

Scotsman[®]

Ice Systems

SERVICE MANUAL **NU100/150/220/300**



Tables of Content	Page
How to use this manual	2
Model and serial number	2
Specifications	3-7
Overview and installation	8
Safety instructions	8
Position and level adjustment	8
Water supply and drainage connection	9
Power supply connection	9
Final check list	10
Start-up	11
PCB Set up	12
Operating check	13
Ice machine adjustments	14
How the ice maker works	15
Freezing cycle	15-16
Harvest cycle	17-18
Components Description	19-21
Wiring diagram	22
Trouble shooting table	23-24
MAINTENANCE & CLEANING INSTRUCTION	25
Summary	25
Maintenance of refrigeration system	26
Water system cleaning	26-27
Winterizing Procedures	27

How to Use this manual

This manual is provided as an aid to the service technician in installation, operation, and maintenance of the ice machines. This manual can also assist the service technician to troubleshoot and diagnose most of the problems that may occur with the machine.

Most aspects of the NU Series machines are covered in this manual, however, if you encounter any conditions not addressed here in, please contact the Scotsman Technical Service Department for assistance. You can contact the Scotsman Technical Services Department in the following ways:

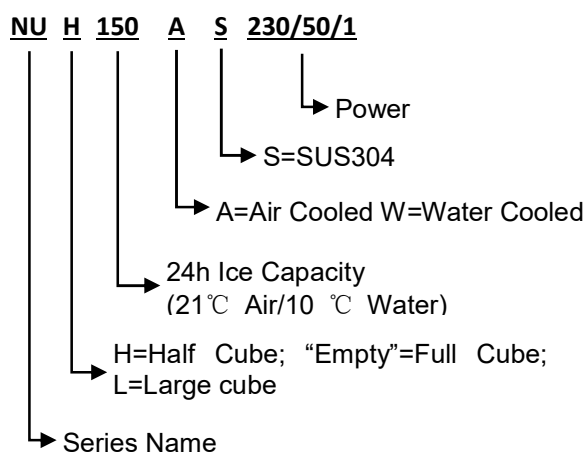
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 Room 2503, Building NO.2, NO.20 of Xu Hong Middle Road, Xuhui District, Shanghai, China

Telephone Numbers: +86 21 61313200
 Service hotline: +86 400 630 0076
service@scotsman-china.com
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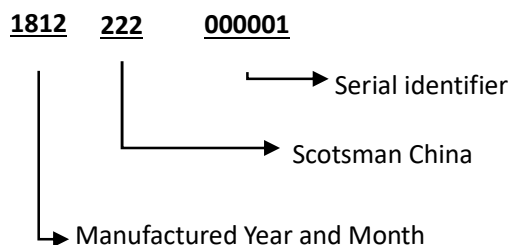
NU series service part list is provided separately with this manual.

Model and Serial Number

Model Numbers



Serial numbers



The serial number includes 13 numbers; the front four letters are referring to the year the machine was manufactured, the next 222 is factory number, the final six numbers are the serial identifier.

NU100/150 Specification












Water Temperature
NU100

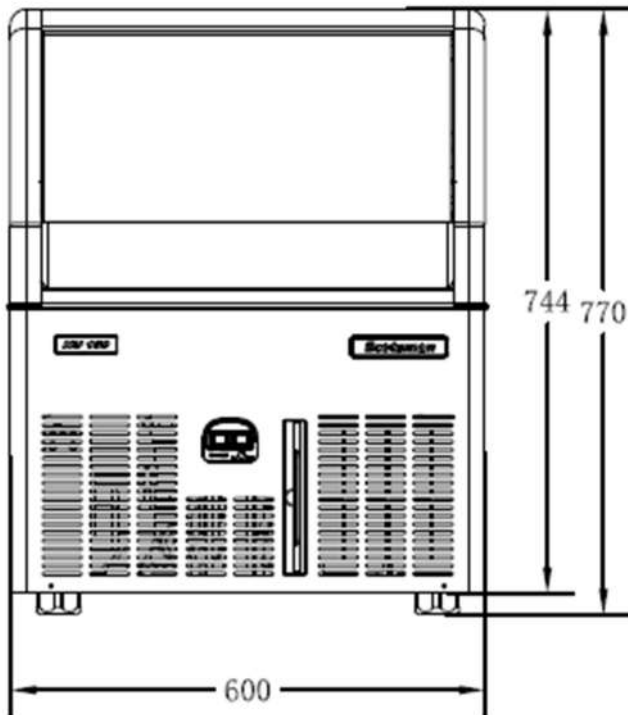
Air Temperature	F	50°	60°	70°	90°	
	°C	10°	15°	21°	32°	
	50°	121				lbs
	10°	55				kg
	70°	99				lbs
	21°	45				kg
90°			70.4		lbs	
32°			32		kg	
100°				59.4	lbs	
38°				27	kg	

Water Temperature
NU150

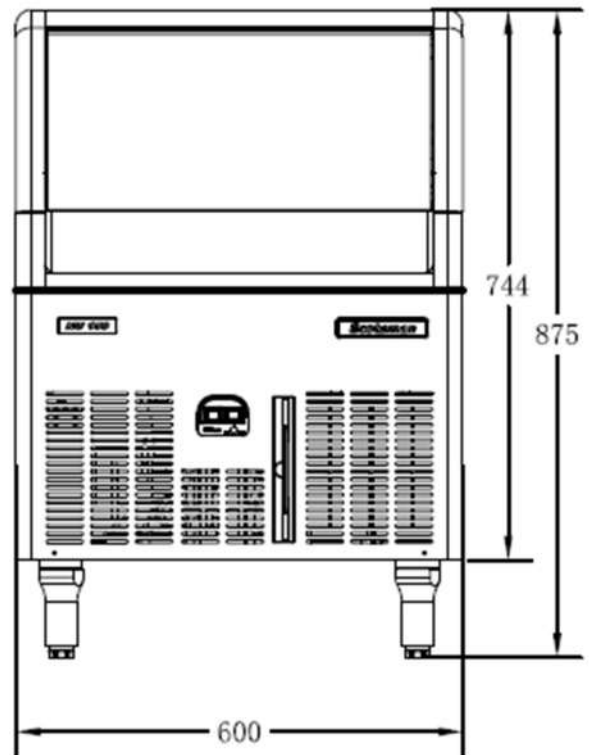
Air Temperature	F	50°	60°	70°	90°	
	°C	10°	15°	21°	32°	
	50°	176				lbs
	10°	80				kg
	70°	150				lbs
	21°	68				kg
90°			106		lbs	
32°			48		kg	
100°				88	lbs	
38°				40	kg	

	  +C° -C°	 [BTU/h] [W]		 [Ømm²]	 V/Hz/Ph	 [W]	 [A]	 [kwh/100lbs]	 [L/100lbs]	24 h ice production kg °C Amb. / °C Water		
		10°C/10°C	21°C/10°C	32°C/21°C								
NU 100AS	✚	2660	780	3x1.5	230/50/1	450	10A	12.6	120	56	45	32
NUH100AS	✚	2660	780	3x1.5	230/50/1	450	10A	12.6	120	56	45	32
NUL100AS	✚	2660	780	3x1.5	230/50/1	450	10A	12.6	120	60	50	40
NU 150AS	✚	3380	990	3x1.5	230/50/1	500	10A	8.5	75	85	68	48
NUH150AS	✚	3380	990	3x1.5	230/50/1	500	10A	8.8	75	85	70	50
NUL150AS	✚	3380	990	3x1.5	230/50/1	500	10A	8.8	75	80	70	50

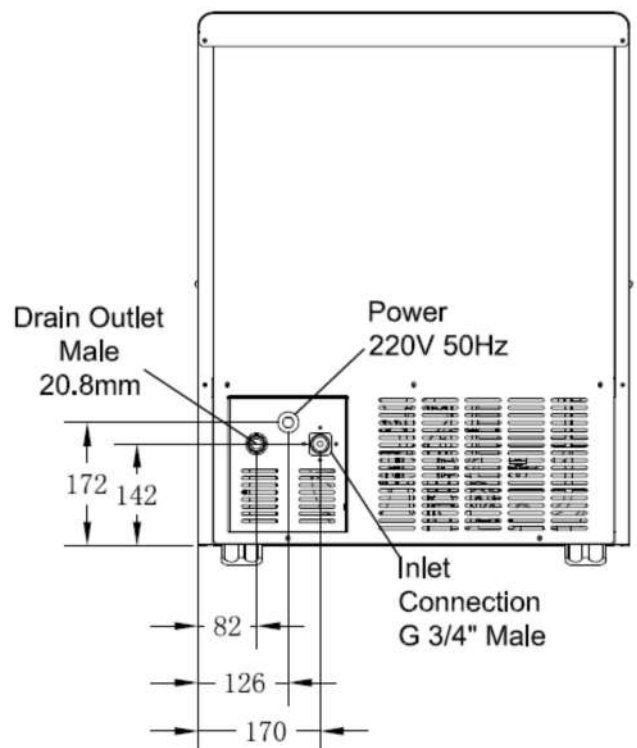
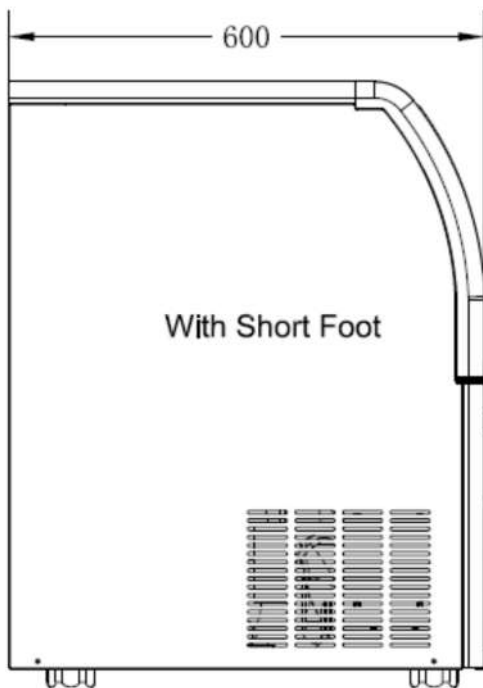
NU100/150 Size



With Short Foot



With High Foot



NU220/300 Specification
























Water Temperature
NU220

Air Temperature	°F	50°	60°	70°	90°	
	°C	10°	15°	21°	32°	
	50°	242				lbs
	10°	110				kg
	70°	220				lbs
	21°	100				kg
	90°			154		lbs
	32°			70		kg
	100°				132	lbs
	38°				60	kg

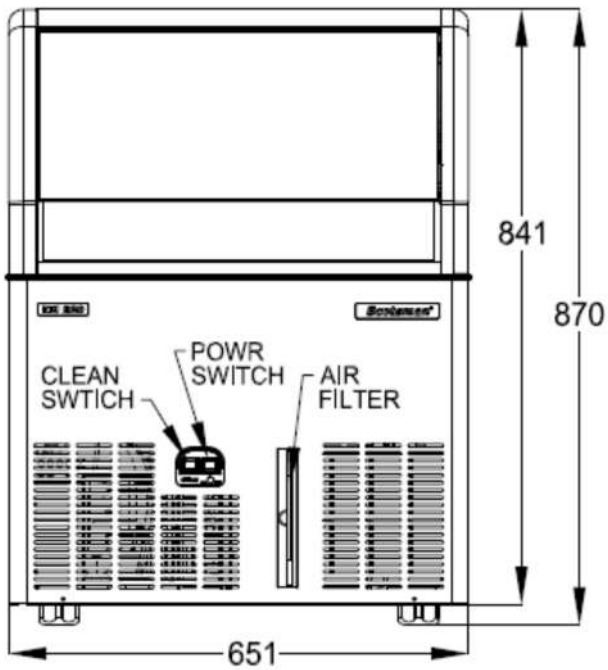
Water Temperature
NU300

Air Temperature	°F	50°	60°	70°	90°	
	°C	10°	15°	21°	32°	
	50°	308				lbs
	10°	140				kg
	70°	293				lbs
	21°	133				kg
	90°			220		lbs
	32°			100		kg
	100°				180	lbs
	38°				82	kg

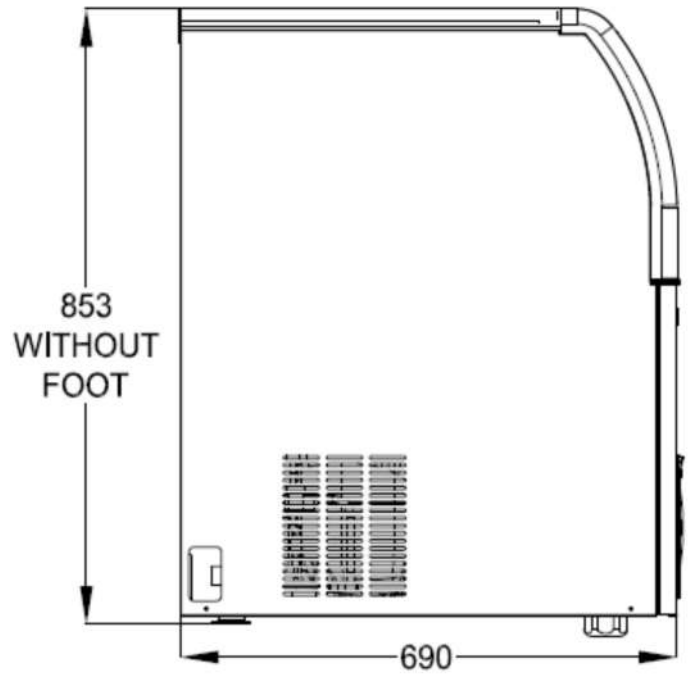
											24 h ice production kg °C Amb. / °C Water		
			[BTU/h]	[W]							[Ømm ²]	V/Hz/Ph	[W]
NU 220AS			4320	1266	3x1.5	230/50/1	600	10A	9.0	75	109	100	70
NUH220AS			4320	1266	3x1.5	230/50/1	600	10A	9.0	75	104	98	65
NUL220AS			4320	1266	3x1.5	230/50/1	600	10A	9.0	75	105	95	70
NU 300AS			6030	1767	3x1.5	230/50/1	950	16A	8.0	68	142	135	100
NUH300AS			6030	1767	3x1.5	230/50/1	950	16A	8.0	68	128	121	92
NUL300AS			6030	1767	3x1.5	230/50/1	950	16A	8.0	68	142	130	93

NU220 Size

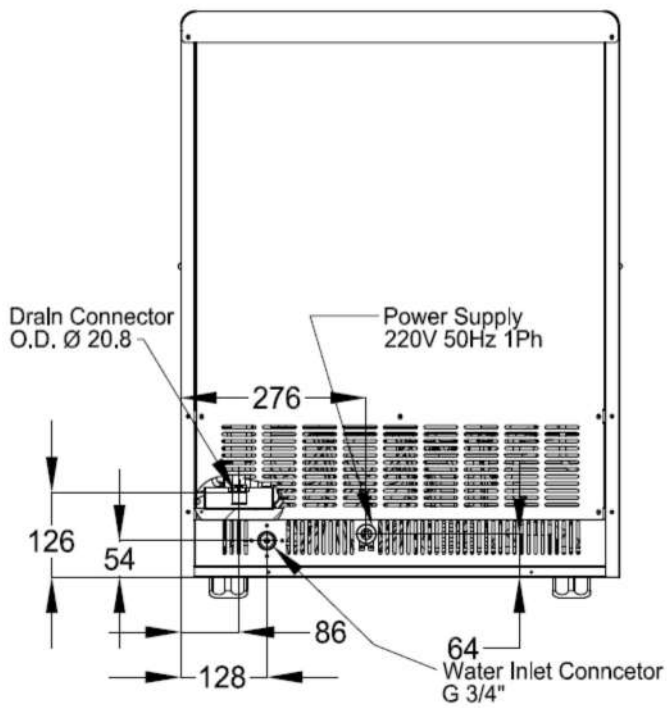
FRONT VIEW



SIDE VIEW

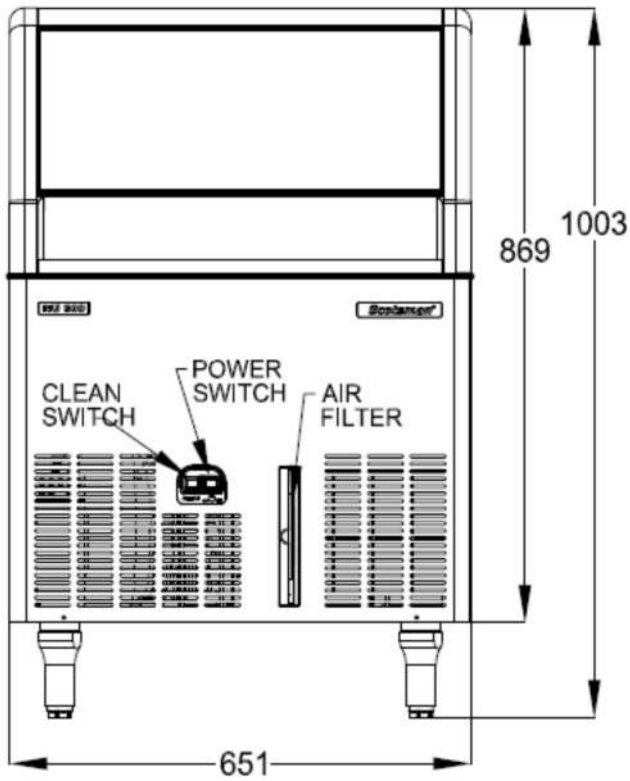


BACK VIEW

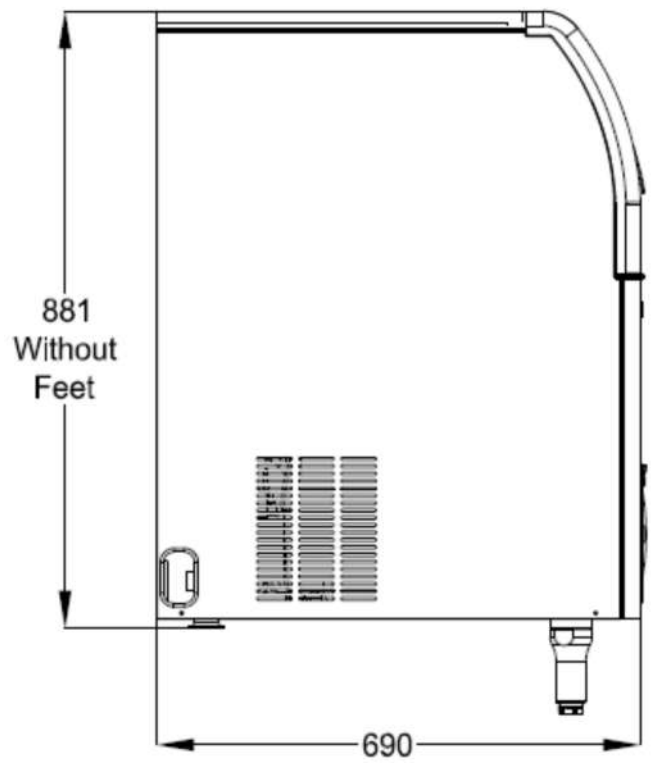


NU300 Size

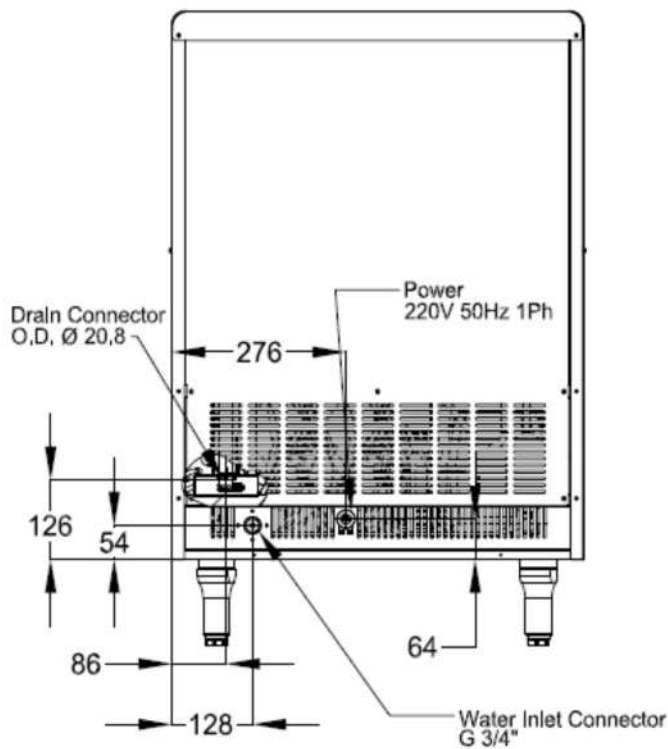
FRONT VIEW



SIDE VIEW



BACK VIEW



Overview and installation

This manual is provided the instruction in installation, start-up, operation, maintenance, cleaning and each operation procedure for Scotsman NU series ice machine.

Safety instruction

In order to ensure the machine working normally in long term, please read the manual carefully and implement strictly before installation. The producer is not responsible for any damage or body injury due to ignoring the safety instructions. If there is any doubt, please contact the local dealer.

Installation requirements

Please ensure the following items are met during you determining the installation location:

- Power source: the power switch for the ice machine should be hand reachable, ensure that the power supply reliable grounded.
- Water supply: the water supply switch should be hand reachable.

Water drain: be sure that the drain pipe has 3cm drop per meter.

Note:

In order to avoid any infection on the user, the water for making ice should be the potable water. If needs, please install water filter or water processor.

In order to reach its high performance and ensure its durability, please pay attention to the following items:

Operating parameters	Lowest	Highest
Ambient temperature	10C (50F)	40C (100F)
Water inlet temperature	5C (40F)	35C(90F)
Water inlet pressure	1 bar gauge	5 bar gauge
Maximum power supply variation based on the nameplate	-10%	+10%

Orientation and level adjustment

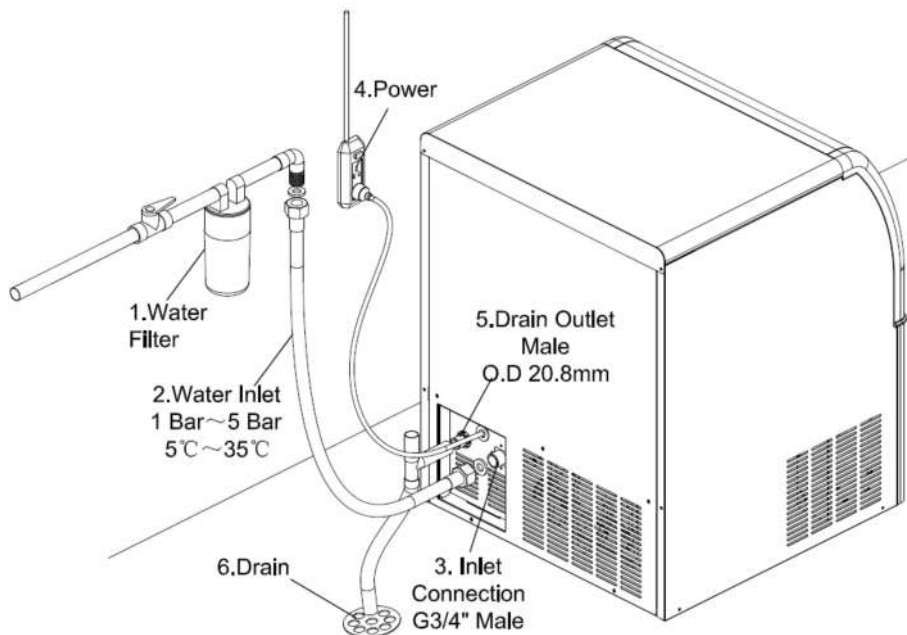
Note:

This ice machine is only designed for indoor installation. For the loss or damage caused by exceeding the following limited temperature or involved in the security claims, it is beyond the general finite warranty clause of Scotsman producer.

In order to get good ventilation and heat radiation, the distance between the machine and the wall, etc. should be more than 150mm.

Don't hang curtain or pile any goods around the machine to avoid overheat caused by bad ventilation, be sure there is no heat source (such as stove, oven, etc.) around the machine and the working environment of the ice maker should not be over humidity.

Before use, install the four supplied legs into leg acceptor on bottom side of unit base, Level the unit in both the left to right and front to rear directions.



Water supply and drainage connection

Choose the ice machine water supply should be considered:

- Water quality requirements: Ice thickness detector cannot work normally in non conductible water; Water containing too many minerals will produce a cloudy like ice and increase water scale accumulation of each part of the water system.
- Enough water pressure : The water pressure should be between 1 to 5 bar. Ice machine cannot work normally if the water pressure is lower than 1 bar (14 psi).

You cannot ignore these three requirements, because water is the key factor in the ice making.

Water supply

Connect the 3/4" male thread connector of water inlet solenoid valve with supply line connector and install a water supply valve in an accessible position between the water supply line and the unit.

If water contains a high level of impurities, it is advisable to install an appropriate water filter or treatment facility.

Water Drain

The recommended drain tube is a plastic or flexible tube with 18 mm (3/4") I.D. which runs to an open sewer.

Note: The water supply and the water drain must installation should conform to the local code. In some case a licensed plumber or a plumbing permit is required.

Note : Ensure the drain pipe has 3 cm drop per meter at least.

Electrical Connections

- See name plate for current requirements to determine wire size to be used for electrical connections.
- All SCOTSMAN ice machines require a solid earth wire. All SCOTSMAN ice machines are supplied from the factory completely pre-wired and require only electrical power connections to the wire cord provided at rear of the unit.
- Make sure that the ice machine is connected to its own circuit and individually fused (see data plate for fuse size).

- The maximum allowed voltage variation should not exceed -10% and + 10% of the nameplate rating. Low voltage can cause faulty functioning and may cause serious damage to the overload switch and motor windings.

Note:
All external wiring should conform to national, state and local standards and regulations.

- Check consistency between voltage on the line and the ice maker's data plate before connecting the unit (power supply).

Final Check List

1. Is the unit in a room where ambient temperatures are within a Minimum of 10°C (50°F) even in winter?
2. Is there at least a 15 cm (6") clearance around the unit for proper air circulation?
3. Is the unit level? (IMPORTANT)
4. Have all the electrical and plumbing been connected, and is the water supply valve open?
5. Is the power supply voltage in accordance with the nameplate ratings?
6. Has the water supply pressure been checked to ensure a water pressure of at least 1 bar (14 psi)?
7. Check all refrigerant lines and conduit lines to guard against come-off by vibrations and possible damage.
8. Have the bolts holding the compressor been checked to ensure that the compressor is fixed onto the mounting base?
9. Have the ice bin and cabinet been wiped clean?
10. Has the user been given the Manual and been instructed on the importance of periodic maintenance checks?
11. Has the manufacturer's registration card been filled in properly? Check for correct model and serial number according to the serial plate and mail the registration card to the factory.
12. Has the user been given the name and the phone number of the authorized SCOTSMAN Service Agent?

Start-Up

After having correctly installed the ice maker and completed the plumbing and electrical connections, perform the following “Start-up” procedure.

- Connect the main power switch.
- Power on the power switch on the right side of the NU front panel.



Power Switch Panel

At the end of the cleaning operation, the unit will enter into the freezing cycle automatically with the start up of compressor; water level of the water tank gets into the control state. The water pump starts to work after the startup of compressor 30 seconds. Fan Motor (air cooled model) is controlled by the temperature sensor of the condenser.

Note:

Every time the unit returns under power after having been switched off, the water supply valve, defrost valve, water pump and the water drain valve get energized for a period of 3 Minutes, thus to admit new water to the machine sump reservoir to fill it up and eventually, to wash-off any dirt that can have deposited in it during the unit off period.

During the cleaning operation, check and see that the incoming water flows through the inlet pipe above the water trough into the drain pipe.

During the water filling phase the components energized are:

- ♦ Water inlet solenoid valve
- ♦ Defrost solenoid valve
- ♦ Water pump
- ♦ Water drain solenoid valve

Note:

If within 3 Minutes of the water filling phase, the machine water trough does not get filled with water from the water inlet, it is advisable to check:

- The water pressure of the water supply pipe that must be at least 1 bar (14 psi). Max 5 bar(70 psi).
- The filtering device installed in the water pipe that may reduce the water pressure below the Minimum value of 1 bar (14 psi).
- Any clogging situation occurs to the inlet water strainer and/or the flow controller of the inlet valve.

PC BOARD SET UP

The PC Board can be set up for:

		restart
	ON	Machine will restart after clean procedure

MANUAL RESET MODE

To Restart the machine it is necessary to Push the **MODE** Button



**MODE
BUTTON**

Default Factory Setting - All Dip Switches OFF

- NW308/508/458/608 ALL OFF
- NW1008/1408 #2 ON
- NW1408 #2 ON #5 ON
- NU #1 ON #8 ON

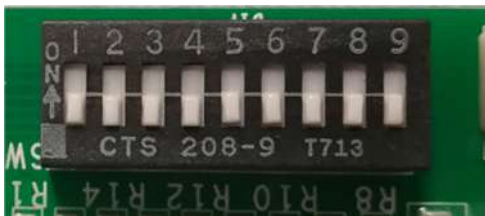
MODE BUTTON FUNCTION

Press MODE button can restart machine when machine in alarm.

When machine is working, press MODE button will going to next process as follow:

- Start -- Automatic clean -- Pressure balance
- Freezing -- Harvest -- Bin full

DIP SWITCH SETUP



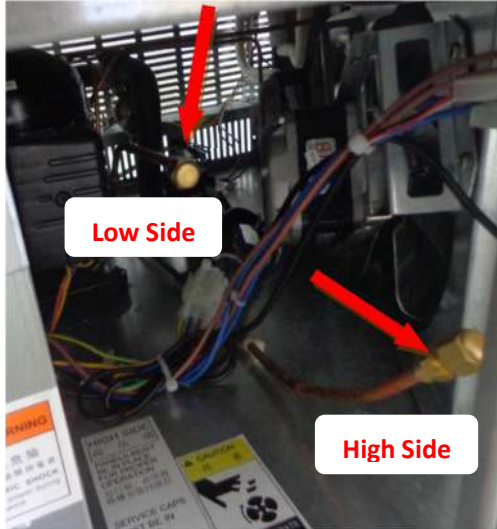
No.	Switch	Function
#1	OFF	For NW series
	ON	For NU series
#2	OFF	No time delay
	ON	Have 90' delay(NW1008/1408)
#3	OFF	3.5' Harvest time
	ON	6' Harvest time
#4	OFF	3' Water fill time
	ON	5' Water fill time
#5	OFF	Fill water in first 4' in freezing cycle
	ON	Fill water in first 5',interval 3' fill again
#6		Water purge control
#6/#7	OFF/OFF	Water pump work 30"
#6/#7	ON/OFF	Water pump work 6" and 30" every sixth cycle
#6/#7	OFF/ON	Water pump work 30" every three cycles
#6/#7	ON/OFF	Water pump work 30" every six cycles
#8	OFF	Without water temperature sensor
	ON	Water temperature sensor on work.
#9	OFF	Machine will stop after clean procedure, need to press clean button to

NOTE: There is same function MODE and CLEAN button in PC board and indicate board.

IMPORTANT: All PC board setup should be operated by authorized

Operating check

If required, the refrigerant service gauges can be mounted on the high pressure side and low pressure side to check discharge and suction pressures of the compressor. (The valve welded with the compressor shell is low pressure valve; the valve welded with discharge tubes is high pressure valve)



Check the evaporator, check whether the spray system is correctly seated and whether the water jets spray water on the surface of the evaporator uniformly, and also make sure that there is no excessive water spilling from evaporator plate into ice bin.

The ice making processes start with the water uniformly flowing through the surface of the evaporator, the ice molds then get gradually refrigerated by the heat exchange which has refrigerant flowing into the evaporator coil. During the freezing process, the ice thickness sensor controls the freezing cycle time. The electric components in operation during the ice making cycles are:

- ♦ Compressor
- ♦ Water pump
- ♦ Fan Motor is controlled by the temperature sensor of the condenser.

Note: The **ice thickness** sensor is installed on the surface of the evaporator; the length of the entire freezing cycle is controlled by the interval time of the **ice thickness** sensor probes the ice cubes.

- ♦ If room temperature is below 15°C, the ice making cycle will be shorter (about 15-25 Minutes).
- ♦ If room temperature is above 30°C, the ice making cycle will be longer (about 25-40 Minutes).

The defrost cycle takes place with the **defrost valve** and water drain valve simultaneously activated. The electric components in operation during defrost cycle are:

- ♦ Compressor
- ♦ Defrost valve
- ♦ Pump and the Water drain valve (controlled by PC board and can drain after each cycle)
- ♦ Fan Motor (air cooled model) is controlled by the temperature sensor of the condenser.

Note:
The length of the defrost cycle is automatically controlled by the program of the PC board, depending on the ice required thickness and ambient condition.

Inspection during defrost cycle

- Check whether the water drain's operation is normal (if water drain function is set), and that water in the sump reservoir is correctly drained.
- Check the **quality** of ice cubes just released. If it doesn't reach the requirement, some adjustment should be carried out (See adjustment procedure). If the ice cubes are thin and cloudy, probably the ice machine is shortage of water or the water quality is not good. It may require the usage of an appropriate water filter or treatment unit.
- To make sure the correct operation of the ice level control, use your hand to press the ice sliding plate down which **simulates** the bin is full, so the ice cube cannot go through the ice sliding plate and fall into the ice bin. After 40 seconds, the unit should stop with the Bin Full indicator light on the display plate of PC board. **Move your** hand out to allow the resumption of the ice

sliding plate. After 3 minutes, the ice maker **returns** to ice making cycle.

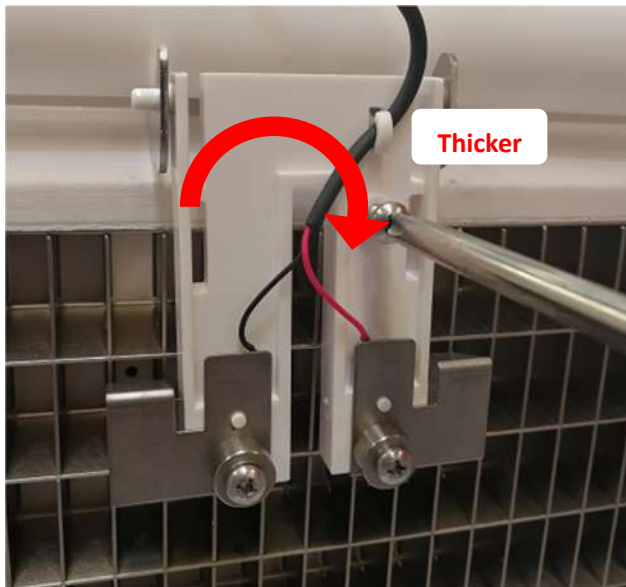
Remove the refrigerant service gauges (if fitted) and refit the unit panels previous removed after adjustment.

Instruct the user on the general operation of the ice maker, the cleaning and maintenance.

Ice machine adjustments

Adjustment of ice thickness

The ice thickness has been adjusted to a suitable position before it was shipped out. If needed, adjust the screw on the ice thickness sensor properly to meet the suitable thickness. Clockwise rotation can make the ice thickness thicker, while counterclockwise can make the ice thickness thinner.



Note:

When adjusting the screw on the ice thickness sensor, do not adjust too much, 1 laps per time or so; after three cycles, if the ice thickness still cannot meet the requirements, adjust it again. The ice thickness could be adjusted to a required level by this mean.

Drainage adjustment

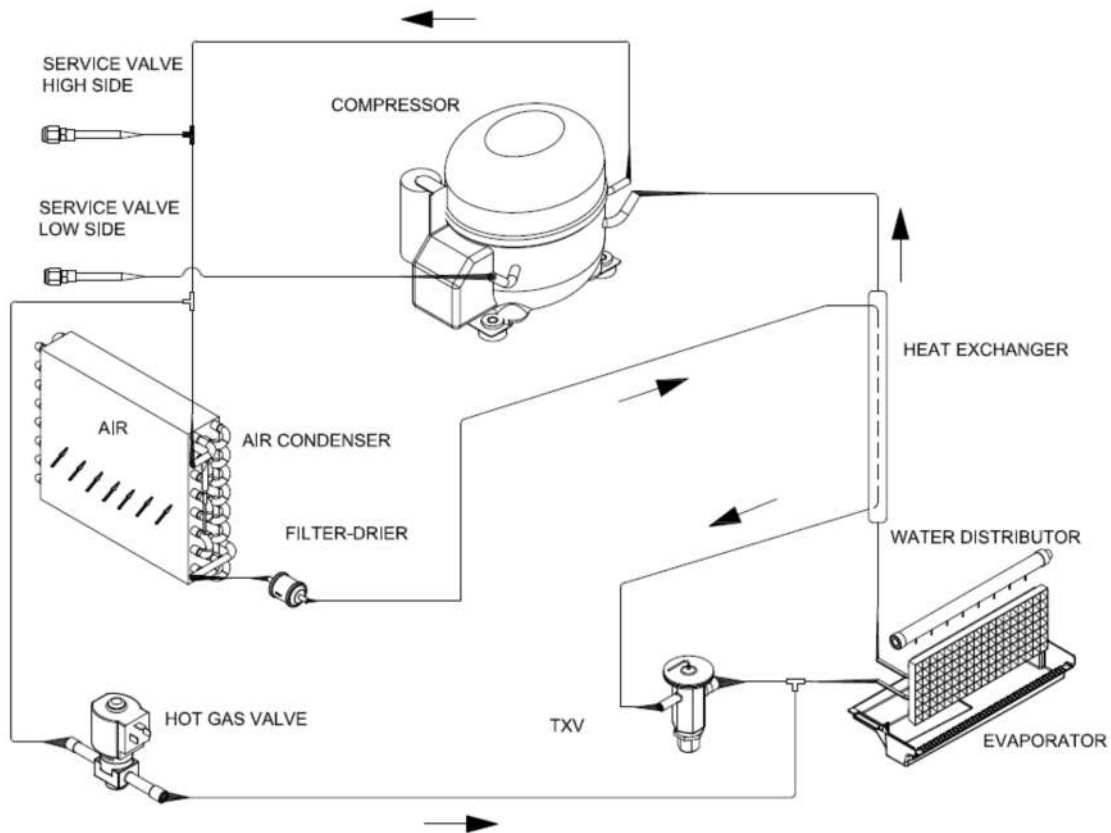
The adjustment of the drainage number of the ice machine depends on the local water quality and water cleanliness.

Recommendation:

To obtain a higher degree of transparency ice and to maintain the cleanliness of the sink, recommends that the drainage is set behind one ice making cycle, this is the factory setting.

How the ice maker works

For NU ice maker, the water for making ice is pumped into the spray pipe by water pump. After flew out from the holes of spray pipe, then it will flow over the surface of the ice plate with constant and even speed. At this spot, some of the water will turn into ice; the other will flow back to the water trough by gravity and will be re-circulated by water pump.



Freezing Cycle

The refrigerant gas discharged from the compressor gets into the condenser, where it is cooled and condensed into liquid. The liquid will flow into drier filter, and then it will pass through the expansion valve. After that, the pressure and temperature of the refrigerant liquid will get much lower.

Then the refrigerant begins to evaporate when it gets into the evaporator coil pipes and exchange heat with water following over the ice molds.

The refrigerant then increases in volume and changes entirely into vapor during heat exchanging process. The refrigerant vapor then passes through the suction line heat exchanger (used to prevent that any small amount of liquid refrigerant may reach the compressor) at the suction line and flow through the suction pipe. It exchanges heat with the refrigerant flowing into the capillary tube or liquid line copper tubes (warmer), before to be sucked in the

compressor and to be re-circulated as hot vapor.

The 40 seconds before freezing cycle is pre-cooling period, in this period, the compressor is working, water pump is not, fan is working (controlled by the temperature sensor of condenser) and water inlet valve is working (controlled by the water-level sensor in the water trough).

The freezing cycle is controlled by the ice thickness sensor, as long as the sensor probes the ice and holds for 30s, the ice thickness has reached the set point. Then, the freezing cycle is end. The total time of freezing cycle depends on the ambient temperature and ice thickness set.

Note:
Ice making indicator light, OPER green light on the display board will be illuminating since the beginning of ice making.

Note:

If defrost cycle does not start 40 Minutes after the starting of freezing cycle, the unit will automatically identify as freezing overtime and automatically enter into the defrost cycle. If the freezing overtime occurs to the ice maker 5 times in a row (caused by short of refrigerant, abnormal operation of defrost valve, etc.), freezing indicator light- **OPER.+ ALARM** lights will be quick flashing. At this time, the user needs to disconnect the unit and contact with the service agent.

During refrigeration cycle, the pressure range of high-pressure side is:

NU100: 15~26 bar (218psi~377psi)

NU150: 15~27bar (218psi~391psi)


NU220: 15~26 bar (218psi~377psi)

NU300: 15~27bar (218psi~391psi)

The pressure of the high-pressure side is controlled by the condensation temperature sensor located at the condenser. If the condensation temperature sensor senses the condensation temperature exceeds the set value, it will feed back to the PC board which will control the operation of fan.

Contrarily, when the condensation temperature sensor is lower than the set value of condensation temperature, it will feed back to the PC board which will control the outage of fan.

Notes:

If condensation temperature probe senses the temperature is higher than 70°C(160°F), the unit will stop caused by the startup of protection device, while the **ALARM**  on display board will be slow flash, warning user of too high condensation temperature.

After the condensation temperature is lower than 70°C(160°F), **switch off the unit by the power button** before the unit restarts, and **switch on the ice maker, then waiting for 3 Minutes**. After 3 Minutes of water injection, the ice maker is working normally.

Reasons for abnormal operation as follows:
Condenser is block;

- Air temperature is higher than 40 °C (100°F);
- To avoid abnormal operation and risk of the unit, the user should cut off the power upon one of the above reasons.

At the start of freezing cycle, pressure of refrigeration suction side or low-pressure side is rapidly reduced; the pressure will be gradually reduced as the ice thickness increases. When the ice cube is completely formed in the ice mold, pressure reaches:

NU100: 5~2 bar (58psi~29psi)

NU150: 5~2 bar (58psi~29psi)

NU220: 5~2 bar (58psi~29psi)

NU300: 5~2 bar (58psi~29psi)

Overall length of freezing cycle is between 15-40 Minutes.

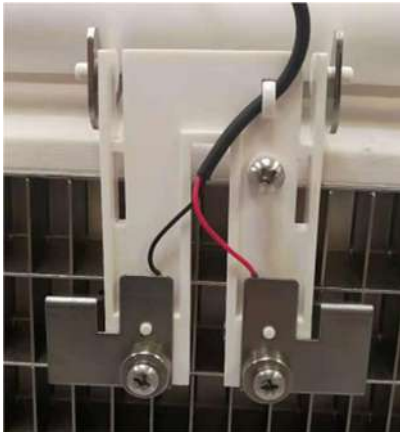
Defrost cycle

The defrost cycle starts after the completion of the freezing cycle. Refrigerant hot gas discharged from the compressor flows into the evaporator coil through defrost valve.

Refrigerant circulated in the evaporator coil heats the ice molds to melt the ice cubes. Ice cubes fall off from the mold cup, into declining ice sliding plate by gravity and finally fall into the ice bin.

Components Description

Ice thickness sensor



The ice thickness sensor is located at the **top of the evaporator plate**. During freezing cycle, if the sensor probes ice, it will convert into electronic signal which **will be transmitted** to the PC board.


The PC board will control the time of the freezing cycle **according to the ice thickness signal**. The time of the **freezing cycle** depends on the ambient temperature and the ice thickness; the higher the temperature is and the thicker the Ice thickness sets, **the longer freezing cycle will be**.

Note :

Ice thickness sensor is inoperative with non conductible water.

Condenser temperature sensor

Note:

Defrost indicator light harvest  is illuminating at the start of defrost.

After the end of defrost cycle, hot gas valve, drain valve (equipped as per PC board) closed. The unit starts its new ice making cycle.

Refrigerant charge

Refrigerant: R404A

NU100: 310g

NU150: 350g


NU220: 360g

NU300: 420g



The condenser temperature sensor probe is located in the condenser, which detects the condenser temperature variations and transmits electronic signals to PC board.


Note:

If the condenser temperature probe detects that the condenser temperature is over 70°C (160°F), the PC board will stop the operation of the machine immediately. The light **ALARM**  will alarm and slow flash.

Ice Full Controller


The ice full controller is divided into two parts: one part is a magnet part which is installed in the ice slide plate, and the other part is a magnetic sensor, which is installed on the plastic frame of the evaporator.

If the ice deflector is not re-set and the magnetism is not sensed by the magnetic sensor within **30** seconds, it means that the ice cubes made in the last freezing cycle cannot drop into the ice storage bin, the ice storage bin

is full and the Bin Full  Red LED indicates.

When the ice in the storage bin is taken out or moved, the ice deflector is re-set, the magnetic sensor detects the magnetism, and the state of ice bin full is released then enters into the freezing cycle.

Note:

If the state of "ice bin full" is released within 3 minutes, the OPER light  is quick flashing, 3 minutes later the ice machine will enter into freezing cycle automatically.

If the state of "ice bin full" is released after 3 minutes more, the ice machine will enter into freezing cycle upon it is started.

Water Level Sensor



The water level sensor is located at the top of the water tank. When water level reaches a certain level during water filling, the magnetic sensor of the water level sensor detects the magnetism and signals it to the PC board. Once the PC board receives the signal, then it will power off the water inlet valve and water filling is stopped.

The water level sensor is installed on the support of water level sensor and can be adjusted.

Note:

When the water level in the water tank is considered to be too high and water overflows whenever water is filled, it means that the water level sensor cannot control the water inlet valve, the position of the water level sensor can be adjusted lower. If the position of the water level sensor is adjusted low and the problem is not solved, it means that the water level sensor is failure and should be replaced.

Vertical Type Water Spray System

The water pump spray out the water sucked from the water tank. The water flow into the spray tube through the PVC tube, then pass the pinholes on the water tube, and then flow evenly through the ice molds of the evaporator, thus ice cubes are made. It is cycled continually.

Water pump

The water pump operates continually throughout the freezing cycle and keeps water flowing continually through the ice molds of the evaporator and produces ice cubes.

Recommendation:

The water pump should be checked at least every 3 months.

Water Inlet Solenoid valve - 3/4" Male Fitting

The water inlet solenoid valve is located on the up and down water support. The incoming water is controlled by the PC board, among which one water flow controller is used to control the water flow incoming the water tank.

Defrost Solenoid Valve

The defrosting solenoid valve, located at the hot gas bypass tube, is consisted of valve body and coil. During defrosting and water filling period, operation is controlled by the PC board.

During the defrost cycle, the defrost solenoid valve is energized and sucks the push rod of the valve body in order to let the hot gas discharged from the compressor to flow directly into the evaporator pipe to melt the formed ice cubes.

Fan

The Fan is controlled by PC board to draw cooling air through the condenser fins, thus to lower the discharge temperature of the compressor. Normally it operates **intermittently** only during the freezing cycle to keep the condenser pressure between two corresponding pressure values.

Compressor

The hermetic compressor is the heart of the refrigerant system of the ice machine and it is used to circulate and retrieve the refrigerant throughout the entire system.


It compresses the low pressure refrigerant vapor causing its temperature to rise and become high pressure hot vapor which is then released through the discharge valve and then will reach the condenser.

Water Drain Solenoid Valve

The water drain solenoid valve is controlled by the PC board. Based on the different configuration of the PC board(Drainage is set behind one ice freezing cycle, which is set by factory), it starts operating for 30 seconds so that all remaining water containing minerals in the water tank drains out.

High Pressure Control switch

The high Pressure Control is in the ice machine, when the ice machine occurs failure and the high pressure is more than 32.6bar(462psi), the high pressure control switch will cut off the electricity supply to protect the ice machine.

The indicator lights **ALARM HI PRESS**  will be keeping always-on until the high pressure lowers to 23bar (322psi), then can restart the ice machine.

Water temperature sensor

The water temperature sensor, located in the water pipes from the water pump to the ice plate, is used to detect the temperature of circulating water in real time and sent signals to PC board with which controls the operation of pump during the ice making cycle.

Thermostatic Expansion Valve

The Thermostatic Expansion Valve regulates the flow of refrigerant to the evaporator and reduces pressure of liquid refrigerant from condensing pressure to evaporating pressure.

This drop in pressure causes the refrigerant to cool. The cooled refrigerant absorbs heat from the water circulating over the evaporator. As the evaporator fills with liquid refrigerant, the evaporator becomes colder.

The flow of refrigerant into the evaporator is controlled by the temperature at the outlet of the evaporator. The expansion valve bulb, mounted to the top of the suction pipe, senses the evaporator outlet temperature causing the expansion valve to open or close.

As ice forms on the evaporator, the temperature drops and the flow of refrigerant into the evaporator decreases, resulting in a drop in suction pressure.

The evaporator should become completely flooded (filled with liquid refrigerant) during the freezing cycle. Only a completely flooded evaporator will have a uniform freeze pattern (ice forms across the evaporator). A starved evaporator (not enough liquid refrigerants) will have poor or have no ice formation, the outlet tube(s) exiting the evaporator will also not frost. All tubes should frost approximately 5 minutes from the start of the freezing cycle.

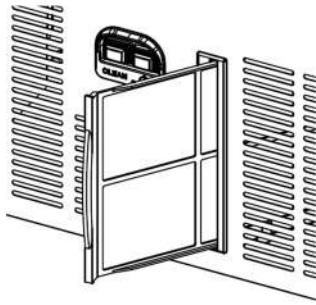
An expansion valve that is restricted or not opening properly will starve the evaporator resulting in lower than normal suction pressure. A low refrigerant charge will also starve the evaporator and cause low suction and discharge pressures. If not sure the amount refrigerant in the system, retrieve it back and recharge of the correct amount of refrigerant and then re diagnosis whether the valve is defective.

If the evaporator is starved but the suction pressure is higher than normal, it shows the TXV is good; If the TXV keeps open or if the thermal bulb doesn't contact well with the suction pipe, the flow of refrigerant into the evaporator will be too much and the liquid refrigerant will flood the compressor. The suction pressure will be higher than normal; the formation of ice is uniform, but the ice making cycle will become longer.

symptoms	issue	corrections
Evaporator flooded but suction pressure not dropping. Compressor has been checked and appears well.	the thermal bulb of TXV doesn't contact well with the suction pipe TXV bulb is installed incorrect	Tighten bulb clamp, and confirm that the insulation is good. Put the thermal bulb on the top of suction pipe. Recharge the refrigerant, and replace the TXV.
Suction pipe at compressor may be colder than normal	System overcharged	
Evaporator starved, no frost on pipe(s) exiting evaporator, suction pressure is low.	Machine low on refrigerant charge TXV restricted or stuck	Retrieve the recharged refrigerant back and recharge of the correct amount of refrigerant Replace TXV and dry filter

Air filter

The NU series air cooled ice machine is equipped with air inlet filter. As the ice machine runs, part of dust will be sucked in the machine through the filter, thus it cuts down the air volume to be sucked in and then the efficiency of the ice machine.



In order to enable the ice machine working efficiently, had better clean the air filter monthly. If the filter is damaged due to aging, call the Scotsman service agent to replace it.

Power switches on front panel

There are two buttons on NU front panel: the right green switch is the power switch, the red switch is the cleaning switch.

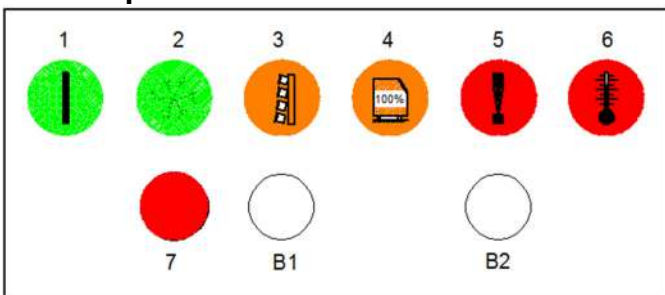


PC Board (Data processor)

The PC board, fitted in its box located in the left bottom of the front of the unit, consists of one power-in high voltage transformer, one PC board with both high and low voltage and a display panel connected with the PC board.

The PC board is the brain of the ice machine; it receives signals transmitted from the four sensors through its micro processor to control the operations of the different electrical components of the ice machine (such as compressor, Fan, defrosting valve, water inlet valve, drain valve, water pump).

The lamps on the control box



1—POWER	6—ALARM HI PRESS
2—OPER	7—CLEAN
3—HARVEST	B1—CLEAN BUTTON
4—BIN FULL	B2—MODE BUTTON
5—ALARM	

MODE: Mode Button

CLEAN: Clean button

Mode Button Functions

Press the button one time in order, the machine will enter the next step:

Power on - Cleaning - Pressure balance - Freezing - Defrosting - Ice Bin Full Detecting

Warning:

Only authorized maintenance people are allowed to press the MODE button.

The function of the clean button

As power switching on, the clean button only activates in the first minute. Press the clean button and hold for 2 seconds or more, the ice machine will enter into the clean procedure automatically. Had better use Scotsman supplied cleaning solution and sanitizer to clean and sanitize.

Alarm lamps failure description:

lamps	State	Failure Description
5+ 6	On	Condenser sensor failure
5+ 6	Blinking slow	Water error
5 + 6	Blinking fast	Water error recovery
5	On	3 times too long HarvestCycle time
5	Blinking slow	Too Hi condensing temperature error
6	On	Too High discharge pressure
4+5	Blinking fast	Ice thickness sensor fault
2 + 5	Blinking fast	5 times too long Freeze Cycle time
3+5	Blinking fast	Water temperature sensor fault

Wiring diagram NU100/150

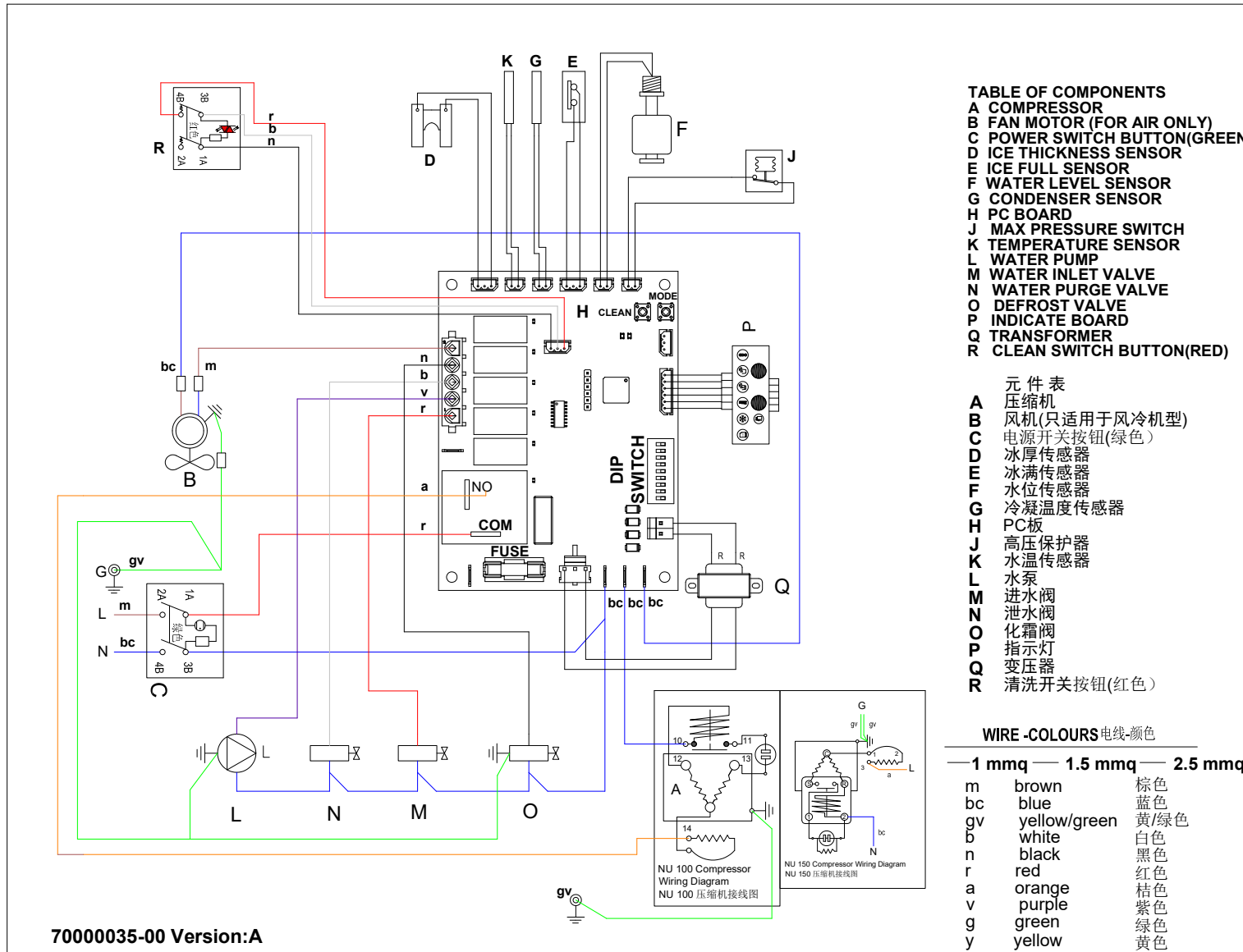


TABLE OF COMPONENTS

- A COMPRESSOR
- B FAN MOTOR (FOR AIR ONLY)
- C POWER SWITCH BUTTON(GREEN)
- D ICE THICKNESS SENSOR
- E ICE FULL SENSOR
- F WATER LEVEL SENSOR
- G CONDENSER SENSOR
- H PC BOARD
- J MAX PRESSURE SWITCH
- K TEMPERATURE SENSOR
- L WATER PUMP
- M WATER INLET VALVE
- N WATER PURGE VALVE
- O DEFROST VALVE
- P INDICATE BOARD
- Q TRANSFORMER
- R CLEAN SWITCH BUTTON(RED)

元件表

- A 压缩机
- B 风机(只适用于风冷机型)
- C 电源开关按钮(绿色)
- D 冰厚传感器
- E 冰满传感器
- F 水位传感器
- G 冷凝温度传感器
- H PC板
- J 高压保护器
- K 水温传感器
- L 水泵
- M 进水阀
- N 泄水阀
- O 化霜阀
- P 指示灯
- Q 变压器
- R 清洗开关按钮(红色)

WIRE-COLOURS 电线-颜色

1 mmq	1.5 mmq	2.5 mmq
m	brown	棕色
bc	blue	蓝色
gv	yellow/green	黄/绿色
b	white	白色
n	black	黑色
r	red	红色
a	orange	桔色
v	purple	紫色
g	green	绿色
y	yellow	黄色

Wiring diagram NU220/300

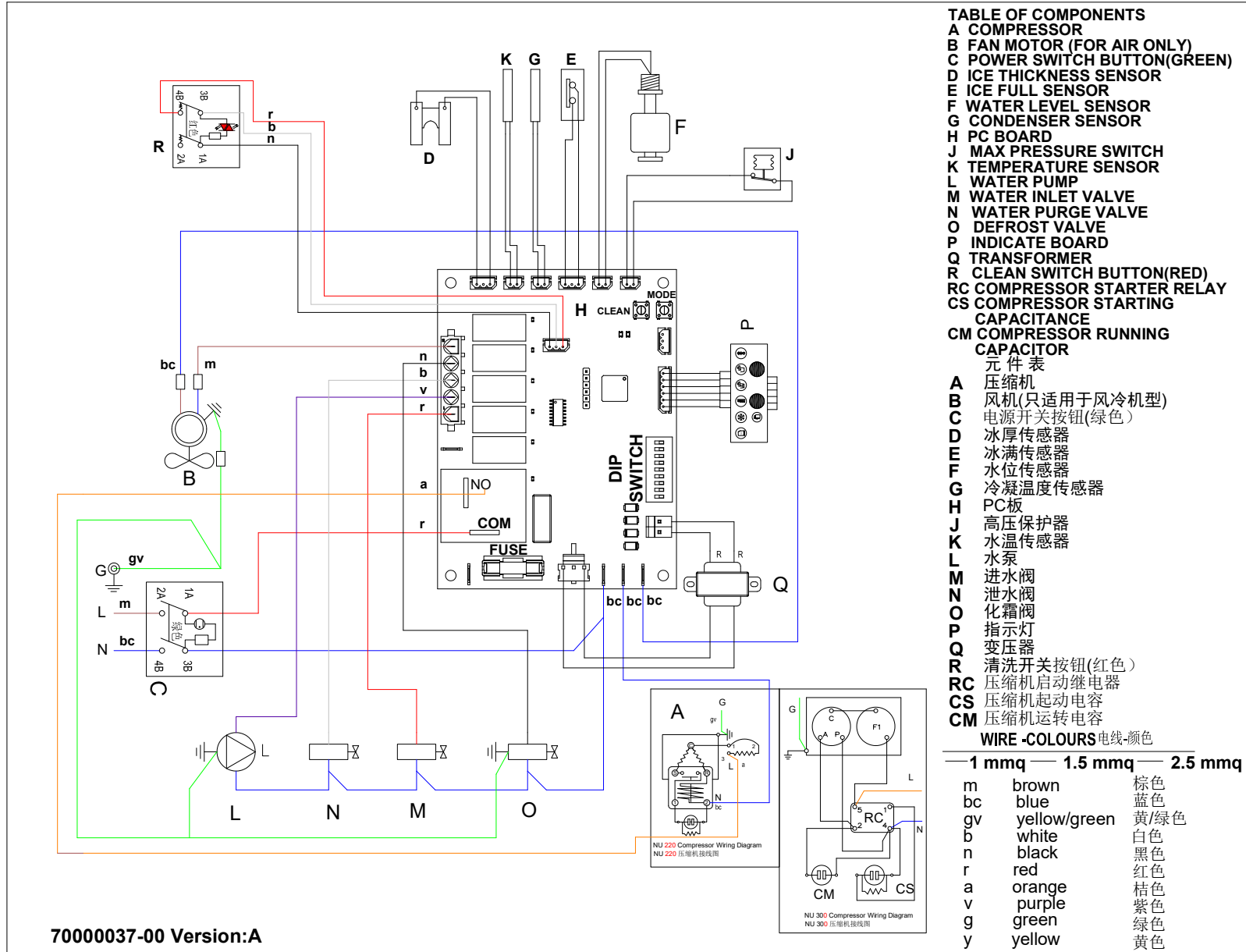


TABLE OF COMPONENTS

A COMPRESSOR
 B FAN MOTOR (FOR AIR ONLY)
 C POWER SWITCH BUTTON(GREEN)
 D ICE THICKNESS SENSOR
 E ICE FULL SENSOR
 F WATER LEVEL SENSOR
 G CONDENSER SENSOR
 H PC BOARD
 J MAX PRESSURE SWITCH
 K TEMPERATURE SENSOR
 L WATER PUMP
 M WATER INLET VALVE
 N WATER PURGE VALVE
 O DEFROST VALVE
 P INDICATE BOARD
 Q TRANSFORMER
 R CLEAN SWITCH BUTTON(RED)
 RC COMPRESSOR STARTER RELAY
 CS COMPRESSOR STARTING CAPACITANCE
 CM COMPRESSOR RUNNING CAPACITOR

元件表

A 压缩机
 B 风机(只适用于风冷机型)
 C 电源开关按钮(绿色)
 D 冰厚传感器
 E 冰满传感器
 F 水位传感器
 G 冷凝温度传感器
 H PC板
 J 高压保护器
 K 水温传感器
 L 水泵
 M 进水阀
 N 泄水阀
 O 化霜阀
 P 指示灯
 Q 变压器
 R 清洗开关按钮(红色)
 RC 压缩机启动继电器
 CS 压缩机启动电容
 CM 压缩机运转电容

WIRE -COLOURS 电线-颜色

1 mmq	1.5 mmq	2.5 mmq
m	brown	棕色
bc	blue	蓝色
gv	yellow/green	黄/绿色
b	white	白色
n	black	黑色
r	red	红色
a	orange	桔色
v	purple	紫色
g	green	绿色
y	yellow	黄色

7000037-00 Version:A

Trouble shooting table

Symptom	Possible Cause	Suggested Correction
Unit does not run	Abnormal power supply	Check power supply voltage, if no voltage, check power supply line Check power supply voltage, if it is low, contact power supply company
	The fuse on PC board blew	Replace the fuse. If the fuse is broken again, check the cause.
	The machine is stopped abnormally(such as high temperature protection)	Press the MODE key on the PC board to reset, the machine starts or unplug the power plug, plug it again 3 minutes later, the machine starts.
	Ice full	Adjust the position of the ice cubes in the storage bin to let the ice trough reset and then start the machine
	Abnormal water supply	See the processing method for water-shortage
Compressor runs intermittently	Low voltage	Check circuit for overloading
	Non-condensable gas in system	Check power supply voltage, if it is low, contact power supply company Purge the system and re-charge
	Compressor starting device with loose wires	Check for loose wires in starting device
	Mechanical problem	Replace compressor
Cubes too small	Ice making cycle too short	Check the distance between the ice thickness and the evaporator plate
	Expansion valve partially blocked	Check the expansion valve, if damage , replace it
	Moisture in the system	Purge the system and re-charge
	Shortage of water	See the processing method for water-shortage
	Shortage of refrigerant	Check for leaks in the refrigerating system & recharge
Cloudy ice	Shortage of water	See the processing method for water- shortage
	Dirty water supply	Use water softener or water filter
	Accumulated impurities	Cleaning as the procedure
	Water temperature sensor failure	Replace the water temperature sensor
Shortage of water	Water spilling out through ice chute	Tighten the screws on the clamping plate of the PVC pipe to reduce water flow
	Water inlet solenoid valve not opening	Check, if damage, replace it
	Water leak in water tank	Check for the leaking points and repair it. If necessary, replace it.
	Water inlet valve blocked	Replace the water inlet valve
	Water drain valve leak	Check, if damage, replace it

Trouble shooting table

Symptom	Possible Cause	Suggested Correction
Irregular cubes size & some cloudy	Spray pipe blocked	Clean the spray pipe
	Shortage of water	See the processing method for water-shortage
	Machine unlevel	Level the machine as required
	Water temperature sensor failure	Replace the water temperature sensor
Decreased capacity ice	Inefficient compressor	Replace the compressor
	Water valve leak	Check, if damage, replace it
	Spray pipe blocked	Check, if blocked, clean it.
	Non-condensable gas in system	Vacuum and re-charge
	Bad ventilation	Improve ventilation or put the machine to the good ventilation place
	Too much dust on air filter	Clean the air filter, if needed, replace it.
	Expansion valve partially blocked	Check, if damage, replace it
	Defrost valve leaking	Change charged volume, release slowly
	Refrigerant over charge Shortage of refrigerant	Vacuum and re-charge according to the nameplate
	Discharge pressure too high or too low	Check for the cause of incorrect discharge pressure
Defrost valve blocked or not open	Check, if damage, replace it	
Unit doesn't defrost or no ice	PC board Failure	Check, if damage, replace it
	Defrost valve not opening	Check, if damage, replace it
	Water inlet solenoid valve not opening	Check, if damage, replace it
Incorrect discharge pressure	Inoperative condenser sensor	Check, if damage, replace it
	Too much or less charged refrigerant, or non-refrigerant gas was charged	Check whether the refrigeration system is leakage Vacuum and re-charge according to the nameplate and the requirement from Scotsman Company
	Inoperative PC board	Check, if damage, replace it
Excessive water on unit base	Water system leak	Check for the leaking points and repair it. If necessary, replace it.

Clean and maintenance

General

The periods and the procedures for maintenance and cleaning can be adjusted.

Cleaning, especially, depends upon local water and ambient conditions and the ice volume produced. Each ice machine must be maintained individually in accordance with its particular location requirements.

Note:

Cleaning should be varied according the local water quality and the operating condition of each ice machine. Check frequently cleanliness of ice cubes and the components of the water system before and after cleaning to determine the cleaning frequency and procedures needed.

Ice-making System Maintenance description

The following maintenance on the ice machine should be scheduled at least two times per year:

1. Unplug the power plug at the end of the defrost cycle.
2. Check and clean the water inlet strainer.
3. Check that the ice machine is leveled in side to side and in front to rear directions.
4. Use special ice machine cleaning liquid to clean water system, evaporator and ice storage bin.
5. When air cooled icemaker stops, can remove the air filter.
6. Check for water leaks and tighten drain pipe. Pour water into storage bin to verify whether the drain pipe is Smooth and clean.
7. Check for refrigerant leaks.
8. Check size, condition and quality of ice cubes. Perform adjustment of cube size control as required.

Water System Cleaning

1. Prepare special cleaning solution for the ice machine in a plastic container.

Warning:

Before opening cleaning solution, must check the instruction of the cleaning solution in order to avoid damage.

Note:

Cleaning solution for ice machine is corrosive. If it splashing on your mouth can cause mouth burns, So don't make it splash. In case cleaning solution splashes on your mouth or eyes, use a lot of water or milk to wash and should go to hospital immediately. When washing the external surface, children are not allowed to close. Cleaning solution should be kept away from children.

2. Scoop out all the ice cubes stored into the bin to prevent them from being contaminated with the cleaning solution.
3. Use a brush to take some cleaning solution to dissolve the impurity material on the ice module of the evaporator and clean scale deposit.
4. Pour the cleaning solution into the **water trough** of the ice machine.
5. Turn on the power switch, press "clean button" and hold for 5 seconds, let the machine go to the Cleaning and rinsing procedure (Cleaning RED light will blink fast), all cleaning and rinsing time is about 40 minutes. After cleaning and rinsing procedure finished, the cleaning RED light will blink slowly.
6. Remove the water spray pipe and the water trough to wash them separately (if necessary).
7. Turn off the power switch after cleaning and rinsing process finished. Turn on the power switch again, the ice machine starts freezing cycle normally.

Sanitizing

Warning:

Never mix the cleaning solution with the sanitizer.

1. Do sanitizing after cleaning operation for the ice machine:
2. Prepare a plastic container, use warm water of 45-50°C (113°F-122°F) to dilute the cleaning sanitizer.
3. Pour the sanitizer into the water trough of the ice machine.
4. Turn on the power switch, press "clean button" and hold for 5 seconds, let the machine go into the cleaning and rinsing procedure (Cleaning RED light will blink fast), all cleaning and rinsing time is about

40 minutes. After cleaning and rinsing procedure finished, the cleaning RED light will blink slowly.

5. At the end of the freezing cycle, make sure of proper quality and cleanness of the ice cubes and that, they do not have any acid taste.

Note:

If the ice is cloudy and sour, use hot water to dissolve them and pour them to the safety place appointed in order to avoid eating by mistake which may cause injury.

Wipe clean and rinse the inner surfaces of the storage bin.

Note:

To prevent the accumulation of undesirable bacterial, it is necessary to sanitize the interior of the storage bin every week.

Winterizing Procedures

Important!

Whenever the ice machine is taken out of operation during the winter months, the procedure below must be performed. Failure to do so may cause serious damage and will void all warranties.

1. Check the ice machine, if ice is being made, initiate harvest or wait for freezing cycle end.
2. At the beginning of harvest, cut off the water supply to the ice machine.
3. At the end of harvest, cut off the power switch and drain water in the system completely as far as possible.
4. Take out all of the ice in the storage bin and discard.

何使用本手册

为了帮助维修技术人员安装、操作和维护 NU 系列制冰机而提供本手册。本手册可以帮助维修技术人员诊断检修本机可能出现的大多数问题。

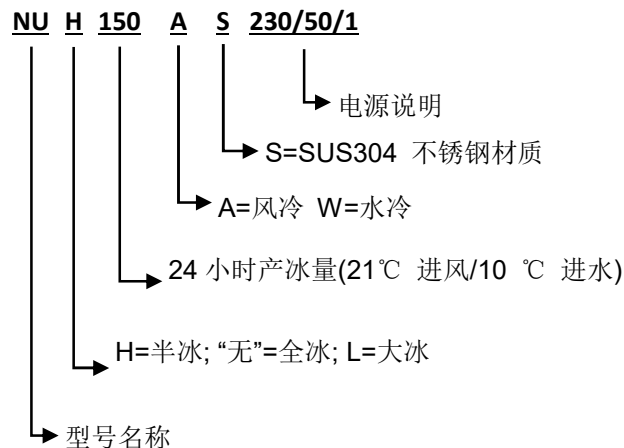
本手册叙述的主要内容可参见手册目录。

本手册介绍了 NU 系列制冰机的许多方面,但是,如果您遇到手册中未提到的情况,请联系 Scotsman 技术服务部,以便获得协助。您可以按以下方式与 Scotsman 技术服务部联络:

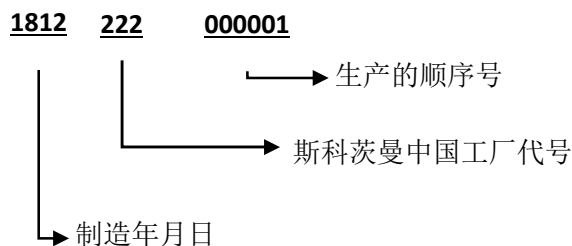
Scotsman Ice Systems
斯科茨曼制冰系统(上海)有限公司
中国上海徐汇区徐虹中路 20 号 2 号楼 2503 室
电话: +86 21 61313200
service@scotsman-china.com
www.scotsman-china.com
服务热线: +86 400 630 0076
NU 系列产品售后服务备件手册单独提供。

型号和序列号介绍

型号介绍
如: NU150AS 230/50/1



序列号说明



序列号包含 13 位,前 4 位为生产年份,月份标记,中间 222 是工厂代号,最后 6 位为 NU 系列产品流水号。

制冰机规格 NU100/150



水温

水温

NU100

NU150

F	50°	60°	70°	90°	
°C	10°	15°	21°	32°	
50°	121				lbs
10°	55				kg
70°	99				lbs
21°	45				kg
90°			70.4		lbs
32°			32		kg
100°				59.4	lbs
38°				27	kg

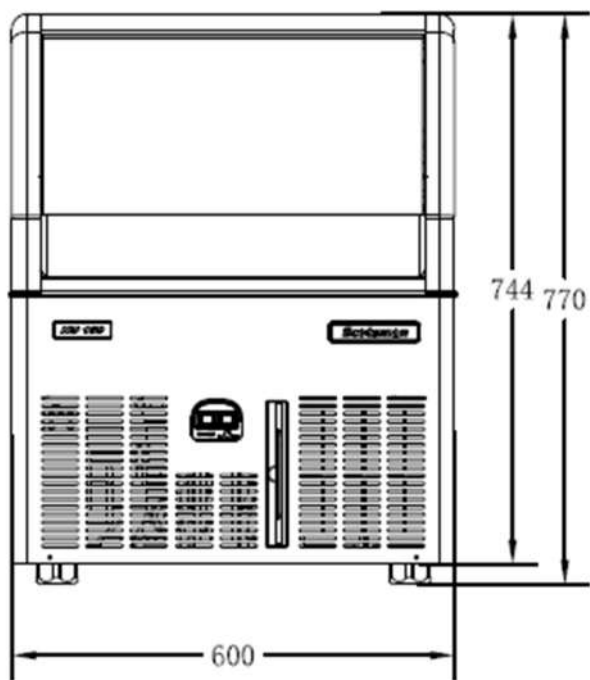
F	50°	60°	70°	90°	
°C	10°	15°	21°	32°	
50°	176				lbs
10°	80				kg
70°	150				lbs
21°	68				kg
90°			106		lbs
32°			48		kg
100°				88	lbs
38°				40	kg

室温

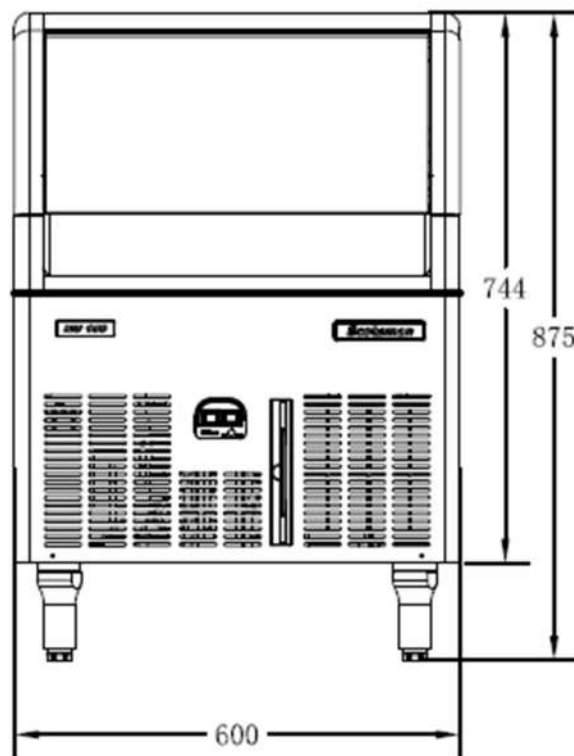
室温

Model	Refrigerant	Cooling Capacity		Ice Thickness	Voltage/Freq/Ph	Power	Current	Energy	Water	24 h ice production kg		
		[BTU/h]	[W]							°C Amb. / °C Water	10°C/10°C	21°C/10°C
NU 100AS	R134a	2660	780	3x1.5	230/50/1	450	10A	12.6	120	56	45	32
NUH100AS	R134a	2660	780	3x1.5	230/50/1	450	10A	12.6	120	56	45	32
NUL100AS	R134a	2660	780	3x1.5	230/50/1	450	10A	12.6	120	60	50	40
NU 150AS	R134a	3380	990	3x1.5	230/50/1	500	10A	8.5	75	85	68	48
NUH150AS	R134a	3380	990	3x1.5	230/50/1	500	10A	8.8	75	85	70	50
NUL150AS	R134a	3380	990	3x1.5	230/50/1	500	10A	8.8	75	80	70	50

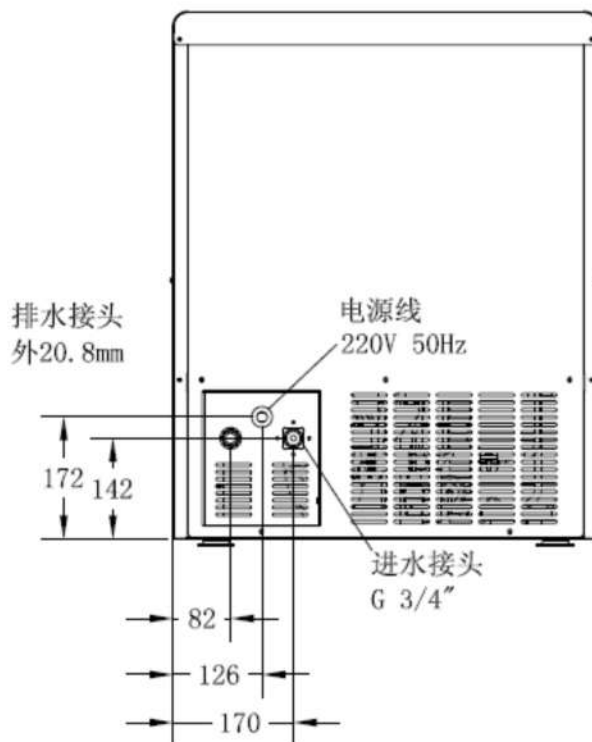
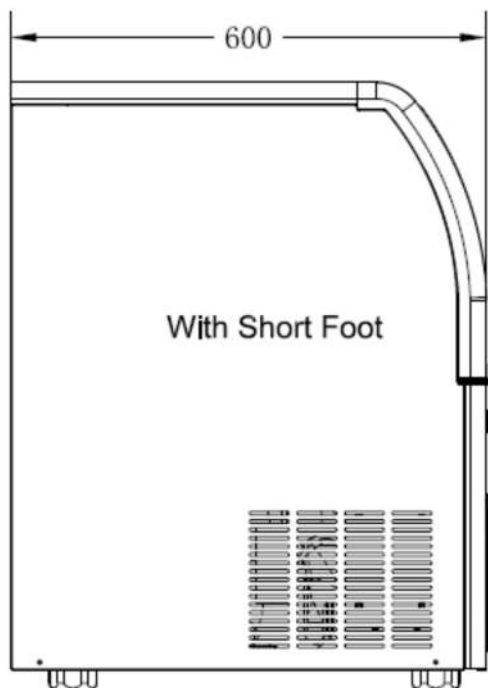
NU100/150 外形图



配备较矮底脚



配备较高底脚



制冰机规格 NU220/300



水温
NU220

室温	°F	50°	60°	70°	90°	
	°C	10°	15°	21°	32°	
	50°	253				lbs
	10°	115				kg
	70°	220				lbs
	21°	100				kg
90°			154		lbs	
32°			70		kg	
100°				132	lbs	
38°				60	kg	

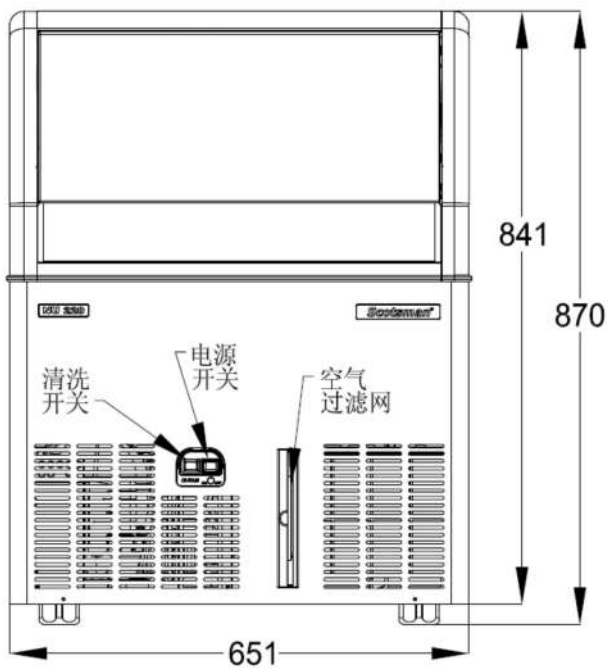
水温
NU300

室温	°F	50°	60°	70°	90°	
	°C	10°	15°	21°	32°	
	50°	308				lbs
	10°	140				kg
	70°	293				lbs
	21°	133				kg
90°			220		lbs	
32°			100		kg	
100°				180	lbs	
38°				82	kg	

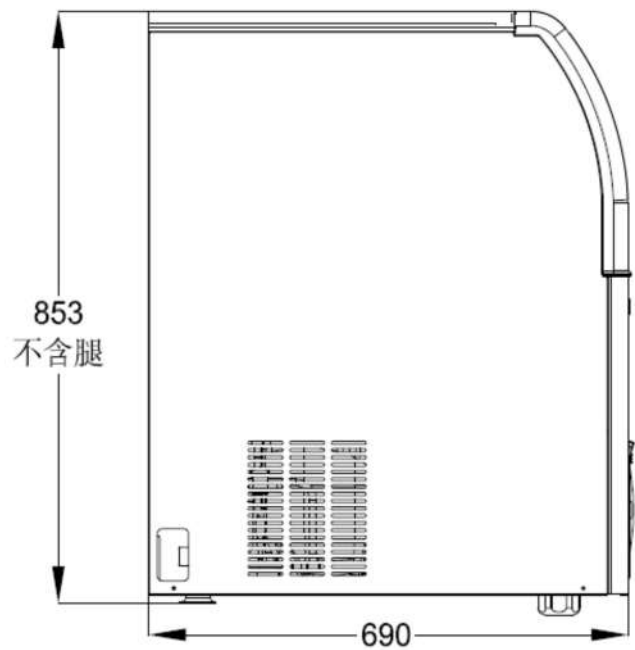
Image	S+C S-C	[BTU/h] [W]		[Ømm ²]	V/Hz/Ph	[W]	[A]	[kwh/100lbs]	[L/100lbs]	24 h ice production kg °C Amb. / °C Water		
		10°C/10°C	21°C/10°C							32°C/21°C		
		4320	1266	3x1.5	230/50/1	600	10A	9.0	75	109	100	70
		4320	1266	3x1.5	230/50/1	600	10A	9.0	75	104	98	65
		4320	1266	3x1.5	230/50/1	600	10A	9.0	75	105	95	70
		6030	1767	3x1.5	230/50/1	950	16A	8.0	68	142	135	100
		6030	1767	3x1.5	230/50/1	950	16A	8.0	68	128	121	92
		6030	1767	3x1.5	230/50/1	950	16A	8.0	68	142	130	93

NU220 外形图

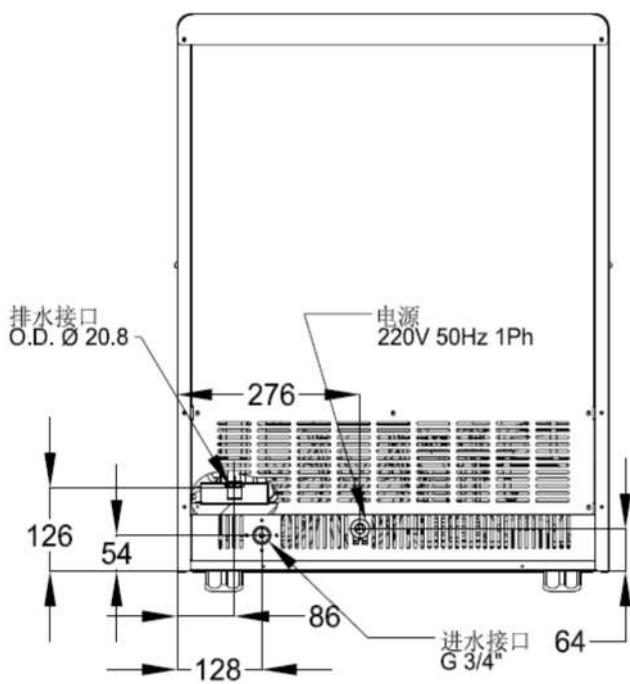
前视图



侧视图

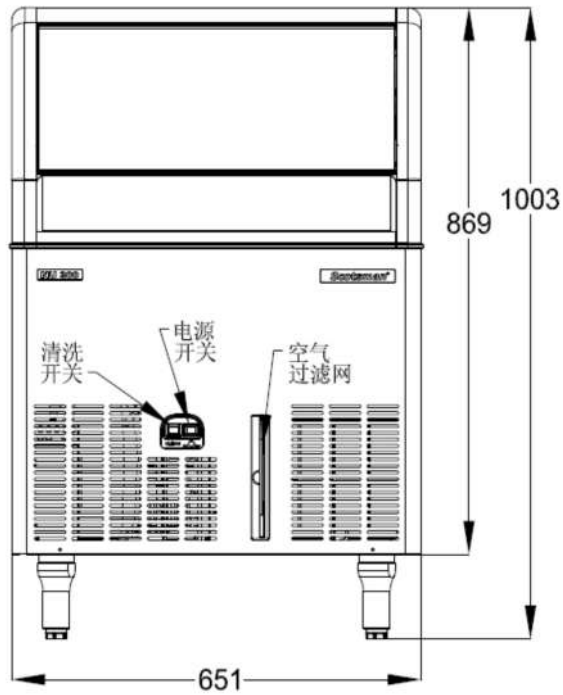


后视图

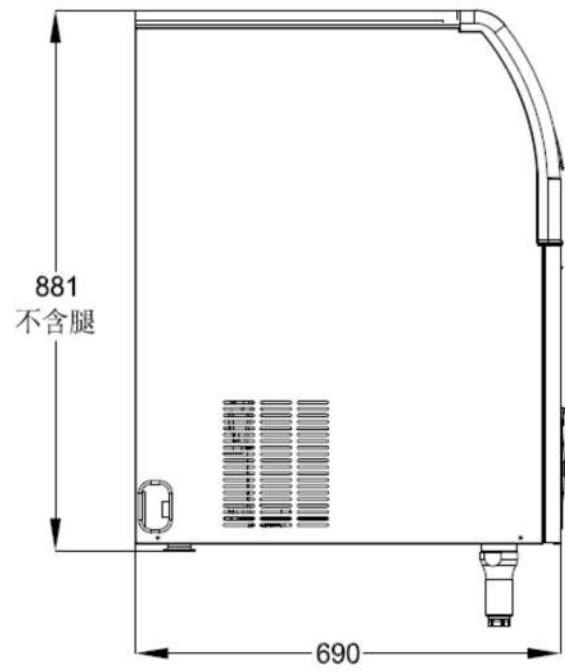


NU300 外形图

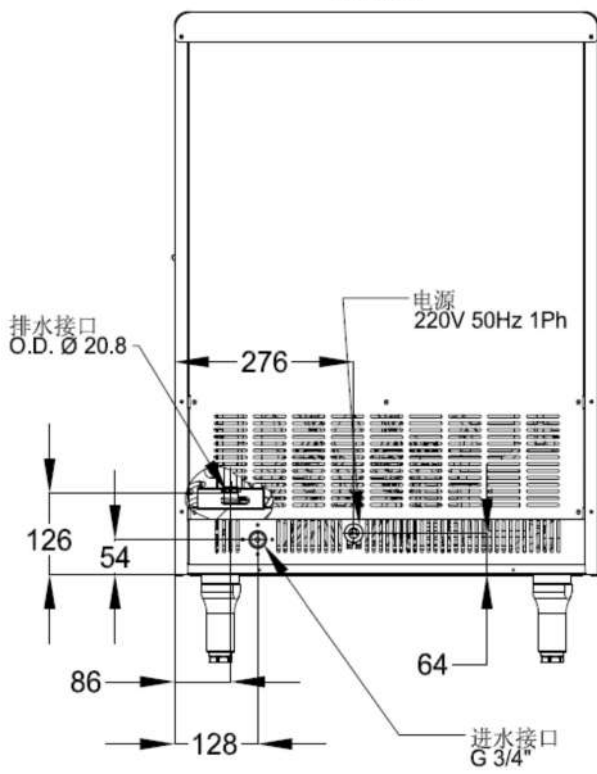
前视图



侧视图



后视图



概述及安装

本手册给出 Scotsman NU 系列的安装、启动和操作、维修、清洗的说明及每步操作程序。

安全说明

为使设备正常工作，安装前务请仔细阅读本说明书并按照其要求执行，以保证设备能长期安全地运行。制造商对因无视安全说明而造成的任何损害或人身伤害不负责任。如有疑问请联系当地经销商。

安装要求

在确定安装位置时，应考虑**确保满足下列条件**：

电源：设备的电气断路器必须安装在伸手可及处，确保供电电源可靠接地。

供水：机器的供水开关必须装于伸手可及处。

排水：连接排水管保证每米要有 3cm 落差。

注意：

为防止对用冰者可能造成任何感染，制冰用水应为食用水。如需要请安装水过滤器或水处理器。

为能充分利用机器性能并确保其耐用性，请注意以下事项：

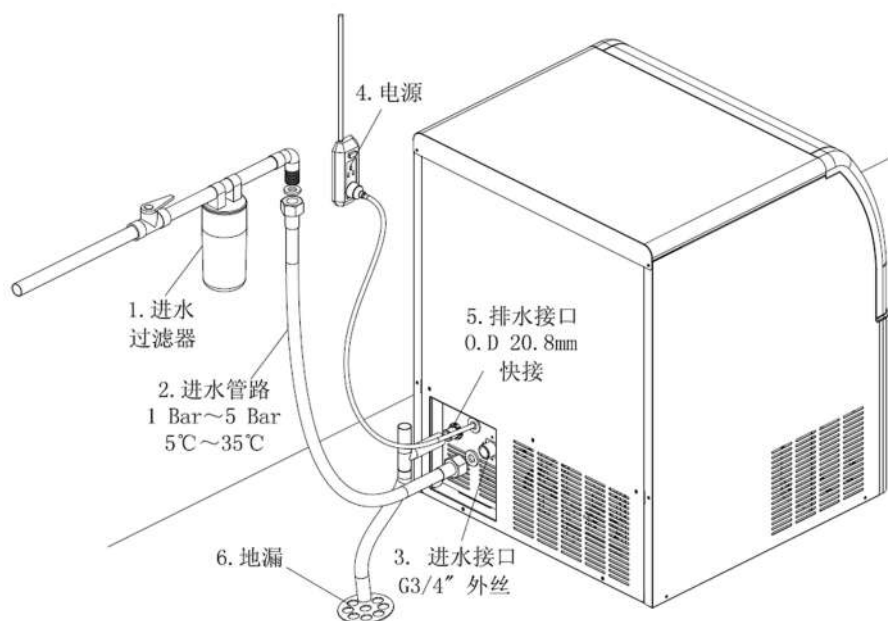
运行参数	最低	最高
环境温度	10C (50F)	40C (100F)
进水温度	5C (40F)	35C(90F)
进水水压	1 bar gauge	5 bar gauge
供电电压较铭牌波动范围	-10%	+10%

定位与水平调整

注意：

本制冰机仅为室内安装所设计，对于超出下列限定温度下产生的损失或涉及到担保索赔，将不在 Scotsman 制造商有限担保条款范围之内。

- 机器与墙壁等物的距离应在 150 mm 以上，以利于通风散热。
- 设备周围切勿遮帘堆物以免阻碍通风造成过热。附近不应有热源（炉灶，烤箱等），工作环境不可太过潮湿。
- 使用前，可将四只腿装在机器腿支座内，并调整到机器呈水平，使机器在左右及前后方向保持水平。



供水及泄水连接

选择制冰机的供水需考虑：

水质要求：纯水环境下冰厚探测器无法正常工作，含有过多矿物质的水将产生雾状冰块，并增加水系统各部分的水垢积累。

足够水压：1~5Bar，水压低于 1bar（14psi）可造成制冰机不正常工作。

您不能忽略上述三项要求，因为水在制冰中是最重要的一个因素。

供水

- 使用随机的进水管将进水电磁阀 G 3/4"阳螺纹接头同供水管接头连接起来，并在供水管和机器间易于控制处安装一个供水阀门。
- 如果当地的水含有过高的杂质，则应考虑安装适当的水过滤器/处理器。

泄水

推荐的泄水管是一根内径为 18mm（3/4"）塑料或易弯曲的管子，通向开口的下水道。

注意：
供水和泄水必需按当地规定安装，在某些情况下，需要有资质的水管工或铺设管道的许可。

注意：
铺设的泄水管应保证在 1 米的长度上至少有 3 厘米的落差。

供电连接

- 查看铭牌，按所需电流确定连接电路所使用的电线规格。
- 所有 Scotsman 制冰机需牢固接地，所有由工厂提供的 Scotsman 制冰机全部预先接好线，仅需将电源连到机器后部的接线上。
- 确保制冰机按其本身电路连接，并设有单独保险丝（查看铭牌保险丝规格）。
- 最大允许电压偏差不超过铭牌额定值的-10%到+10%。低电压可产生误动作并可对过载开关和风机绕组造成严重损害。

注意：
所有外接线应符合国家、当地标准的规定。

在连接机器（电源）前检查线路和制冰机铭牌上的电压是否一致。

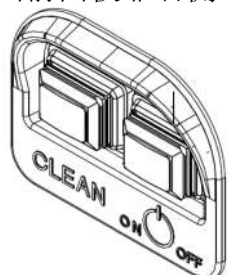
最终检查清单

- 室内和环境温度，即使在冬季也不应低于 10°C（50°F）
- 为使空气适当流通，是否在机器周围留有 15cm（6"）的空间？
- 机器是否水平（重要）？
- 所有的电气连接和水管连接是否已完成，供水阀门是否打开？
- 检查电压是否符合铭牌上的额定值？
- 检查供水，保证最小压力为 1bar（14psi）。
- 检查所有的制冷管路及线路，防止振动脱落或可能的损坏。
- 检查固定压缩机的螺栓，是否确保压缩机与垫圈紧固配合？
- 储冰箱和外壳是否已经擦拭干净？
- 用户是否有使用手册及是否被告知过定期维护和检查机器的重要性？
- 厂商的担保登记卡是否正确填好？对照铭牌检查型号及编号正确性并给工厂邮寄登记卡？
- 用户是否获得 Scotsman 授权的服务代理商的电话及公司名称？

启动

在正确安装制冰机及完成水、电管路连接后，执行下列启动程序。

- 接通电源总开关，启动制冰机。
- 接通 NU 正面前面板靠右侧电源开关。



电源开关示意图

注意：

每次断电后重新通电，机器开始运行，供水阀、化霜阀、水泵、泄水阀先运转 3 分钟，这样使新的水填入水槽，同时清洗掉停机期间所积累的一些杂质。

在清洗期间，注意查看进水通过水槽上方进水管进入水槽。

在此期间工作部件是：

- 进水电磁阀
- 化霜电磁阀
- 水泵
- 泄水电磁阀

注意：

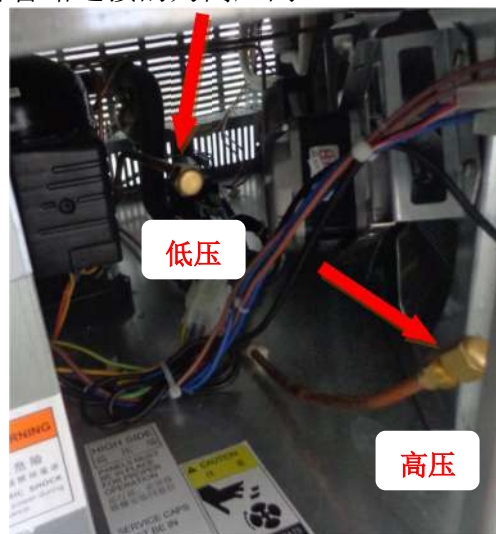
如果在注水 3 分钟内，进水管没有水注入到水槽，建议检查：

- 供水管水压必需至少 1bar (14psi)；最大 5bar(70 psi)。
- 在水管中的过滤装置可能使水压低于 1bar (14psi) 的最小值。
- 在水管中是否有进水滤网和/或进水阀的流量控制器的阻塞。

在机器清洗完成后，将自动进入制冷循环，开启压缩机，同时水箱水位进入受控状态；压缩机开启 30 秒后水泵开始工作；风扇电机（风冷型）由冷凝器温度传感器来控制。

运行检查

- a) 如需要，可在高压、低压两端接上制冷维修压力表，以检查压缩机排气和吸气压力。（与压缩机壳体焊接连接的为低压阀，与排气铜管管路连接的为高压阀）



- b) 查看蒸发器正面，查看喷水系统在正确的位置，及喷水管是否均匀地把水喷到蒸发器表面，并确保没有多余的水溅出挡冰板到储冰箱内。
- c) 制冰过程随着水均匀地流过蒸发器表面开始，制冷剂进入蒸发器蛇形管中进行热交换而使冰模逐渐冷却，在制冰过程中，冰厚传感器会控制制冰周期时间。在制冰周期工作的电子元件是：
- 压缩机
 - 水泵
 - 风扇电机（风冷型）由冷凝器温度传感器来控制。

注：

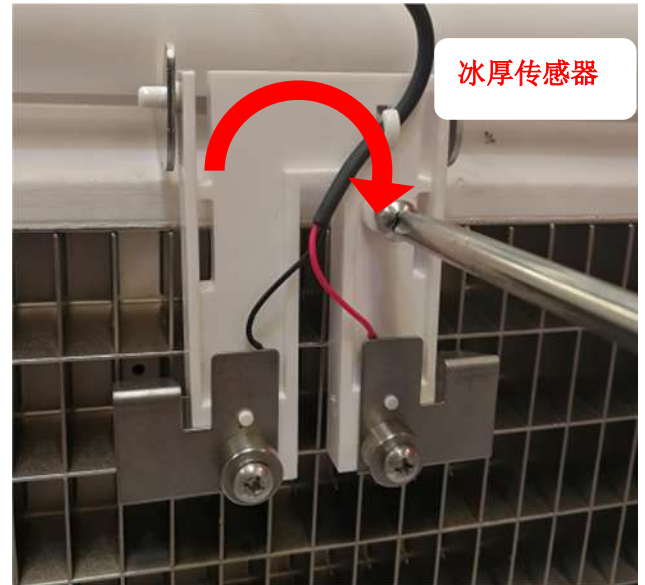
整个制冰周期的时间取决于安装在蒸发器表面的冰厚传感器接触到冰块的时间间隔。如室温低于 15℃，制冰周期将较短（约需 15~25 分钟）。如室温高于 30℃，制冰周期则较长（约需 25~40 分钟）。

- d) 制冰周期结束后，进入化霜周期。化霜周期随着化霜阀和进水阀的同时工作而开始，在化霜周期工作电子元件是：
- 压缩机
 - 化霜阀

- 水泵及泄水阀（由 PC 板控制，出厂设置为每次循环后都排水）
- 风扇电机（风冷型）由冷凝器温度传感器来控制。

注：

化霜周期长度是自动由冰满传感器和 PC 板的程序自动控制，时间长短取决于冰的要求厚度和环境条件。



注意：

在调节冰厚传感器上的螺丝时，不要调节过多，每次调节 1 圈左右；在三次循环后，如冰块的厚度仍不能达到要求，再进行下一次调节。反复几次后，可以获得满意的冰的厚度。

泄水的调节

制冰机的泄水次数可视当地水质和清洁度，进行调节。

建议：

为获得透明度较高冰块和保持水槽的清洁度，建议将泄水配置设置在 1 次制冰循环后泄水,此为出厂设置。

在化霜期间检查

泄水阀是否正确工作（如有设置泄水功能），是否把水槽中的水排出。

- e) 检查刚卸出的冰块质量，如果达不到要求，则进行调整（见调整程序）。如冰块薄并成雾状，上水不足或供水水质不好，需使用适当的水过滤器或处理器。
- f) 为了确定冰满控制器工作是否正常，在第一次化霜周期结束时，用手将挡冰板打开，做出储冰箱已满冰块已不能掉入储冰箱的现象。在 40 秒后，PC 板的显示板上冰满指示灯亮起，机器停机。然后放开手，使挡冰板复位，3 分钟制冰机重新开始制冰循环。
- g) 如果调整完毕，拆去制冷维修仪表（如有），并将先前拆下的面板装上。
- h) 按制冰机操作说明，指导用户如何清洗和维修。

制冰机的调整

冰块的厚度的调整

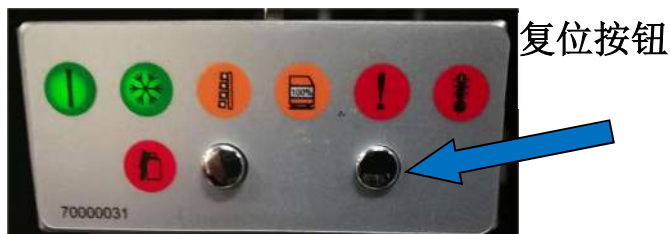
制冰机在出厂时已经到调整到最佳状态原则上不需要用户进行调节，如确实需要调节，可使用螺丝刀调节冰厚传感器上的螺丝对冰厚进行调节。顺时针方向旋转为冰块的厚度加厚；逆时针方向旋转为冰块的厚度变薄。

PC 板设置

PC 板可以做以下内容的设置:

手动复位模式

如果需要的话, 可以挥动复位按钮复位制冰机。



拨码开关设置



- #1 OFF **NW 系列专用**
ON **NU 系列专用**
- #2 OFF 无延时时间
ON 90 分钟延时
(NW1008/1408 专用)
- #3 OFF 3.5 分钟化霜时间
ON 6 分钟化霜时间
- #4 OFF 3 分钟进水时间
ON 5 分钟进水时间
- #5 OFF 在制冰周期前 4 分钟加水
ON 在制冰周期前 5 分钟加水 1 次, 三分钟后再次进水一次。
- #6 排水设置

- #6-OFF/#7-OFF 水泵工作 30 秒
- #6-ON/#7-OFF 水泵工作 6 秒,
水泵每 6 个循环工作 6 秒
- #6-OFF/#7-ON 水泵每 3 个循环工作 30 秒
- #6-ON/#7-ON 水泵每 6 个循环工作 30 秒

- #8 OFF 水温传感器无效
ON 水温传感器有效
- #9 OFF 制冰机在执行清洁程序后会停机,
需要按动清洗按钮重启制冰机
ON 制冰机在执行清洁程序后会自动重
启

拨码开关默认设置:

NW 出厂默认设置均为 OFF

NU #1 ON #8 ON

NW1008 #2 ON

NW1408 #2ON 5#ON

复位按钮功能

当制冰机在报警状态时按动复位按钮可以复位制冰机。

当制冰机在运行过程中, 按照复位按钮可以使用制冰机直接进入下一周期, 具体次序如下:

启动 - 自动清洗 - 压力平衡 - 制冰周期 - 收冰周期 - 冰满

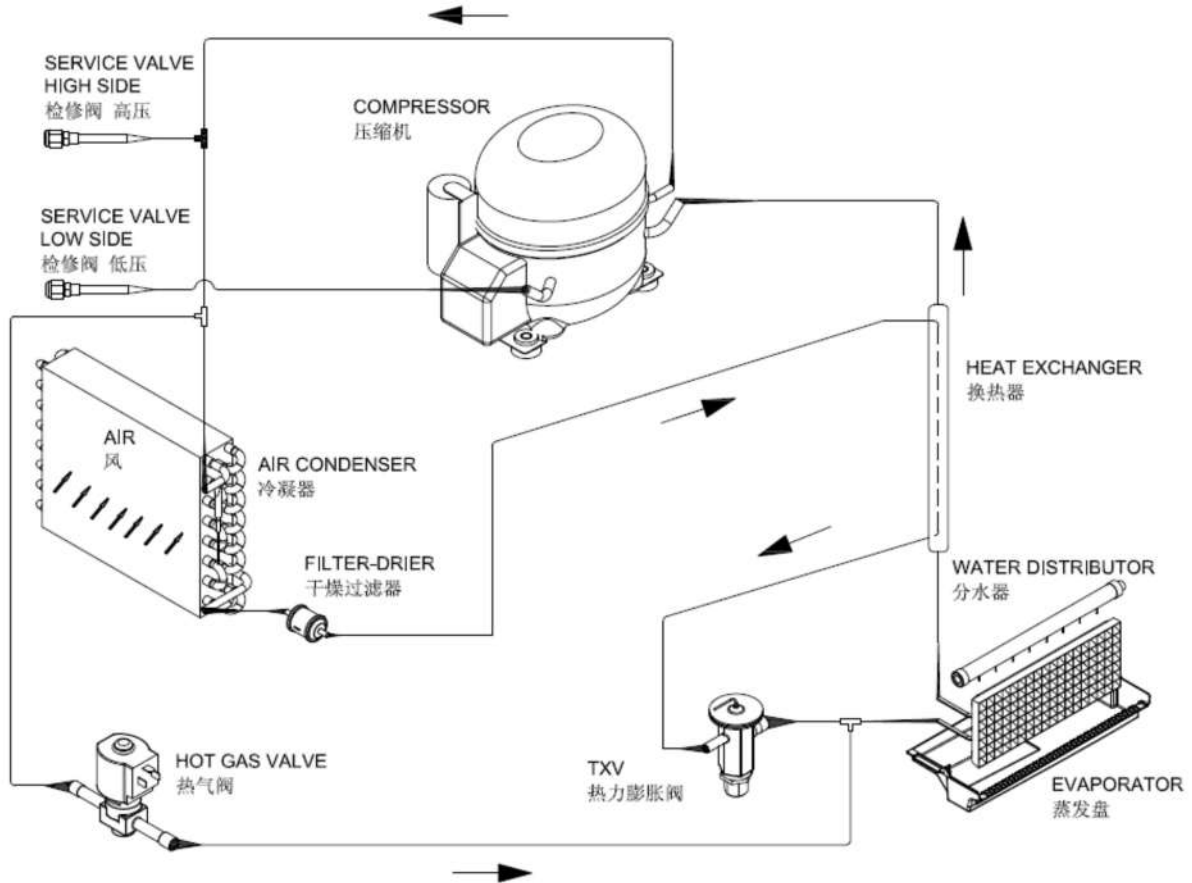
注意: 在 PC 板和显示板均复位按钮, 功能相同。

重要提示: 所有的 PC 板设置必须有

工作原理

对于 NU 制冰机，制冰所需的水是通过水泵将水注入喷水管后，通过喷水管上的小孔流出后，在蒸发器冰模表面均匀地流过，流过冰模表面的水一小部分制成冰，其它部分靠重力流到水槽，再由水泵抽出不断循环。

制冰周期



- a) 制冷剂热气体从压缩机中排出进入冷凝器，冷却后成为液体，通过干燥过滤器流入液体管路，然后流经膨胀阀，由于热交换损失了一些热量，压力和温度也降低。
- b) 接着，制冷剂进入蒸发器蛇形管路开始蒸发，并与流过冰模的水进行热交换。在热交换过程中，制冷剂大量蒸发，并完全变成蒸气。制冷剂蒸气随后流过吸气管处的热交换器（用于防止少量的液体制冷剂流入压缩机）及吸气管。在制冷剂气体被吸进压缩机并再次变成热蒸气进行循环之前，与流入膨胀阀的制冷剂（较热的）进行热交换。
- c) 制冰周期开始的前 30 秒为预冷期，在这个期间，压缩机工作，水泵不工作，风机工作（受冷凝温度传感器控制），进水阀工作（受水槽内的水位传感器控制）
- d) 整个制冷周期由冰厚传感器来控制制冰周期时间长短，当冰厚传感器探头与冰相接触时

说明冰已经到了所需的厚度，制冰周期结束。整个制冰周期时间与环境温度及冰的厚度设置有关。

注：
显示板上的制冰指示灯 OPER 绿灯在制冰开始时就会亮起。

注意：
如果在制冰周期开始后超过 40 分钟后，仍未进入化霜周期，机器会自动差别为判别为制冰超时，并自动进行化霜循环。若制冰机连续 5 次制冰超时，（制冷剂短缺，化霜阀工作不正常等原因造成），则显示板 OPER.+ ALARM 快闪，机器保护停机，用户需与售后服务商联系。

- e) 在制冷周期过程中：制冷高压端压力范围为：
 NU100: 15~26 bar (218psi~377psi)
 NU150: 15~27 bar (218psi~391psi)
 NU220: 15~26 bar (218psi~377psi)
 NU300: 15~27 bar (218psi~391psi)

f) 高压端压力由位于冷凝器上的冷凝温度传感器控制，当冷凝温度传感器高于预先设定的冷凝温度限定时，给 PC 板反馈，则 PC 板控制风机运转。

相反，当冷凝温度传感器低于预先设定的冷凝温度限定时，给 PC 板反馈，则 PC 板控制风机停机。

的挡冰板上，最终掉入储冰箱中。
注：
 开始化霜时，显示板化霜指示灯 HARVEST 常亮。

b) 当化霜周期结束时，热气阀、泄水阀(按照 PC 板配置)关闭，机器又开始新的制冰周期。

制冷剂充注量

制冷剂种类: R404A

充注量:

NU100: 310g

NU150: 350g

NU220: 360g

NU300: 420g

注意：
高温保护
 如果冷凝温度探头感知温度高于 70°C (160°F) 时，当由于保护装置启动而使机器停止，同时显示板 ALARM 慢闪，警告用户冷凝温度过高。当冷凝温度低于 70°C (160°F) 后，再次启动机器前，必须拔下电源插头，等待约 3 分钟后再插上。经过 3 分钟的注水，制冰机正常工作。
不正常原因之一如下：

- 冷凝器堵塞
- 环境温度高于 40°C (100°F)

为避免机器发生不正常工作和危险，如有上述原因之一者应立即切断机器电源。

在制冰周期开始时，制冷吸气端或低压端压力迅速降低，然后随冰的厚度增长，逐渐降低，当冰块在冰模中完全形成，压力范围为：

NU100: 4~2 bar (58psi~29psi)

NU150: 4~2 bar (58psi~29psi)

NU220: 4~2 bar (58psi~29psi)

NU300: 4~2 bar (58psi~29psi)

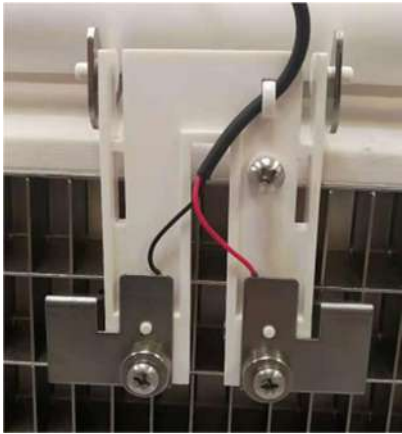
全部制冰周期时间为 15~40 分钟之间。

化霜周期

a) 在制冰机完成制冰周期后，化霜周期开始。从压缩机排出的热制冷剂气体通过化霜阀直接流入蒸发器蛇形管中。在蒸发器蛇形管中循环的制冷剂加热冰模使冰块融化，从冰盘脱落。冰块从冰模中掉出，靠重力掉在倾斜

部件说明

冰厚探测传感器



冰厚探测传感器位于蒸发器上边缘。在制冰周期期间，当冰厚传感器的探头碰到冰后，就会转化成电信号传给 PC 板。根据所接收的电信号，PC 板会对返回信号进行反馈，从而控制制冰周期的时间长短。而制冰周期总时间的长短，是由环境温度和冰块厚度来决定的，环境温度越高，冰厚设置越厚，则制冰时间愈长。

注意：
冰厚探测器依赖水的导电性可在纯水应用中失效。

冷凝温度传感器



冷凝温度传感器探头位于冷凝器上，监测冷凝器温度变化并转化成电信号传给 PC 板。

注意：
如果冷凝温度探头感知冷凝温度高于 70°C (160°F) 时，PC 板会立即停止机器工作，显示板 ALARM 常亮报警会常亮。

冰满控制器

冰满控制器分为两个部分，一部分为被安装在挡冰冰板上的磁铁；另一部是磁性传感器，安装在

蒸发器的塑料框架上。如果在 40 秒内，挡冰板没有复位到与蒸发器塑料框接触，磁性传感器未感受到磁性，则说明上次制冰周期制成的冰块已经不能落入储冰箱内，进入冰满状态，显示板冰满指示灯红灯亮起。

如果在储冰箱内冰被取出或移动后，挡冰板复位，磁性传感器感受到磁性，解除冰满状态，进入制冰循环。

注意：
若进入冰满状态 3 分钟内，解除冰满状态，则显示板 OPER 冰满指示灯快闪，3 分钟后，自动进入制冰循环。若进入冰满状态大于 3 分钟后解除冰满状态，则机器直接开机进入制冰循环。

水位传感器



水位传感器位于水槽的上部，当在注水过程中，水位到达一定的高度时，其中的磁性感应器感应到磁性，并将其转化成电信号后反馈给 PC 板，PC 板收到信号后，使进水阀断电，起到停止注水的效果。水位传感器安装在水位传感器支架上。

注意：
当认为水槽内的水位过高时，而每次进水时都会有溢流现象，则说明水位传感器无法控制进水阀。可把水位传感器位置调低，如调低后仍无法解决，则说明水位传感器失灵，需更换。

垂直式水喷淋系统

水泵把由水槽吸入的水喷出，通过食品级 PVC 管流入分水管，后经分水管上的小孔流出，均匀的流经蒸发器冰模板，从而冻结成冰块，并不断循环。

水泵

水泵在制冰周期持续工作使用水可以不断在蒸发器的冰模上流过，产生冰块。

建议：

水泵至少每隔 3 个月检查一次水泵的状况。

进水电磁阀—3/4”阳螺纹

进水电磁阀位于上下水支架上，由 PC 板控制进水，用以控制进入水槽的单位时间的水量。

化霜电磁阀

化霜电磁阀位于热气旁通管上，包括阀体和线圈两部分。在化霜和注水阶段由 PC 板控制工作。在化霜周期时，化霜阀线圈通电吸起阀体内的顶杆，使压缩机排出的热气直接流入蒸发器管路中，融化已经成型的冰块。

风机

由冷凝温度传感器经 PC 板进行控制，使冷空气通过冷凝器翅片，从而降低压缩机的排气温度。正常情况下，它仅在制冰周期间断工作，使用冷凝压力保持在两个相应的压力值之间。

压缩机

全封闭活塞式压缩机是整个制冰机的制冷系统的核心。它使制冷剂经过整个系统进行循环。它压缩低压制冷剂蒸气，使其温度和压力升高，变成高温高压的蒸气，经排气管排出到冷凝器。

泄水电磁阀

受 PC 板控制，依据 PC 板上的配置（出厂设置为每次制冰循环后泄水）开始工作 30 秒以内便将水槽中残留的含矿物盐的水排出。

高压保护开关

高压保护开关位于机器内部，当机器出现故障高压大于 33bar(462psi)时，高压保护开关会切断电源，机器会保护停机，**ALARM HI PRESS** (显示板)会常亮。只有等到高压降低到 23bar(322psi)时，自动复位后才能再次启动机器。

水温传感器

水温传感器位于水泵至冰盘的水管管路中，用来实时探测循环水的温度，并将信号传递给 PC 板。用于控制制冰周期内水泵的工作。

热力膨胀阀(TXV)

热力膨胀阀计量流入蒸发器的制冷剂的流量，将制冷剂从高压液体变成低压液体。这种压力上的降低使制冷剂冷却，冷却了的制冷剂则吸收蒸发器四周的水的热量。当蒸发器中充满了液体制冷剂时，蒸发器温度变低。

流入蒸发器的制冷剂流量由蒸发器出口的温度控制。装在蒸发器出口管顶部的膨胀阀感温包对蒸发器出口的温度很敏感，从而使膨胀阀打开或关闭。

当蒸发器上开始结冰时，温度会降低，流入蒸发器的制冷剂流量会降低，从而导致吸气压力的降低。

蒸发器在制冰周期中应溢满（充满液体制冷剂），只有满了的蒸发器才能均匀制冰（冰在整个蒸发器上形成）。一个非满液的蒸发器（没有足够的液体制冷剂）在顶部只有很少的冰形成，蒸发器的出口管道也不结霜。在制冰周期开始后约 5 分钟的时间，所有管道都应该结霜。

一个受到限制或不能适当打开的膨胀阀，会引起蒸发器内制冷剂的短缺，从而导致吸入压力比正常情况要低。充注量不足也会使蒸发器内制冷剂短缺，并引起吸气压力和排气压力的降低。如果不确定系统中的制冷剂是否充足，应该回收制冷剂，重新按正确的量充注，然后再诊断阀门是否有故障。

如果蒸发器里面的制冷剂不足，但吸气压力比正常压力还高，这说明 TXV 没有问题。如果 TXV 总是开着、或是感温包与铜管接触不良，流入蒸发器的制冷剂就会太多，液体制冷剂会溢入压缩机，吸气压力会比正常时高，这时形成的冰虽然很均匀，但机器的制冰期会变长。

现象	问题	纠正措施
蒸发器溢满，但吸气压力没有降低。检查过压压缩机，情况似乎良好。	TXV 感温包和吸气管接触不好或保温不好 TXV 感温包的	拧紧感温夹，并确认保温良好。 把感温包放置到吸气管顶部重新充制冷剂

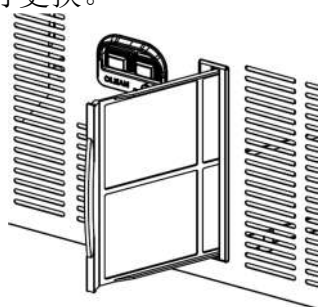
安装不正确 更换 TXV

压缩机吸气管比正常温度低。系统中的制冷剂充注量太多 TXV 一直处于打开状态

蒸发器不满，蒸发器出口管路不结霜 吸气压力低 机器制冷剂充注不足 TXV 受限制或打不开 回收制冷剂，重新按正确的量充制冷剂 更换 TXV 和干燥过滤器

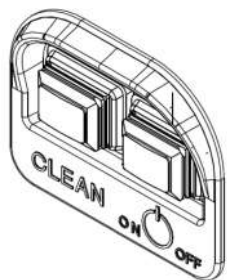
过滤网

NU 系列空气冷却制冰机，配备有进风过滤网。制冰机持续运行，部分灰尘会被过滤网吸附，降低制冰机的吸入风量，造成制冰机效率的下降，可通过每月对过滤网进行清洁以保持制冰机的高效运行。若过滤网老化损坏，可联系 Scotsman 服务部门进行更换。



过滤网示意图

前面板按钮



电源开关示意图

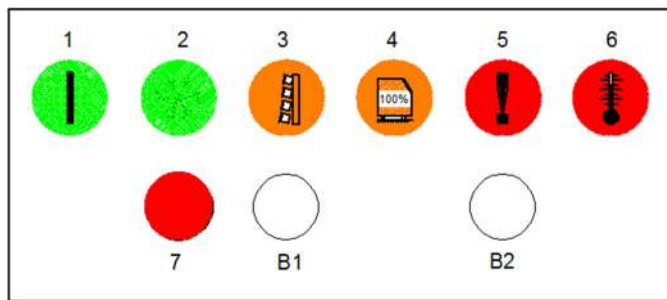
NU 正前面板有两组开关：靠右边绿色为电源开关，靠左红色为清洗开关。

电器盒

电器盒组件位于机器正面左侧底部的电器盒内，含一个进电高压变压器、一块高低压并存的 PC 板和与之相连的显示板。

控制板(如下图)是整个制冰机的大脑，它通过微处理器获得四个传感器的信号以控制制冰机的不同电器元件（如压缩机、风机、化霜阀、进水阀、泄水阀、水泵、各类传感器及保护装置）工作。

电器盒子盖板上指示灯



1—电源灯	6—高压报警灯
2—制冰灯	7—清洗灯
3—化霜灯	B1—清洗按钮
4—冰满灯	B2—MODE 按钮
5—报警灯	

Mode 按键功能

每按一下可进入下一状态，依次为：



注意：非专业维修人请勿按 MODE 键。

清洗按键功能

在初次上电前 1 分钟有效，按住清洗开关 2s 以上，则机组进入自动清洗模式。可以配合 Scotsman 专用清洗剂、护理剂对机组进行清洁消毒。

报警灯故障说明

灯	状态	故障描述
5+6	常亮	冷凝传感器故障
5+6	慢闪	水系统故障
5+6	快闪	水系统恢复
5	常亮	3 次化霜超时
5	慢闪	高温报警
6	常亮	高压报警
4+5	快闪	冰厚传感器故障
2+5	快闪	5 次制冰超时
3+5	快闪	水温传感器故障

电路图 NU100/150

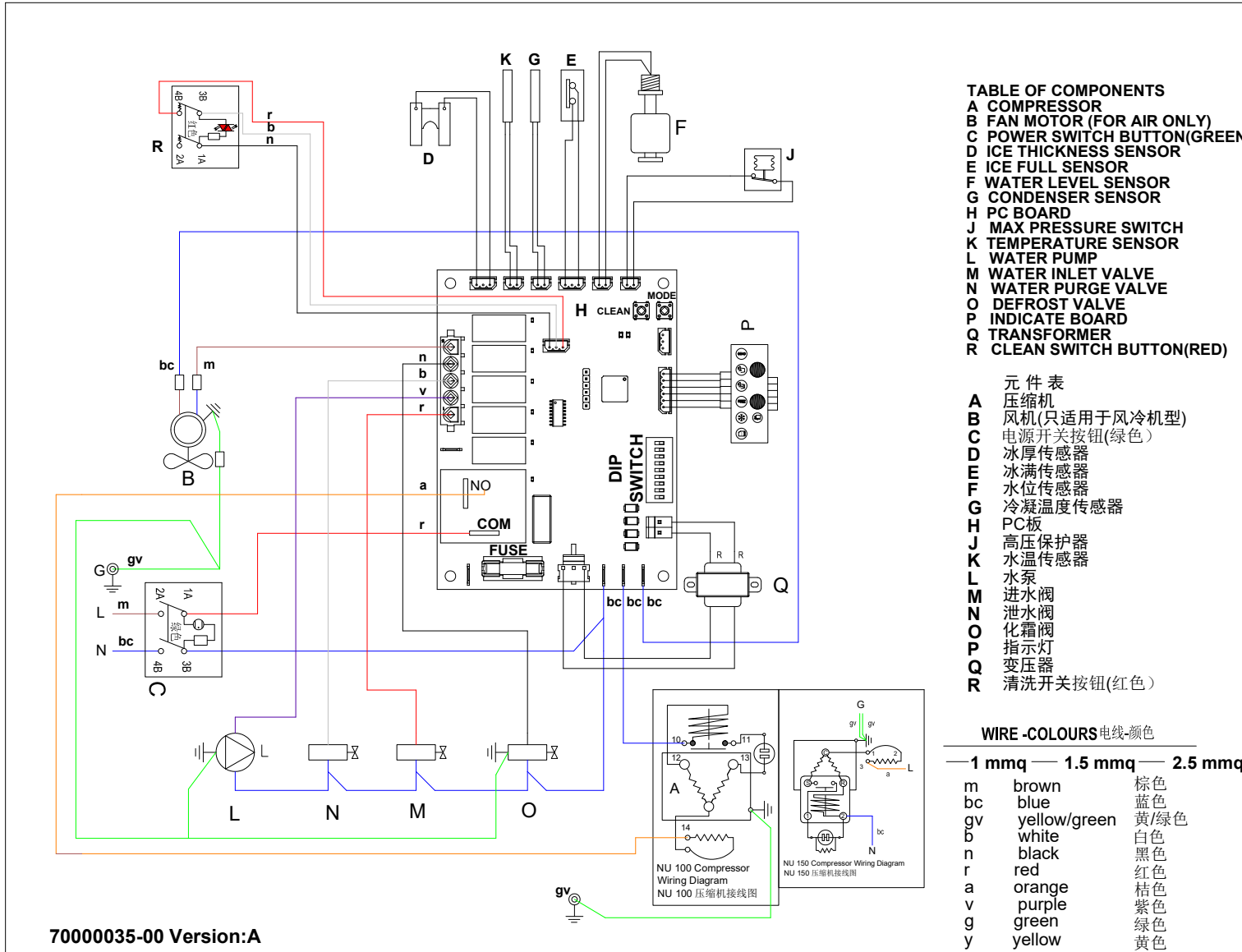


TABLE OF COMPONENTS

- A COMPRESSOR
- B FAN MOTOR (FOR AIR ONLY)
- C POWER SWITCH BUTTON(GREEN)
- D ICE THICKNESS SENSOR
- E ICE FULL SENSOR
- F WATER LEVEL SENSOR
- G CONDENSER SENSOR
- H PC BOARD
- J MAX PRESSURE SWITCH
- K TEMPERATURE SENSOR
- L WATER PUMP
- M WATER INLET VALVE
- N WATER PURGE VALVE
- O DEFROST VALVE
- P INDICATE BOARD
- Q TRANSFORMER
- R CLEAN SWITCH BUTTON(RED)

元件表

- A 压缩机
- B 风机(只适用于风冷机型)
- C 电源开关按钮(绿色)
- D 冰厚传感器
- E 冰满传感器
- F 水位传感器
- G 冷凝温度传感器
- H PC板
- J 高压保护器
- K 水温传感器
- L 水泵
- M 进水阀
- N 泄水阀
- O 化霜阀
- P 指示灯
- Q 变压器
- R 清洗开关按钮(红色)

WIRE-COLOURS 电线-颜色

1 mmq	1.5 mmq	2.5 mmq
m	brown	棕色
bc	blue	蓝色
gv	yellow/green	黄/绿色
b	white	白色
n	black	黑色
r	red	红色
a	orange	桔色
v	purple	紫色
g	green	绿色
y	yellow	黄色

7000035-00 Version:A

电路图 NU220/300

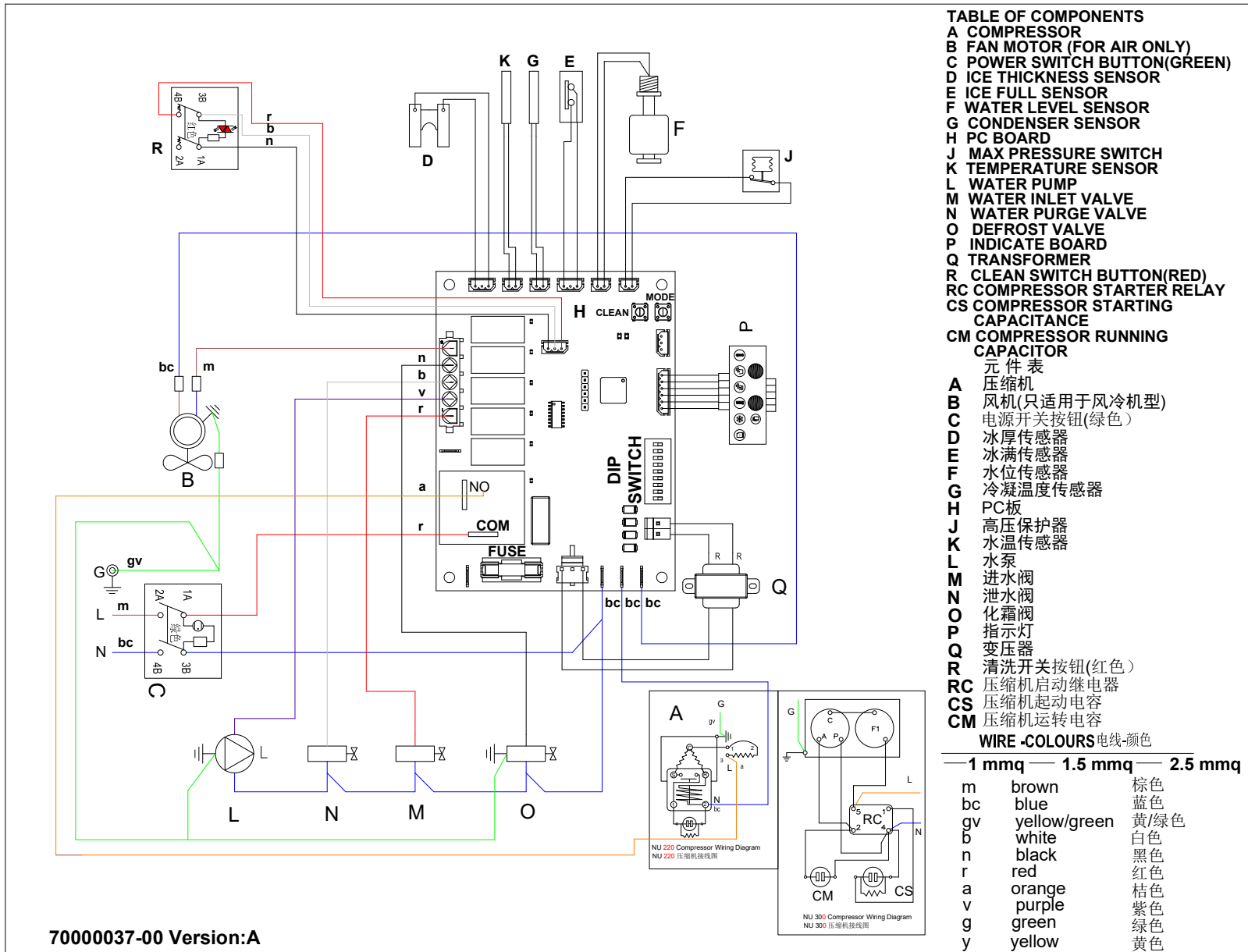


TABLE OF COMPONENTS

A COMPRESSOR
 B FAN MOTOR (FOR AIR ONLY)
 C POWER SWITCH BUTTON(GREEN)
 D ICE THICKNESS SENSOR
 E ICE FULL SENSOR
 F WATER LEVEL SENSOR
 G CONDENSER SENSOR
 H PC BOARD
 J MAX PRESSURE SWITCH
 K TEMPERATURE SENSOR
 L WATER PUMP
 M WATER INLET VALVE
 N WATER PURGE VALVE
 O DEFROST VALVE
 P INDICATE BOARD
 Q TRANSFORMER
 R CLEAN SWITCH BUTTON(RED)
 RC COMPRESSOR STARTER RELAY
 CS COMPRESSOR STARTING CAPACITANCE
 CM COMPRESSOR RUNNING CAPACITOR

元件表

A 压缩机
 B 风机(只适用于风冷机型)
 C 电源开关按钮(绿色)
 D 冰厚传感器
 E 冰满传感器
 F 水位传感器
 G 冷凝温度传感器
 H PC板
 J 高压保护器
 K 水温传感器
 L 水泵
 M 进水阀
 N 泄水阀
 O 化霜阀
 P 指示灯
 Q 变压器
 R 清洗开关按钮(红色)
 RC 压缩机启动继电器
 CS 压缩机启动电容
 CM 压缩机运转电容

WIRE -COLOURS 电线颜色

1 mmq	1.5 mmq	2.5 mmq
m	brown	棕色
bc	blue	蓝色
gv	yellow/green	黄/绿色
b	white	白色
n	black	黑色
r	red	红色
a	orange	桔色
v	purple	紫色
g	green	绿色
y	yellow	黄色

7000037-00 Version:A

问题描述与处理方法

现象	可能原因	改正建议
机器不运转	供电电源不正常	检查供电电压,若无,请检查供电线路 检查供电电压,若低,与供电公司联系
	PC 板保险线烧断	更换保险丝,如再次烧断需检查原因
	机器有过非正常停机-高温保护、高压保护等	按电器盒面板上 MODE 按钮复位,机器起动或等待 2 小时后机器自动重新起动或拔下电源插头,3 分钟后再插上,机器起动.
	在冰满状态	调整冰块在储冰箱内的位置,使挡冰板复位,机器起动
	供水不正常	参看缺水处理方法
压缩机间断工作	电压低	检查线路是否过载 检查供电电压,若低,与供电公司联系
	系统中有不冷凝气体	重新抽空加液
	压缩机启动器接线松动	检查, 或松动接好
	机械问题	更换压缩机
冰块过薄	制冰周期太短	查看冰厚传感器与蒸发盘的距离
	膨胀阀部分堵塞	检查膨胀阀, 如损坏则更换
	制冷系统内有水分	重新抽空加液
	缺水	参看缺水处理方法
	制冷剂不足	检查制冷系统漏点,重新抽空加液
雾冰	缺水	参看缺水处理方法
	供水不清洁	使用水过滤器或处理器
	杂质积累	按清洗程序清洗
	水温传感器故障	更换水温传感器
缺水	水从挡冰板处溅出	拧紧 PVC 管上的夹板螺丝,减少上水量
	进水阀未打开	检查,如损坏则更换
	水槽漏水	查找漏点并修理.如需要则更换
	进水阀堵塞	更换进水阀
	泄水阀泄漏	检查,如损坏则更换
	水温传感器故障	更换水温传感器

问题描述与处理方法 (接上页)

现象	可能原因	改正建议
冰块尺寸不正常略带雾冰	一部分分水管上小孔堵塞	清洗分水管
	缺水	参看缺水处理方法
	机器不水平	调平机器
	水温传感器故障	更换水温传感器
产冰量减少	压缩机效率低	更换压缩机
	进水阀泄漏或	检查,如损坏则更换
	机器上水管或分水管小孔堵塞	检查;如堵塞则疏通
	系统中有不冷凝气体	重新抽空加液
	通风不良	改善通风或放置制冰机至通风良好的地点
	过滤网灰尘过多	清洁过滤网, 如有需要或可更换过滤网
	膨胀阀部分堵塞	检查膨胀阀, 如损坏则更换
	化霜阀泄漏	检查,如损坏则更换
	制冷剂过量	改变充注量,缓慢释放
	制冷剂不足	按照铭牌标识,重新抽空加液
	排气压力过高或过低	查找不正确的排气压力原因
	化霜阀堵塞或未打开	检查,如损坏则更换
	机器不化霜或不出冰	PC 板工作不正常
化霜阀未打开		检查,如损坏则更换
进水阀未打开		检查,如损坏则更换
排气压力不正常	冷凝温度传感器工作不正常	检查,如损坏则更换
	制冷剂充注过量/过少, 或系统混入非制冷剂物质	检查制冷系统是否泄漏; 按照铭牌标识和 Scotsman 公司要求, 重新抽空加液;
	PC 板工作不正常	检查,如损坏则更换
机器底板积水	水系统泄漏	查找漏点并修理.如需要则更换

维护及清洗说明

概述

维护和清洗的周期和步骤是可改变的。尤其是清洗，它是根据当地水质、环境条件及冰的生产总量来决定的。每台制冰机需要按当地的特定要求进行针对性维护。

注意：

清洗需按当地水质的情况及每台制冰机的使用工作的情况改变，经常对冰块进行洁净度检查及查看在清洗前和清洗后水系统部件，将能确定当地要进行的清洗次数和程序。

制冰系统维护说明

按下列步骤进行制冰机的维护，每年至少 2 次：

- a) 在化霜周期结束时，拔掉电源插头。
- b) 检查并清洗进水滤网。
- c) 检查制冰机前后、左右水平。
- d) 用专用的制冰机清洗液清洗水系统、蒸发器、储冰箱。
- e) 在风冷式制冰机停机时，可以拆下过滤网。
- f) 检查漏水，紧固泄水管夹，把水注入储冰箱看泄水管是否畅通及清洁。
- g) 检查制冷剂泄漏。
- h) 检查冰块尺寸、状况及质地，如需要可进行调整。

水系统清理说明

清洗

- a) 在塑料容器中准备制冰机专用清洗剂。

警告：

在打开清洁剂前必须先查看清洁剂使用说明，以免造成不必要的损伤。

注意：

制冰机清洗剂带有腐蚀性，如果溅到嘴上会引起烧伤，所以勿使其喷溅。如果溅到嘴或眼上，必须马上使用大量水或牛奶进行冲洗，并应立即就医。在对外表面冲洗时，勿让儿童接近。
清洁剂存放时请远离儿童。

- b) 铲出储存在储冰箱的所有冰块以防止清洗液的污染。
- c) 用刷子沾取清洗剂溶液溶解蒸发盘冰模上的

杂质并清除水垢。

- d) 将清洗剂导入制冰机水槽内
- e) 在打开电源开关后的 1 分钟内按住前面板上的清洗开关 5 秒，机器将进入自动清洗及漂洗程序(清洗红灯闪亮),总的清洗及漂洗时间在 40 分钟左右。清洗及漂洗完毕后，清洗红灯慢速闪亮。
- f) 如果需要，还可拆除喷水管和水槽单独清洗。
- g) 在全部清洗及漂洗程序结束后,可关闭电源开关/重新打开一次，进入正常制冰循环。

消毒

在清洗结束后，可执行消毒程序。

- a) 准备一个塑料容器，用 45~50°C (113°F ~ 122°F) 的温水稀释消毒剂。

警告：

决不可将清洗剂与消毒剂混合使用。

- b) 将清洗剂导入制冰机水槽内
- c) 在打开电源开关后的 1 分钟内按住前面板上的清洗开关 5 秒，机器将进入自动清洗及漂洗程序(清洗红灯闪亮),总的清洗及漂洗时间在 40 分钟左右。清洗及漂洗完毕后，清洗红灯慢速闪亮。
- d) 在制冰和化霜周期完成后，应保证冰块质量和洁净度完好，并无任何酸味。

注意：

如果有雾状及酸味的冰块，应用热水溶化并倾倒指定安全区域，以免因为误食造成损伤。

刷洗并冲净储冰箱内表面。

注意：

应每周使用抗菌消毒剂清洗储冰箱内表面以避免积累有害细菌，并漂洗洁净。

过冬准备

重要!

冬季不使用制冰机时，请采用以下程序。如不遵照此程序，可能会导致严重损害并保修失效。

- a) 观察制冰机，如果正在制冰，等待制冰结束。
- b) 在刚开始收冰时，切断制冰机水源。
- c) 在收冰结束时，切断制冰机电源。以尽可能地排空系统中的水。
- d) 取出储冰箱内剩余的冰块。

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