA-10(A) emits a lot of steam and heat. It is essential to provide exhausting hood (800x800 mm, 500 m<sup>3</sup>/h or more) installed over the kettle. See ANNEX B for more details.

Ambient conditions have strong impact on the end product quality. See section 2.7 for more details.

## 2.3. GETTING STARTED

Unpack machine carefully, check delivery set, and remove protective film from all surfaces. Put the machine on even floor. Once machine is placed, lock all four swivel casters to avoid unexpected machine roaming.

Dumping mechanism for popcorn container must be set up for RoboSugar CPA-10A machine (see ANNEX A).

Insert steel paddle under the belt from the kettle's side. During operation, small particles of caramel and popcorn will be accumulated on the paddle, this will make cleaning easier.

Install stand for discharge box.

In the upper part of conveyor belt drive shaft is located. Unscrew four wing nuts and remove protective shroud. There is a silicone scraper under the shroud. Check the gap between scraper and conveyor belt, it should be minimal; but without touching each other, see Fig.2:



Fig.2 Checking the gap

## 2.4 POWER REQUIREMENTS

---



EQUIPMENT MUST BE GROUNDED!

---



MAINS CONNECTIONS MUST BE DONE  
BY QUALIFIED ELECTRICIAN ONLY!

---



IT IS PROHIBITED TO USE POWER SUPPLY WITH  
CHARACTERISTICS OTHER THAN SPECIFIED!

---

Machine uses power supply with voltage range from 208 to 240 volts, 50 or 60Hz.

There is a voltage relay installed in the circuit, which won't let the machine to be energized if voltage exceeds allowed limits.

It is recommended to use 32A 2+E plug (pin and sleeve type IEC60309) for power supply connecting. Follow the wiring diagram sticker attached to the cord, as shown on Fig.3:



*Fig.3 Connection diagram*

---



UNSTABLE POWER SUPPLY MAY AFFECT MACHINE OPERATION!

---

## 2.5 CARAMEL RECIPES<sup>3</sup>

Below are few caramel recipes to start with. Depending on customer's needs, those recipes may be modified or substituted with your own recipes. Feel free to experiment with different recipes to get the best results.

### *Caramel recipe # 1:*

Super Caramel Premix or similar – 1300 g  
sugar (beet or cane) – 1200 g  
coconut oil or butter – 200 g  
water<sup>4</sup> – 500 g  
lecithin Free-N-Easy<sup>5</sup>

### *Caramel recipe # 2:*

Super Caramel Premix or similar – 1050 g  
sugar (beet or cane) – 750 g  
coconut oil or butter – 150 g  
water – 375 g

### *Caramel recipe # 3:*

Super Caramel Premix or similar – 1100 g  
c sugar (beet or cane) – 1000 g  
coconut oil or butter – 200 g  
water – 300 g

---

<sup>3</sup> Feel free to experiment with different ratios of ingredients, or even with different ingredients. This way you will be able to get the result that suits your needs in the best way!

<sup>4</sup> The main purpose of adding water is to provide proper blending of all ingredients; almost all water will be boiled down during caramel cooking stage. Mind this while calculating the output!

<sup>5</sup> Free'N'Easy lecithin helps popcorn not to stick to each other. Lecithin should be applied onto popcorn in the middle of mixing stage.

## 2.6 MACHINE OPERATION

RoboSugar CPA-10 (A) has following controls (Fig.4):

- temperature regulator
- main switch (ON-OFF)
- HEATING push button with backlight
- MIXING push button with backlight
- COOLING push button with backlight

Each button actuates one of the named stages. Corresponding backlights indicates current stage of operation. While in operation, the machine switches the stages automatically, however, any stage may be actuated manually by pressing the button.

The operation process consists of the following stages.

### *HEATING STAGE*

The mixture in the kettle is being heated till caramel is ready. Kettle mixer operates occasionally at this stage, providing proper blending of all ingredients. Almost all water will be evaporated at this stage. Once caramel is ready, popcorn will be automatically dumped into the kettle. Upon completion of heating stage machine will give an audible audio alarm.

### *MIXING STAGE*

Once popcorn is dumped into the kettle, the mixer operates

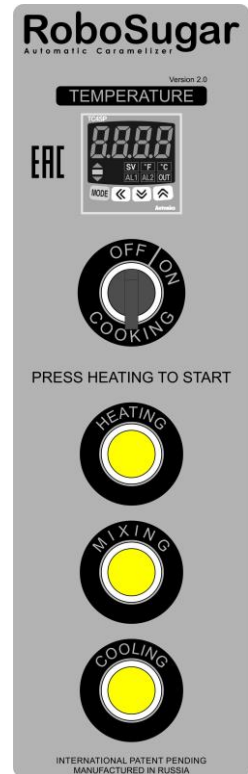


Fig.4 Controls



continuously for 1.5 minutes, providing smooth coating. Once time is expired, coated popcorn will be dumped to the cooling belt automatically. Upon completion of mixing stage machine will give an audible audio alarm.

**IMPORTANT! See STARTING NEXT BATCH section below!**

## COOLING STAGE

Caramel coated popcorn needs to be cooled down and separated. Cooling conveyor belt operates continuously, providing popcorn cooling down and separation.

Once cooling is completed, ready-to-eat product will be discharged automatically into dedicated container. Upon completion of cooling stage machine will give an audible audio alarm.

It is possible to finish cooling before time. To do this, press and hold COOLING button for 5 seconds, then the belt will stop and the product will be dumped to the container.

## **STARTING NEXT BATCH**



IT IS REQUIRED TO GET THE INGREDIENTS  
PREPARED IN ADVANCE!

---

Once the first batch of caramel coated popcorn went to the cooling conveyor belt, and the kettle got back to initial position, the machine is ready for the next batch. HEATING button will be blinking.

Since the kettle is quite hot, it is strictly required to put all ingredients at the same time; put oil first, then dry ingredients and then water. Once you put all ingredients, press blinking HEATING button immediately, to actuate the mixer, thus avoiding burning of ingredients or early evaporation of water.

Starting next batch before finishing previous one will maximize overall productivity.

## CPA-10/CPA-10A OPERATION ORDER

### *RoboSugar CPA-10 (semi-automatic)*

To make caramel coated popcorn, do the following:

1. Put caramel ingredients into the kettle. Put popped popcorn into popcorn container.
2. Turn the main switch to ON position, set temperature if needed, and press HEATING button.
3. Audible alarm means that caramel cooking is completed. Dump popcorn container into the kettle and press MIXING button.
4. Audible alarm means that mixing is completed. Press COOLING button, the conveyor will be activated. Tilt the kettle and dump popcorn onto the belt. Once cooling stage is done, popcorn will be discharged into container automatically.

### *RoboSugar CPA-10A (automatic)*

1. Remove safety clamp that interlocks kettle and popcorn container handles (Fig.5):
2. Put caramel ingredients into the kettle, put popped popcorn into popcorn container.
3. Turn the machine on with the main switch. Set the temperature if needed.  
After this, machine will do the rest automatically.
4. Upon completing, put safety clamp back.



Fig.5 Safety clamp

## 2.7 END PRODUCT QUALITY

### TEMPERATURE ADJUSTMENT

Due to constructive features, temperature value set on the thermoregulator may be different, depending on recipes used. The goal is to get good taste rather than reach some temperature value.

The following recommendations will help you to find out the right temperature that should be set on the thermoregulator.

Make a batch of caramelized popcorn with default temperature setting (165°C) and give it a try.

If caramel is sticky to the tooth, it means that caramel is *undercooked*; therefore, the temperature value must be *increased*.

If caramel has bitter taste with hint of burnt, it means that caramel is *overcooked*; therefore, the temperature value must be *reduced*.

Caramel that cooked with normal temperature and properly cooled is crunchy and doesn't stick to the tooth.

### POPCORN CRUNCHINESS

Crunchiness of caramel coated popcorn comes mostly from caramel layer. To be crispy, caramel should be properly cooked, which means that there is virtually no water left in the mix.

However, even if caramel is cooked properly, the result may be not so good. Popcorn is highly hygroscopic product. It is very important to make sure that popcorn you put into the machine has not more than 1.0—1.5% of moisture. Otherwise, excessive moisture will ingress into caramel layer after coating and make it sticky.

Except providing proper ambient conditions (see section 2.2), some additional equipment may be required in order to keep popcorn in good condition at intermittent stages as well as finished product.

## 2.8 MACHINE SETTINGS<sup>6</sup>

Some aspects of machine operation may be adjusted. To adjust settings do the following:

Turn the machine off, then press and hold HEATING and COOLING pushbuttons together and turn the main switch in ON position. You will see flashing buttons and hear buzzer signals.

Default values are the following:

1 – mixing frequency during heating stage – 5 s;

2 – mixing stage duration – 90 s;

3 – cooling stage duration – 300 s.

Buttons are flashing in cyclic way. Count of flashes per single cycle points current value:

*Frequency of mixing  
in heating stage*



1 - 2,5s  
2 - 5,0s  
3 - 7,5s  
4 - 10,0s  
5 - 12,5s  
6 - 15,0s  
7 - 17,5s  
8 - 20,0s

*Duration of mixing  
in mixing stage*



2 - 60s  
3 - 90s  
4 - 120s  
5 - 150s  
6 - 180s

*Duration of cooling process*



2 - 120s  
3 - 180s  
4 - 240s  
5 - 300s  
6 - 360s

Thus, with default settings, HEATING, MIXING, COOLING backlights are flashing 2, 3 and 5 times per cycle, respectively.

To adjust any value, corresponding button must be pressed. Each stroke increases the value by one point. Once maximum value is reached, further stroke will set minimum value.

For example, let's suppose that cooling time should be changed from 300s to 240s. Pressing COOLING button four times we'll make changes like this: 360s – 120s – 180s – 240s.

To exit adjustment mode and save the changes, turn the machine off.

---

<sup>6</sup> Applicable for machines with s/n starting with 1338.215.04.164.

## 3. TECHNICAL MAINTENANCE

### 3.1 GENERAL INSTRUCTIONS

The maintenance purpose is to keep the machine operable during the entire service life. The recommended<sup>7</sup> maintenance schedule with types of actions is presented below:

<i>PROCEDURE</i>	<i>PERIOD</i>
Kettle cleaning	once a day
Scrap tray cleaning	once a day
Outer surface cleaning	once a day
Conveyor drive shaft cleaning	once a week
Conveyor belt cleaning	once a week



DISCONNECT THE MACHINE FROM THE MAINS BEFORE  
TECHNICAL MAINTENANCE!



DO NOT USE SHARP TOOLS OR OBJECTS WHILE PROVIDING  
TECHNICAL MAINTENANCE!  
DO NOT USE ABRASIVE SOLUTIONS!



DO NOT LET ALL WATER TO BOIL DOWN!



DO NOT POUR MORE THAN 4 L OF WATER INTO THE KETTLE!



DO NOT REMOVE THE LID WHILE KETTLE IS HOT!  
HOT STEAM INSIDE! BURN HAZARD!

<sup>7</sup> Period may be different. Maintenance procedures must be done as necessary.

## 3.2 MAINTENANCE ORDER

### *KETTLE CLEANING*<sup>8</sup>

Pour *not more than* 4 liters of water in the kettle, close the kettle with lid provided in the delivery set, and turn the main switch in ON position. Wait until water is started to boil; let it boil for a few minutes, so hot water steam will be able to fill the kettle properly. Turn off the machine and let the kettle to cool down.

In case of severe carbon build ups, use special cleaning product (Heat N Kleen or similar).

### *SCRAP TRAY CLEANING*

Take out scrap tray, remove scrap, then wash the tray with warm water.

### *PADDLE CLEANING*

From the kettle's side, there is a protective paddle laid under the conveyor belt. During machine operation, a lot of small particles of caramel and popcorn are accumulated onto this part. Take it out and wash with warm water.

### *CONVEYOR DRIVE SHAFT CLEANING*

It is important to clean conveyor drive shaft area once in a week or more often. To get access to the area, remove four wing nuts and take protective shroud out. It is convenient to clean shaft's gears with stiff bristle brush. Once the area is cleaned, put silicone scraper, mind its position (refer to section 2.3).

---

<sup>8</sup> The machine must be plugged in for kettle cleaning procedure.

## CONVEYOR BELT CLEANING

During normal operation belt contamination is minimal. Use warm water with cloth for cleaning. It is convenient to use a steam generator as well.

---



DURING MACHINE OPERATION SOME AMOUNT OF DARK-COLOURED CONDENSATE MAY BE FOUND BELOW THE KETTLE, ON MIXER MOTOR HOUSING AND AROUND. IT SHOULD BE REMOVED AS NECESSARY!

---

## 4. TRANSPORTATION AND STORAGE

The equipment 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 to +55°C.

## 5. ACCEPTANCE CERTIFICATE

Equipment is met mandatory requirements of the state standards, actual technical documentation, and approved for use.

<i>TEST CERTIFICATE</i>	
<u>CPA-10</u>	_____
<i>Product Name</i>	<i>Serial No.</i>
<i>The equipment is made with accordance to mandatory requirements of the state standards, actual technical documentation, and approved for use.</i>	
<i>QC Engineer</i>	
<i>STAMP HERE</i>	
_____	_____
<i>Signature</i>	<i>Full Name</i>
_____	
<i>DD.MM.YYYY</i>	



## 6. WARRANTY OBLIGATIONS

The manufacturer guarantees trouble-free operation of the equipment during 12 months from the date of receiving the equipment by dealer (in accordance with transport documentation); or, in case of purchase directly through Trapeza LLC, from the purchase date, given that terms of using, transportation, and storage are met.

The warranty repair is performed upon presentation of this manual and filled warranty card with the seller's seal and the date of sale.

Technical specifications of the equipment can be changed by manufacturer at any time due to improvements and/or other reasons. Technical specifications stated in this document are intended to act as a reference point, which is necessary to evaluate suitability of the equipment for the customer's needs, and are not the subject of warranty policy.

The information stated in this document has been thoroughly checked and considered as accurate one; nevertheless, the manufacturer is not responsible for any typographical errors or misprints.

**Due to constant improvement of the equipment, technical specifications are subject to change without prior notice!**

## 7. MANUFACTURER DETAILS

NPO Tvertorgmash LLC

11 Industrial Street, Tver, 170000 Russia

Technical support:

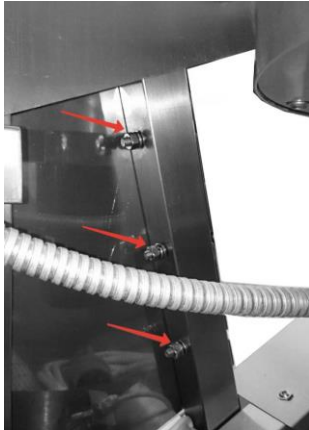
Email: [support@robolabs.pro](mailto:support@robolabs.pro)

Phone: +7 495 956 4000

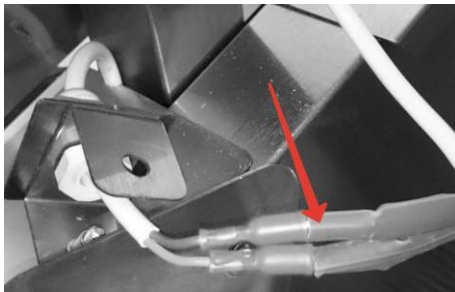
## ANNEX A.

### DUMPING MECHANISM SETTING UP

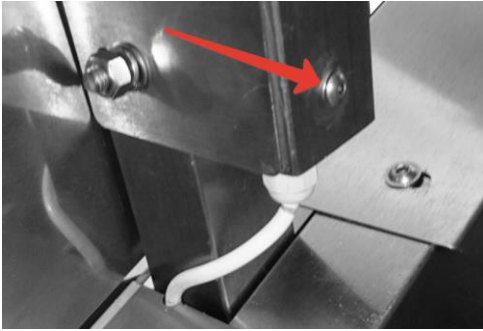
1. Remove three fasteners; take screws out:



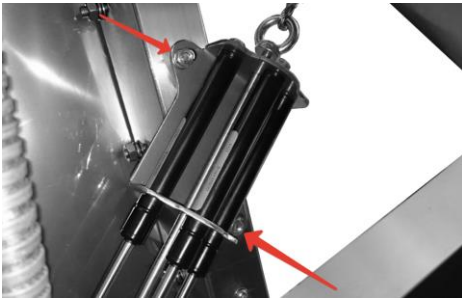
2. Mount the pillar, fix it with the fasteners.
3. Connect electric magnet. Wire colour codes are not important. Insulate joints if needed.



5. Stuff wires inside the pillar, then put end-piece with the wire into the end of pillar and tighten the fixing screw:



6. Install gas spring assembly. It is convenient to do with kettle turned down. Adjust assembly position it the way that steel bar doesn't touch anything during kettle movement. Fix the assembly's position with two screws:



7. Put the popcorn container into the cradle and fix it with two plastic ties.

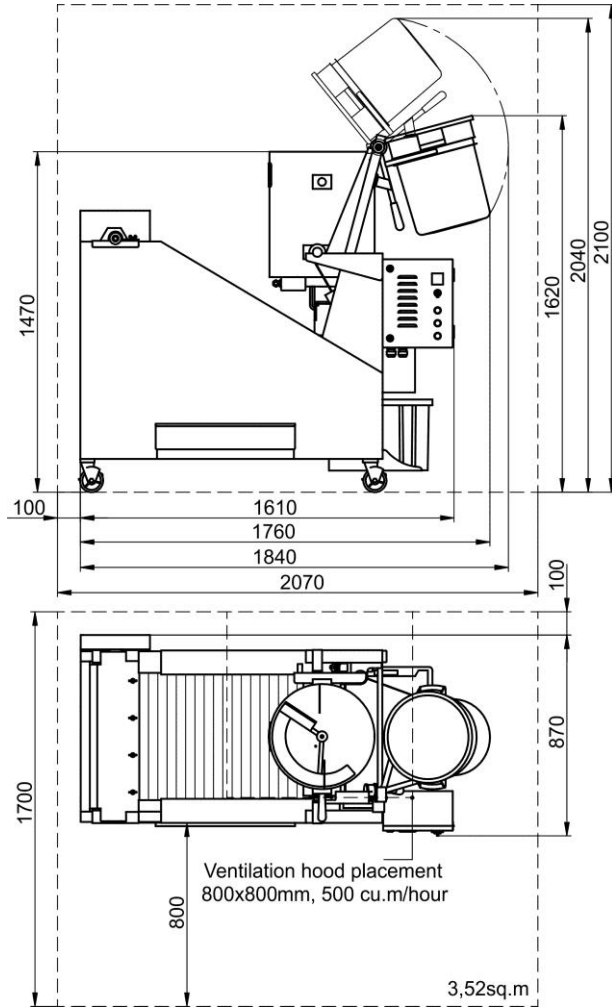


MAKE SURE THAT KETTLE AND POPCORN CONTAINER DON'T TOUCH EACH OTHER WHILE CONTAINER IS MOVING!

8. If kettle is touching container during turning down, then pillar position must be adjusted; to do this, loosen three fixing bolts, adjust pillar position, and finally tighten all three bolts.

# ANNEX B.

## DIMENSION REQUIREMENTS



All dimensions in mm.

# ANNEX C.

## ELECTRIC COMPONENTS LIST

<i>SIGN</i>	<i>DESIGNATION</i>	<i>MODEL</i>	<i>SPECIFICATIONS</i>
AT	Safety thermostate	TK24-13-1-220 Thermorex	230 Vac, 16 A
BT	Temperature sensor	ДТС124-PT100-A3.10/2 Owen	Pt100
C1	Capacitor	ДПС-0,45-30 Electrointer	450 Vac, 30 uF
C2	Capacitor	ДПС-0,45-12 Electrointer	450 Vac, 12 uF
DC1	Temperature regulator	TC4SP, Autonics	230 Vac
	DC1 socket	PG-11, Autonics	—
DC2	Controller (PLC)	DVP14SS211T, Delta	24 Vdc
DC3	PLC output extension	DVP08SN11T, Delta	24 Vdc
EK1, EK2, EK3	Heater	1GIK3CG41002, IRCA	230 Vac, 30Ω
FU1, FU2, FU3	Fuse 8,5x31,5	DF2BA1000 Schneider Electric or E9F8GG10, ABB	400 Vac, 10A
	Fuse disconnecter	DF83 Schneider Electric or E93/20, ABB	690 Vac, 20A
HA	Buzzer	SC235B, Sonitron	24 Vdc
HL1, HL2, HL3	Contact block with LED	B5, Emas	24 Vdc
K1, K2, K3	Electromechanical relay	G2RV-SL700 DC24, Omron	24 Vdc, 4A
KM	Contacteur	LC1D09M7, Schneider Electric	230 Vac, 9A
M1	AC motor with gearbox	Y100-140F 104JB30G1542, Linix	400/230 Vac
M2	AC motor	AIP71B8	400/230 Vac, 750 rpm
QF	Circuit breaker	S202-C32, ABB	32 A
SA	Switch	B100S20, Emas	4A
SB1, SB2, SB3	Pushbutton, yellow	B100DS, Emas	4A
TV	Power supply	DVPPS02, Delta	24Vdc, 2A
VS1, VS2, VS3	Solid state relay	SA842070, Celduc	25A, 4-32 Vdc
VS4	Solid state relay	SAL963460, Celduc	35A, 4-32 Vdc
YA1, YA2	Electromagnet <sup>9</sup>	YM-5030-24, Magnitek	24 Vdc

<sup>9</sup> Only for CPA-10A (automatic) RoboSugar model

## ANNEX D.

### TEMPERATURE REGULATOR SETTINGS

GROUP	PARAMETER	VALUE	DESCRIPTION
PAR2	In-t	dPtH	Temperature sensor Pt100
	OR	tCAH	Temperature sensor thermocouple K type
PAR2	L-Su	90	Low limit set point value
PAR2	H-Su	180	High limit set point value
PAR2	oUt	SSr	Control output: to solid-state relays
PAR2	AL-1	Añ I. <input type="checkbox"/> Añ <input type="checkbox"/> .A	Alarm operation mode
PAR2	ALYS	5	Alarm output hysteresis
PAR1	AL1	-5	Alarm temperature setting
PAR1	P	120	Proportional band
PAR1	I	400	Integral time setting (integral component)
PAR1	d	150	Derivative time setting (derivative component)
PAR2	LoC	LoC2	Lock settings (all settings, except Operating temperature)

Default temperature set point (SV) is 165°C.