Installation and operation manual for SNIGOPAD SP200/300-1SW snow fall production machine

The manufacturer reserves the right to make technical changes without prior notice

SST Engineering
Ukraine, 04080, Kyiv, str. Hvoiky, No. 15/15
tel (044) 425 79 39

PURPOSE OF EQUIPMENT

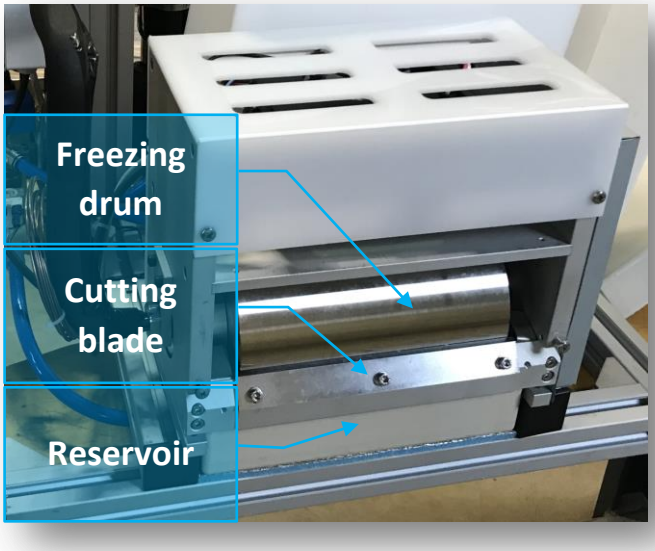
The device, control unit is intended only for the use described in this manual. No other use is allowed.

1. Operating principle

SNIGOPAD automatic **Snow Production Machine** (**SPM**) is fully prepared for quick commissioning.
The unit should be installed and fixed in the designated place then have to be connected to cold water, drainage for melt water drainage and power supply network.
For snow of good quality, it is recommended to provide sufficient ventilation.
Water is supplied to the machine via electric magnetic valves and fills the reservoir under the evaporator.
The evaporator consists of rotated freezing drum and electric motor with gearbox.
The freezing drum is constantly immersed in a reservoir. Water is frozen on the outer surface of the drum.
The evaporator includes a capillary tube with refrigerant (R452 A). Evaporation temperature range is between - 22° C and - 24° C.
The cutting blade continuously cuts a thin layer of ice from the outer wall of the evaporator. Snow goes into the discharge box and falls down.

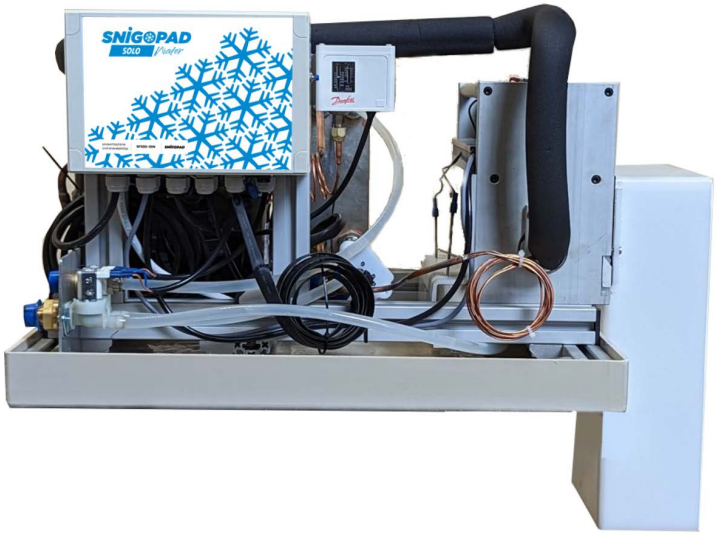
The ideal snow temperature is -10°C.
The resulting snow has an uneven crystal structure, which makes it loose. Snow does not require additional cooling and does not freeze.

The time to start snow production after starting depends on the indoor air temperature, and is about 3 minutes.



2. Technical data SNIGOPAD Solo SP300-1SW:

Snow production capability:	30-40/ 50-60 L / h
Noise level:	50 dBA (at distance 3м)
Dimensions:	600 x 600 x 450 мм
Weight (net):	~70 kg
Temperature:	+5 - +30°C



Evaporator:

1. Freezing drum unit
2. Reduction by the thermostatic expansion valve
3. Refrigerant R452A/R404A – 440/400 gr
4. Boiling point -24-30°C
5. Inlet pressure – 9 Bar
6. Outlet pressure – 1,8-2,0 Bar
7. The speed of the evaporator is about 8/15 rpm.
8. Electric drive power – 90 W

Compressor:

1. The low-temperature compressor
2. Electric power – 1.28 kW
3. Cooling – 1580 W
4. The temperature of the condensation – 54,4°C

Heat exchanger:

1. Heat exchanger with aluminum fins, copper tubes and galvanized steel body
2. Type of heat exchanger – condenser
3. Performance – 4,47 kW (for dt=15 ° C)
4. Type of coolant - water
5. Coolant temperature ≤16°C (to obtain rated performance and dry snow)
6. Nominal water consumption - 120/150 l/hour (it depends on initial setup and surrounding air temperature)

To reduce the water consumption in the cooling system, depending on the pressure in the cold water supply system and the water temperature, a flow control relay is used in the snow generator.

3. Necessary connections

Water connection:
Machine runs on normal tap or purified water
PH: 7.2 - 9.5 water
Hardness: > 14°dH (>250 mgsaco3/l): install a water softener.
< 6°dH (<100 mgsaco3/l): consult the seller
ensure water supply pressure: 2.5 - 5 bar
In supply: Pipe with an external thread 1/2"
installed filter-mud

Electrical connection:
Voltage: 1x230V 50 Hz (other voltage on request)
Supplied: Cable with plug
The customer must: Provide a separate 16 A circuit breaker and Residual Current protective Device (RCD) , or a differential circuit breaker

4. Control system/Operating algorithm

4.1 Control unit:

It contains automation for controlling the elements of the SPM.

4.2 Control panel with piezo button with a ring of color indication of the state of the SPM.

The snow production is started by pressing a button (after connecting the snow generator to the power supply network).

The backlight color indicates the state of the snow generator; namely:

-No glow – the device is disconnected from the power supply or is in sleep mode. If button haven't been pressed for a 30 minutes SPM goes to sleep mode.

When the snow generator is connected to the power supply network, the color of the indicator becomes

Green – the installation is ready for operation, but no snow is produced;
To start snow production, press the button

Blue glow flashing the initialization process is running, water is being poured;

Blue glow - snow production;

When the snow level in the tank reaches the level set for the scanner, the generator switches to the stop mode (for more details, see paragraph 3.3 of the Installation section) **White glow flashing**

White glow - pause after reaching the set snow level in the snow bowl;

Purple glow - commercial pause mode (optional);

Red glow:

- there is no water or its pressure is insufficient for the normal operation of the snow generator;

- the water in the bath is not produced due to refrigerant leakage - there is no freezing on the drum;

- the device overheated (for example, due to the supply of hot water to the cooling system instead of cold).

4.3 Snow level height scanner:

The snow level scanner turns off the snow generator when the specified snow level is exceeded and turns it on again after it is selected or thawed. The snow level scanner allows you to set the off point from 0.2 to 1.8 m. from the scanner to the top of the snow slide. When the snow generator stops, the backlight turns from blue to white until the snow generator turns on again. Setting up the scanner is described in paragraph 3.3 of the Installation section

4.4 Automatic water drain after stopping snow production:

For matters of appropriate operation of evaporator and if the machine is switched off for a long time to prevent the formation of microorganisms in the standing water of the bath under the evaporator, water is automatically drained from the bath into the condensate collection tray and then drained into the sewer system.

4.5 Commercial mode (option):

If SPM has been working for more than 2-3 hours in a row, ice may form on parts of the evaporator, which affects the normal operation of the equipment. It takes 20-30 minutes for thaw the ice. The "commercial mode controller" periodically stops the equipment for forced defrosting of the SPM. Automatic defrosting mode allows to avoid forgetfulness of personnel and ensure proper operation of the equipment. Every 2 hours of operation, the controller sets the SPM for a 20-minute pause (factory setting) and defrosts the evaporator and its parts. As pause occurs LED ring at switching panel glows yellow.

ATTENTION: "Commercial mode" is a mandatory option for SPM purchased for commercial use.

4.6 Decorative color illumination of snow.

It turns on simultaneously with the transition of the snow generator to active mode.

4.7 Water pressure monitoring:

In the absence or decrease of water pressure to the level of 0.5-0.8 Bar during snow production, the operation of the device stops, which is indicated by a red light. If there is no water when starting the device (flashing blue light), snow generation will not start until the snow drum bath is filled with water. If this does not happen within 10 minutes, the device will turn off and the backlight will turn red. To start the device after troubleshooting with water, you need to press the button twice (the first time to exit the accident mode, the second time to start snow production).

4.8 Temperature control:

Temperature control relay switches off the compressor in case of overheating. Security threshold is + 55 ° C, and when it is reduced to +45 ° C it returns to normal mode. LED indicator glows red.

5. Operational safety

CAUTION when connecting the device to a power source

It is strictly prohibited to disassemble, repair, or make changes to the device, except when serviced by authorized personnel.	**The electric plug must not be pointing upwards or pressed against the equipment** Water may seep onto the plug or damage to the plug may result in fire or electric shock.
Use a separate electrical outlet for the device If several devices are connected at once, overheating may occur, which may cause a fire.	**The device must be disconnected from the power supply during cleaning or maintenance. Do not connect / disconnect the device with wet hands** There is a danger of electric shock.
Make sure the electrical connection is properly grounded In case of insufficient grounding, there is a risk of electric shock in the event of a device malfunction or short circuit. The power supply circuit must have a circuit breaker with an RCD.	**Do not use household extension cords** Current consumption surge is possible when starting the compressor. Therefore, the supply voltage "sag" and the unstable operation of the snow generator are possible, for example, due to the small cross-section of the extension cord wires, as well as sparking and melting of the contacts.
In the event of a strange smell or smoke, immediately disconnect the device from the power supply and contact Technical support	**Wait at least 5 minutes after disconnecting the device from the power source before plugging back into the outlet** Otherwise, there is a possibility of device malfunction or breakdown.

ATTENTION !

In order to avoid uncontrolled freezing of ice on the evaporator drum, after the compressor stops, the evaporator drum continues to rotate for 30-40 seconds.

6. Preparing for installation

Choose an appropriate place for installation

Allow at least 20 cm spacing around the device. If the gap is too narrow, the performance of the device will decrease and the power consumption will increase.
Install the equipment in a place with low humidity and good ventilation. Otherwise, corrosion, electrical insulation deterioration and follow of electric shock. Install the device in a well-ventilated area.
Recommended air temperature at the place of operation of the device +15 - + 30 ° C
If the air temperature is too high or too low, malfunctions of the device and performance fault may occur or the complete cessation of snow production.

ATTENTION !

To avoid electric shock, the device must be grounded.

Use a separate, grounded electrical outlet.

With a ground terminal
When connected to a 220 VAC electrical outlet with a grounding additional grounding is not required.

If there is no ground terminal
If connected to a 220 VAC electrical outlet without a grounding terminal, grounding must be done with a separate wire, which must be connected to the grounding terminal in the control unit.

In case of insufficient grounding parameters

In places with high humidity or cases of insufficient grounding, you must additionally purchase an automatic residual current device (RCD) with a trip current of 15 mA and connect equipment through this device to an electrical outlet.

※WARNING: DO NOT USE GAS / WATER PIPES OR TELEPHONE LINE FOR GROUNDING!

7. Installation

ATTENTION!

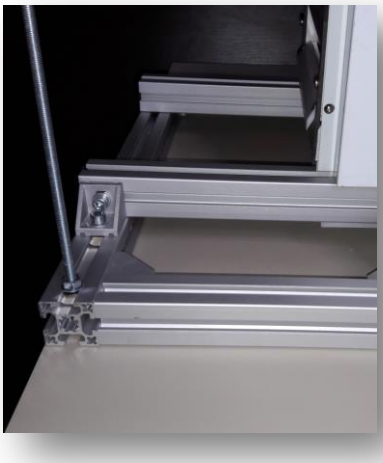
Before completing the installation, the device must be disconnected from the 220V power supply!

IMPORTANT

Align carefully horizontally. Otherwise, uneven snow production across the width of the snow outlet is possible.

There are few options to fix equipment on intended place depending on architectural and technical condition of facility.

-To use hangs for fix supporting framework of equipment to ceiling slab

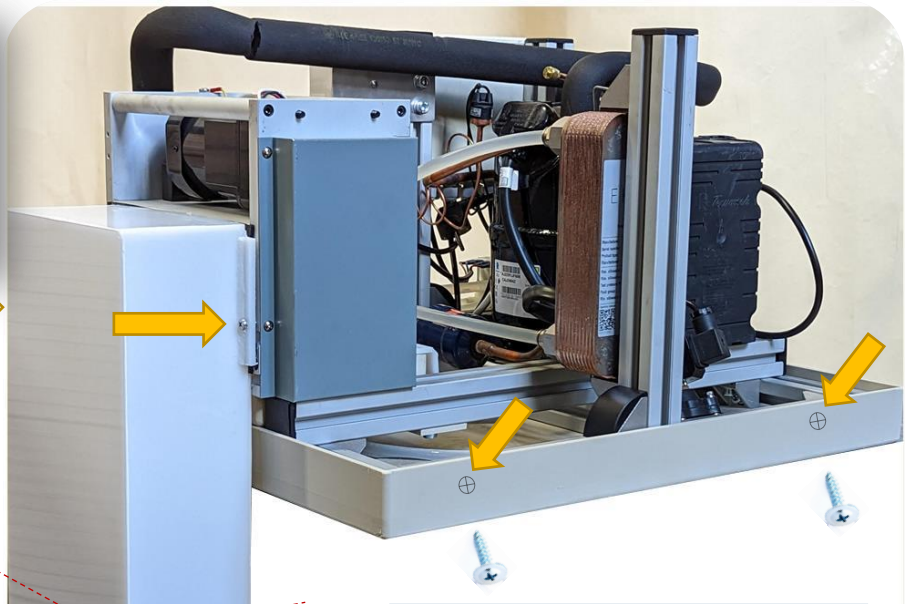


-To use wall mounted console as for an air conditioner

- To use metal structures for suspended ceiling

In advance put under the supporting framework the protective drip tray

Connect the collet with pipe for draining water from the protective drip tray to the sewer system with a 12 mm hose. The point of connection to the sewer must be below the level of the pallet to ensure the necessary slope for full without stagnation of water in the pallet discharge.



Trim the box to the required size, after finishing the snow generator housing.

Remove the snow exit box from the package (it is supplied with a standard height of 400 mm.). Cut off the excess, taking into account that the lower edge of the snow outlet should protrude at least 10 mm. from the

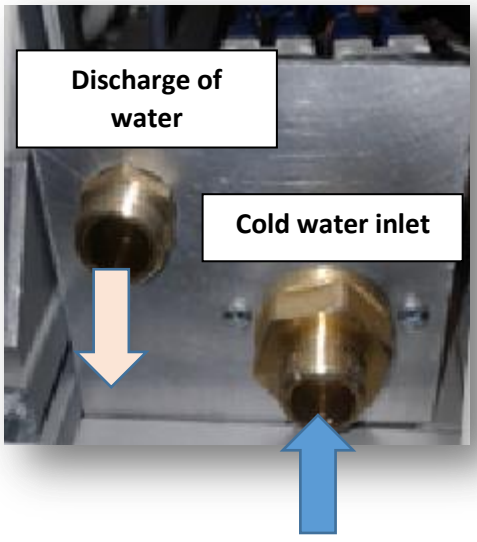
finishing ceiling to prevent water droplets (from partially melting snow) from getting on the ceiling and getting wet.

Lock it with two M5 screws to the snow drum support frame.

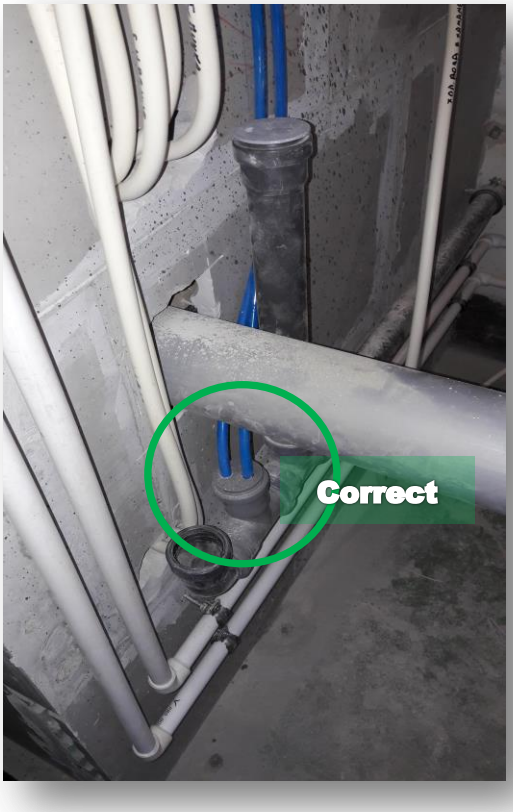
During further of the ceiling, be sure to leave a gap of 2-3 mm between the hole in the ceiling of the snow outlet box. Otherwise, the ceiling may resonate from a working snow generator. It is possible to fix the position of the box with a sealer or drops of sealant around the perimeter. It can be equipped with a decorative flange (optional)

Connect the snow generator pipe shown in the photo below to the water supply system

Do not connect together (for example, with a tee) the drains from the snow generator and the condensate collection tray! Due to the large pressure difference in the drain systems, this can lead to overflow of the condensate collection tray and leaks to the ceiling.

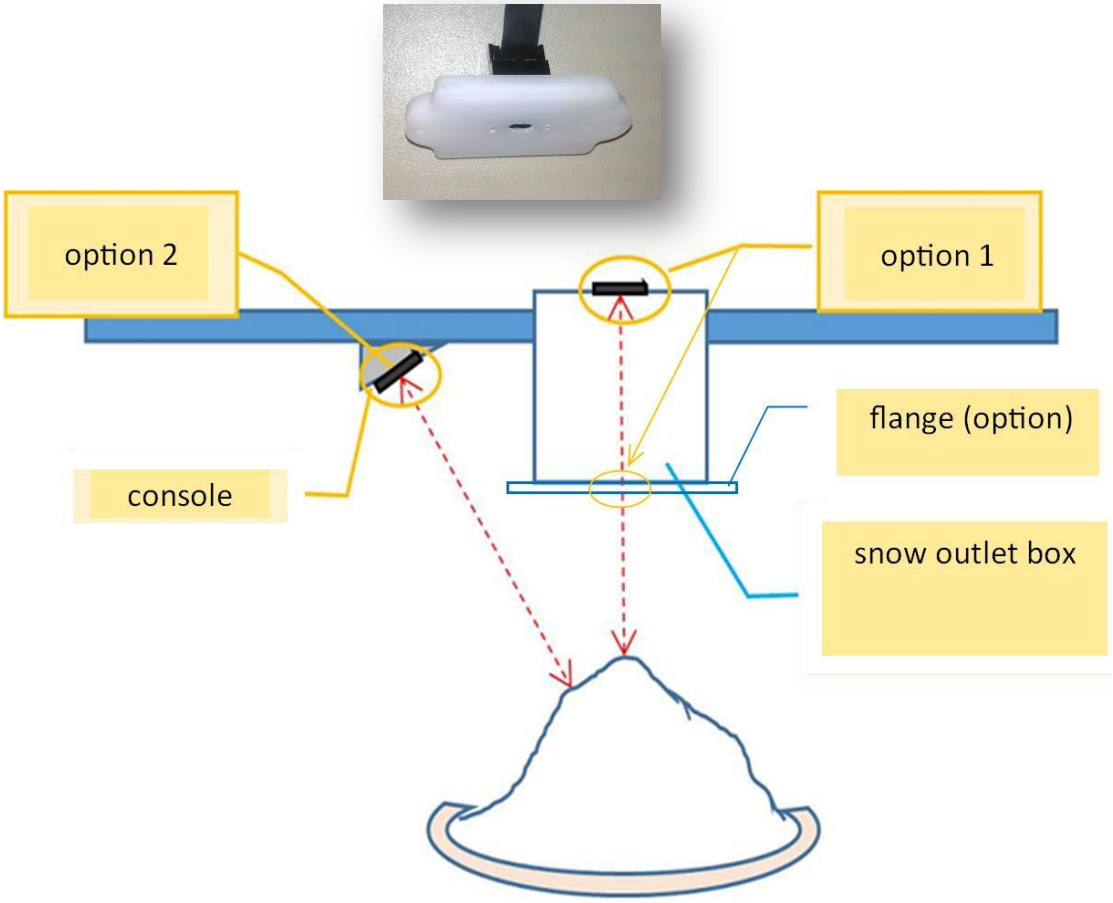


While snow making is going on the cold water running continually from discharge outlet



Connect the SPM to the power supply system and grounding using the power cord with a plug. Switching on / off of the snow production is carried out by switching panel with a piezo button with LED status indication ring . This module could be installed in any place convenient for the user on the wall.

8. Installation and adjustment of the snow height sensor (optional)

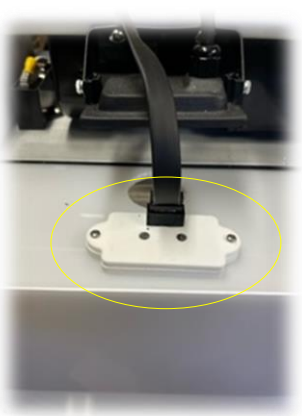


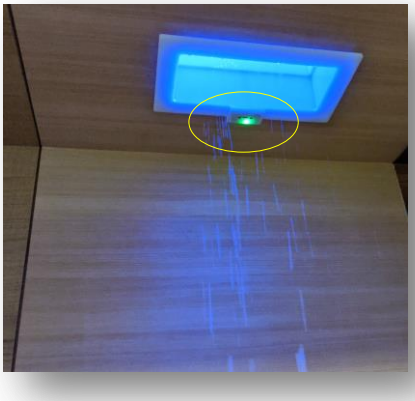
A photoelectric laser sensor with feedback is used to control the amount of poured snow and the timely suspension of its production.

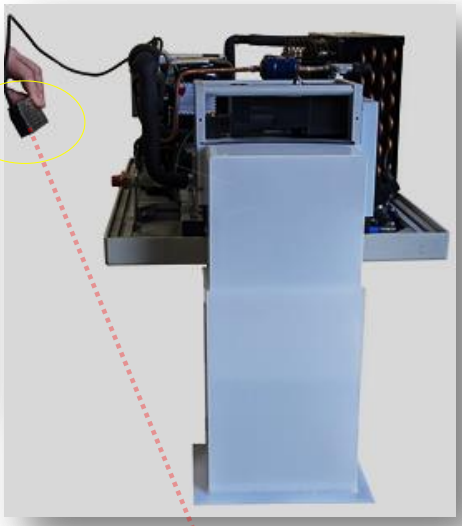
Mount the sensor on the snow box after installing the box (option 1) if it is not fixed at the factory. If flange is ordered it's suitable to install sensor at flange. Installation is possible next to the snow generator unit to settle console behind the ceiling or on the wall so that the beam falls on the snow collecting bowl (option 2)

It should be borne in mind that powdery snow does not have clearly defined reflective properties so to prevent frequent shutdowns of the snow generator when selecting snow from the bowl by hand, the snow generator is turned off when the required height of the snow slide is reached, with a delay of 20 seconds.

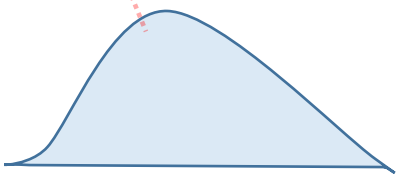
In cases where the finish design does not interfere with the placement of the scanner according to variant 2, it is preferable, since the scanner beam is reflected not from the conical part of the snow slide, but from the side surface, then the measurement accuracy increases.







Button for activation scanner adjustment



To adjust the desired snow level, do the following:

1. Prepare a white sheet of A4 paper or better sheet of plastic.

2. Turn on the mains power of the snow generator. The green backlight should light up.

3. Press the start button. The preparation of the system will begin, in particular, filling the reservoir under the evaporator with water.

4. When the backlight turns blue, it means that snow production has started.

5. Hold a piece of paper close to the snow outlet box and press the snow level set button 1 second. The scanner will record initial level value (MAX).

6. Remove the paper and let the snow generator work until the desired level is reached. Press the button on for 1 second to remember this snow level by the scanner. After 20 seconds, the snow generation will stop, the generator will first switch to the drum run-out mode, which is indicated by the flashed white color, and then the illumination will turn white, which means a pause when the snow level is reached.

7. Take away part of snow. After 20 seconds, snow generation will start again. Make sure again that the snow generator stops when the desired level is reached and starts when the snow is decreased.

8.When idle in the stop mode with the button (it is green), the device switches to sleep mode after 30 minutes. At the same time, the backlight goes out. The first press of the button will bring the snow generator out of sleep, the next one will start snow production.

9. Maintenance and hygiene

ATTENTION !

Work with electrical and refrigeration equipment have to be carried out only by specialists!

Turn off the main oower switch,
pull out the electric supply plug, close the water supply tap

For trouble-free operation:

Every 3 months
Rinse the tub under the evaporator .
Clean the condenser with a soft brush or vacuum cleaner
Check the condition of the main cutting knife and the side ice cleaners.
if necessary, sharpen the knife and side cleaners in a specialized company

Every 6 months
The condition of the evaporator bearings, chain tension, and sprockets is checked

Every 10-12 months
Check the inlet and outlet pressure of the evaporator in accordance with technical description .

For snow that meets hygiene standards:

Parts covered with lime sediment:
clean mechanically, then rinse
with lime sediment remover (replace if necessary).

10. What to do in case of malfunction

Attention! Work with electrical and refrigeration equipment should be carried out only by specialists!

IN ALL CASES, WE STRONGLY RECOMMEND CONTACTING THE TECHNICAL SUPPORT SERVICE OF TECHNOSNEG LLC

malfunction	possible cause	actions
Red glow	- there is no water or its pressure is insufficient for the normal operation of the snow generator; - the water in the reservoir is not produced due to refrigerant leakage - there is no freezing on the drum; - the device overheated (for example, due to the supply of hot water to the cooling system instead of cold).	Check water pressure: min 2.5 bar - max 5 bar Check the water filter Check temperature
SPM doesn't work	Electric power absent	Check electric power supply
The snow level scanner does not turn on/off the snow production	* The scanner is not configured correctly	adjust the desired snow level as chapter 3.3
The snow generator works, but does not produce snow: The compressor is running, the evaporator is rotating, but there is no water in the evaporator bath The performance of the snow generator is low, the snow is wet.	* Insufficient amount of refrigerant/ leakage *The heat exchanger, the water inlet valve or the throttle on the water drain is clogged * The filling valve is clogged * the water level sensor is faulty * The compressor is faulty * Water-cooled: high temperature of the supplied water (above 16°C) * The air temperature is very high (above 30°C) **The filter- dryer is clogged	Eliminate leakage, perform vacuuming, fill with refrigerant Clean or replace Check the water supply to the evaporator reservoir Call to support hotline Check/ Replace Reduce the water temperature Improve ventilation Replace filter- dryer
"crunch" or strong creaking, strong vibration	* the drive chain is loose * insufficient chain lubrication	Pull the chain Lubricate the chain
Crunch in snow drum	Evaporator bearings are faulty * Ice breaks off from the surface of the snow drum	Replace Check the temperature of the evaporator. Raise the water level in the evaporator reservoir.

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