

vortex popcorn™ machine **Robo**pop®

OPERATIONS MANUAL

VORTEX POPCORN™ MACHINE

MINIROBO M1, MINIROBO S1, MINIROBO S1F



2014

1. DESCRIPTION AND OPERATION OF POPCORN MACHINE

1.1. POPCORN MACHINE DESIGNATION

Vortex Popcorn™ machine MiniRobopo is a popcorn machine which pops kernels on the basis of the revolutionary technology. Vortex Popcorn™ Technology distributes the flow of kernels over the parabolic dish of the working chamber in an even layer, securing their continuous movement round the chamber's axis and simultaneous stirring, which in its turn secures their even and fast heating. And due to the artificially created vortex inside the chamber, popped kernels are immediately withdrawn from the hot zone, which contributes to their better taste and quality. In the nowadays existing big hot air poppers, most popped kernels stay for some time in the overheated air of the working chamber which makes them tough, chewy and tasting like plastic foam.

1.2. TECHNICAL SPECIFICATIONS

Model	MiniRobo M1	MiniRobo S1	MiniRobo S1F
Output, kg/h	15	15	12
Batch loading, gr	300	300	-
Popping cycle, sec	90	90	-
Corn feeder capacity, kg	-	-	3
Starting current, A		6,5	
The maximum load on all phases, A		26	
Nominal voltage, v		3 phases 380-415 (3 phases 208-240*)	
Frequency, Hz		50	
Rated power, kW		5,6	
Waiting mode power, kW/h		1,4	
Running Power, kW/h		3,8	
Overall dimensions, LxWxH, mm	690x640x790	1130x770x1640	1130x770x1700
Weight, kg	65	108	110

*- For North American market Vortex Popcorn™ machine Robopop® is provided with the next technical parameters: 208-240 V and 60 Hz.

The popcorn machine protection class IP22 (EN60204-1). The popcorn machine is to be used indoors with forced ventilation provided.

The machine should be operated at ambient air temperatures from +5°C to +40°C and relative humidity not exceeding 50% at 40°C. The above sea level should not exceed 1000 m (EN60204-1).

The machine should be connected to the mains by qualified electrical staff only. A three-phase five-core circuit with an earth wire should be used for connection.

1.3.SCOPE OF DELIVERY



Popcorn machine MiniRobo M1 is supplied in the assembled condition and does not require any additional assembly or adjustment. After the package is removed, the machine is ready for operation.

Popcorn machine MiniRobo S1 and miniRobo S1F are supplied in disassembled condition. Prior to use assemble the machine in accordance with the available instruction manual (see Annex B).

The scope of delivery includes:

Popcorn machine MiniRobo M1, MiniRobo S1 or MiniRobo S1	1 pc
Mains cable 5m with plug 3P+N+E, 32A	1 pc
Cable outlet 3P+N+E, 32A	1 pc
Measuring cup for 1 feeding – 300 g (10.6 oz)*	1 pc
Control unit key	1 pc
Set of spare parts:	
halogen lamp 20Bt	1 pc
V-belt 3A925	1 pc
Registration certificate and operating instruction manual	1 copy

* Only for MiniRobo M1, MiniRobo S1

1.4. ARRANGEMENT AND PRINCIPLE OF OPERATION



Prior to shipment to the customer all popcorn machines are tested, so a small amount of corn and oil may remain in the machine.

Popcorn machine model MiniRobo M1 consists of the following key components (see fig.1 and fig. 2):

1. Heat-insulated chamber with the bowl of specific shape where the popping process takes place;
2. Observation port;
3. Control unit;
4. Corn feeding funnel;
5. Heating elements unit;
6. Case for processed popcorn;
7. Electrical motor;
8. Belt drive cover.

Corn is manually supplied to preheated to 190-230°C chamber 1 (model MiniRobo S1F has an automatic corn delivery supply). The chamber performs continuous heating and closed circulation of hot air. The air circulation in the chamber is provided by means of impeller driven by the electrical motor 7 connected via belt drive and covered by cover 8.

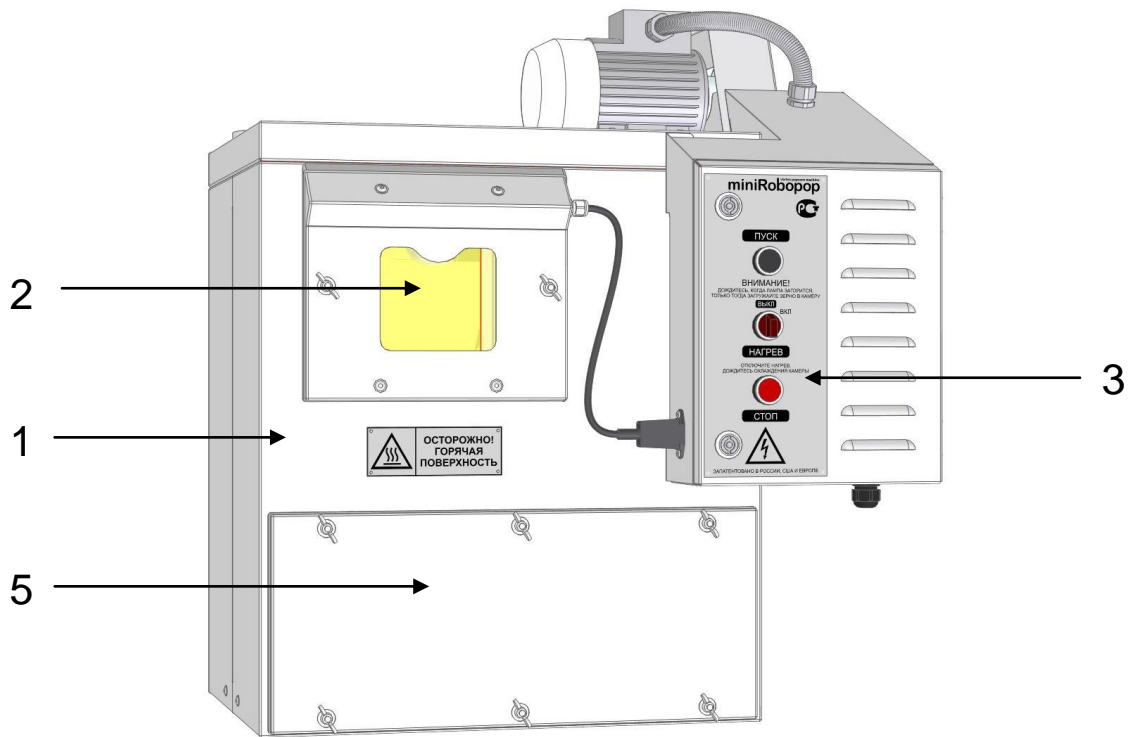


Fig. 2. Machine general view (front view)

The corn in the chamber is heated and bursts (pops). As soon as the popcorn pops, the airflow immediately removes it from the chamber. Observation port 2 is used for visual control over the popping process.

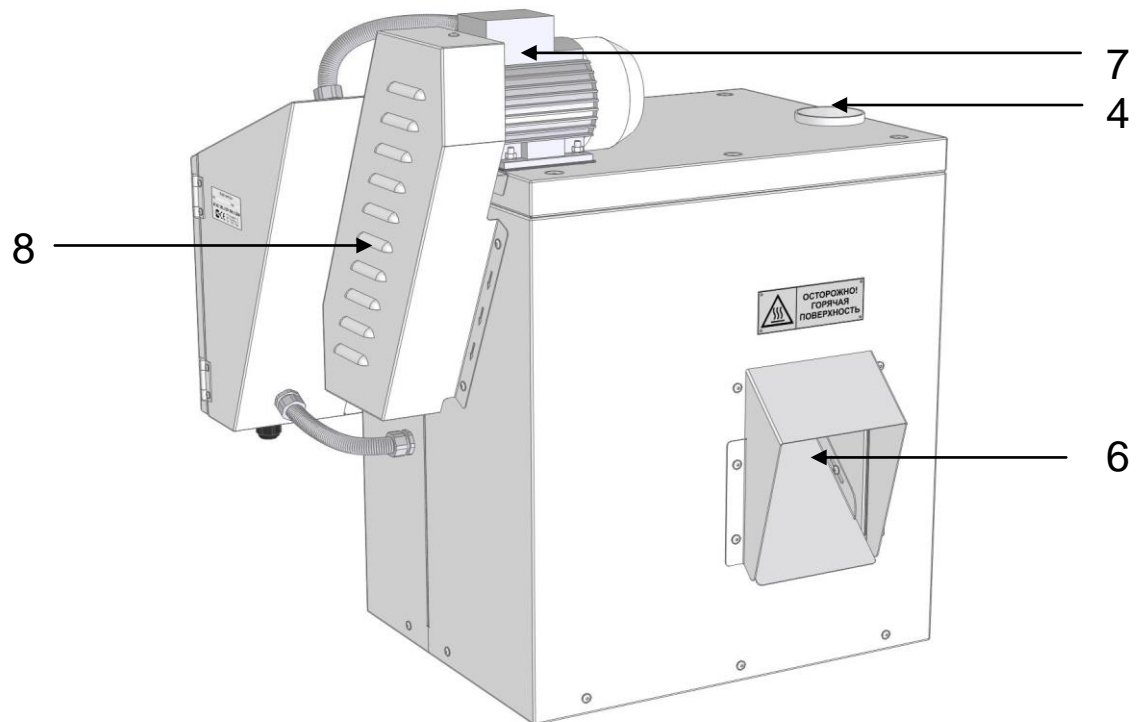


Fig. 2. Popcorn machine general view (rear view)

Control unit 3 regulates the chamber temperature and electrical motor.

2. INTENDED USE

2.1. SAFETY REQUIREMENTS

Never turn the machine off using STOP button when it is running. This may result in fire and breakdown of the machine!

First, wait until all corn leave the chamber, then disable heating by turning HEAT switch to OFF position. It's allowed to press STOP button only in 3-5 minutes after chamber continuous cooling.



CAUTION! Many machine components become hot during operation and may cause burn injury!

2.2. PLACEMENT REQUIREMENTS

In a view of the equipment specialties we recommend to provide the machine with purge ventilation. 560 m³/hour is recommended level of purge ventilation for Vortex Popcorn™ Machine miniRobo.

STRICTLY PROHIBITED!

- TO ACTIVATE THE MACHINE WITH THE BELT DRIVE COVER REMOVED !
- TO WASH ELECTRICAL COMPONENTS AND CONTROL UNIT WITH WATER, YOU MAY ONLY CLEAN THEM WITH WET CLOTH!
- TO DISASSEMBLE THE MACHINE OR REMOVE IT IS INDIVIDUAL PARTS WITHOUT UNPLUGGING IT FROM THE MAINS!
- TO MODIFY THE MACHINE DESIGN!
- TO USE THE MACHINE FOR POPPING THE KERNELS OTHER THAN CORN!



PROHIBIT! For MiniRobo M1 and MiniRobo S1 to feed more than 300 g of corn (over one measuring cup) into the machine. The second corn portion should be fed only after checking the chamber on the absence of unpopped corn.

ATTENTION!

CAREFULLY READ THE OPERATING MANUAL BEFORE THE MACHINE USING!

ONLY TRAINED PERSONNEL MAY BE ADMITTED TO USING THE POPCORN MACHINE!

DO NOT OPERATE THE MACHINE IF THERE IS SOME POPCORN INSIDE THE CHAMBER! IT SHOULD BE REMOVED FIRST.



ATTENTION! In case of any emergency power shutoff during the machine operation, the chamber can be blocked with popcorn. To resume the operation, it's required to remove the inspection window and clean the internal chamber from popcorn and kernels.

2.3. PRESTARTING PROCEDURES

1. Remove the package carefully, check up the contents of delivery and remove the protection film from all surfaces.
2. Install the popcorn machine onto the flat surface or onto the special support rack with chute for popcorn. The support rack is not included into the scope of delivery

2.4. POWER CONNECTION

The machine is to be connected to power source by skilled electricians. Three-phase 5-cable circuit with ground wire shall be used for the machine connection.

2.5. MACHINE FIRST START

1. Switch on the machine by pressing START button.

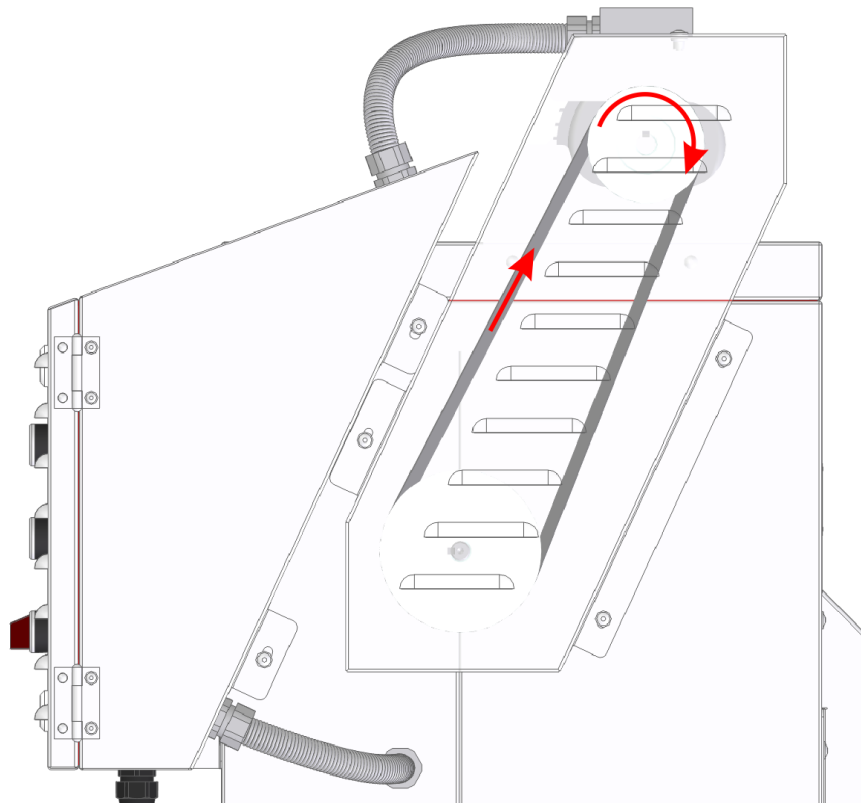


Fig. 3. Motor shaft rotation direction

2. The motor will be launched. Check the rotation direction of the motor shaft. The shaft shall rotate clockwise (see fig. 3). If the shaft rotates counter clockwise, it is necessary to exchange two phases in mains plug. To do this, you have to switch off the machine by pressing STOP button.

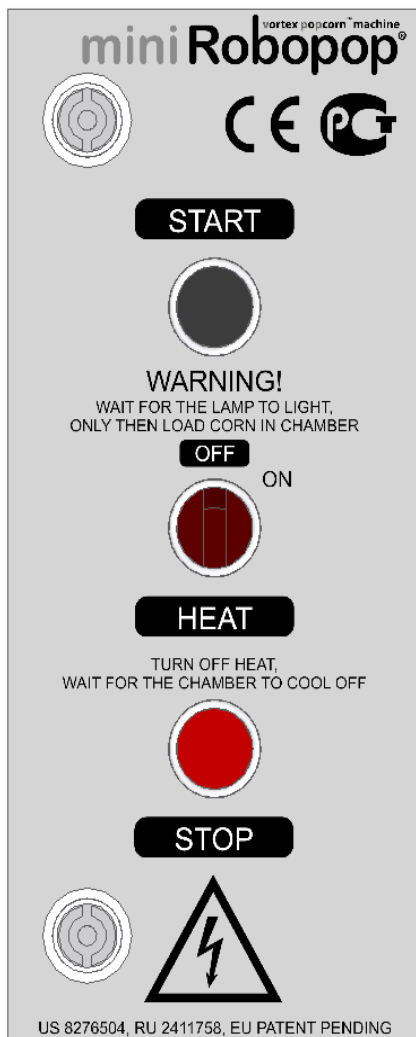
3. If the motor shaft rotates in the necessary direction, activate the warming process by turning HEAT switch to ON position and wait while the chamber reaches the set temperature. It takes 10-15 minutes. The indicator HEAT lights up when the chamber is heated to the required temperature. The initial startup can be accompanied with specific smell and smoke. This is normal.



ATTENTION! THE FIRST CORN PORTION IS INTENDED FOR CHAMBER CLEANING AND IS NOT SUITABLE FOR EATING.

2.6. OPERATION PROCEDURE FOR MINIROBO M1 AND MINIROBO S1.

Before starting the operation prepare the container for popcorn. Please notice that 35-40 l of “butterfly” popcorn and around 25-30 l of “mushroom” popcorn is popped from 1 kg of corn.



1. Connect the machine to power source. Switch on the machine by pressing START button.

2. Make sure that there is no non-popped corn in the chamber. If there is some non-popped corn or peels in the chamber, wait for some minutes until they are carried away from the chamber by air.

3. Enable the warming process by turning the toggle HEAT to ON position, wait for the chamber to be heated up. It will take 10-15 minutes. When the chamber is heated to set temperature, the indicator HEAT will go on. The default temperature inside the chamber is 200°C. To modify the default temperature, see par. 2.9.

4. Supply corn into the chamber using the measuring cup and the funnel.

5. Wait for 80-90 seconds. This time is enough for corn to be completely popped and leave the chamber.

6. Using the observation port, make sure that popcorn has completely left the chamber.

7. The next portion can be fed into the chamber only if the indicator HEAT is still on. If the indicator is off, it means that the chamber temperature is not sufficient. Wait for 1-2 minutes until the chamber warms up again and the indicator goes on.

8. Before switching off the machine, wait until the popcorn is completely thrown out of the chamber, then disable warming process by turning the switch HEAT to OFF position.

Fig. 4. Popcorn machine control panel

Wait for 3 – 5 minutes until the chamber is cooled down. Then press STOP button, and the

machine will be switched off.

9. If the main machine motor is running, and the turbine inside the housing is not rotating or rotating with insufficient speed (it can be heard) which signify about open circuit or loosened belt, in that case the operation should be immediately stopped by pressing STOP button.

10. In case of inflammation inside the machine chamber (it is possible if the machine is not cleaned or switched off incorrectly), you should disconnect the machine from power source by unplugging the mains cable and only after this initiate fire-fighting activities.

2.7. OPERATION PROCEDURE FOR MINIROBO S1

Popcorn machine model MiniRobo S1 is delivered together with sifter (fig. 5). Sifter is intended to separate the non-popped kernels, peels and other wastes from popcorn.

To activate the sifter, turn the switch SIFTER to ON position, after that the sifter will start to rotate clockwise.

During the operation of popcorn machine MiniRobo S1 the sifter should be activated before feeding the corn into the chamber. And the sifter should be disabled only after you finish the popping process and there is no more popcorn in the chamber.

After separation the non-popped corn, peels and other wastes will go into the special chute located under the sifter.

If the waste includes a big percentage of non-popped kernels, they can be used again for popping process.

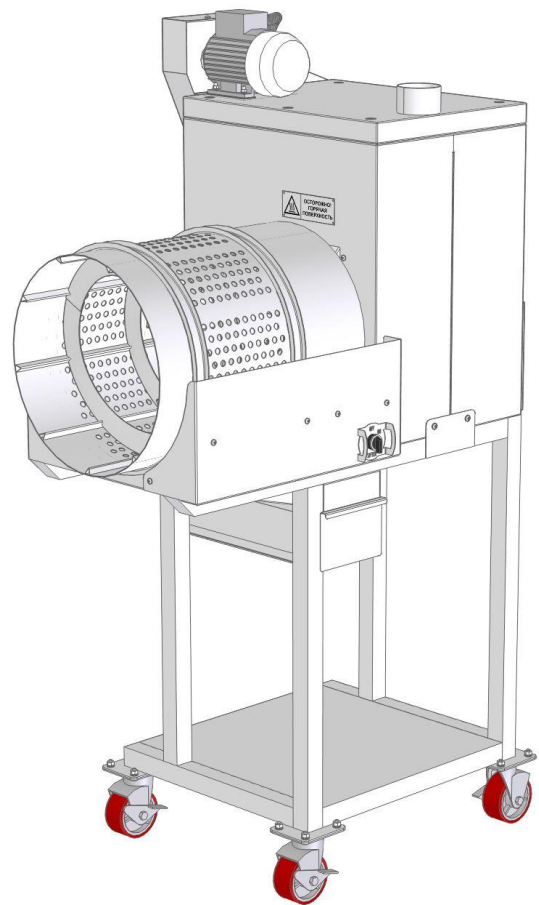


Fig. 5. Popcorn machine with sifter, model miniRobo S1



ATTENTION! IT IS NOT ALLOWED TO FEED THE CORN INTO THE CHAMBER WITH DISABLED SIFTER. THIS CAN CAUSE THE CONTAMINATION OF THE CHAMBER AND EVENTUALLY THE SMOKING.

2.8. OPERATION PROCEDURE FOR MINIROBO S1F

1. Load corn to the corn feeder
2. Prepare the cart for popcorn

3. Turn on the machine by pressing START button (fig. 4). The light lights up in the chamber. Make sure by the means of observation port that the internal chamber is empty and there are absence of any foreign objects. In the case of necessity clean the chamber.

4. Turn on the heating by turning HEAT switch to ON position. The sifter will start automatically together with heating.

5. Having reached the set temperature HEAT indicator lights up and corn supply will take place. If there is a lack of corn in the chamber and there is necessity of process proceeding. Before continuation make sure by means of observation port that the chamber is not clogged and nothing prevents the free circulation of corn over the chamber bottom.

6. At the end of the work shift turn HEAT shift in OFF position.



PROHIBIT! TO LOAD A NEW BATCH OF CORN, WHITHOUT CHECKING THE CHAMBER ON THE SUBJECT OF CLOGGING.

2.9. POPPING TEMPERATURE ADJUSTMENT

If you are not satisfied with popcorn quality, you may improve it by changing the temperature inside the chamber. The temperature range for popping process in popcorn machine miniRobo is 190 – 230°C. «Butterfly» popcorn is popped at lower temperature 190 – 210°C, and «mushroom» popcorn is popped at 200-230°C.

To get the perfect quality, we advise you to make test runs in every specific case. Start with minimum temperature 190°C, make 2-3 corn feedings. Then gradually increase the temperature by 5°C each time and also make 2-3 feedings. Choose the best operation mode by comparing the corn popped at different temperatures.

To modify the parameters of temperature controller, you will have to:



1 – open the control unit with special key which is the part of the machine delivery scope. It should be done during the machine operation.



ATTENTION! Popcorn machine control unit should be opened only by the trained personnel familiar with operation of electrical circuits with voltage 380V.



ATTENTION! FAULTY HANDLING OF POPCORN MACHINE BY NON-SKILLED PERSONNEL CAN RESULT IN ELECTRICAL SHOCK.

2 – to change the popping temperature press one of the buttons   on the thermostat. The SV indicator lights, and will flash the current popping temperature.

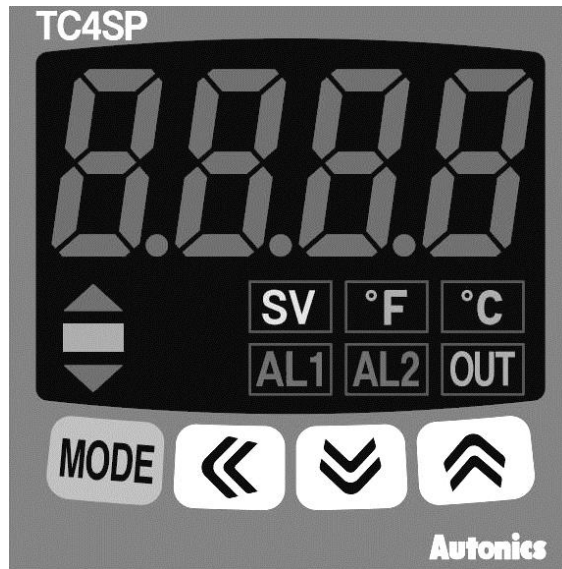


Fig. 6. Temperature controller TC4SP

3 – using those same buttons to set the required temperature in the chamber. If within 3 seconds without pressing buttons, then the display will show the current temperature in the chamber.

You can not set the popping temperature in the chamber below 190 * C and more than 230 * C. This range of temperature is more than enough for the preparation of most sorts of popcorn.



The other parameters of temperature controller are preset by the manufacturer. They are locked for changes. Access to them is only a service technician. Don't change them without specific need. This can result in inappropriate operation of the machine.

3. MAINTENANCE

3.1. GENERAL INSTRUCTIONS

The purpose of maintenance is to keep the popcorn machine operable during the entire service life and observance of the fire safety rules.

Maintenance of the popcorn machine should be performed as separate parts become dirty.

The recommended maintenance schedule with certain actions is presented below

No.	Actions	Period
1	Cleaning the external surface of the machine from dust and dirt	Once a day
2	Cleaning the internal chamber from husks and corn dust	Once a week
3	Cleaning the internal chamber net from husks and corn dust	Once in 3 months
4	Chamber lamp replacement	Once in 3 months
5	Drive belt replacement	Once in 6 months

3.2. SECURITY MEASURES

Prior to maintenance, disconnect the machine from the electrical mains.

Do not wash electrical parts and control unit with water. You may wipe them with a soft cloth moistened in a soap solution.

If combustion occurs when the machine is running (it is possible if the machine is not cleaned or turned off incorrectly), you should de-energize it by pulling the power cord from the socket, and only after that you may take any fire-fighting actions.

3.3. MAINTENANCE PROCEDURE

At the end of the working day or before a long idle time clean the internal chamber from husks and corn dust.

In order to clean the chamber, unscrew the wing nuts and open access hole cover in the lower part of the chamber. Remove husks and dirt from the chamber through special hole. It is convenient to do this with a vacuum cleaner.

After you have cleaned the chamber, replace the access hole cover and fix it with the wing nuts. Washing the internal chamber with water jet is prohibited.

3.4. TROUBLESHOOTING

Problem	Possible reason	Remedy
Corn rotates slowly in the bowl; open popcorn does not fly out of the machine	Electric motor rotates in the opposite direction	Swap the two phases in the wall plug
Corn is opened not as a "mushroom", but as a "butterfly"	Low temperature in the chamber	Increase the chamber temperature. "Butterfly" pops at 190-210°C, "mushroom" at 200-230°C.
Corn is opened not as a "butterfly", but as a "mushroom"	High temperature in the chamber	Reduce the temperature in the chamber. See prev. point.
Abnormal sound during turbine rotation	Foreign object inside the internal chamber	Clean the internal chamber
	V-belt low tension	Check the V-belt tension; replace the V-belt if necessary
	Bearing unit of the turbine is worn out	Replace the turbine bearing unit

3.5. PRESERVATION

If the equipment is not used for a long time, perform all maintenance works.

4. TRANSPORTATION AND STORAGE

Robopop[®] popcorn machine may be transported by any roofed transport in accordance with the transportation rules for this kind of transport.

The popcorn machine transportation conditions are as per group (J2), and the storage conditions are as per group (C) GOST 15150-69.

The transportation conditions as to the mechanical effect are as per group (C) GOST 23216-78.

5. ACCEPTANCE CERTIFICATE

Popcorn machine MiniRobo M1 / MiniRobo S1/ MiniRobo S1F corresponds to the requirements of the Technical Conditions TU 5151-016-74387948-2010 and is qualified as suitable for operation.

Acceptance Certificate

Popcorn machine MiniRobo M1 / MiniRobo S1
(Article description)

No. _____
(serial number)

Manufactured and accepted in accordance with the mandatory requirements of the state standards, current technical documentation and qualified as suitable for operation

Quality Control Department Engineer

Personal signature

Printed name

Year, month, date

6. WARRANTY OBLIGATIONS

The warranty period for the popcorn machine is 12 months from the date of receipt the equipment by the dealer (according to the transport documentation) or in case of purchasing directly through Business Russia LLC structures – from the date of shipping the equipment from Business Russia LLC, subject to observance of the operation, transportation and storage conditions.



ATTENTION! The warranty does not cover the chamber lamp and the V-belt.

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

The manufacturer reserves the right to change the design of the popcorn machine without notice to the customer.

7. MANUFACTURER'S DETAILS

Address: Russia, 170000, Tver, Industrial street, 11.

“NPO Tvertorgmash” LLC

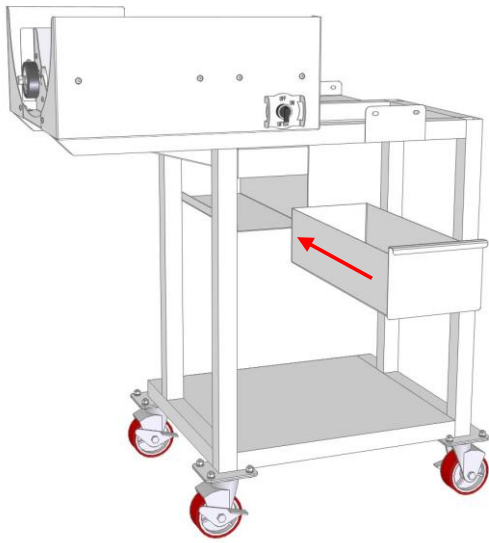
Phone: +7 (4822) 77-81-73

www.npo-ttm.ru

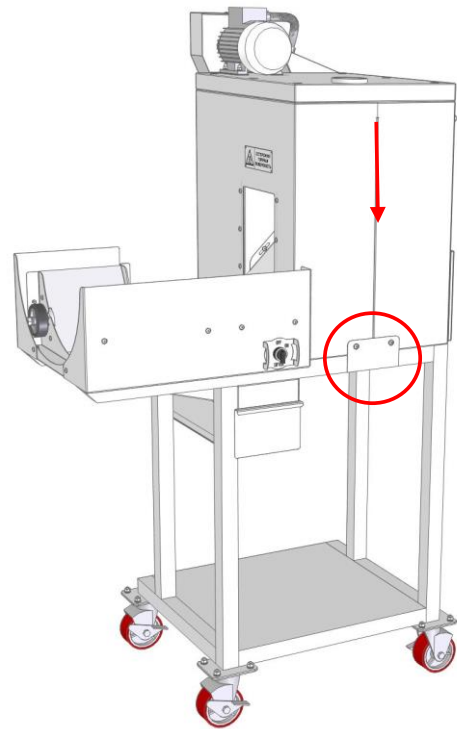
APPENDIX A. SPECIFICATION OF THE WIRING DIAGRAM

Signs	Name	Description
AT	Thermostat 300°C	230AC, 16A
BT	Temperature sensor (RTD)	Pt100
C1	Capacitor	1,5 µF
DC1	Temperature controller TC4SP	230AC
EK1, EK2	Heater	230AC, 2500W
EL	Lamp halogen	12DC, 20W
EMI	EMI Filters DL-25EB3	440AC, 25A
HL	Lamp signal HEAT	230AC
KM1	Contactator 3-phase	440AC, 9A
KM2	Contactator 3-phase	440AC, 16A
M1	Electric motor	380AC, 3000rpm
M2	Electric motor YN70-15 with gear 1:36	230AC
M3	Electric motor YN70-15 with gear 1:36	230AC
Q1	Circuit breaker	400AC, 16A
S1	POWER switch	4A
S2	STOP switch	4A
S3	HEAT switch	4A
S4	SIFTER switch	4A
TV12	The power supply	12DC, 5A
VS1, VS2	Relays Solid State HD-2544.ZD3	3...32DC, 25A

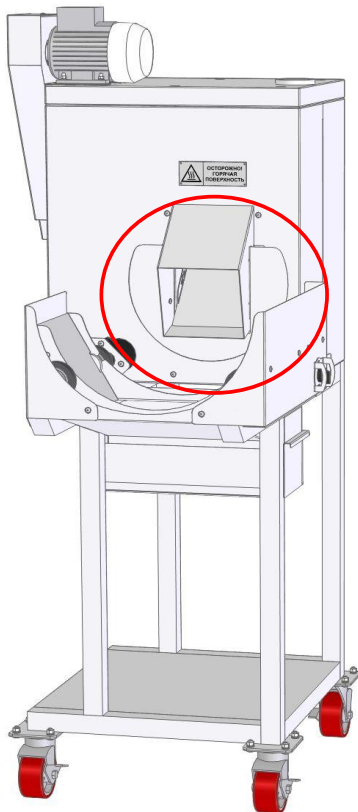
APPENDIX B. ASSEMBLY INSTRUCTIONS FOR MINIROBO S1



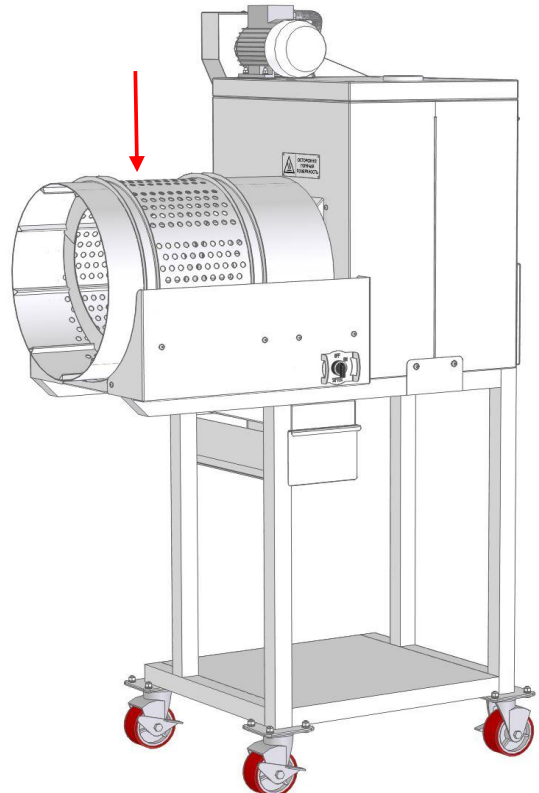
1. Place the waste tray



2. Set the popcorn machine on the stand and attach with four screws.



3. Attach the guide sleeve for ready popcorn.



4. Set the sifter to the stand and connect to the control unit.