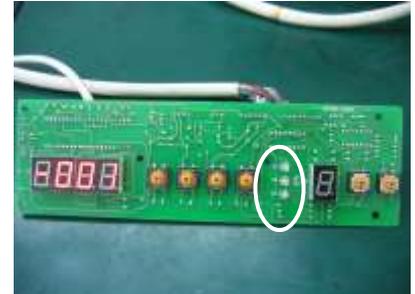


Chapter 1, Electrical maintenance

1.1 Problems with the power supply.

The ice cream machine is a high-power machine with an inductive load; this results in a higher requirement concerning the quality and stability of the power outlet. This problem may cause the low-voltage protection to be triggered during start up.

If this happens, all the indicator lights (red, green and blue) and digital digits will all go out. In order to keep the normal operating conditions and the service life of the machine, the following should be followed when the machine is used:



a. The Current should be high enough.

If the current is too low, the low-voltage protection will be triggered. The ice cream machine is a high-power machine with an inductive load, so we suggest that the current capacity should not be less than 20A.

b. The cable connecting the machine with the power outlet should be according to the requirement of the machine.

The soft ice cream machines need a high current during operation, so the cable connecting the machine with the power outlet cannot be too thin and too long. Both the socket and the plug cable must have a grounded wire. The sectional area of each wire in the cable should not be less than 2.5 mm^2 in diameter and the length not longer than 6m.

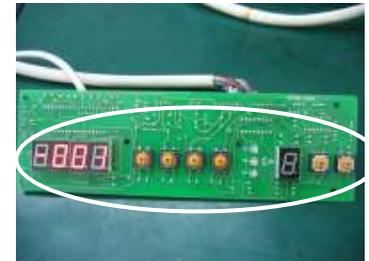
c. If the voltage is not steady, the power supply must still be high enough.

The usage of a voltage stabilizer will prevent problems related with an unstable power source, but if the power is not high enough it may also trigger the low-voltage protection. The power supply to the machine should not be lower than 5KW.



1.2 The control board is malfunction.

The control board is operating the different operating condition such as “clean”, “STOP”, “MANUAL”, “AUTO”, the hardness value and will also display a current value of the motor. Problems concerning the damaged indicator lights; the digital display showing wrong number; the press buttons cannot be used and other similar errors with the control board.



1.3 Problems with the driving board.

The main function of the driving board is to amplify the control signals that are sent by the control board to the motor, compressor, fan as well as the power supply to the control board. Including high and low voltage protection circuit and the current sampling circuit of the motor. The current over the board will increase during operation of the soft ice cream machine.

The main causes for the problems that may occur is mainly caused by:

The potentiometer has taken damage or the parameter for the sampling circuit has



been changed which result in that the machine cannot stop or will stop too early;

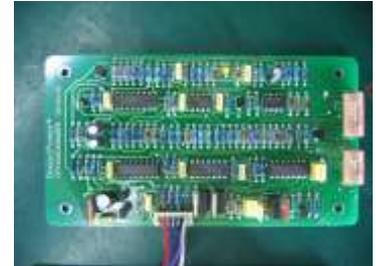
If the relay on the compressor has been damaged then this may cause that the compressor and the fan cannot stop. This will cause the frozen cylinder phenomena.

Solution: change a new driving board.

1.4 Problems with the main control board.

The function of the main control board is to supply signals that will operate the machine. If the main board has been damaged, then the compressor may not start or will not operate well.

Solution: change main control board to a new one.



1.5 The motor is damaged.

The motor in a soft ice cream machine has to be stopped and started frequently, so this results in high requirements on the motor. If the motor is damaged, the machine cannot distribute the product.

When the machine start up, it will make a big shake and stop automatically after a while; the machine will not start after the “clean” button is pressed.

Solution: change the motor.



1.6 Start-up capacitor of the motor is damaged.

If the start-up capacitor is damaged, these problems will happen:

The machine cannot distribute the product; Increase in the noise; frozen cylinder will



occur; the motor cannot start or it is difficult; the compressor will not start etc.

Solution: Change the start-up capacitor and it is also important to check if the AC electromagnetic contactor needs to be changed or not. The start-up capacitor is located on the left bracket and the running capacitor on the right bracket.

1.7 Running capacitor is damaged.

The running capacitor is an important component that is needed in order to ensure operation of the machine. If the running capacitor is damaged, the motor will not operate correctly and the current will increase sharply, this will result in that the compressor may not start or the motor will take damage.

Solution: change the running capacitor in time.

1.8 Potentiometer is not in the right position.

The main function of the potentiometer located on the driving board is to adjust the stopping (back) current. If it is has moved during the operation to the wrong position, then the compressor will start and stop randomly or cannot stop, the machine may also distribute too soft ice cream.

Solution:

Adjust the potentiometer. It should be placed near the XH-06 connecting seat on the middle of the driving board.



1.9 The AC electromagnetic contactor is damaged.



The function of the AC electromagnetic contactor is to protect the start-up assemblies of the motor. If it has been damaged, the following will occur:

The noise will increase and the machine will shock when the motor is rotating;

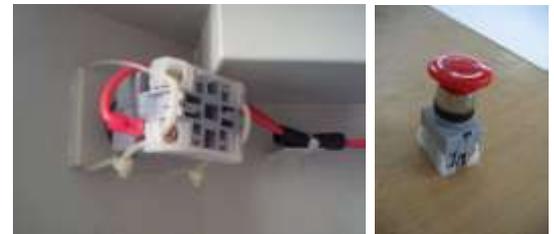
The relay will connect;

The machine stops frequently.

Solution: change the AC electromagnetic contactor in time. Its general model can be seen in the pictures.

1.10 Emergency switch is damaged.

If the emergency switch is damaged, the machine will not stop after it had been pressed. Solution: A multimeter can be used to test if the emergency switch is working properly, if the emergency switch is damaged it should be changed into a new.



1.11 The Transformer is damaged.

The transformer is used to supply the working power for the whole control system. If it has been damaged, the machine cannot be operated normally.

Solution: A multimeter can be used to test if the transformer has been damaged, if the transformer is damaged, it should be replaced to a new one.



Chapter 2, Mechanical maintenance

2.1 Speed reducer (slow speed motor) is damaged.

The speed reducer is an important part concerning the transmission in the soft ice cream machine. If the frozen cylinder phenomena occur, the speed reducer can easily take damage because of the big moment.



This problem can cause: high increase in the noise; no distribution of ice cream since the beater cannot rotate; the refrigeration is unstable.

Solution: Exchange the new speed reducer.

2.2 The translating (gear) strap is out of place.

After the machine has been used for a long time, the fixed screw on the gear wheel can unscrew itself and result in that the strap will get out of its track. If the strap is too loose, it will start skidding and result in that the transmission to the beater will



stop and there through not rotate; if the strap is too tight, the motor resistance and current will increase and the control system will reach the value when the cooling cycle should stop to early. This will result in that the machine will stop before the cooling cycle is complete or even before the compressor has started; Since the work load on the motor is too big, the right rotating speed can not be reached and may cause increase in noise.

Solution: adjust the translating strap.

2.3 Tank beater is damaged.

If the frozen cylinder occurs, the moment of the beater is too big and may cause damage to the beater or the part connecting the beater and speed reducer distortion.

If this occurs, the product cannot be distributed.

Solution: Exchange the beater.



2.4 The ripple seal ring is damaged.

The main reason is that the ripple seal ring has got damaged from ice crystal during the frozen cylinder phenomena. This will cause leakage of the ice cream mix.

Solution: Exchange the ripple seal ring.



2.5 Screws may unscrew themselves.

After the machine has been used for a long time, some of the screws may unscrew themselves, especially the screws connected with the transmission part of the machine near the cooling cylinder, such as the screw attaching the speed reducer. The user should



also tighten the screw of the discharge door, or mixture may start leaking and the refrigeration may become less efficient. If the first problem happens, a service man can tighten the screw. If the second problem happens, tightening the screws holding the discharge door easily solves the problem.

Chapter 3, General problems on refrigeration system

3.1 The compressor is damaged.

If the compressor is damaged, the air from the air outlet will not be warm.

Solution: change the compressor.

3.2 Refrigerant is leakage.

This problem can be used pressure gage to judge. If there is a refrigerant is leakage, the refrigeration efficiency will be low.

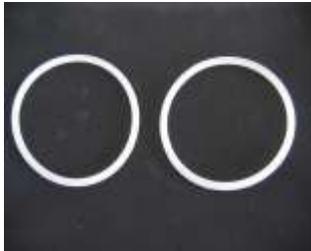
Solution: Locate the leakage and refill the refrigerant.



Chapter 4, General troubleshooter for the ice cream machine

1. Firstly, examine the outer appearance of the machine.

- a) Examine the shell, top cover and wheels.
- b) Examine the discharge door assembly, beater and seal rings and packing. If some of these are damaged, please change to new ones in time.



- c) Examine the speed reducer, make sure it does not leak mixture or oil.
- d) Examine the power supply cable and plug. If damaged, please change or repair in time.



2. Test if the machine can be started or not.

If the machine does not start, please examine the following components:

- (1) Examine the emergency switch and circuitry;
- (2) Examine the control board;
- (3) Examine the main control board;

If the machine starts, please examine whether the following problems happen or not:

1. The ice cream is too soft
2. The ice cream is too hard
3. The machine cannot be distributed
4. High noise level.

If these problems do not occur, please proceed to part three; if these problems occur, the solutions can be seen bellow:

1. *The ice cream is too soft*

Examine the compressor:

- (1) The compressor does not start
 - a. Examine the control board
 - b. Examine the start-up capacitor
 - c. Examine whether the numerical value of the resistance of the coil is normal or not



- (2) The compressor runs for too long time or does not stop.
- a. Examine if there is enough ice cream mixture in the hopper.
 - b. Examine the control board
 - c. Examine the refrigeration system
 - d. Examine whether the condenser and radiator need to be cleaned.
 - e. Examine whether the cannel joints leak or not
 - f. Examine if there is enough refrigerant, too much or if air or water is in the system or not.
 - g. Examine the expansion valve
 - Examine the temperature sensing package has been tightened, has encrusted, bad effect and leaks or not
 - Adjust the right value for the degree of superheat
 - Examine whether the valve is filled with ice or dirt or not
- (3) The compressor stops after it has been running for some time.
- a. Examine if the compressor is over heated or not and has too fluid (refrigerant) or not, this may trigger the protection.
 - b. Examine the control board
 - c. Examine if the power cable is too thin and too long or not
 - d. Examine the motor



2. *The ice cream is too hard*

- a. Examine the main control board
- b. Examine whether the mixture is enough or not
- c. Ensure that the ice cream mix has been prepared right (water ratio)

3. *The machine cannot distribute the product*

- a. Examine the proximity switch and circuitry
- b. Examine the start-up capacitance and coil of the motor
- c. Examine the main control board

4. *High noise level*

- (1) Examine the tank motor
 - a. Examine the shock pad of the motor
 - b. Examine the translating strap
 - c. Too high resistance from the beater, decelerator or the translating strap.
 - d. Check the motor
- (2) Examine the compressor, condenser and blower fan
 - a. Examine the start up capacitor of the compressor.
 - b. Check the compressor

3. Problems on other electric parts.

- 1. The display lights do not work
- 2. The digital display do not work
- 3. The machine can't operate normal, please examine the control board.



Appendix 1

| Ice cream machine maintain manual | | | |
|--|---------------------------|---|---|
| | Defect part | Problems | Solutions |
| Mechanical maintenance | Speed reducer | High noise level; cannot distribute after refrigeration; No refrigeration in one of the cylinders; The motor do not rotate. | Change the speed reducer |
| | Translating strap | The compressor do not start; high noise level | Adjust the translating strap |
| | Beater | Can't distribute the product | Change a new beater |
| | Ripple sealed ring | Leakage of mixture from the cooling cylinder | Change the ripple seal ring |
| | Screw | Mixture leakage and bad refrigeration efficiency | Tightened the screw |
| | | | |
| Electrical maintenance | Power supply | The low-voltage protection is triggered; high noise from the motor; the compressor will not start. | Use voltage stabilizers with enough power |
| | Display board | Display does not work properly. | Change the display board |

| | | | |
|-------------------------------|---------------------------|---|---------------------------------|
| Electrical maintenance | Driving board | The machine do not stop; Frozen cylinder will occur frequently (the fan and the compressor do not stop); the compressor do not start; the relay is do not work. | Change the driving board |
| | Main control board | The compressor and fan do not start; Machine does not operate normal. | Change the main control board |
| | Motor | Cannot distribute; high noise when the machine is started. The machine stops without finishing the cooling cycle; the motor does start after pressing the “clean” button; the machine do not start. | Change the motor |
| | Start-up capacitor | Can’t distribute; big noise; frozen cylinder; the machine will not start up or is difficult to start; bad refrigeration; the compressor do not start. | Change a new start-up capacitor |
| | Running capacitor | The machine will not distribute the product after cooling cycle been complete; the compressor does not start. | Change the Running capacitor |

| | | | |
|-------------------------------|-------------------------------------|--|---|
| Electrical maintenance | Potentiometer | The compressor will stop after it starts after a short time; the ice cream is too soft | Adjust the potentiometer |
| | AC electromagnetic contactor | Big noise and Shaking; the relay not working; the machine stops frequently | Change a new AC electromagnetic contactor |
| | Emergency switch | Do not work | Change the emergency switch |
| | Transformer | The machine does not start. | Change the transformer |
| Refrigeration system | Compressor | No refrigeration | Change a new compressor |
| | Refrigerant | No refrigeration | Fill refrigerant or locate leakage. |