A01 – Instructions on how to read references

All the parts in this manual are identified by their position on the machine's exploded view: pos. XX. In the parts list the exploded view position is linked with the corresponding part number. Each Problem is identified with the number: PXX and contains description of the potential Couse as well as Remedy to the Problem. You will also find references to the necessary tools: AXX, required for the repair.

A05 – Recommended Maintenance Tools

Brush
13 mm alan wrench key
10 mm alan wrench key
8 mm alan wrench key
7 mm alan wrench key
Small slotted tip screwdriver
Large slotted tip screwdriver
Small Phillips screwdriver
Large Phillips screwdriver
Small Phillips stubby screwdriver
1.5 mm hex key
Hammer
Plyers
Cutting nippers
5 mm hex key
Electrical Tester
Electrician's scissors
Wire Trimmers
Refractometer

A10 – Features and Technical Specifications

Model	Freon	Compressor	HP Compressors	Voltage	Condensator	Capillary tubes	Gas Charge	Low Pressures	Noise
FCM-1	R404A	E 2121Z	1/3	230/50	Iron M0102101-001 12 pipes	5,5mx1.06mm	110gr / 3.88oz	21.72 psi/ 1.5bar/ -20°C	<= 61dB
FCM-2 Tropical	R404A	T2168GK	3/4	115/60 230/50	Iron C082036007 32 pipes	3mx1.06mm	275gr/ 9.70oz	31.00 psi/ 2bars/ -20°C	<= 35dB
FCM-2	R404A	T2168GK	3/4	115/60 230/50	Iron C082036007 32 pipes	3mx1.06mm	290gr/ 10.23oz	29.00 psi/ 2bars/ -20°C	<= 35dB
FCM-2 Watercooled	R404A	T2168GK	3/4	230/50	water	3mx1.06mm	150gr/ 5.29oz	31.99 psi/ 2.2bars/ 19°C	<= 35dB
FCM-3	R404A	T2168GK	3/4	115/60 230/50	Iron C082036007 32 pipes	5mx1.06mm	315gr/ 11.11oz	25psi/ 1.7bar / -15°C	<= 84dB
FCM-3 Watercooled	R404A	T2168GK	3/4	230/50	water	3,5mx1.06mm	170gr/ 6.00oz	25psi/ 1.7bar / -15°C	<= 84dB

A15 – Recommended Preventive Maintenance Spare Parts Kit

Spare parts listed in the below table are the wearable parts which are subject to periodical replacement, based on frequency with which the machine is used.

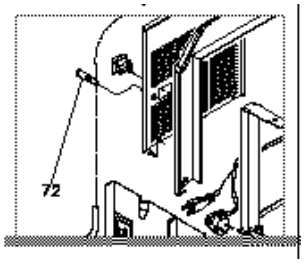
Exploded View#	Part#	Description	Quantity
6	OR13000117	O-ring 117	9
9	M0003117-001	Outlet Back Gasket	3
14	M0000147-001	Transparent Tank Gasket	3
15	M0005159-001	Low Voltage Contact Wires Kit	3
32	M0004104-001	Pinion Vertical Auger	1
35	M0000117-001	Cotter Pin	3
45	M0004105-001	Horizontal Auger Gear	1
88	F11584	Fuse 5A 5X20	1
90	A0005103-001	Fuse F315MA 5X20	3

NOTE: At least once a week check condenser/condenser filters if dirty and covered with dust. For further instructions refer to *P01.*

A20 – Important information on functionality of the FCM control board

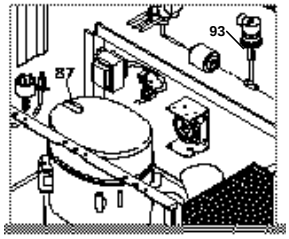
FCM offers series of auto diagnostic alarms. They are displayed on the controller's screen. If screen blinks ON & OFF, press MENU and hold it in order to see what type of alarm is on.

P01 – Machine does not freeze and red light located near the main power switch (pos.72) is ON



Problem

High pressure switch cut off compressor (pos.87).

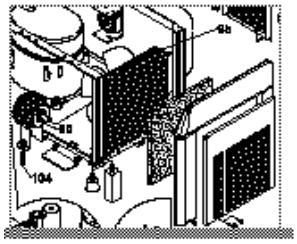


Reason_1

Condenser/Condenser air filter is dirty (pos.95).

Solution_1

Clean the condenser/condenser air filter with a brush (a) or compressed air and them reset the compressor by pressing high pressure switch down (pos.93). ATTENTION: machine has to be ON in order to reset the compressor.



Reason_2

Airflow around the machine is insufficient due to either other piece of equipment blowing hot air into the machine or insufficient space (recommended approximately 12 cm – 5 inches on each side).

Solution_2

Establish required space around the machine and reset the compressor by pressing down high pressure switch (pos.93)

Reason_3

Condenser fan motor does not turn (pos.99).

Solution_3

Verify whether fan motor's blades are not blocked by the condenser or a loose wire.

Verify whether fan motor is burned. If so, replace fan motor: 1. unplug the wires and remove screws from the base of the machine (pos. 104); 2. Remove screw, which holds the fan motor blades; 3. Install new fan motor and blade; 4. turn the machine back ON; 5. verify if fan motor is turning and cooling the machine; 6. reset the high pressure switch (pos.93)

P02 – Machine does not freeze even though the solenoid valve is ON (solenoid light located on the screen is ON; high pressure red light remains OFF - pos.72)

Problem

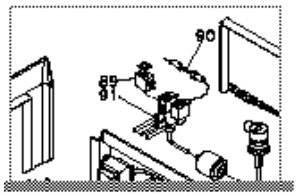
Refrigerant does not pass through into the evaporator.

Reason_1

Electrical coil or coil's fuse is burned.

Solution_1

Replace the 315mA fuse (pos.90), located in a fuse holder near the coil; if this does not help, replace the coil.



Reason_2

Solenoid body valve (pos.91) is defective: remains closed even through it is commanded by the control board to open ("click sound" coming out of the coil).

Solution_2

Replace the entire defective solenoid body valve (pos.91).

Reason_3

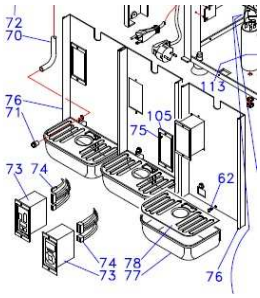
There is a false contact in fuse holder.

Solution_3

Restore the proper contact by between wires and a fuse in a fuse holder

Reason_4

Control board (pos.73) is defective and does send the signal to the electrical coil to open. It has to be verified with electric tester (r).



Solution_4

Replace the control board: remove two screws (pos.75) on the frame around the control board (f); pull the entire control board through the front panel; disconnect 2 connectors from the back of the board. Follow the same steps in revers in order to install new control board.

P03 – In SLUSH mode machine does not freeze and solenoid light does not come ON on the control board's screen; In COLD/DEFROST mode machine works properly

Problem

Machine does not freeze.

Reason_1

Control Board is discalibrated.

Solution_1

Turn the machine OFF (pos.69); fill up the machine with 1 gallon of tap water at 65-75 degrees F; Turn the machine back ON; set to SLUSH mode; auto calibration process begins (WAIT AUTO SETTING comes on the control board's screen in place of SLUSH); After approx. 30 seconds calibration process ends and machine goes into SLUSH mode.

P04 – Control board's screen is blinking; when MENU button pressed and released, "ALARM MOTOR" comes on the screen; mixing augers turn

Problem

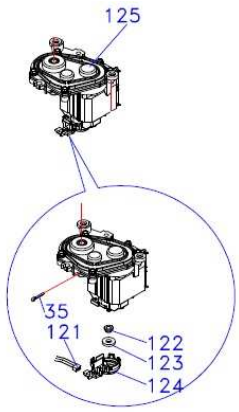
Machine does not freeze.

Reason_1

Magnetic Reader (Hall Cell) attached to the gear box is broken (pos. 124).

Solution_1

Replace the Magnetic Reader: disconnect the magnetic reader wire (pos. 121); remove the magnetic reader's black plastic cover (pos.124) with small flat screw driver (f) – pay attention to 3 little hooks that hold the reader attached to the gear box; Install the Magnetic Reader – follow the above instructions in reverse.



Reason_2

Magnet located on a short shaft of the gear motor (underneath the Magnetic Reader (pos. 123)) has been dislocated.

Solution_2

After removing the Magnetic Reader and gaining access to the magnet and sleeve (pos. 122 & 123), reposition the magnet on the gear motor's shaft: it should be positioned exactly half way through the shaft (3 mm from the gear motor).

Reason_3

Connection between the control board and magnetic reader has been interrupted.

Solution_3

Verify if the magnetic reader wire (pos. 121) is connected properly to the magnetic reader. Disconnect the wire, clean all the contacts, and verify if none of the 3 pins (male part of the magnetic reader) is missing. Then reconnect the wire.

P05 – Control board's screen is blinking; when MENU button pressed and released, "ALARM MOTOR" comes on the screen; Mixing augers do NOT turn

Problem

Machine does not freeze.

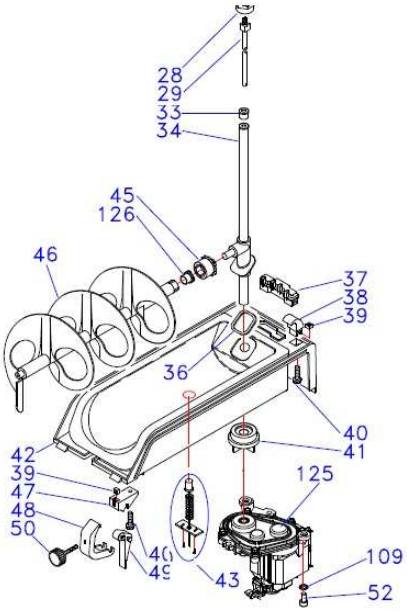
Reason_1

Gear motor (pos.125) either does not receive voltage or received the voltage but it is locked

Solution_1

Verify if gear motor (pos. 125) is plugged into the machine electrical wire harness. If connection is good, replace the gear motor: disconnect all the wire coming into the gear motor; cut the cotter pin that goes through gear motor's shaft (pos.35); remove transmission shaft (pos.29); remove 2 screws pos. 52 with alan wrench key (q); remove the whole gear motor assembly from inside the machine. Install the new gear motor following above steps in reverse then verify if gear motor is operational.

Note: If gear motor is burned also verify whether control board has not been damaged in a process.



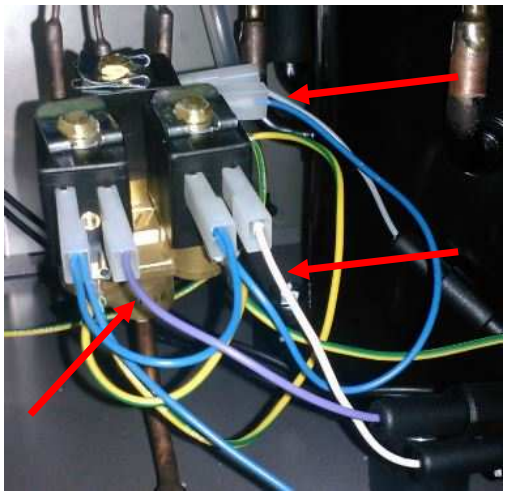
P06 – One tank over freezes, other one does not freeze at all

Reason_1

Wires plugged to the solenoid valve coils are crossed wired. Control board does not engage corresponding solenoid valve.

Solution_1

Invert the wires between coils. Follow color guidelines that are described in electrical schematic (wiring for each coil has different colors). Please review the below picture for reference:



P07 – Machine over freezes in COLD/DEFROST mode

Problem

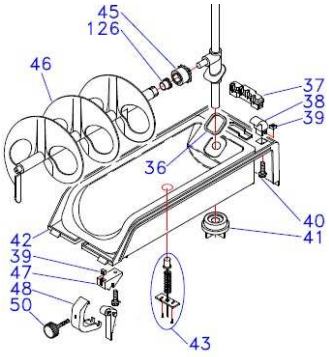
Machine over freezes to the point that mixing augers are blocked by the amount of ice built-up in the hopper

Reason_1

Thermostat probe (pos. 43) has been dislocated, is burned or conductive paste located between probe and tank has been compromised

Solution_1

Remove the thermostat probe: remove 2 screws in the bracket holding the probe; once bracket and spring being removed, gently pull down probe's electrical wire down and take it out. Clean the probe (or replace it) and the whole the probe goes into (pos. 42); reinstall the new probe.



P08 – Machine does not freeze; product inside all tanks remain at ambient temperature; red light located near the main power switch (pos.72) is OFF

Problem_1

Machine does not freeze due to compressor being OFF or no refrigerant in the circuit.

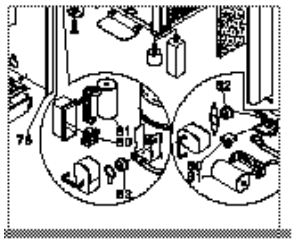
Reason_1

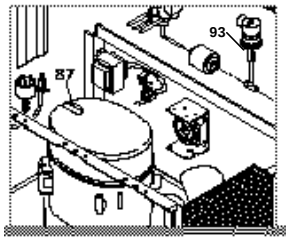
Either compressor or electrical component of the compressor (start capacitor, relay, thermal protector) are malfunctioning

Solution_1

If the compressor comes on, install the gages and check working pressures of the refrigerant: Fill up the machine with some mix (or water + sugar), open the solenoids on all tanks and read the working pressures of the refrigerant (reference: A10 Table with proper gas pressures for each model). It may take 10-20 minutes for the machine to arrive to the actual working pressures. If pressures are low, look Cause_2

If the compressor does not come on, check if the high pressure switch tripped but the red warning light remained off due to the burnout. Try to reset the high pressure switch as instructed in P01. Replace the red warning light if necessary.





Reason_2

Leak of the freon out of the circuit. Working pressures of the refrigerant come below indicated values listed in A10.

Solution_2

In order to find a leak, pressurize the machine with nitrogen up to 280 PSI. Use leak detector to locate a leak. Spray water and soap and look for air bubbles building up on the outside of the cupper tubes

Once you locate a leak, vacuum the system (minimum 20 minutes with pump working), then restore the welding (using silver alloy with coverage of antioxidant). We recommend recharging the machine with refrigerant by weight. Proper freon weights per model are indicated on a data plate located on the front steel panel (pos.76).

P09 – Control board's screen blinks. When MENU button pressed and released "ALARM VOLTAGE" come on the screen.

Problem

There is a fluctuation in the supply voltage exceeds +/- 10%.

Reason_1

The power supply to the machine is insufficient. Most likely due to multiple pieces of equipment plugged in on one circuit/breaker. We always recommend having a dedicated circuit for our slush machines.

Also, we recommend eliminating any extension cords and electrical splitters.

Solution_1

It is necessary to ensure an adequate power supply to the slush machine. If the alarm comes back, it means that the power supply is still not adequate; Turn off the lights of the lids in order to decrease the absorption; this precaution could restore the functioning of the slush machine without the alarm.

Notes: If the slush machine is set up on BIB AutoFill System, shut down both slush machine and autofill system before securing proper power supply.

P10 – All control boards remain OFF; mixing augers do not turn; lights inside the tank lids remain OFF. Only compressor and condenser fan motor work.

Problem

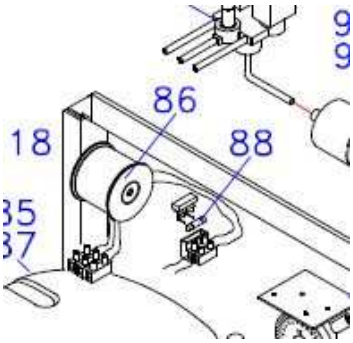
The electronic boards are not powered.

Reason_1

Transformer or transformer fuse is burned, due to power surges or other accidental reasons.

Solution_1

Replace the 5Amp fuse (pos.88): remove the fuse holder; remove the old fuse; insert the new one; insert the fuse holder back into its place. If machine still does not come on, check with a tester 12V reading past transformer, at the output terminals of the transformer; if there is no 12 Volts coming out of the transformer, replace it.



P11 – Control board's screen is blinking. After pressing and releasing MENU button "ALARM THERMAL" comes on the screen.

Problem

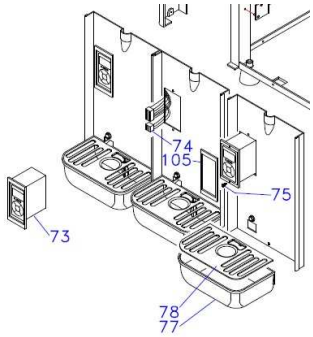
Machine works in SLUSH mode without problems. While in COLD position the solenoid valve light does not come on.

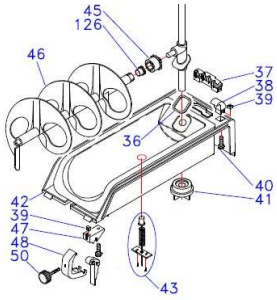
Reason_1

The two-way connector behind the electronic terminal (pos.73) is not properly installed.

Solution_1

Restore the contact and verify if there is an oxide; in case there is, clean the contacts; if the problem persists, replace the thermostat probe.





Cause_2

The thermostat probe is defective.

Remedy_2

The thermostat probe must be changed: Unplug the two-way connector behind the electronic board(pos. 73) Loose the two hex screws that secure the plate (pos. 43) with hex wrench (m) turn the plate clockwise until it releases; reposition the new probe and reinstall the bracket.

Notes: To verify if the probe is defective, Use a voltmeter to measure the voltage at the terminals of the suspected probe; subsequently measure the value of the voltage across a probe known as functional. Use below table as reference:

TEMPERATURE VS RESISTANCE CHARACTERISTICS [ITS-90]
Resistance 1k Ohms at 25 deg. C
Resistance Tolerance + / - 1 %

Temp. (deg. C)	Rmax. (k Ohms)	Rst. (k Ohms)	Rmin. (k Ohms)	Tolerance (deg. C)	
-10	3.736	**3.651**	3.568	-0,6	+0,6
-9	3.583	**3.503**	3.425	-0,6	+0,6
-8	3.438	**3.363**	3.289	-0,6	+0,6
-7	3.299	**3.229**	3.159	-0,6	+0,6
-6	3.168	**3.101**	3.035	-0,6	+0,6
-5	3.042	**2.979**	2.917	-0,6	+0,6
-4	2.922	**2.863**	2.804	-0,6	+0,6
-3	2.808	**2.752**	2.697	-0,6	+0,6
-2	2.699	**2.647**	2.594	-0,6	+0,6
-1	2.595	**2.546**	2.496	-0,5	+0,6
0	2.496	**2.449**	2.403	-0,5	+0,5
1	2.400	**2.356**	2.312	-0,5	+0,5
2	2.309	**2.268**	2.226	-0,5	+0,5
3	2.222	**2.183**	2.144	-0,5	+0,5
4	2.139	**2.102**	2.065	-0,5	+0,5
5	2.059	**2.024**	1.989	-0,5	+0,5
6	1.983	**1.950**	1.917	-0,5	+0,5
7	1.910	**1.879**	1.848	-0,5	+0,5
8	1.840	**1.811**	1.782	-0,5	+0,5
9	1.774	**1.746**	1.719	-0,5	+0,5
10	1.710	**1.684**	1.658	-0,5	+0,5

Reason_3

Completely empty machine has been running in a either SLUSH or COLD modes for more than 4 minutes. ALARM THERMO comes on and machine stops freezing.

Solution_3

Fill up the machine with mix. ALARM will go away automatically.

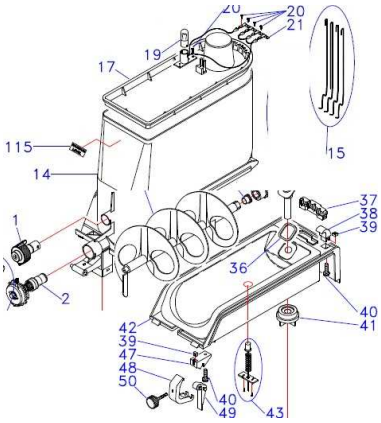
P12 – Control board's screen is blinking. After pressing and releasing MENU button "ALARM LEVEL" comes on the screen. Machine works properly.

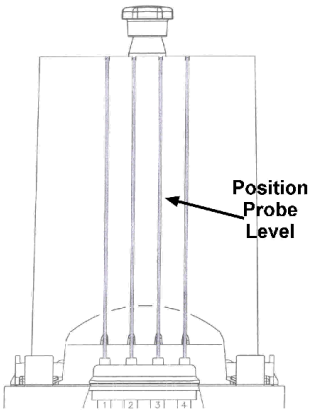
Problem

Machine alerts an operator about low level of MIX in a hopper.

Reason_1

If tank is full of MIX (at least 8 liters/2 gallons) the level probe (pos. 15) is not in a proper contact with a terminal (pos.37).





Solution_1

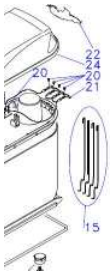
Restore probe level's contact inside the terminal (pos 37). Also, make sure the probe is located in the correct spot on the back of the tank – picture above.

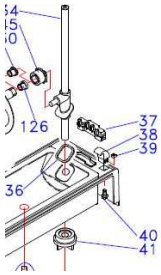
P13 – Machine does not freeze; Mixing augers do not turn, lights in the tanks' lids remain OFF

Problem:

Prongs on the back of the tank (pos. 15) are not in a proper a contact with stainless steel connectors on the back of the lid (pos. 21).

Attention: In most cases, the problem originates in the terminal board (pos 37). Make sure that prongs on the back of the tank (pos. 15) are installed correctly into the bottom terminal board (pos. 37).





Reason_1

The tank's lid is not positioned correctly on top of the tank.

Solution_1

Tap on the lid (pos.21) by pushing it downward (pos.17); position the lid correctly on top of the tank.

Reason_2

The 4 prongs (pos.15) housed in the back of the transparent tank (pos.14) do not make good contact in the terminal (pos.37).

Solution_2

Restore the connection inside the terminal board (pos. 37).

NOTES: You can always override the lid and make the mixing blade spin regardless of whether the lid sits on top of the tank or not or if the prongs are installed correctly or not. You have to activate the BYPASS function the controllers MENU:

Press and hold the key MENU, click through the MENU until option BYPASS is written on the screen; with the ⌃⌃ key select ON. Augers should start to spin now.

To remove the bypass, use the same procedure and with the ⌃⌃ key select OFF

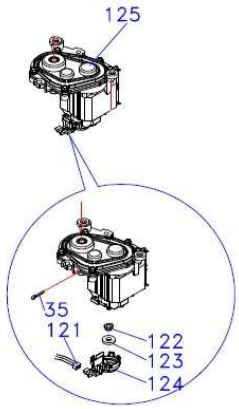
P14 - Control Board does not come on

Reason_1

The magnetic reader (pos. 124) short-circuited and the electronic board goes into a protection mode and remains off. Disconnect the 3 cable wire electrical system from the magnetic reader and verify if the electronics turns on.

Solution_1

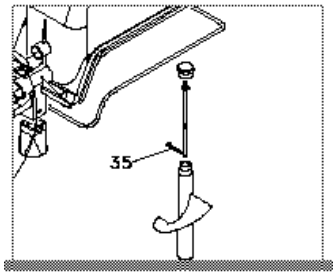
Replace the magnetic reader (pos.124).

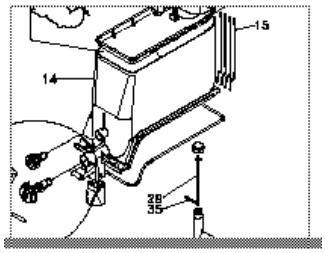


P16 – Mixing augers do not turn; machine does not freeze

Problem

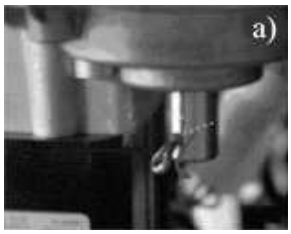
Cotter pin (pos. 35) broke due to too much of a pressure on the gear motor's drive shaft. Most of the time it occurs due to low % of sugar in the slush mixture (it should never be less than 11%).

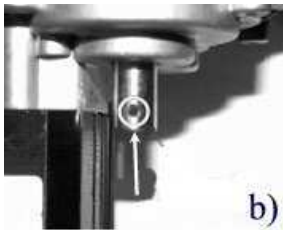


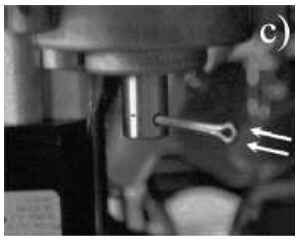


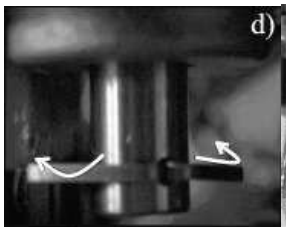
Solution_1

The cotter pin (pos.35) must be replaced:







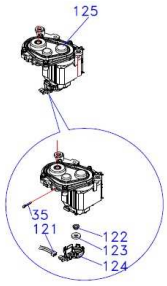


Reason_2

The gears inside the gear motor are broken or stripped.

Solution_2

The gear motor (pos.125) must be replaced. Make sure you remove the cotter pin and shaft (pos 28), before you try to replace the gear motor.



P17 – Horizontal mixing auger "skips", making loud noise

Problem

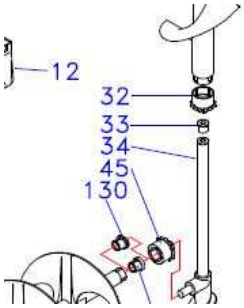
There is a problem in the rotation of the horizontal mixing auger, which begins to "skip" or hang up permanently.

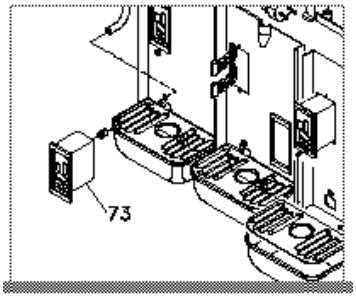
Reason_1

The horizontal auger gear (pos 45) and/or vertical auger gear (pos 32) are worn out, usually due to the following reasons:

The % of sugar in the mix is too low (less than 11%)

Density of the slush is set too high. The higher the number of the front display of the control board (pos. 73), the denser the slush gets.





Solution_1

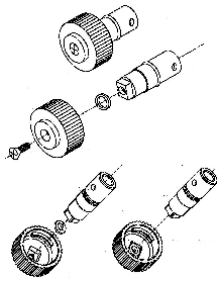
Replace gears worn out gears with new ones.

Reason_2

Horizontal auger is too short and while slush mix thickens up, it moves forward and creates a separation between the elapsing teeth of the horizontal and vertical augers gears. They tend to skip in rotation.

Solution_2

Install an additional washer in the horizontal auger knob:

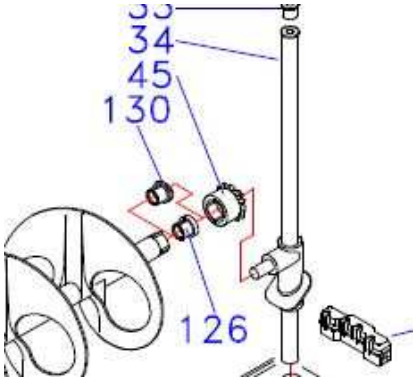


Reason_3

Horizontal auger seems too short, because it is missing horizontal auger bushing at the end of it (pos.126 or 130)

Solution_3

Replace the missing bushing with a new one



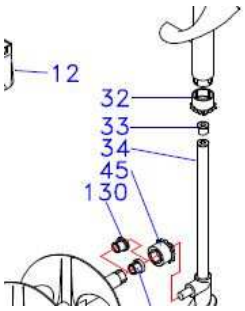
P18 – Laud squeaking noise comes from the inside of the tank, when mixing augers are turning

Reason_1

No lubricant on the pinion of the augers.

Solution_1

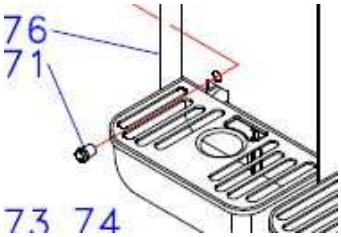
Apply food grade lubricant on the internal gears inside the hopper (pos 32 & 45)



P19 – Product leaks from underneath the tank into a drip tray

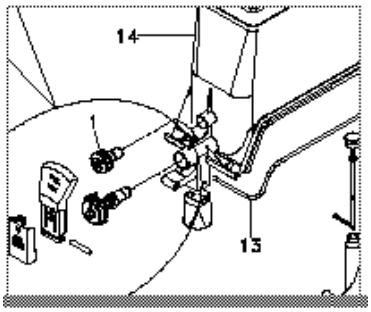
Problem

Slush mix leaks into a drip tray through a white outlet right above it (pos 71):



Reason_1

The gasket transparent tank (pos.13) is misplaced, loose or pinched. We recommend replacing it at least once every 12 months.

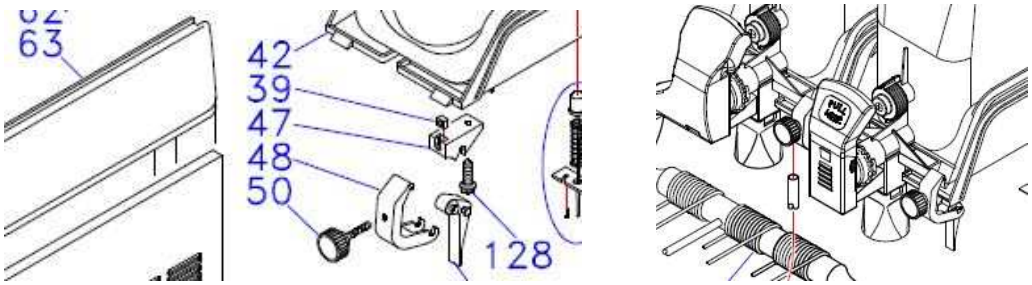


Solution_1

Inspect the gasket. If good, try to reinstall it properly in the tank. If machine still leaks, replace the gasket with new one.

Reason_2

The hinge hooks (pos.48) are deformed and do not hold the tank down strong enough anymore.



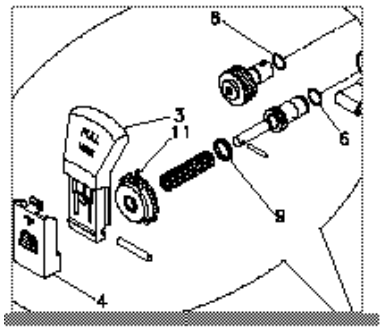
Solution_2

The hinge hooks (pos.48) must be replaced.

P20 – Product drips from the dispensing spout while it is in a closed position

Reason_1

The internal o-ring located on piston (pos.6) is worn out. We recommend replacing once every 6 months.



Solution_1

The O-ring must be changed. Empty the tank before replacing the o-ring

Reason_2

The outlet back gasket (pos.9) is worn out

Solution_2

The gasket must be changed. Empty the tank first

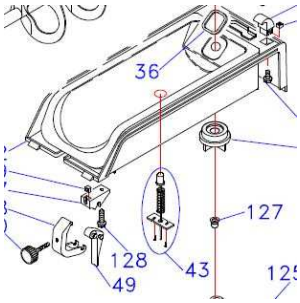
P21 – In SLUSH, COLD & DEFROST modes machine over freezes or does not freeze at all

Reason_1

This malfunction is generally caused by the thermostat probe, which is positioned incorrectly or is faulty.

Remedy_1

Remove and replace the thermostat probe (pos 43). Check parameters of the removed probe. Parameters table in P11



Reason_2

If one tank over freezers and another tank under freeze, most likely wires on the solenoid valves are inverted.

Remedy_2

Please review below picture for the correct sequence of the wires on the solenoid valves. Please note that there are three different wire colors corresponding to their coils and tanks (purple, white and gray):