ICE MACHINE TEMPERATURE CONTROLLER Model ICE V3 (GB) KIOUR

ATTENTION *Firmware V3*

Read carefully these instructions before installing and using this device and keep them for future reference. Attention to installation and electrical wiring. Use this device only as described in this document and never use itself as a security device. The device must be disposed of in accordance with local standards for the collection of electrical and electronic equipment.

DESCRIPTION

ICE is an ideal thermostat for sprinkling ice machine. It has two NTC/PTC sensors: one is for the evaporator temperature and the other is for the ice storage in order to terminate the production when the storage is full. It has 3 indication digits of temperature display with an accuracy of 0.5°C and 4 buttons. Three relays (for compressor 30A, water pump 10A, and defrost 10A) with NO contact, three adjustable timers in minutes for the control of the compressor/water pump and defrost relays, electrical or HOT-GAS defrost mode, OFF mode for the device and an alarm buzzer for high or low temperature. The device is mounted on a panel hole 29x71mm and it is restrained with plastic side brackets.

INDICATIONS AND BUTTONS FUNCTION

Display indications	
❄	compressor ON
◀	water pump ON
❄	defrost ON
dFr	manual defrost ON
◴	timer ON
T2	evaporator temperature
TS	ice storage temperature
⚠	alarm ON
🔧	malfunction ON

Keyboard	
↵	enter/exit the parameter's menu
SET	display the parameter's value enter parameter's value manual defrost
▲ T2	up arrow display evaporator temperature
▼ ⏻	down arrow mute buzzer ON/OFF device (check below) display ice storage temperature

For more indications regarding the alarms please see the alarm's table at page 3.

DEVICE OPERATION WITH ELECTRIC DEFROST

- During start-up, the defrost relay ❄ is activated and timer t2 starts counting. The screen displays t2 time duration, which counts backwards, while the indications ◴ and ❄ turn on. If **the evaporator temperature is lower than the set point after the defrost**, all operations and relays will be deactivated automatically and the screen will display the indication "**EEE**". The alarm is automatically deactivated after the restart of the device using the ON/OFF button or by toggling the power supply. **Manual defrost** duration is based on timer t2 and does not end based on the defrost end temperature – parameter dE5.
- When timer t2 elapses, the defrost relay is deactivated ❄ and timer t3 starts counting while the compressor ❄ and water pump ◀ relays are activated. The display shows the current evaporator temperature and the indications ❄, **T2** and ◀ light up. When the evaporator temperature reaches the set point, timer **t1** begins counting, while the compressor and water pump relay remain activated until timer **t1** elapses. The display shows time duration of timer **t1**, which counts backwards, while the indications ◴, ❄ and ◀ light up. When timer **t1** elapses, the compressor and water pump relays are deactivated, and afterwards the cycle starts again with the activation of defrost relay, etc.
- If a malfunction occurs in the cooling circuit and the **evaporator temperature does not decrease**, the aforesaid process will end based on timer **t3**. All functions and relays will be deactivated automatically and alarm "**FFF**" will be displayed. The alarm is automatically OFF by restarting the thermostat from the power supply or the ON / OFF button.
- When the ice storage temperature sensor reaches the SP2, the production will stop when the last production of ice drops on the storage and the cycle ends. On screen the indication "**FUL**" is displayed until the storage temperature reaches SP2+dF2 and the cycle resumes.

  The aforesaid cycle repeats continuously without interruption during the smooth operation of the thermostat.

  In case **of evaporator's temperature sensor failure or OFF device state**, all thermostat functions are deactivated.

  In case **of storage temperature sensor failure**, the cycle continues and does not stop because of this failure.

HOT-GAS OPERATION

Parameter **do** set the defrost function in electric or HOT-GAS mode. Only in hot-gas defrost mode (do = 1), the compressor relay works in parallel with the defrost relay, for time t2.

ADJUSTING THE ICE STORAGE SET POINT

1. Press ↵ and parameter **SP2** is displayed.
2. Press SET and its value is displayed while the arrows ▲ T2 ▼ ⏻ change its value.
3. Press SET to store the new value. Now the device is operating with the new value.

⏻ SWITCHING ON / OFF THE DEVICE

By pressing at the same time ▲ T2 and ▼ ⏻, the device switches ON/OFF.

MANUAL DEFROST

By pressing for 3 seconds the SET, manual defrost starts and ends when timer **t2** elapses**.**

PROGRAMMING A PARAMETER

ATTENTION*: to gain full access to the parameter's menu, the 5th parameter* ***Cod*** *must be adjusted to* ***22*** *(see parameter table page 2).*

1. Press ↵ to enter the parameter menu.
2. Choose the parameter you want to adjust by pressing ▼ or T2 and press SET to display its value.
3. Press ▼ or T2 to change its value and then press SET to store the new value.
4. Press ↵ to exit the parameter menu.

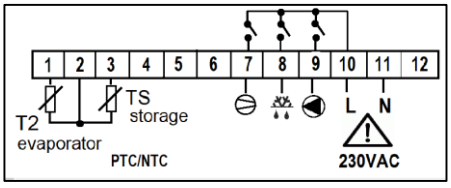
TECHNICAL SPECIFICATIONS

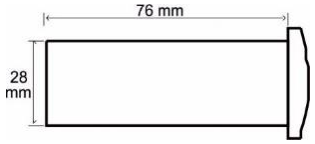
Model **ICE** power supply: 230VAC 50/60Hz / Maximum power consumption: 3W.
It is recommended using a power supply safety fuse: 0.5A (not included)
Evaporator and ice storage temperature sensors NTC 10K 1% 25°C IP68 and temperature range -50÷+110°C (-58÷+230°F) (or PTC 1K 25oC with temperature range -50 ÷ +150°C (-58÷+302°F) not included) / Accuracy: ±0.5°C
Alarm buzzer
Compressor relay 30A res. 250VAC normally open contact / Pump and defrost relays 10A res. 250VAC normally open contact / Max current load 16A
Connections: cable cross section 2.5 mm² for all relays / cable cross section from 0.25 to 1.0 mm² for the sensors
Connections with terminal blocks 18A using cable with cable cross section up to 2.5 mm² / It is recommended using a torque wrench with maximum torque 0.4Nm
Operating temperature: -15÷+55°C / Storage temperature: -20÷+80°C
Dimensions 37x79x81mm / The device is mounted on panel hole 29x71mm and restrained with plastic side brackets / Protection IP65 front
Firmware: V3

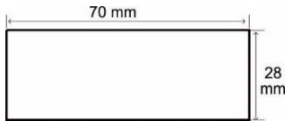
ELECTRICAL DIAGRAM - DIMENSIONS

ATTENTION*: according to safety standards, the device must be properly positioned and protected from any contact with electrical parts. The device must be fastened in such a way that it cannot be removed without the use of tools. Disconnect the main safety switch of the installation before proceeding to any maintenance. Disconnect the power supply of the device before proceeding to any maintenance. Do not place the device near heat sources, equipment containing strong magnets, in areas affected by direct sunlight or rain. Prevent electrostatic discharges and sharp objects from been inserted to the device. Separate signal cables from power supply cables to prevent electromagnetic disorders. Signal cables must never be in the same pipe with the power supply cables.* ***ATTENTION****: Read carefully the technical specifications and make sure that the working conditions are appropriate. According to safety standards, the device must be fastened in such a way that it cannot be removed without the use of tools.*

Dimensions are in mm. The device is mounted on panel hole with cut 29x71mm and restrained with plastic side brackets.







PARAMETER TABLE

No		description	min	max	ICE	UOM
1	**SP2**	ice storage SET POINT: temperature control of the ice storage	-50	+150	1	°C/°F
2	**SLo**	minimum temperature limit of SPo	-50	SHi	-20	°C/°F
3	**SHi**	maximum temperature limit of SPo	SLo	+150	8	°C/°F
4	**dF2**	differential of temperature sensor ice storage SP2	1	+150	4	°C/°F
5	**Cod**	code to enter parameter's menu Cod = 22	0	255	0	-
6	**Cr**	minimum pause time of the compressor	0	4	0	minutes
7	**dE5**	defrost's end temperature: in case of evaporator's sensor malfunction (**LF1**), defrost does not end based on the dE5 parameter but when timer **t2** elapses.	1	70	20	°C/°F
8	**dt**	(not used)	-	-	-	-
9	**SPo**	Evaporator SET POINT: temperature control of the evaporator	SLo	SHi	-12	°C/°F
10	**do**	Derfrost Mode: electrical for do = 0 or hot-gas for do = 1 (the compressor relay works in parallel with the defrost relay during the defrosting process)	0	1	0=electrical	-
11	**dr**	(not used)	-	-	-	-
12	**SEN**	Type of sensor NTC/PTC. 0 = PTC / 1 = NTC	0	1	0 = PTC	-
13	**SE1**	zero adjustment of evaporator temperature sensor	-9	+15	0	°C/°F
14	**SE2**	zero adjustment of ice storage temperature sensor	-9	+15	0	°C/°F
15	**tS**	(not used)	-	-	-	-
16	**FC**	Switch between °C/°F (0=°C, 1=°F) ATTENTION: toggling between °C/°F does not change SPo	0	1	0=°C	°C/°F
17	**t1**	countdown timer where the compressor relay remains activated as long as the evaporator reaches the desired set temperature	1	255	10	minutes
18	**t2**	countdown timre where the defrost relay remains ON	1	255	2	minutes
19	**dHL**	delay time until the activation of the alarm "AHi" and "ALo"	0	99	0	minutes
20	**t3**	maximum compressor operating time during the cooling process until it reaches the desired set point. At the end of time t3, all functions and thermostat relays are deactivated and "**FFF**" indication is displayed. The alarm is deactivated automatically by restarting the device	0	255	30	minutes
21	**ALo**	low evaporator temperature alarm	-50	+150	-30	°C/°F
22	**AHi**	high evaporator temperature alarm	-50	+150	+35	°C/°F

ALARM TABLE		
1	**LF1**	Evaporator temperature sensor failure. In this case all functions and relays are automatically deactivated.
2	**LF2**	Ice storage temperature sensor failure where the cycle continues without any interruption
3	**ALo**	Low evaporator temperature alarm
4	**AHi**	High evaporator temperature alarm
5	**FFF**	Cooling failure. All functions and relays are deactivated automatically after the end of time t3. The alarm is automatically deactivated by restarting the device.
6	**EEE**	Upon completion of the defrosting procedure, the evaporator temperature remains less than the SPo. All functions and relays are deactivated automatically. The alarm is automatically deactivated by restarting the device.
7	**FUL**	The storage is full with ice. The ice production stops until the storage sensor reaches SP2+dF2 temperature.
8	**EEr**	Error in RAM memory: rewrite the first parameter SP2 (check page 1 – adjusting the Set Point)
The alarms LF1, LF2, ALo, AHi are deactivated automatically when the cause of their activation is no longer present		

Made in Greece.

The device is under two year's guarantee. The guarantee is valid only if the manual instructions have been applied. The control and service of the device must be done by an authorized technician. The guarantee covers only the replacement or the service of the device. KIOUR PC implements a Quality Management System according to EN ISO 9001:2015 Standard with registration number 01013192. KIOUR preserves the right to adjust its products without further notice.