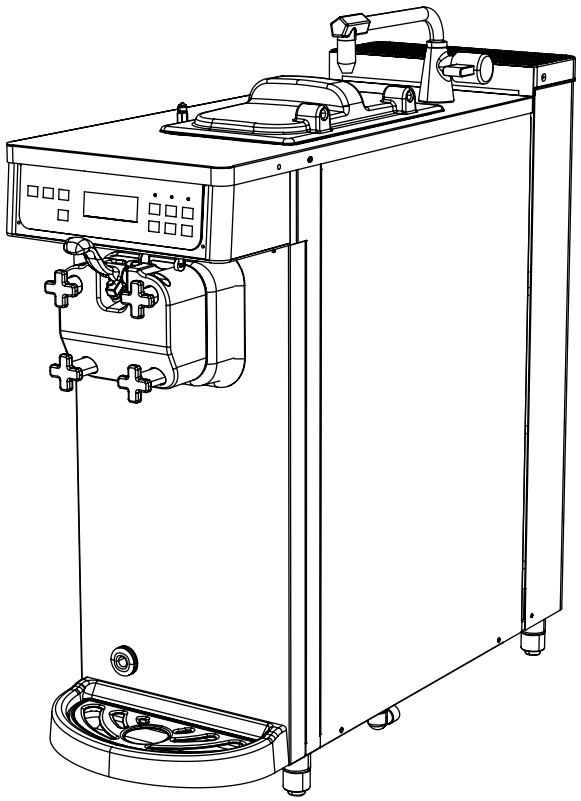
Ice Cream Machines
User's Manual



ISI-161TH

* This product is designed for indoor use.
* Make sure to install it indoors.
* The appearance, design, color, and parts of the product are subjected to change without prior notice.

ICETRO

Ice Cream Machines offers the following advantages

1. Slim line soft Ice Cream Machines

Easy to install thanks to the compact form factor in Korea and slim body.

2. Minimised noise & Vibration cooling system

With a high efficiency and low noise motor, we can achieve minimal noise from the refreshing cooling system.

3. MICOM control system

Use of an artificial intelligence control system achieves an optimal cooling system.

4. Pasteurization function

A low-temperature pasteurization process is implemented for heating products at 68℃ for 30 minutes to supply sanitary ice cream products the spoilage of materials.

5. Defrost function

The soft ice cream inside the cylinder can be defrosted to liquids.

6. Ergonomic button used premium LCD display panel

Push button design for easy operation.

7. Convenient washing system

Water valve are directly connected to the body of machine pasteurization functions allows boiling water when cleaning the cylinder and the mix hopper to facilitate the cleaning of the system.

8. Inverter system application(Taste & Texture control system)

By allowing separate speed controls for producing and projecting soft ice-cream, you can have the best ice cream quality.

Dear customers

Thank you very much for purchasing a Ice Cream Machines made by ICETRO. For correct use of the product and its maintenance, please read this manual carefully. If a problem occurs while using the product, you can refer to this manual for troubleshooting. This manual contains a product warranty, so keep it safely for future reference. This product can be installed only by someone qualified for installation.
If use of parts and accessories not provided or approved by ICETRO or any part or accessories made by ICETRO but remodeled by other person causes a problem, we are not responsible for if financially.
(The functions and specifications shown in this manual and on the web site are subject to change without notice.
Please visit our website at http://www.icetro.com to obtain the latest specifications

Contents

Cautions for your safety

The caution/warning details for safety are intended to prevent accident or danger through safe and proper use. Therefore please follow the details accordingly.
The precaution details are categorized into warning and caution, and the respective meanings are as follows.

⚠ Danger	If you neglect this symbol and wrongly use the product, it may cause a fire, serious injury or death.
⚠ Warning	This means that it can cause death or major injury when the details are violated.
⚠ Caution	This means that it can cause injury or house/ property damage when the details are violated.

※ Personal Injury: Minor cuts, burns (high or low temperature) or electric shocks that do not need hospitalization or long–term hospital visiting.

※ Property Loss: The loss on houses, household goods, livestock, bedding, and such.

[Each symbol has the following meanings]


This symbol means that it can be dangerous in specific conditions.


This symbol means never to do the described action.


This symbol means not to touch specific parts with bear hands.


This symbol means to unplug the power from the outlet.


Must be grounded.

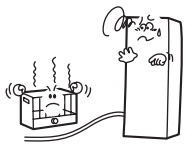

This symbol means not to disassemble the product.


This symbol means to be careful because there is a possibility of electric shock.

For relocation of the product, call an expert.
The product may cause such hazards as falling down unless properly installed.
It should be installed in accordance with related regulations such as the road and traffic act, the fire fighting act and the food sanitation act.
※ Call your distributor.

Call an expert for repair.
Imperfect repair may cause fire, electric shock or injury.

※ : If you think the product needs repairing, call your distributor.



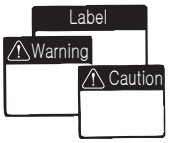
Keep a heating device away from the power cable.
A heating device may melt down the coating of the power core, resulting in fire or electric shock.

If the power cable needs replacement or repair, call a service center or an expert.

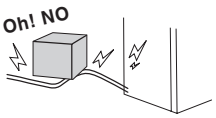
Do not inject inflammable material such as benzene, gasoline, paint thinner or LP gas into the product or keep it close to product.
Explosion, fire or injury may occur.

Before you clean the inside of the product, unplug the earth leakage breaker wearing rubber gloves.
Electric shock or injury may result.

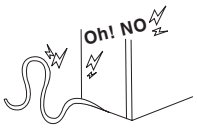
Do not disassemble or alter the product.
Electric shock, fire or injury may occur.



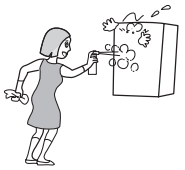
Keep your warning and caution labels clean for easy legibility.
If the user misunderstands the content of such a label, an accident may occur.



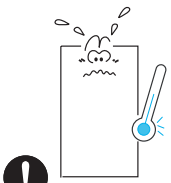
Do not put anything on the power cable.
Make sure that the power cable is not twisted or knotted.
Fire or electric shock may occur.



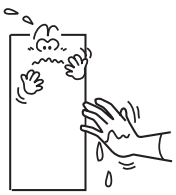
Stop using the machine, if you find the power cable, or any other cable to be defective.
Fire or electric shock may occur.



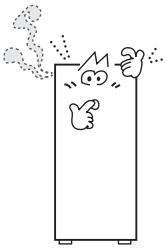
Do not spray with an insecticide, flammable spray or perfume near the product.
Fire or electric shock may occur.



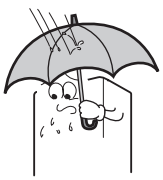
This product shows the optimal performance at temperature of 10~38℃



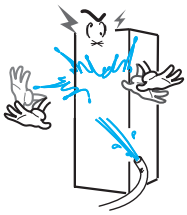
Do not touch the power cable or any elctric part with wet hands.
Explosion, fire or injury may occur.



Stop operating the product if you hear any unusual noise or smell or if you see smoke coming out from the product.
If you continue to operate the machine in such condition, fire or electric shock may result.



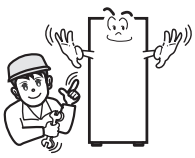
When you replenish ice cream raw materials, do not allow rain or snow to get into any interior electric part.
Defective operation may occur.



Make sure that no electric part has come into contact with water.
If the product was immersed in water by a flood, call a service center for a check. Otherwise, fire or electric shock due to electric leakage may occur.

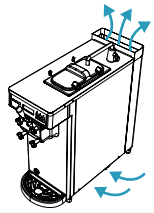
Do not touch any moving part inside the product.
You may get injured.

Do not climb onto the product or shake or tilt it.
The product may fall down or develop a problem.

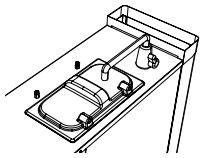


When you dispose of the product, consult a disposal expert.
An accident may result unless it is properly disposed of.
※ Call your distributor.

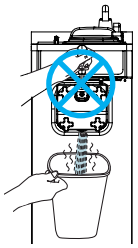
If you sell or hand over the product, make sure to hand over the user's manual with it.
Without the manual, an accident may occur because of erroneous handing or operation.



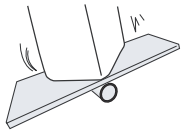
Do not place any obstacle at the entrance of the air vent.
It may cause the degradation of functionality.



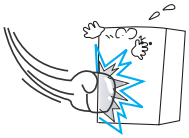
While operating the product, please close mix cover completely.
Bugs or alien substances can enter the product.



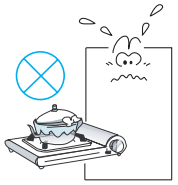
Never operate the lever during sterilization or defrosting.
Hot material cna be discharged and it may cause burns.



Do not install it on a tilt.
It can cause physical injury or product damages.



Do not apply excessive force or impact to the product.
It can cause damages to the product.

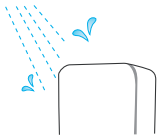


Do not use or store inflammable gas or material near the product.
It can cause electrical shocks or fire.

Please do not press "WASH" button during empty condition which the cylinder doesn't contain any ingredients or water.
The bearing of drum can be frayed because there is no lubrication.

To have good soft icecream, it is recommended to pasteurize or clean it everyday.
Otherwise, the ingredients can deday.
If sterilization is not done every day, you are recommen ded to clean it every day.

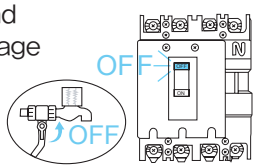
Do not place water containers, medicine, foods, small metal parts or inflammable material on top of the product.
If they go inside the product, it can cause electrical shocks, fire and damages.



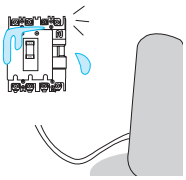
Do not install it near dust, moisture or rainwater(water) popping.
It can cause electrical shocks or fire.

Don't let an uneducated person or a child touch or operate the machine.
The machine can be damaged, or an injury may occur.
The damage will go to the machine or there is a possibility of injury.

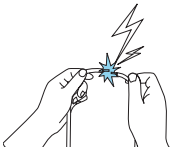
If you want to leave it unused for a long time, then close the water supply valve and turn off the earth leakage circuit breaker.
Injury may occur if it falls over.



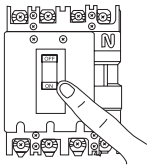
If there is water inside the power supply, turn off the earth leakage circuit breaker and dry it before use.
It can cause electrical shocks or fire.

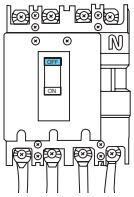


Do not arbitrarily connect the power cord or process it for use.
It can cause fire.

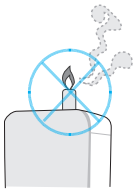


Do not turn the power ON/ OFF with the circuit breaker continuously.
It can cause electrical shocks or fire.

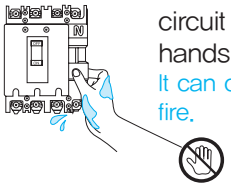




Do not connect many electrical products to the earth leakage circuit breaker. Use it individually.
It can cause fire.

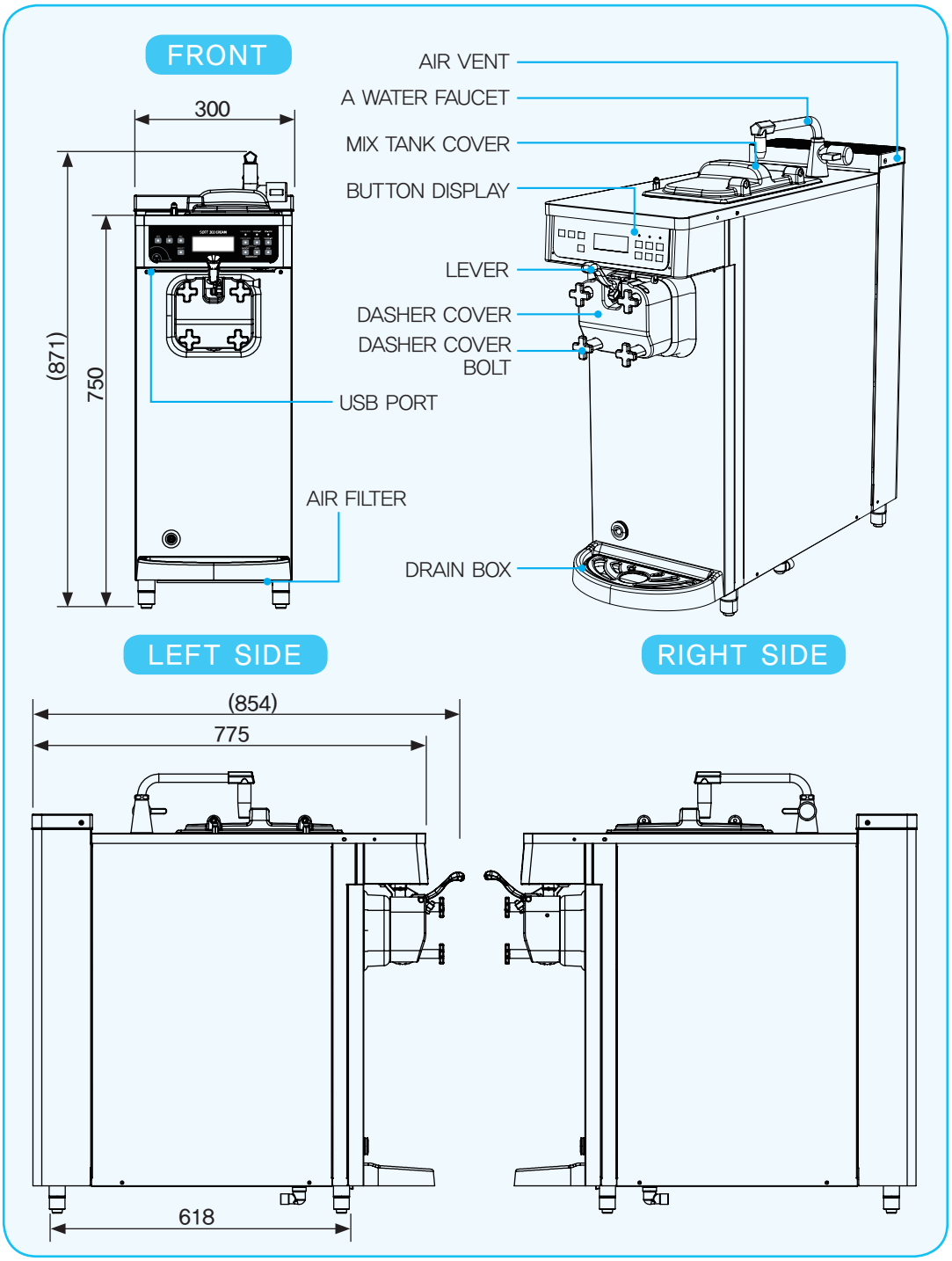


Do not place candle lights or cigarettes light on top of the product.
It can cause fire.

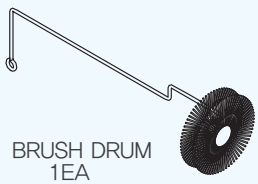


Do not touch the earth leakage circuit breaker with your wet hands.
It can cause electrical shocks or fire.

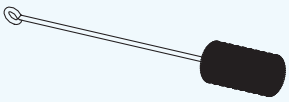
Name of each part



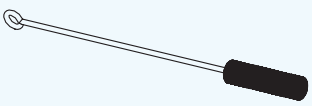
ATTACHMENTS



BRUSH DRUM
1EA



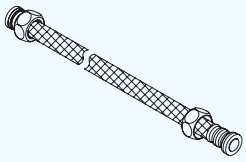
BRUSH COVER
1EA



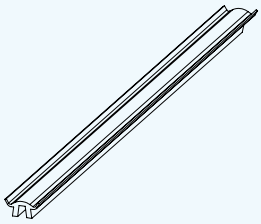
BRUSH 3

1EA

BRUSH CARBURETOR OUT
1EA

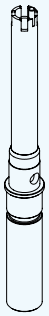


HOSE
1EA



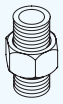
DASHER LUG POM
6EA

CARBURETOR TUBE
1EA

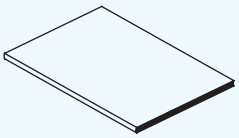


CARBURETOR
TUBE BODY
1EA

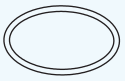
SOCKET
(PT½"–NPT½")



UNION 1/2
1EA



MANUAL
1EA

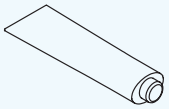


PACKING DASHER COVER
1EA

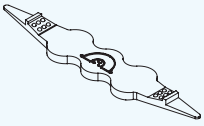
PACKING CARBURETOR
1EA

PACKING PISTION
2EA

BEARING DASHER
1EA



HINES
1EA



PACKING REMOVE HANDLE
1 EA

Product specification

CLASSIFICATION		SPECIFICATION	
Product name		Ice Cream Machines	
Model name		ISI-161TH	
Rated power		220V, 60Hz	115V, 60Hz
Power consumption		1286 W	1350 W
Current consumption		7 A	13.2 A
Product size (Applicable to rubber feet / Not applicable to tap, cover, and lever)	WIDTH(W)	300 mm	
	DEPTH(D)	775 mm	
	HEIGHT(H)	750 mm	
Cylinder capacity		1.4 ℓ	
Mixing tank capacity		3 ℓ	
Consecutive selling (30 second interval)		4 Cups(15 Cups)	
Initial sales hours		8 minutes	
Cooling temperature		Can keep under 5 ℃	
Condenser		Fully sealed compressor	
Pasteurization function		68 ℃ 30 Minute Pasteurized	
Filter mounted		bottom filter	
Refrigerant amount		17.63 oz(500 g)	
Refrigerant Material		R-404A	
Display system		LCD screen	
Product weight(Before packing)		90 kg	

Check prior to use

【 Make sure to check them prior to use ! 】

Install it independently in an earth leakage circuit breaker with more than 20A and provide an external grounding.
(Ask a qualified electrical technician for the installation.)
The power cable should be connected before the product can be operated normally.

- Do not block the air vent.

  The air suction and discharge should be facilitated so that the cooling performance can be optimized.

- Periodic filter cleaning(Once a week)

  For better taste of soft ice cream, do not miss the filter cleaning time.

- Clean the condenser once a month.

  It is recommended to clean the cylinder, the mix tank, the impeller, the dasher, the carburetor, the piston every day.
  Clean the condenser at least once a month or more often.

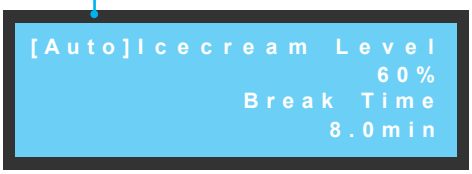
- Pasteurize it at least once a day.

  The cylinder, impeller, dasher, or piston inside the product makes a contact with the ingredient, so you should clean them once every day..

For your information

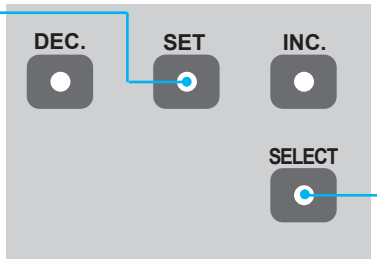
If you intend to leave it unused for a long time, wash it and turn off the water supply valve and turn off the earth leakage circuit breaker.

Button display names and functions



‘ DISPLAY WINDOW ’
- Displays the degree of soft ice cream formation in operation.

‘SET’
- Button is used to change the setting. Press the ‘DEC.’ & ‘INC.’ buttons at the same time for five seconds to lock or unlock the touch buttons.



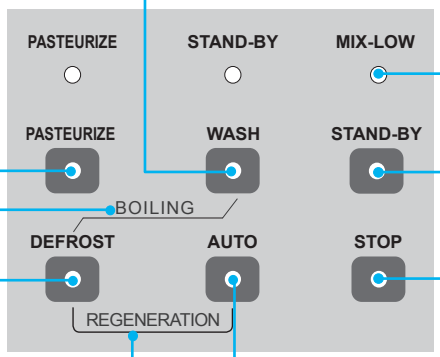
‘SELECT’
- Button is used to check the temperature.

‘WASH’
- Button is for wash function

‘PASTEURIZE’
(Heating, Heat)
- Used when pasteurizing the soft ice cream or the raw material in the hopper.

‘BOILING’
(‘DEFROST’+‘WASH’)
- Used for boiling water when cleaning the system.

‘DEFROST’
(‘DEFROST’+‘AUTO’)
- Used when defrosting the soft ice cream.



‘MIX-LOW’
- Lamp blinks when there are insufficient ingredients.
- The light is on if there are no raw materials.

‘STAND-BY’
- while the raw material in the cylinder and the hopper is being refrigerated.

‘STOP’
- Button is used to stop all the functions.

‘REGENERATION’
(‘DEFROST’+‘AUTO’)
- Used when the Soft ice cream solution is watery.

‘AUTO’
- Button is used to make soft ice cream.

Description of the functional buttons

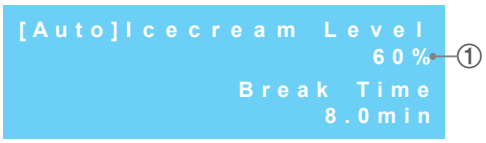
【 Detail description of each mode 】

Pour the raw material in the mixing tank and press the 'AUTO' button. The following status display will be shown.

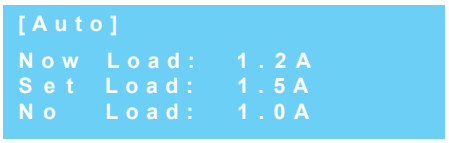
① Current level of soft ice cream is indicated.

② Press the 'SELECT' button to display the level setting (Current, Set–up, No–load) of soft ice cream.
to change soft ice cream level setting, press the 'SET' button for three seconds.
(For futher details, see ' Adjusting Setting Value' section.)

Making soft ice cream in 'AUTO' mode



To check 'AUTO' mode level set up ②



To see the information of the raw material in the hopper, press 'SET' button:

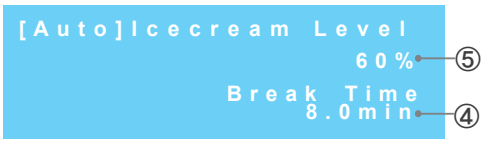
③ Information including the temperature of the hopper and cylinder can be obtained.
To change temperature, press the 'SET' button for three seconds.
(For further details, see 'Adjusting Setting Value' section.)

To see the raw material information of the mixing tank in the 'AUTO' mode

When soft ice cream has been produced, the compressor will be shutdown for a while, and the status will be displayed as shown to the right.

④ The time remaining until the restarting of the compressor will be displayed in Min unit.
(If the ambient temperature is high, the compressor may start up earlier than the indicated time.)
⑤ Soft ice cream level is indicated.
(After indicating 100%, the value will decrease as time passes, faster if the ambient temperature is higher).

After making soft ice cream in the 'AUTO' mode.



For your information

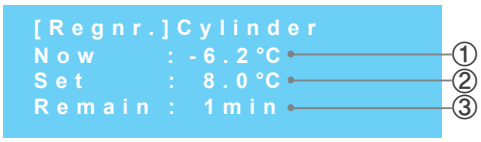
The soft ice cream level is set to the default by the manufacturer. Depending on the types of ingredients and the abrasion of the blade, it should be adjusted properly.
When installing this equipment, the settings for the ingredients should be based on the suggestion by the installation technician.
When changing the ingredients, consult with a professional to adjust the setting.

【 Detail description of each mode 】

If the soft ice cream is not used for a long time, then its shape will be degraded. In this case, you can use the 'Regeneration' function to make it look better.
Press the 'DEFROST' + 'AUTO' button at the same time for more than 2seconds, the status display window shown in the right figure will appear.

※Caution: Activated under the operation conditions only.

"REGENERATION" mode



① : It displays the current temperature of the soft ice cream.
② : It displays the temperature setting of the cylinder.
③ : It displays the duration of time (by minute) to maintain the set temperature(②) after the current temperature(①) reaches the set temperature.

As the duration of the temperature(③) maintenance expires after the current temperature(①) reaches the target temperature(②), it will automatically enter into 'AUTO' mode to make soft ice cream.

For your information

The 'Regeneration' function refers to a process where the soft ice cream is liquidized and then Process of producing soft ice cream; operable in "AUTO" mode only.
It takes about 20 to 30 minutes.

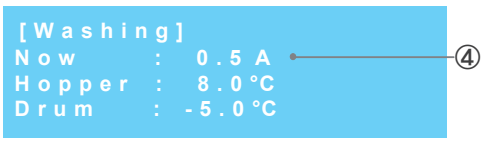
"DEFROST" mode

Use the 'DEFROST' function to melt the soft ice cream in the cylinder.

"WASH" mode

It is used to operate the impeller of the hopper and the dasher motor of the cylinder. Mainly, the washing function is used to remove the water or the liquid raw material.

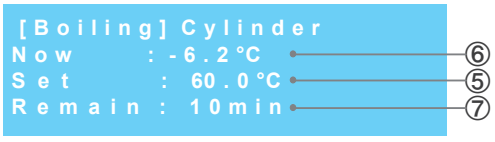
④ : It displays the present current value of the dasher motor.



"BOILING" mode

Heat the raw material or water in the cylinder and the hopper to reach the set temperature in order to wash with hot water. Press both 'DEFROST' + 'WASH' buttons for longer than 1seconds to display the state window shown in the picture on the right.

⑤ : The set temperature of the cylinder is displayed.
⑥ : The current soft ice cream temperature is displayed.
⑦ : The retention time (minutes) is displayed, after the current temperature(⑥) reaches the set temperature(⑤).



After the current temperature(⑥) reaches the set temperature(⑤), when the retention time(⑦) passes, the operation halts.

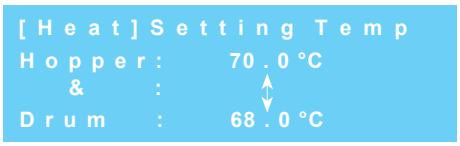
【 Detailed description of each mode 】

"PASTEURIZE" mode

If pasteurization is not done every day, and the ingredients are stored at a temperature below 5℃, after 2 or 3 days, it can cause deformation or decay.
To prevent decay and to maintain the initial refreshing soft ice cream ingredients, then you should heat it at 68~70℃ for more than 30minutes every day.

To check 'PASTEURIZE' mode temperature setting

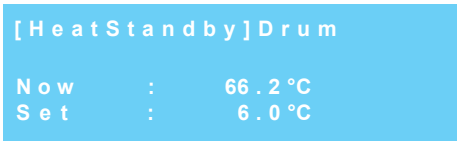
Current temperature and the time (Min.) for pasteurization process are indicated, as shown in the top right.
Press 'SELECT' button to display the Control Temperature in the hopper and cylinder.



Standy–by the hopper after completing 'PASTEURIZE'

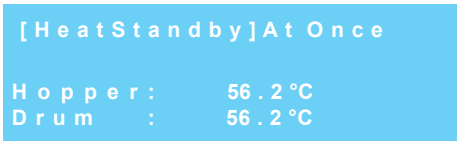
After pasteurization, this stage refrigerates the raw material in the hopper and cylinder to keep it cool.
Refrigeration process is applied to the hopper first and the cylinder next, as shown to the right.

Standy–by the cylinder after completing 'PASTEURIZE'



Standy–by the hopper and cylinder simultaneously after completing 'PASTEURIZE'

When the hopper and the cylinder are refrigerated simultaneously, the temperatures of the hopper and cylinder are indicated as shown in the bottom right.

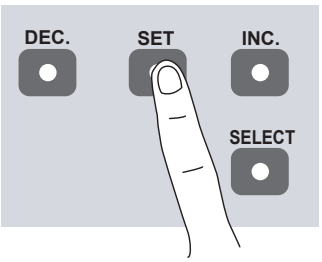


For your information

- While the 'PASTEURIZE' function operates, do not touch the dasher cover and the hopper cover because they are hot. Do not disassemble or modify.
  The hot ingredient can cause you bum injuries.
- If the 'PASTEURIZE' function has not been operated, then you should remove the original liquid in the hopper and the soft ice cream and perform cleaning job.

【 Check the setting 】

Press the 'SET' button lightly to enter the mode where set-up value can be confirmed, as shown below.
In the confirmation mode, Press the 'SET' button to see the setting values in the following order.



The temperature setting in the hopper and the cylinder is displayed.

```
[Temperature]

Hopper:     8.2°C
Drum   :    -6.2°C
```

The rated voltage, frequency and current of the freezer are displayed.

```
[Power]
Voltage    :          220V
Frequency:            60Hz
Current    :          1.2A
```

The version No. of the software operating the Main PCB, Vend PCB, Control PCB, and Door PCB are displayed.

```
[Version]
Main:    1.0
Control:    1.0
voice:    0.1
```

The time and date set up in the freezer are displayed.

```
[Current time]

        2012.12.03
          17:01:02
```

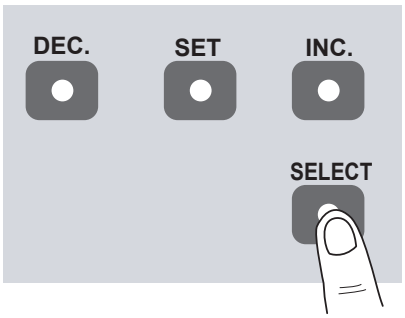
No-load current of the dasher motor is displayed.
First: No-load current when controlling ice cream first
Run: No-load current when controlling ice cream during operation
Draw: No-load current when discharging ice cream
After Draw: No-load current after draw

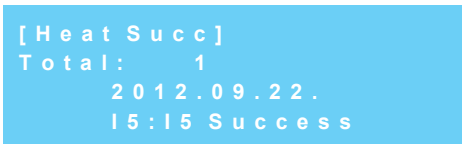
```
[Noload Current 1]
First    :   3.0A
Run      :   3.0A
Draw     :   2.1A
```

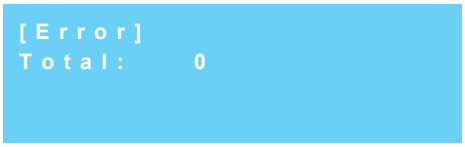
```
[Noload Current 2]
After
Draw     :   3.0A
```

【 Check the record 】

Press the 'SELECT' button for three seconds to check the records in the order of Sterilization, Washing, and Error, as shown in the right.
Display items can be changed with the 'DEC.', 'INC.' buttons.
To check the date, there has to be at least one record.
Press the 'SELECT' button shortly to see the year, month and date. Multiple records can be viewed using the 'DEC.' and 'INC.' buttons.

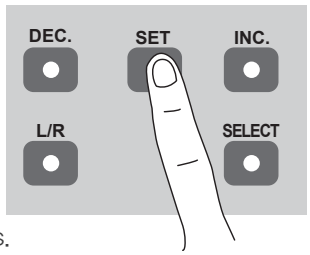






Explanation of the button function

【 Change the setting 】



Press the 'SET' button for three seconds to enter the setting change mode as follows.
Move to other items using the 'DEC.' and 'INC.' buttons.
Press the 'SET' button. While the setting value is flashing, change the value using the 'DEC.' and 'INC.' buttons.
Press the 'SET' button again to go to another item.
To change several values in an item, move to another value using the 'SET' button.
When the last value is changed, the first screen of the item appears.
If you press the 'SET' button again for three seconds, then you can exit the setting change mode.

3–1 : Adjust the soft ice cream level.
This item is used to adjust the target current of the soft ice cream.The larger the number is, the stronger the soft ice cream level is. The smaller, the weaker it is.

```
[3-1]Setting Current
First  : 1.0A  ①
Run    : 1.2A  ②
Draw   : 1.8A  ③
```

If the soft ice cream level is too strong, Then the number of soft ice cream cups sold can be decreased. '①' The level of soft ice cream at the start of producing.
After 100%, producing will be done at the level as shown at '②'.
③applied when discharging ice cream.

```
[3-1]Setting Current
After
Draw  : 1.0A  ④
```

3–4 : Adjust the hopper cooling temperature.
This item is used to adjust the cooling temperature of the ingredients in the hopper. The larger the number is, the higher the storage temperature is.
The smaller the number is, the lower the storage temperature is.
If you keep the storage temperature too low, then it can form ice in the ingredients in the hopper.
If you set it too high, it can cause decay of the ingredient in the hopper.

```
[3-4]Control Temp.
Hopper(AUTO+STANDBY)
        4.0C
```

3–5 : Voice guidance and volume level can be selected.
Voice guidance time can be set up.

```
[3-5]Voice Service

1.Service :      On
2.Volume  :       4
```

3–6 : The time and date of the internal clock can be set up.

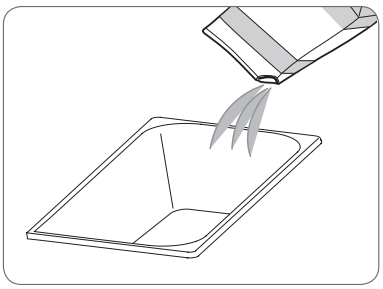
```
[3-6]Time Setting
External clock: On
     2012.06.26
      19:32:00
```

Important

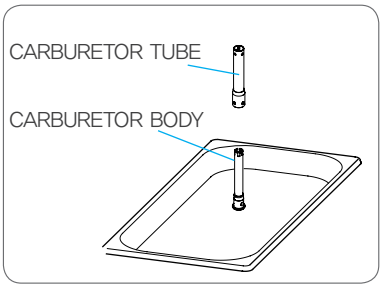
- The soft ice cream level is configured to the default factory setting and shall be adjusted depending on the raw materials. Adjust the settings upon consulting with the installation engineer when changing the soft ice cream level.

Making soft ice cream

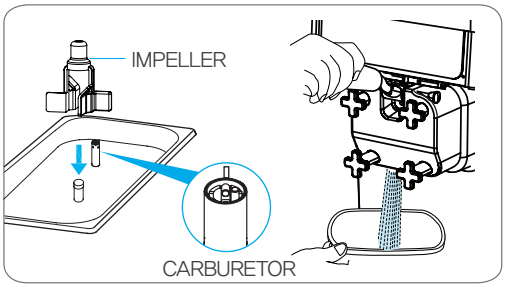
1. Open mix tank cover and put in sufficient amount of ingredients.



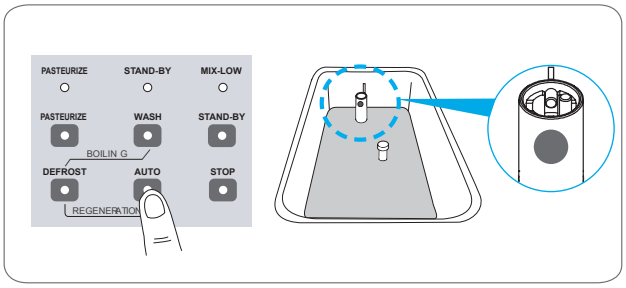
2. Insert the carburetor body and carburetor tube into the mix tank.
   When you move to 'AUTO' mode after 'STAND–BY' mode, please make sure to insert the carburetor in fullface, so that you can see the carburetor hole to prevent clogging.



3. Cover the carburetor hole and insert the impeller.
4. Discharge 300g and pour it back into the mix tank with the ingredients.



5. Operate the product by pressing the AUTO button.
6. Open the carburetor hole after completing operation.

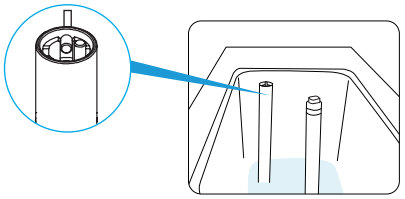


For your information

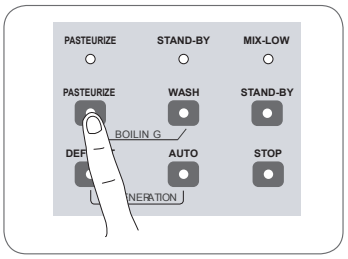
- The smaller the carburetor hole is, the higher the overrun (air content) is. Instead, in case of continuous sales, the ingredients supply gets slower and the soft ice cream is let out slowly.
- The carburetor hole can get clogged, so check it and wash it periodically during use.
- The manufacturer shall not be responsible for any trouble (e.g. , spoilage of materials, overcooling, non–production of ice cream) caused by using materials in non–frozen state (10℃).
- To continue sales on the "LOW OUT" condition, please make sure to remove the carburetor for ice cream dispensing. If dispensing ice cream with the carburetor on, the ingredients can be left in the mix tank.

How to pasteurize the soft ice cream

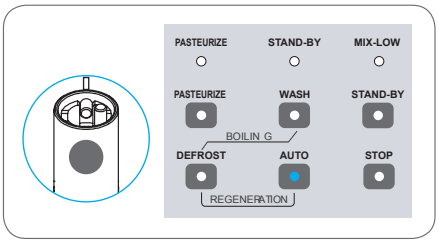
1. Cover the carburetor hole inside the mix tank cover.



2. Press the ‘PASTEURIZE’ button.
This function is used to suppress the growth of micro organisms and maintain the ingredients fresh for a long time by performing low temperature heating on the ingredients and the soft ice cream in the hopper and the cylinder (68–70℃ 30 minutes). This function should be executed every day. If it is not pasteurized every day, the machine should be cleaned every day.

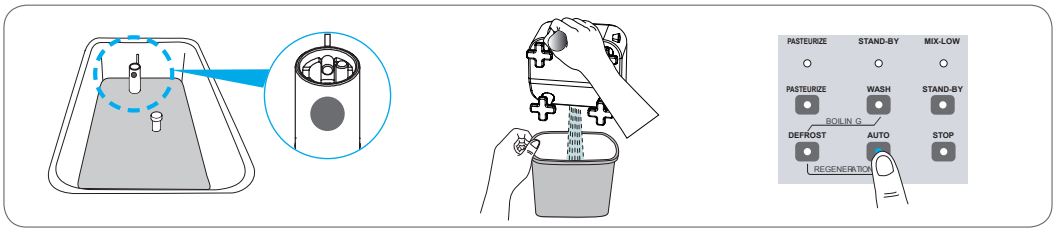


3. When the pasteurization is complete, the ‘AUTO’ lamp is on. In this case, it means that pasteurization is completed and it is generationg ice cream.
When you move to 'AUTO' mode after 'STAND–BY' mode, please make sure to insert the carburetor in fullface, so that you can see the carburetor hole to prevent clogging.



※Caution : After pasteurization, to prevent carburetor clogging, please make sure to clean it and to fill the mix tank with the ingredients as the condition of initial operation.

4. When the pasteurization is complete, the ‘STAND–BY’ lamp is on.
In this case, it means that pasteurization is complete and the ingredients in the mixing tank and the cylinder is being refrigerated.
Be sure to discharge 300g of ingredients by opening the carburetor hole before pressing the 'AUTO' button. Start serving soft ice cream when it is fully formed.

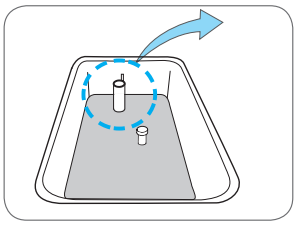


For your information

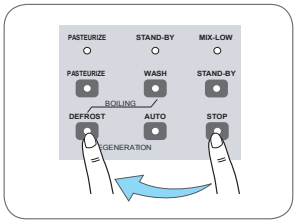
- The lease raw materials shall be kept in the mix tank during sterilization, and materials shall smoothly be agitated by the impeller.
The 3–liter mix tank shall be filled with material of 1 liter at least.(cylinder kept fully filled)
- This product has a built in automatic pasteurization function. Auto pasteurization only operates in 'AUTO', 'STAND–BY' mode. You must block the mix valve hole before pasteurization.
and Operation of every function button stops during sterilization.
- The automatic pasteurization function of this product operates four o’ clock in the morning; Startup time of the function may slightly vary among models.
Automatic pasteurization only works in 'AUTO', 'STAND–BY' mode; you must not cut off electrical power supply during the pasteurization process. If the ingredients are decayed due to the absence of pasteurization, the manufacturer will not assume any responsibility for it.

How to make the soft ice cream look better

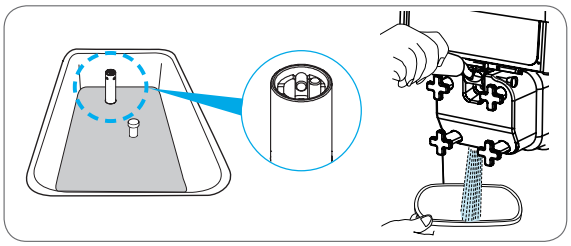
1. Remove the carburetor from the mix tank.



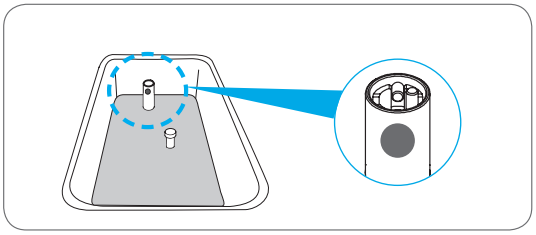
2. Press 'STOP' and 'DEFROST' on the control panel.



3. Insert the carburetor back after defrosting is complete and cover the hole.
When you move to 'AUTO' mode after 'STAND–BY' mode, please make sure to insert the carburetor in fullface, so that you can see the carburetor hole to prevent clogging.
Discharge 300g of ingredient by pulling the discharge lever and put it back in the mix tank.
Press 'AUTO' to start making soft ice cream.



4. When ice cream quality that can be served is fully produced, open the carburetor hole again in the mix tank.

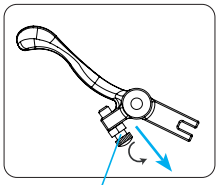


For your information

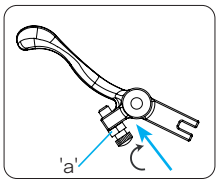
- When ingredient with too much milk fat is used, the consistency of the produced ice cream will appear poor, if a few cups of ice cream are served for 5 or 6 hours. In such case, use the abovementioned method to compensate the consistency of the produced ice cream.
- The carburetor hole gets easily blocked; thus, be sure to check and clean it frequently while operating the product.

Soft ice cream discharge control

1. By adjusting 'Screw Adjust' at the bottom of the lever (out lever), you can adjust the discharging speed of the soft ice cream.
   As shown in the figure on the right, release the 'Screw Adjust' to reduce the discharging speed of the soft ice cream.

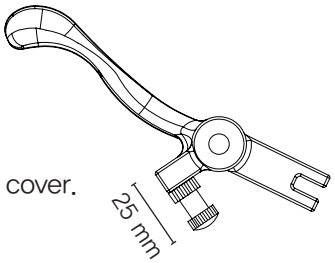


2. As shown in the figure on the right, fasten the 'Screw Adjust' to increase the discharging speed of the soft ice cream.

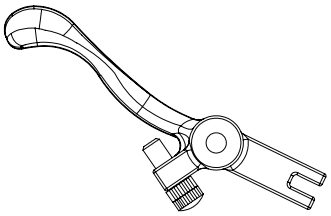


※ After setting up the adjustment bolt position, tighten the set nut 'a' to fix the 'Screw Adjust' position and maintain constant dispensing volume.

〈Minimum open〉 – Ice cream dispensing speed is minimalized.
Please avoid loosening the bolt more than shown in the right picture.
Otherwise, dispensing can be interrupted for the Screw Adjust may touch the dasher cover.



〈Maximum open〉 – Ice cream dispensing speed is maximized when the Screw Adjust is tighten as shown in the right picture.

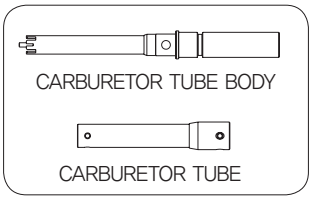


For your information

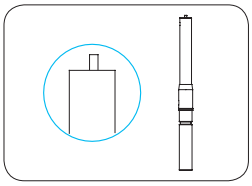
- If you tighten the Screw Adjust to increase the discharging speed of the soft ice cream, then the ingredients in the mixing tank will be supplied to the cylinder relatively slowly. Suddenly, the soft ice cream may no longer come out. Therefore, you are recommended to adjust the discharging speed for one cup every 6 to 8 seconds.

Adjustment method for carburetor

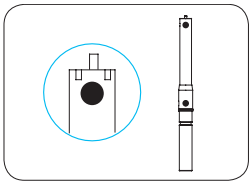
The carburetor is made up of two parts.
The part that is inserted into the hole of the mixing tank is called the body and a tube is inserted into this. The tube has a hole at the top and at the bottom.
It can't be inserted in the reverse direction.



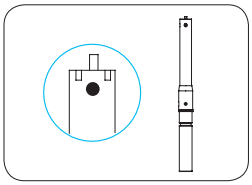
The figure shows the carburetor with a blocked hole.
If you align the protrusion of the upper area of the carburetor body with the area having no hole in the upper area of the tube, then the hole in the lower area of the carburetor body will be blocked.
Condition of use: ① Initial soft ice cream making
② "Heating" mode executed
③ "Regeneration" mode execute



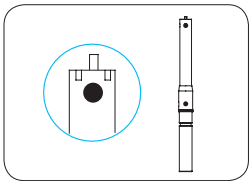
This figure shows the carburetor aligned with a large hole.
Align the protrusion of the upper area of the carburetor body with the large hole in the upper area of the tube. Decrease the overrun and increase the amount of ingredients injection in this way when you need continuous vending of the product.
Condition of use: ① When the "Auto" mode is executed



This figure shows the carburetor aligned with a small hole.
Align the protrusion of the upper area of the carburetor body with the small hole in the upper area of the tube. Then, it will be aligned with the small hole in the lower area of the carburetor body. Increase the overrun and decrease the amount of ingredients injection in this way when you expect a small amount of sales.
Condition of use: ① When the "Auto" mode is executed



This figure shows the carburetor aligned with a medium hole.
Align the protrusion of the upper area of the carburetor body with the medium hole in the upper area of the tube. Then, it will be aligned with the medium hole in the lower area of the carburetor body. It will make the overrun and the amount of ingredients injection adequate for sales.
Condition of use: ① When the "Auto" mode is executed

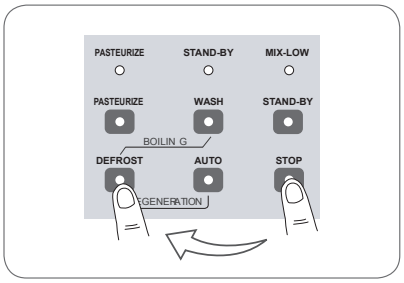


For your information

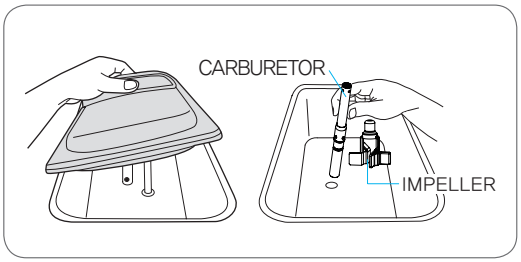
A small hole can improve the overrun, but it may depend on the amount of ingredients in the mixing tank. The fewer ingredient is in the mixing tank, the higher the overrun becomes. The more the ingredient is, the lower the overrun becomes.

Cleaning method

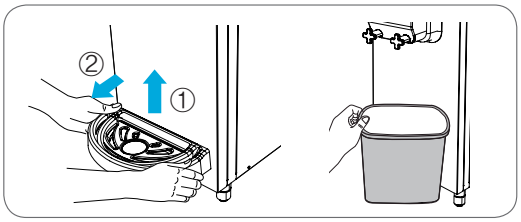
1. Press STOP' button, and then 'DEFROST' on the operation panel.
(Wait about ten minutes until soft ice-cream is melted in the cylinder.)



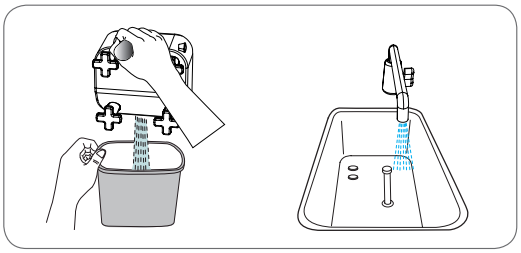
2. Open the cover of the mix tank, and then remove and clean the carburetor (the body), Impeller.



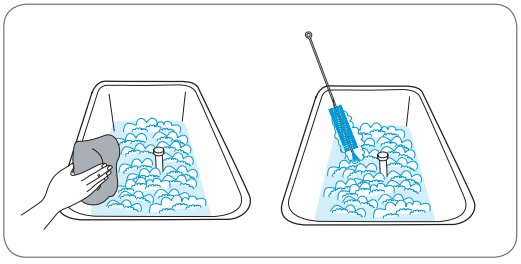
3. Remove the drain box and put on the drain bin.



4. Remove the soft ice cream liquid in the mixing tank and pour faucet water into it. Repeat it two or three times until you get clean water from it.

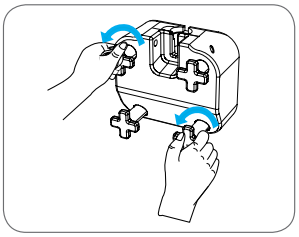


5. In order to remove residue of ingredients in agitation shaft in mix tank cover, drain hole or water level sensor, use neutral detergent in the clean water with brush and apply process.
6. After process, press the STOP button to release the water and rinse the machine with clean water.

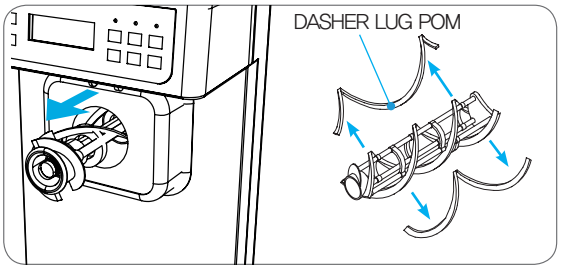


Caution
- When sterilization is performed once a day, the system shall be cleaned every 14 days as shown in the figure.
- The carburetor, impeller, and ice cream discharge port shall be cleaned once a day.

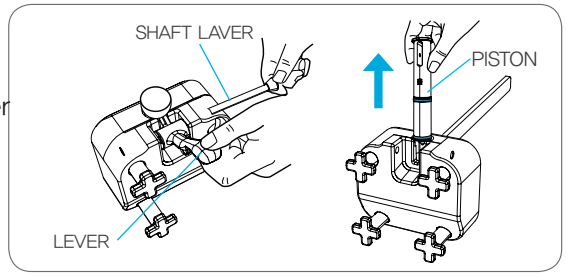
7. Stop the product by pressing stop button(do not turn off the power switch) and loose the dasher cover bolts diagonally by the order shown in the picture and separate the dasher cover from the soft ice cream freezer.



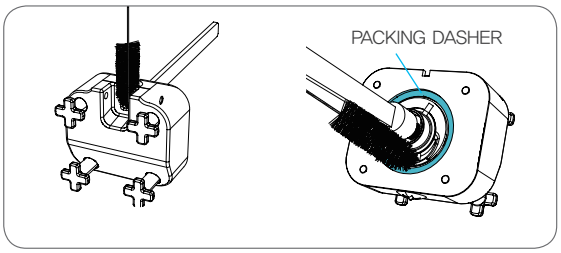
8. Draw the dasher and separate it from the cylinder.
   Clean the inside of the cylinder with a brush and wipe with a soft cloth.
9. Separate the dasher blade and clean the blade hole with a brush and wipe out moisture with a soft cloth.



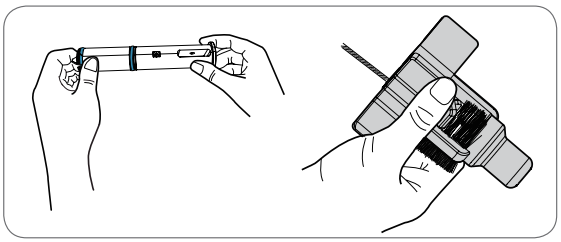
10. Insert the lever into the piston and insert the lever shaft into the dasher cover and the lever.
    Insert the piston in the middle of the dasher cover.



11. Clean the inside of the piston hole of the dasher cover with a brush and remove any remaining moisture with a soft towel.

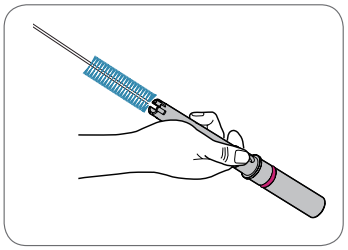


12. Please use the 'Packing Remove Handle' when taking out the o-rings from the pistons to avoid damaging them.
    Wash out the o-rings and the pistons thoroughly and clean the impeller using the attached brushes.



Caution Wear rubber gloves when cleaning the inside of the system. Otherwise, electric shock or injury may be caused.

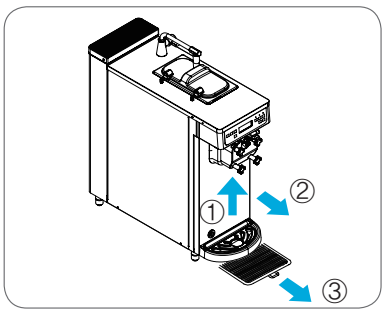
13. Clean carburetor body and tube with brush.



14. After cleaning, dry and reassemble the parts in reverse order.

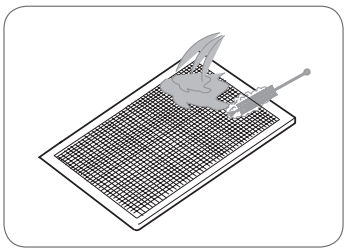
【 Condenser and filter cleaning method 】

1. Filter Decomposition method
   ① Lift and pull the drain box to remove it.
   ② Slowly pull the filter from the front bottom part to remove it.



2. Shake off filter dusts and wash it off thoroughly with water.(After washing it, Dry the filter)

3. The condenser surface has lots of dust.
   Remove it by using a small brush
   • Located at the bottom of product.



4. Clean and dry the filter and insert it into the machine.

• The Cleaning cycle :
– Filter : Once a week
※The pollution status may differ depending on the installed location, so clean the polluted filter occasionally.
– Condenser : Once a month
※Clean the condenser with a clean brush.

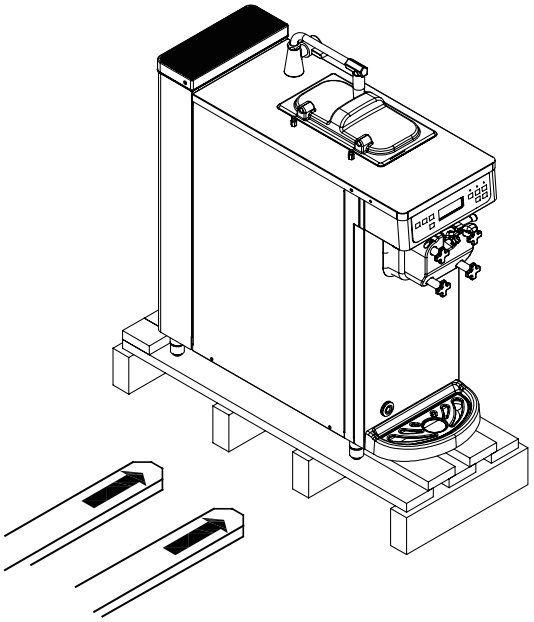
Caution Wear rubber gloves when cleaning the inside of the system .
Otherwise, electric shock or injury may be caused.

Unpacking and Installation

The Ice Cream Machines has been fully inspected and tested at the factory prior to shipping. If you detect damage to the wooden package or apparent distortion of the shape of the system after unpacking the product, immediately inform your distributor or manufacturer.
Find the serial number marked on the packing and the machine before starting installation. Inform us of the serial number if you have any inquiry. Request the dealer or service provider for assistance when the machine is to be moved.

1. Remove the wooden packing, taking care not to damage the exterior of the Ice Cream Machines.
2. Remove the wooden packaging and the protective tapes and make sure that all parts of the system are complete.

※ When tilting or moving the machine, take care not to overturn the machine.



• Location and Precautions for Installation

1. Avoid sloping or irregular surface.
– Installation on a sloping or an irregular surface may result in machine overturning, malfunction, or failure.
2. Avoid direct sunlight, rain, snow, and wind.
– Otherwise, fire or electric shock may occur due to the ice cream or rain water.
3. Avoid the direct influence of sea wind and hazardous gases.
– Ice cream buyers may complain or file a claim.

Installation

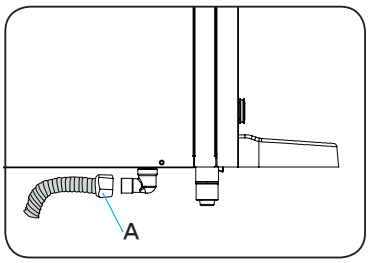
● The raw water supply valve may vary depending on the installation environment of the system.

For your information

- Consult with the engineers of the company for the details of installation of the system to ensure optimal performance of the system (change of the installation site of the system also requires consultation with the engineer of the company).
- Do not install the system on a place with adverse conditions such as uneven floor, place exposed to direct light, or place with too much dusts or direct splashing of water.
- Reset the current time when restarting after a long standstill.

● Water Supply Connection

1. Insert rubber packing in the corrugated tube nut of the feed water line and join it to the water inlet at the bottom.
   Tighten the nut firmly with a tool.
2. Pay special attention not to damage "A" when assembling.

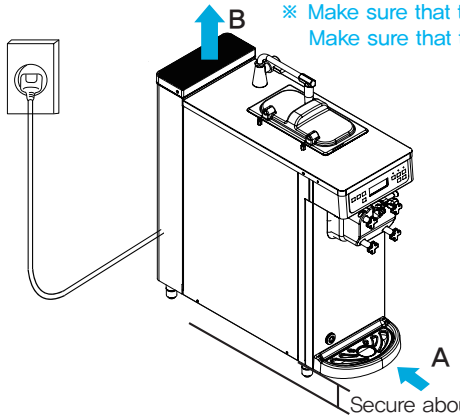


※ Check the followings after connecting the feed and discharge water lines:

1. Feed water pressure should be between 20psi~80psi .
   ▶ If the water pressure is too high, water may leak at connections.
2. If the temperature can go down below 10℃, provide a means to prevent freezing.
   ▶ Freezing can cause water leakage or failure of the system.
3. There should be a tap water valve when you connect the system to tap water.
   Close the tap water valve if there is water leak due to a defect of the tap on top of the product.

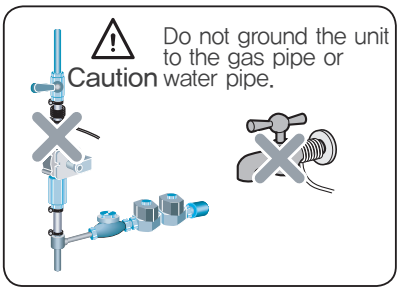
● Electrical connection

1. Connect the main power for single-phase power distribution box.
2. Install an earth leakage breaker (with capacity of 20A or higher) in the distribution box.
3. Earth connection shall be provided for the safe operation of the system.
4. Maintain space of 50cm or more each between the walls and the right and rear sides, 20cm or more between the left of the system.
5. Precisely seat the rubber feet at the bottom to prevent slipping.



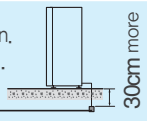
※ Make sure that the air vent is never blocked.
Make sure that the air inlet (A) and top exhaust (B) are never blocked.

Secure about 50mm space at the bottom.



Warning

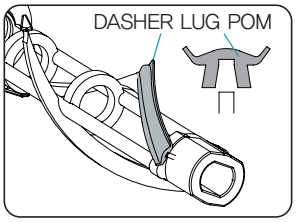
Before installing the unit, be sure to earth for a place with no power supply for earth connection.
– Bury the copper plate or ground rod at a depth of 30 cm or more underground.
– Failure to perform ground work may cause electric shock caused by leakage.

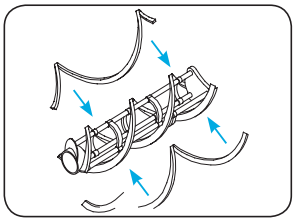


Dasher and dasher cover assembly method

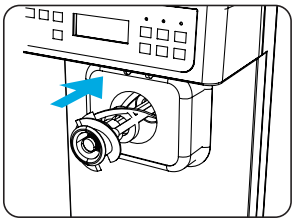
【 Dasher assembly 】

1. Assemble the dasher lug fom(blades) by rotating it on the wing of the dasher.



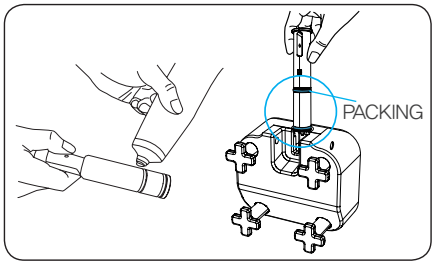


2. Insert the assembled dash bundle into the cylinder.

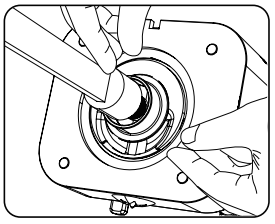


【 Dasher cover assembly 】

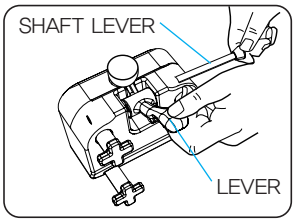
1. Apply some edible grease on the o–rings of the piston and slowly insert the piston into the piston hole making sure its head is horizontal to the dasher cover.

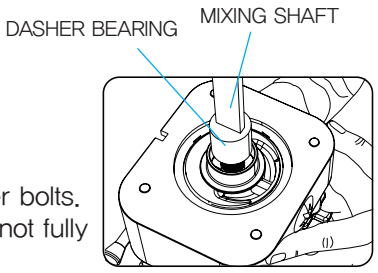


2. Insert the packing dasher(o–ring for dasher coverto) the dasher cover.



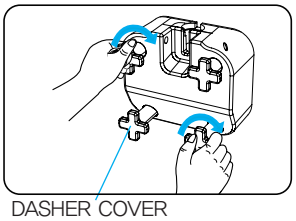
3. Insert the discharge lever into the piston hole and the shaft lever into the dasher cover and the lever hole.





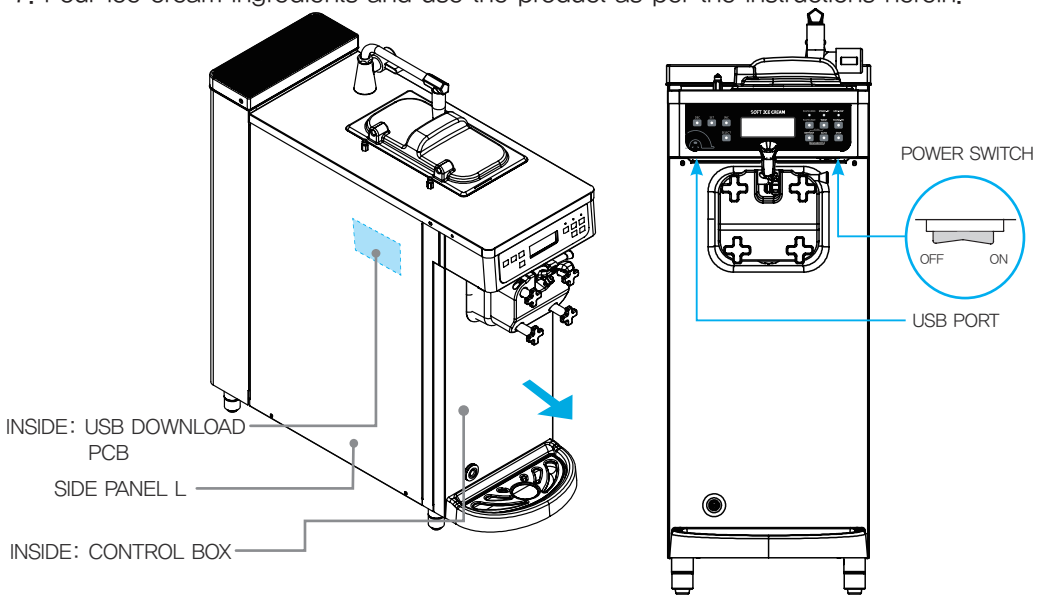
4. Assemble the mixing shaft and the dasher bearing.

6. Fully tighten the 4 dasher cover bolts. Ice cream may leak if they are not fully tightened.

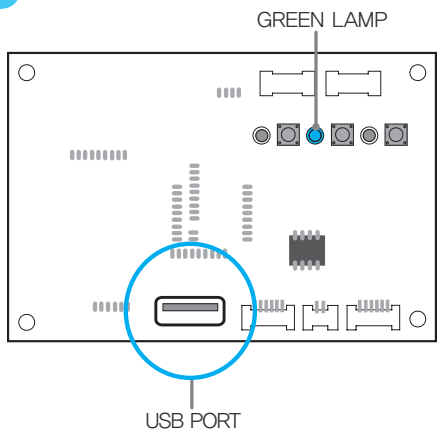


How to upgrade the program

1. Download the program from our website or the customer service center of the company to a USB driver.
2. Insert the USB memory stick into the USB port on the front of the product.
3. Turn off the power switch on the front side of the unit, and then turn it on.
4. Wait for approximately 5~10 minutes until the front LCD screen lights up.
5. Remove the USB memory stick and select a model to reset the product (Item no. 4).
   ex) ISI-161TH
6. Power off the product and restart it.
7. Pour ice cream ingredients and use the product as per the instructions herein.



USB DOWNLOAD PCB



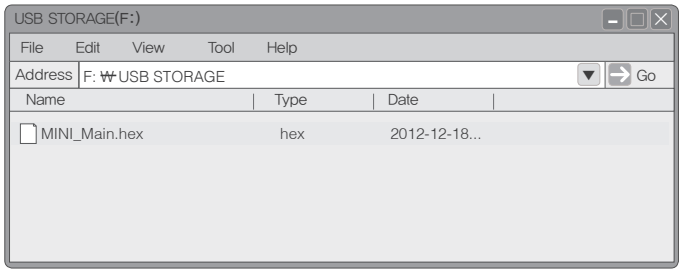
How to use USB downloader

1. How to write programs on main PCB, control PCB.

1-1. Follow the steps as described below with USB downloader connected to main PCB, control PCB:

1-2. Turn off the power.

1-3-1). Copy the main PCB program on the USB memory root folder in name of "MINI_Main.hex"



1-4. Insert the USB memory stick in the USB downloader.

1-5. Turn on the power.

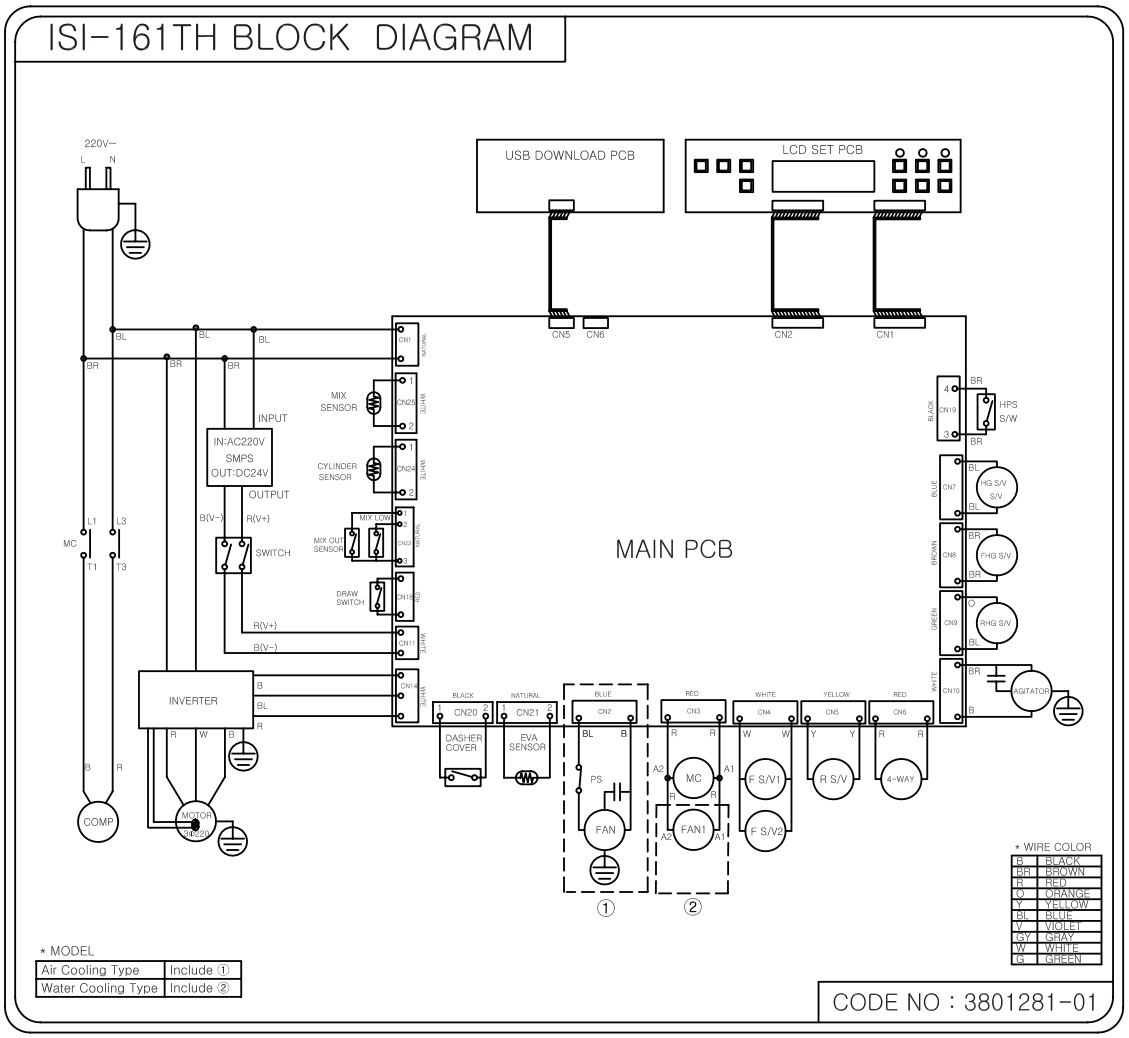
1-6. The front LCD will light up when the software is fully downloaded.

1-7. Reset the product as per the instructions on page 31 after removing the USB memory.

For your information

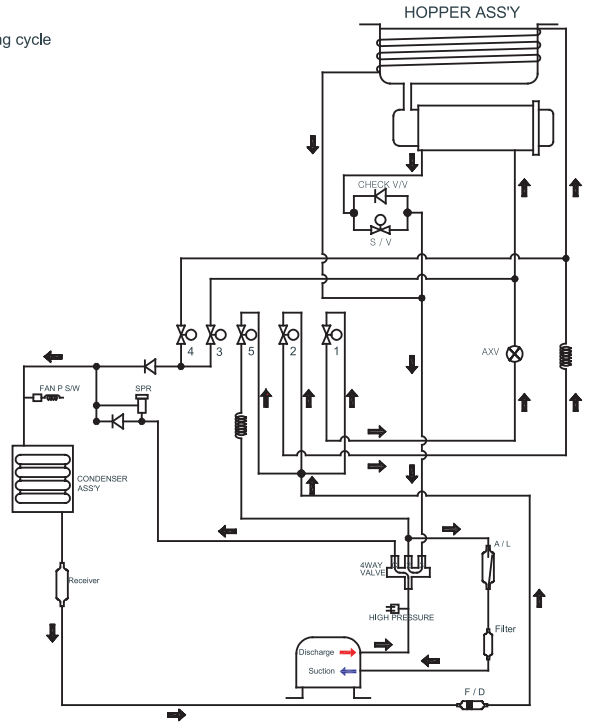
- If upgrade is not complete within 30 minutes, turn off the power, insert the USB memory again, and turn it on again. If the problem persists, please contact our customer service.
- Delete the date and version from the name of the original file "MINI_Main_2017.02.03.hex" and copy the file as follows:
  예) "MINI_Main.hex"

Wiring diagram

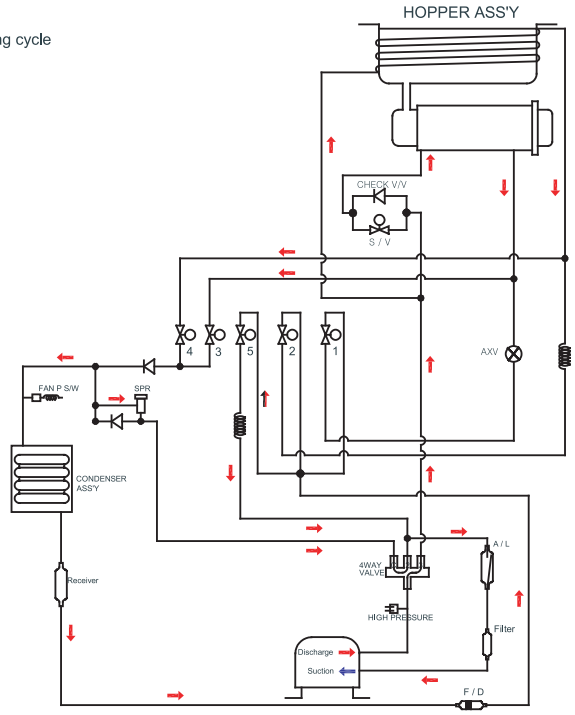


Refrigeration circuit diagram

Normal operation ➡ Cooling cycle



Sterilization operation ➡ Heating cycle



Cautions for operation of Ice Cream Machines

If the temperature is too low (overfreezing) while operating the product, issues may arise such as interrupted operation or damage on a part or the power delivery axis. Some issues may involve too much noise or burning smell due to friction, and foreign substance may come out with the ice cream due to damage of a part inside the product.
Refer to the main causes of overfreezing and operate the product safely.

1. We highly recommend using the proper liquid ingredients. If you intend to use powder ingredients by mixing it with water or milk, be sure to follow the mixture ratio suggested by its manufacturer.
   (This ice cream machine should use properly mixed ingredients in order to produce good-quality ice cream. Please apply additional caution if you intend to use powder-type ingredients, since it tends to precipitate or gets separated over time from the water or milk, which results in overfreezing and troubles with producing ice cream and operating the product.)
2. Even if you use the proper liquid ingredients, adding an additive to it or arbitrarily adjusting the dilution ratio may result in poor quality of the ice cream or overfreezing. We do not provide warranty or assume responsibility for issues related to the ingredients. Be sure to check and follow the dilution ratio.

3. The powder ingredients must be mixed manually and slowly.
   If the powder ingredients is mixed fast using mechanical means, too much oxygen will be mixed into the final ingredients, which easily causes oxidization and coagulation over time. In this case, the ingredients will become lumpy like pieces of tofu, causing troubles with the supply of the ingredients and overfreezing.

4. Overfreezing may also occur due to the poor supply of the ingredients to the drum which the ice cream is produced. Be sure to check the amount of the ingredients, so that the product is always operated with sufficient amount of ingredients. Due to the nature and viscosity of the ingredients, it may easily get lumpy and block the carburetor (mixing valve) hole through which the ingredients is supplied to the drum. Be sure to remove and wash the carburetor frequently.

5. If the product is not expected to be used for an extended period of time, ice formation may occur in the mix tank(hopper) due to the extended waiting time, which causes poor supply of ingredients; repeated production process during the waiting time will facilitate the separation of fat. In this case, the ice cream will become too thin, or overfreezing will occur. Be sure to operate the product on a regular basis even when there is no demand so that the waiting time of the ingredients can be minimized.

6. Repeated use of the ingredients will result in the poor quality of ice cream and overfreezing. When intending to clean the product, refill with new ingredients for re-start.

Before requesting service

The Ice Cream Machines can operate abnormally because you are not familiar with the method for use or due to another insignificant reason. It does not necessarily mean a malfunction. In this case, check the following items to resolve a simple problem on your own without the help from your distributor. If you still can't resolve it after checking the following items, please contact your distributor.

State	Please check
The machine does not work!	1. Contact an electrician or your distributor in case a phase error occurred. 2. Check whether the ELB and switch are turned off. 3. In case the display (front display) is on, turn the ELB (breaker) and switch on.
Does not stop but continues to operate!	1. Check whether dust is stacked in the ventilation hole. Take out the filter and remove the dust. 2. If the machine is close to the bottom and has no ventilation, it can occur. Please, secure it at least 50mm from the bottom. 3. Check whether the carburetor hole is blocked and if so clean out the hole. 4. Check whether the temperature in the ventilation hole (inhalation hole) is high. Make the inhalation temperature of the condenser lower than 38℃.
Soft ice cream is thin!	1. Check whether the carburetor is inserted. 2. In case there are no sales for more than 3 hours, please melt the soft ice cream and remake ice cream by using the regeneration function(cover the carburetor hole during regeneration). 3. Check whether a sweet raw material is being used and adjust the setting value (when the raw material is different from the one used during the initial installation, adjust the level value of the soft ice cream or contract tyour distributor).
The noise is disturbing!	1. This product is a commercial machine and has some operation noise when compared to household appliances. This product is designed to generate noise that is less than 70dB. Contact your distributor, in case abnormal noise is generated during machine operation.
Soft ice cream dose not come out enough!	1. The administrator can adjust the discharge amount of ice cream. The factory default amount is basics, which may change depending on the condition of the ingredient or overrun. Thus, please be sure to refer to the user manual to adjust the amount appropriately. 2. Is the 'MIX LOW' lamp blinking In the case of MIX LOW, the ejection amount can become small. Replenish the raw material. 3. The ejection amount can change by carburetor hole. The ejection amount can be large when a large hole is used. 4. Was the level of ice cream set too high? (If the level is high, little amount of ice cream may be discharged and if the level is low, ice cream can be discharged more.) (If the level is too high, the product may fail to discharge ice cream.)
Soft ice cream comes out too much!	1. The administrator can adjust the discharge amount of ice cream. The factory default amount is basics, which may change depending on the condition of the ingredient or overrun. Thus, please be sure to refer to the user manual to adjust the amount appropriately. 2. The ice cream will get thinner over time, causing the product to discharge more ice cream in a session. If the ice cream gets too thin, use the regeneration function to restore the quality. 3. The ejection amount can change by carburetor hole. The ejection amount can be large when a large hole is used. The amount will decrease if the hole is smaller. 4. Was the level of ice cream set too low? (If the level is high, little amount of ice cream may be discharged and if the level is low, ice cream can be discharged more.) (If the level is too high, the product may fail to discharge ice cream.)
Overrun does not seem to work!	1. Please familiarize yourself with the instructions on how to make ice cream in the user manual. 2. Overrun will be improved with a smaller carburetor hole. 3. Overrun may deteriorate after serving ice cream for an extended period of time. If this appears to be the case, cover the carburetor hole in the tank to defrost the ingredient fully and check the amount in the mix tank. Overrun will be improved by discharging 300g of ingredient from the cylinder and producing ice cream again. Discharging too much ingredient (more than 1/3 of the volume in the cylinder) will cause overfreezing and poor production of ice cream.

State	Please check
There are lumps of milk fat in the ice cream.	1. If the ingredient has too much milk fat, lumps may be formed in proportion. The carburetor hole needs to be smaller if you happen to serve fewer cups of ice cream per unit hour. Try defrosting and resuming ice cream production if ice cream appears to be too thin. (This will not be the case if a sufficient number of cups of ice cream are served.)
The amount of ice cream produced in a session does not seem to be consistent!	1. Please check if the level of ice cream is set too high. The deviation of amount of produced ice cream will get bigger if the level of ice cream is set too high. 2. Please understand that precise control of the amount is extremely difficult since this product controls the amount of produced ice cream based on the time of operation, making it sensitive to the quality and conditions of ingredient, amount of ingredient in the mix tank, the quality after producing ice cream, and changes in quality after no production for an extended period. Thus, please familiarize yourself with this user manual to ensure consistency of operation of the product for some time.
The ice cream has gone bad!	1. This product requires cleaning on a daily basis, and any ingredient left after a day's service must be discarded before starting production the next day with a fresh batch of ingredient. This product requires at least sterilization if cleaning is not possible. We do not assume responsibility if these requirements are not followed.

Replacement cycle of consumable parts

PART NAME	Replacement cycle	Quantity
PACKING DASHER COVER	6 months	1EA
PACKING PISTON	6 months	2EA
CARBURETOR PACKING	6 months	1EA

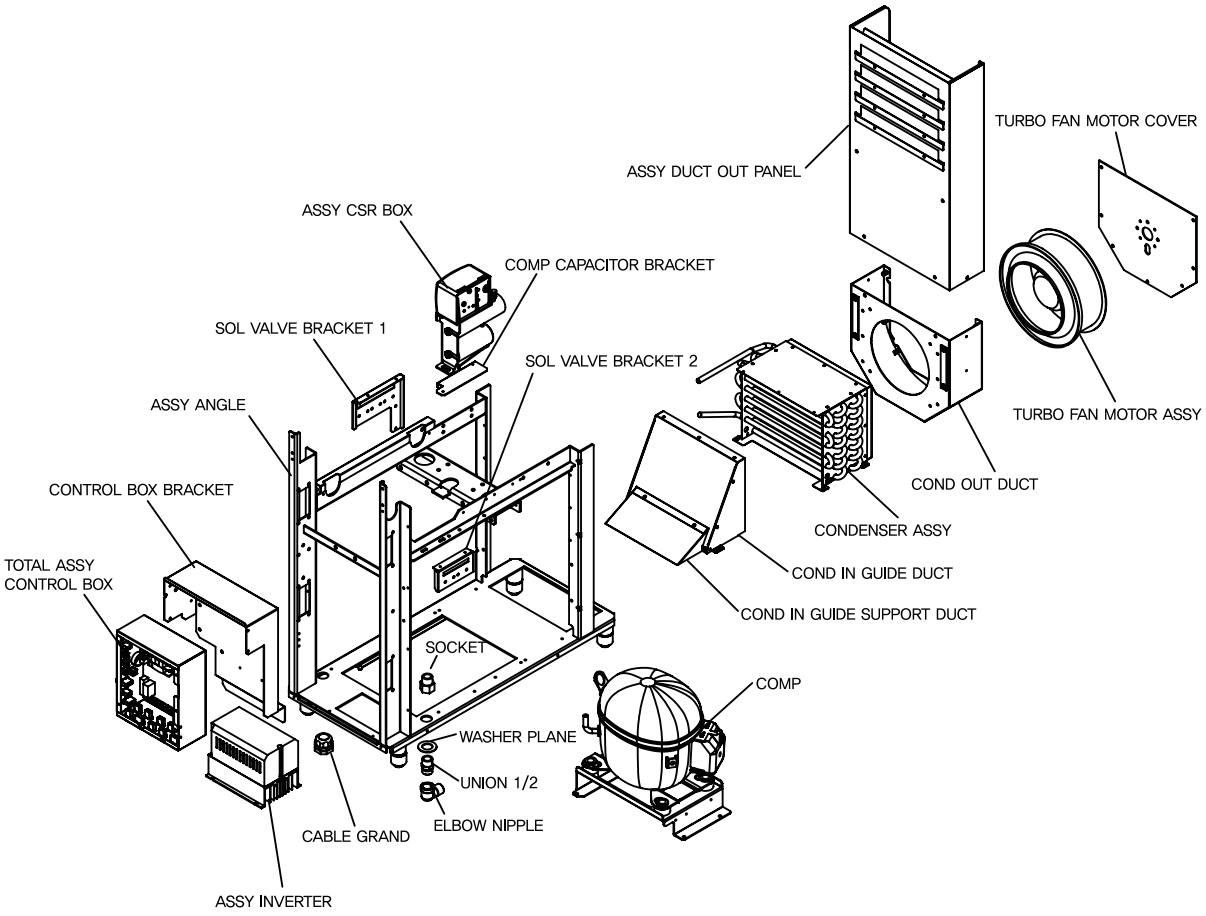
Error Codes and Corrective Actions

The Ice Cream Machines may malfunction due to incorrect operation procedure or a trivial cause other than machine defect or failure. If the following corrective actions fail to correct the problem, or the error code is not presented below, or the same error persists, contact the nearest After Service Center.
※ Before contacting the After Service Center, turn power off, wait for five minutes, then turn power on and start the machine again.

Error code		Possible Cause	Corrective Action	Release	Action
Er00	Mix Out	Fall short of row material	Refill row material in the storage container	Auto release	Stop
Er01	Hop. Sensor Op.	Cooler sensor OPEN	Sensor failure(contact A/S Center)	Auto release	Stop
Er02	Hop. Sensor St.	Cooler sensor SHORT	Sensor failure(contact A/S Center)	Auto release	Stop
Er03	Cyl. Sensor Op.	Cooler sensor OPEN	Sensor failure(contact A/S Center)	Auto release	Stop
Er04	Cyl. Sensor St.	Cooler sensor SHORT	Sensor failure(contact A/S Center)	Auto release	Stop
Er07	EOCR	Motor over current detected	Melt the ice cream and restart the machine	Reset	Reset operation
Er08	High Pressure	Over voltage detected	Clean the filter unit, check exhaust air line	Auto release	Stop
Er09	noLA	Product immature yet	Refrigerant problem(contact A/S Center)	Auto release	operation
Er12	Draw Switch Er.	Discharge lever ERROR	Lift the discharge lever	Auto release	operation
Er13	Condensor OH	Abnormal temperature of condenser	Check the vent for clogging.	Auto release	operation
Er14	Motor Belt Er.	Defective drive shaft	Melt the ice cream and restart the machine	Reset	Reset operation
Er15	EEPROM Error	EEPROM fault	PCB fault(contact A/S Center)	Reset	operation
Er17	Heating Error	Defective sterilization function	Replace the ice cream row material and clean the machine	Other operation	operation
Er18	Cover Error	Defective dasher cover	Mount the dasher cover at correct position	Auto release	Stop
Er19	Eva. Sensor Op.	Eva. Sensor OPEN	Sensor failure(contact A/S Center)	Auto release	operation
Er20	Eva. Sensor St.	Eva. Sensor SHORT	Sensor failure(contact A/S Center)	Auto release	operation
Er21	Motor Power Er.	Failed to detect electric motor current	Machine failure (contact A/S Center)	After reset release	Reset operation
Er50	Power IC Er.	Power IC ERROR	Sensor failure (contact A/S Center)	Auto release	Stop
Er51	Caburetor Er.	Carburetor sensor error	Sensor failure (contact A/S Center)	Auto release	Stop
Er52	Invertor Comm.	Inverter communication error	Sensor failure (contact A/S Center)	Auto release	Stop
Er53	Invertor OC	Inverter over current	Sensor failure (contact A/S Center)	Auto release	Stop
Er54	Invertor OE	Inverter over voltage	Sensor failure (contact A/S Center)	Auto release	Stop
Er55	Invertor OE	Inverter over heat	Sensor failure (contact A/S Center)	Auto release	Stop
Er56	Invertor LU	Inverter under voltage	Sensor failure (contact A/S Center)	Auto release	Stop
Er57	Invertor TH	Erroneous detection of temperature senso	Sensor failure (contact A/S Center)	Auto release	Stop
Er58	Invertor COM	Communication failure detected	Sensor failure (contact A/S Center)	Auto release	Stop
Er59	Invertor OL	Mean overvoltage detected	Sensor failure (contact A/S Center)	Auto release	Stop
Er60	Invertor OT	Max. output protection	Sensor failure (contact A/S Center)	Auto release	Stop
Er61	Control Comm.	Control pcb communication error	PCB fault(contact A/S Center)	Auto release	Stop

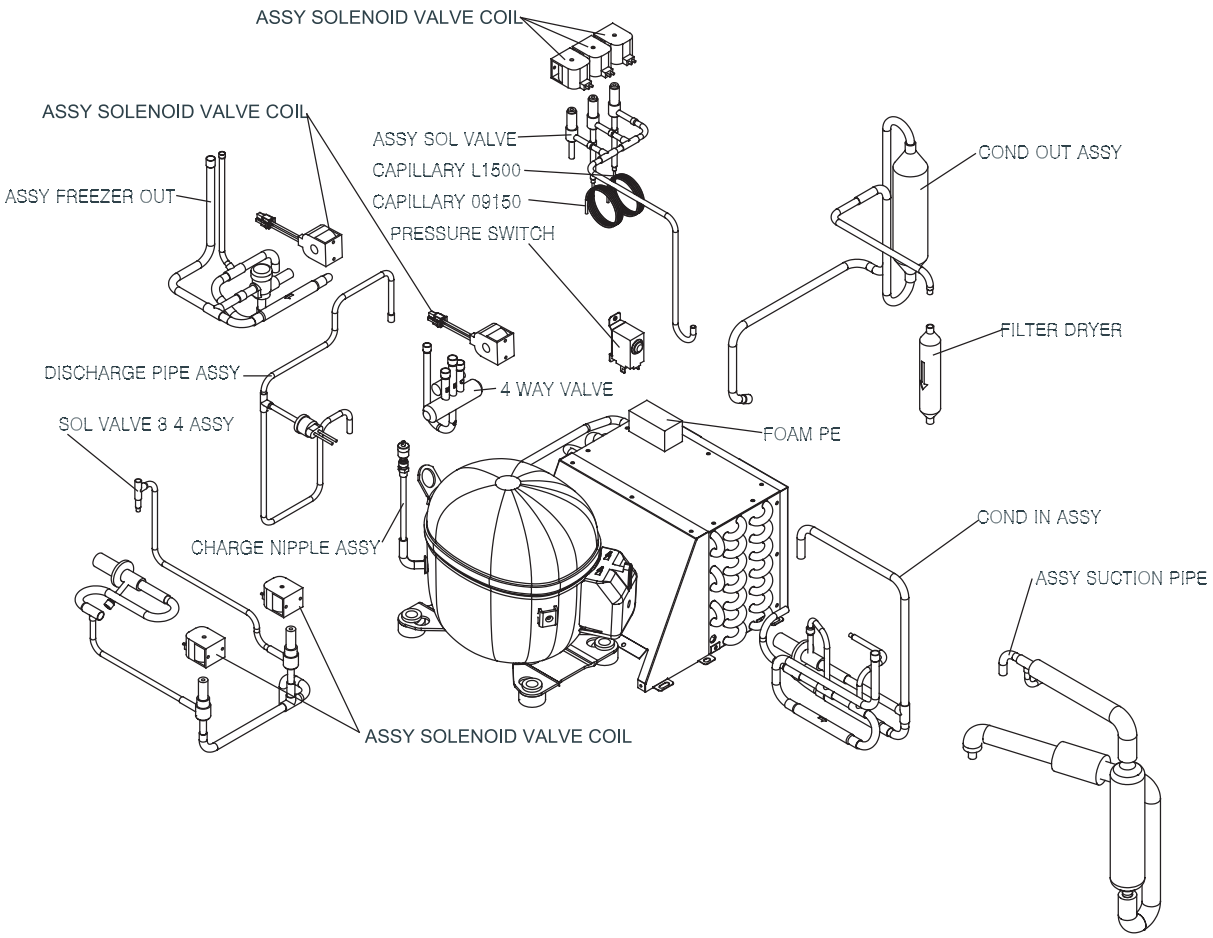
Part list

FREEZER ASSEMBLY (AIR-COOLED TYPE)



Part list

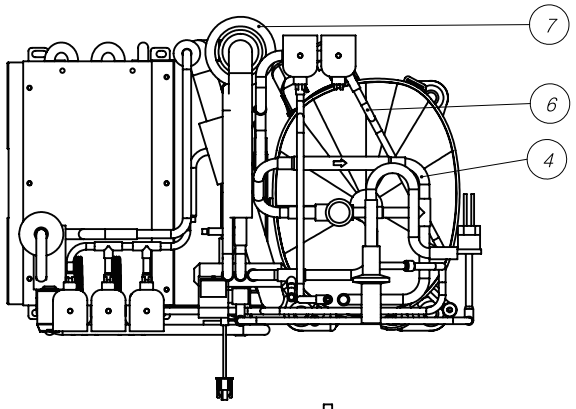
FREEZER ASSEMBLY (AIR-COOLED TYPE) – 115 V, 60 Hz

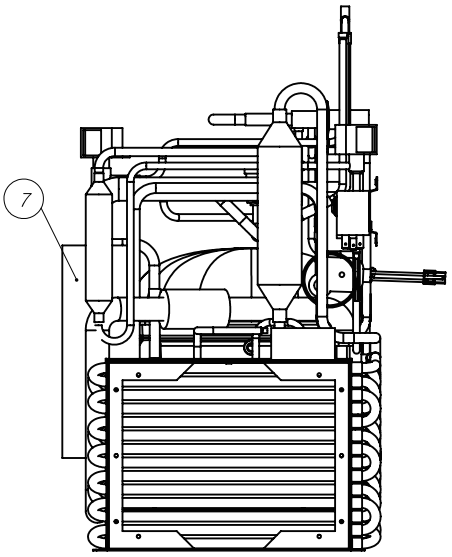


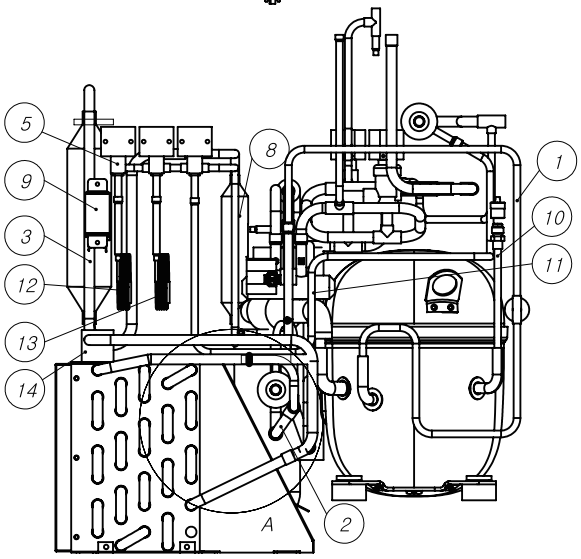
Part list

FREEZER ASSEMBLY (AIR-COOLED TYPE)

NO	NAME
14	FOAM PE
13	CAPILLARY L1500
12	CAPILLARY 09150
11	4 WAY VALVE BODY
10	CHARGE NIPPLE ASSY
9	PRESSURE SWITCH
8	FILTER DRYER
7	ASSY SUCTION PIPE
6	SOL VALVE 3,4 ASSY
5	ASSY SOL VALVE
4	ASSY FREEZER OUT
3	COND OUT ASSY
2	COND IN ASSY
1	DISCHARGE PIPE ASSY

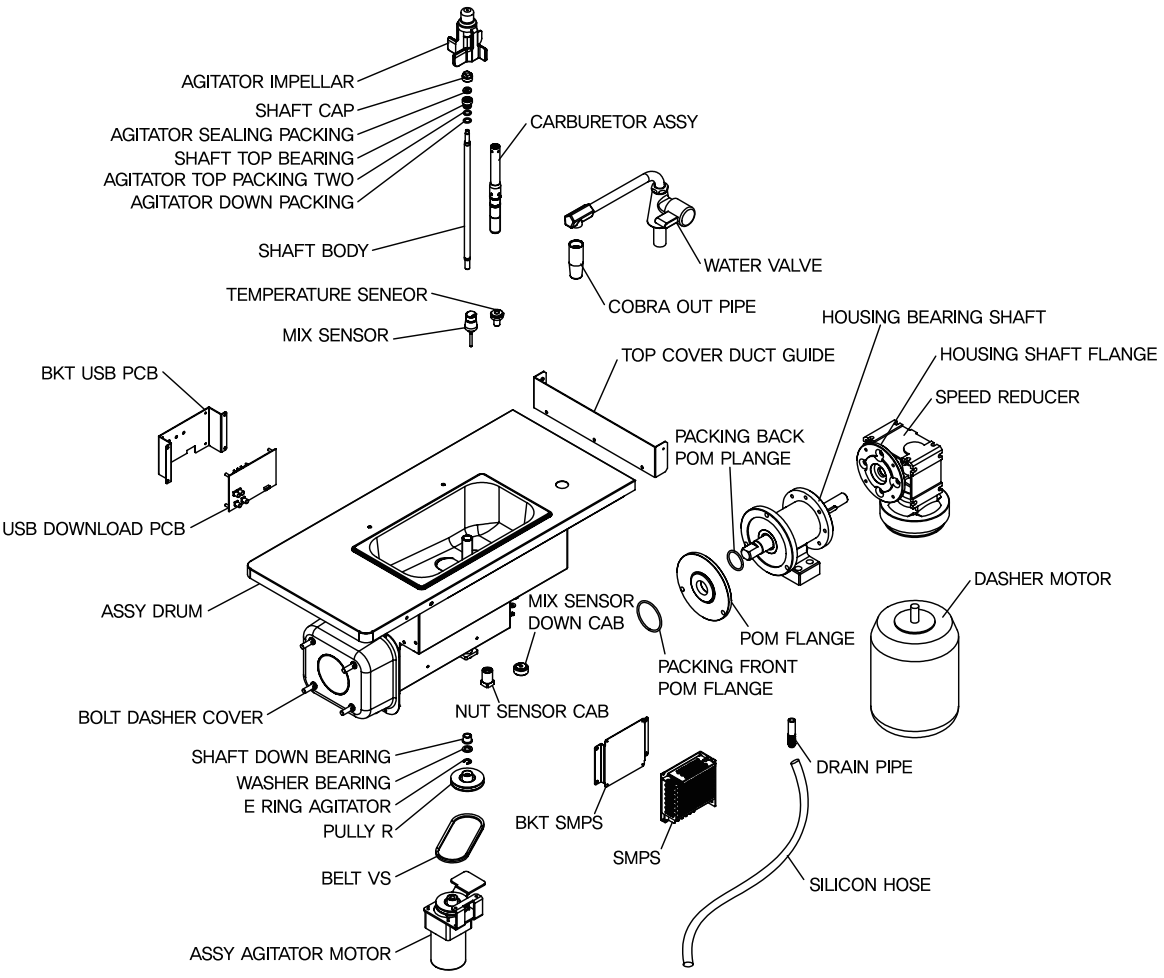






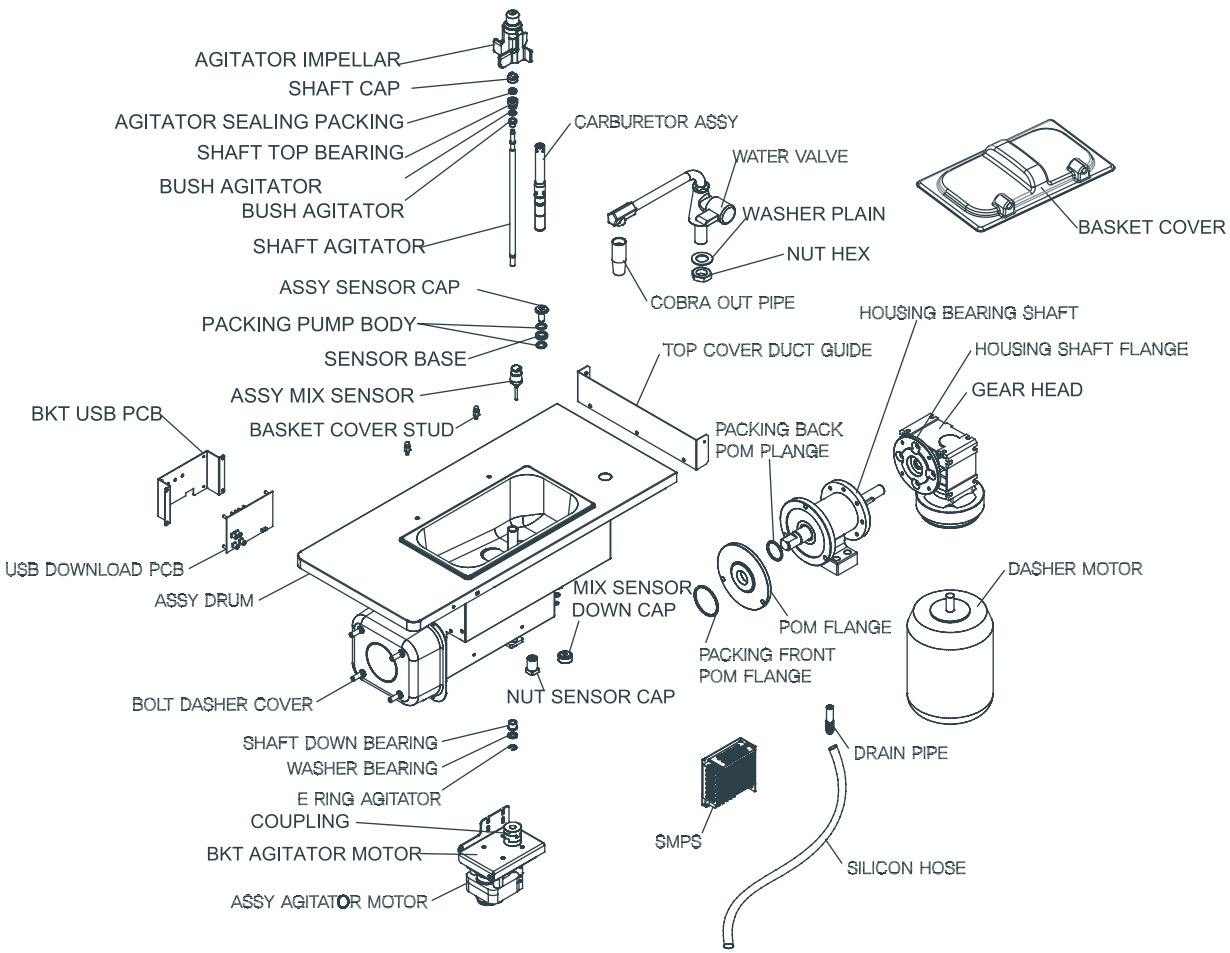
Part list

DRUM ASSEMBLY



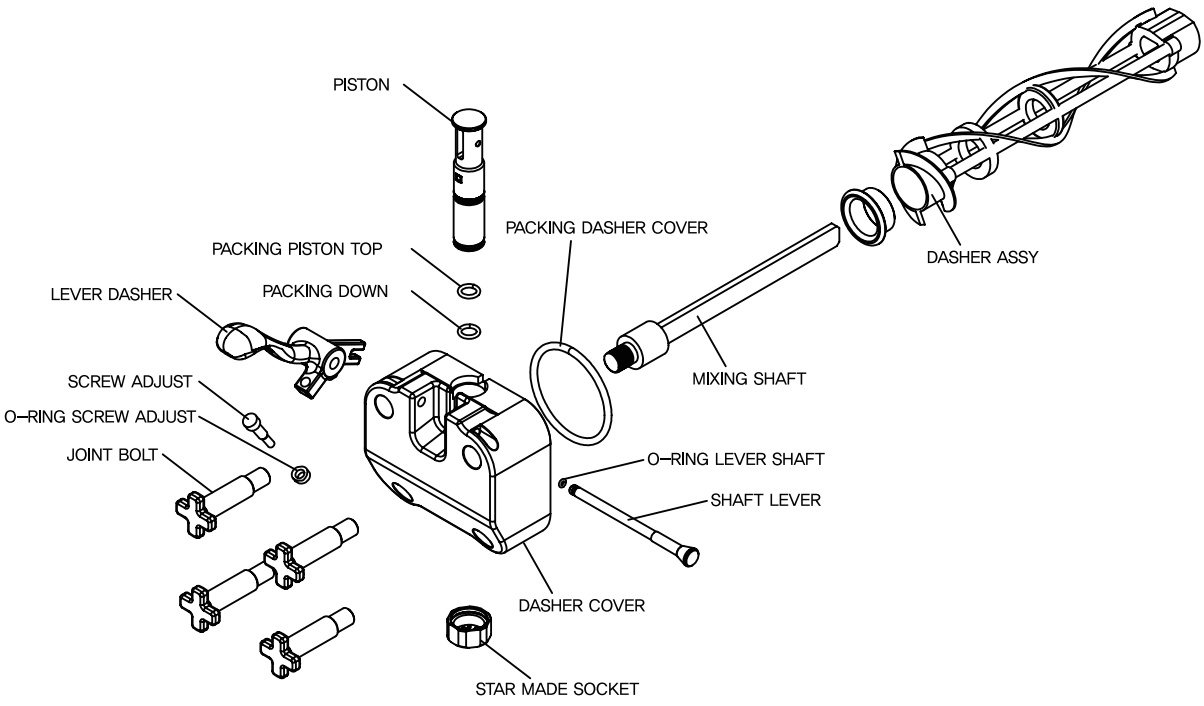
Part list

DRUM ASSEMBLY – 115 V, 60 Hz



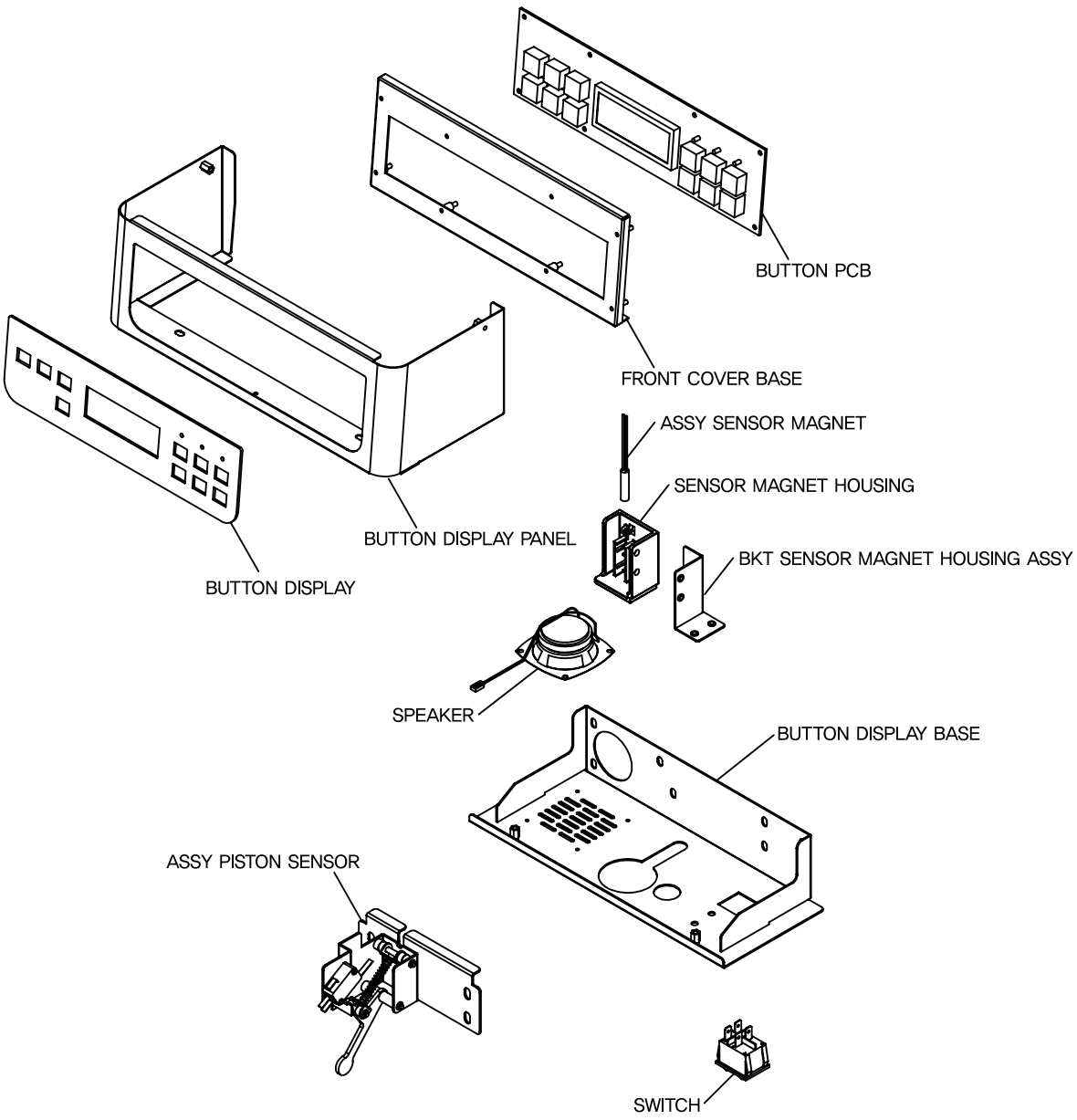
Part list

FOAM ASSEMBLY



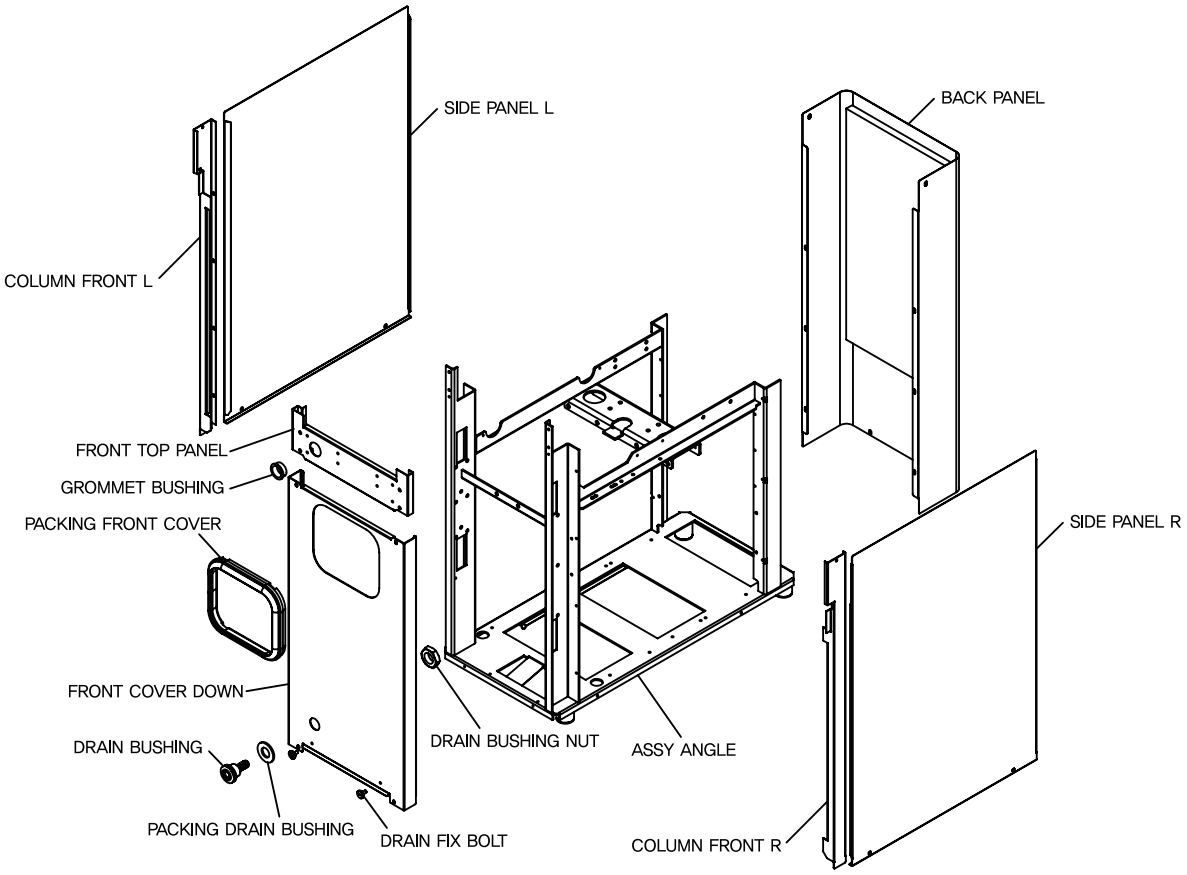
Part list

BUTTON DISPLAY ASSEMBLY



Part list

ANGLE & PANEL ASSEMBLY



Warranty

If the warranty policy or receipt has not been kept or is lost, or if it is hard to determine the date of purchase due to other reasons, warranty is applied after 6 months from the manufacturing date.

[Free repair]

1. Error in performance or functionality during normal operation before the warranty expires

[Credit repair]

1. If the warranty has expired.
2. If installation is required again due to incorrect installation by the customer or the store.
3. If installation is required again due to the relocation of product or moving.
4. If the malfunction is not attributable to the product.
5. If the wrong power specification is applied.
6. If damage is caused by using accessories that are not recommended by the manufacturer.
7. If damage is caused by external force or dropping of the product.
8. If damage is caused by natural disaster such as lightning, fire, earthquake, storm, typhoon, etc.
9. If any accessory/consumable goes obsolete or its service life comes to an end. (packing, o–ring, blade, cleaning brush, etc.)
10. If foreign object is put into the product such as water, beverage, coffee, toy, etc.)
11. If external force is applied during installation or usage, causing damage or malfunction.
12. If directions for installation or standards are not followed.
13. If the customer arbitrarily disassembled and lost or damaged any part.
14. If a person other than an authorized engineer from the manufacturer repairs or modifies the product.
15. If malfunction is caused by failure to follow the "Safety warning / caution" on the user manual.

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