

Electronic digital refrigerator controller (Compact) with ON-OFF function, level water control, dfrost control (valve or resistance), fan, ON-OFF relay and buzzer ALARM.
Range -45 -+150 °C/°F.

Electronic controller **REF-FR** is a device composed of two parts, **REF-FR-SB** and **REF-FR-SP**. Designed for the refrigerator's control, it is ideal for ventilated refrigerator rooms of low temperatures with dfrost control. It is provided with 5 relays: compressor (30 A, 2 HP), fan (5A), valve or resistance (12A), level control (5A), ON-OFF relay and a buzzer ALARM.

It controls two temperatures with its two sensors in range of -45 - +150 °C/°F, while it has an **Off state**, in which all relays are off and **OFF** is displayed. Also it is provided with one input for level control (Patent No.1004976) and one input for open door. If the door opens the fan stops. After four minutes the compressor also stops and the ALARM of the open door is displayed, while the buzzer is ON.



MANAGING THE UNIT

- ↓ : By pressing ↓ the parameter's menu is displayed.
- df** : By pressing **df** for five minutes, a dfrost cycle is forced.
- T2** : By pressing **T2**, the temperature of the evaporator is displayed.
- ▼ : By pressing ▼ for 1 sec, the setup °C or °F is displayed.
- RESET** : By pressing **RESET**, the display of the ALARM and the buzzer stops.
- ⏻ : By pressing ⏻ for 3 sec, the state changes from **OFF to ON** or from **ON to OFF**.

MANAGING THE PARAMETERS

- By pressing ↓, the first parameter SPo (Set Point) is displayed and with the arrow buttons we can see the other parameters as they appear in the table below.
- By pressing **SET**, we can see the value of the parameter and with the arrow buttons we can change the value. We confirm the new value with the enter (↓), while the name of the parameter is displayed. If we press **SET**, we cancel the new value and the name of the parameter is displayed.
- To exit the parameters, we press ↓.

*NOTE: For security reasons, we can't see all the parameters. To access them all, we enter the value 22 to the **Cod** parameter.*

OPTICAL SIGNS - ALARMS

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|---|---|
| ALo : Low temperature of room | LF2 : Malfunction of the evaporator's sensor |
| AHi : High temperature of room | dor : Open door. If the door remains open for 4 minutes, the compressor stops, an ALARM is displayed and the buzzer is ON. |
| LF1 : Malfunction of the room's sensor | |

SERIAL INPUT

Via serial input the instrument is connected to the memory backup (key) or to a network.

- Memory backup (key):** With the key we save the setup of the parameters. We connect the key to the instrument and:
 - By pressing SET and the UP button, the instrument connects to the key and the message **Eo** is displayed.
 - By pressing UP button, the instrument reads the parameters from the key and the message **ro = read O.K.** or **rF = read Fail** is displayed.
 - By pressing DOWN button the instrument writes the parameters to the key and the messages **Yo = Write o.K.** or **YF = Write Fail** is displayed. The key can be connected to various types of instruments. If you try to read the parameters of a different instrument, a message **rF = read Fail** is displayed.

At all instruments and at any time we can perform the write operation. After 10 sec, the key is disconnected automatically.

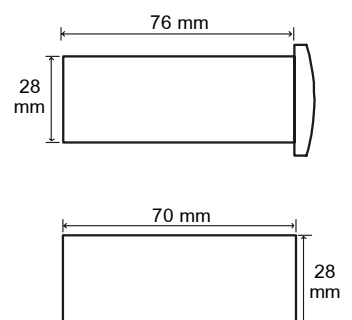
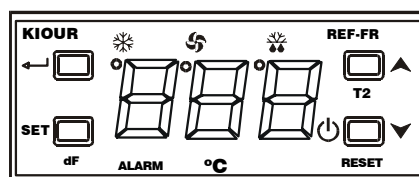
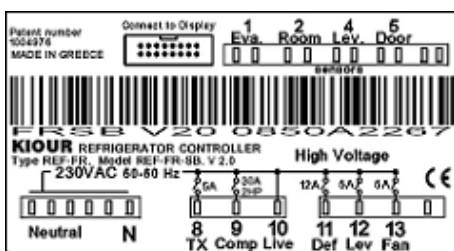
- Connect to network:** The device can be connected to the **CAMIN** net (RS485 Modbus protocol) through an interface, **NET-IN-1**. **CAMIN** is an application designed to collect information, watch and fully control a net of devices. The maximum length of the net can be 1000 meters.

TECHNICAL SPECIFICATIONS

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| <ul style="list-style-type: none"> Power supply: 12 VAC/DC Accuracy: 0.5 % ±1 digit Connection: TAB 6,3 mm (DIN46247) Security power supply: 0.5 A REF-FR-SP is mounted thought panel hole, while REF-FR-SB is mounted to the machine Relay 250 VAC 30 A Resistive Load 2 HP | <ul style="list-style-type: none"> Relay 250 VAC 5 A Resistive Load Two relays 250VAC 5 A Resistive Load Operating temperature: -10 - 60°C Storage temperature: -20 - +80°C Maximum power consumption: 3 Watt Connection for two sensors |
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ATTENTION: It is necessary to prevent electrostatic discharges at the ventilation openings. Also prevent insertion of pointed elements.

CONNECTION DIAGRAMS - DIMENSIONS



REF-FR-SM		
A/A	PARAMETERS - DESCRIPTION	
1	Spo	Set Point temperature control room, Values: LSP to HSP
2	Alo	Alarm of low temperature room, Values: -45 - +20 °C
3	Ahi	Alarm of high temperature room, Values: 0 - +60 °C
4	dr1	Repeat time of dfrost, Value: 1 - 100 hours
5	Cod	Code Number. The number 22 permits scrolling into the other parameters
6	diF	Differential working temperature of compressor, Value: 1 - +20 °C
7	dd2	dfrost duration, 0 - 120 min , in which 0 means that dfrost is OFF
8	dP3	Dripping time, 0 - 15 min and compressor's time pause after the dfrost
9	dY4	Display Operation at dfrost dY4 = -1 : If the temperature of the room is greater than Spo+dif , dFr is displayed dY4 = 0 : Temperature is displayed continually dY4 = 1-40 min : dFr is displayed from the beginning of the dfrost, until time expires
10	dE5	Temperature of dfrost: 1 - +70 °C . Sensor's malfunction of the evaporator doesn't make temperature control and dfrost finishes from expire of time.
11	dt6	dfrost's working mode, Values 0 and 1. 0 = Electrical: Compressor OFF, Resistance ON 1 = Hot GAS: Compressor ON, Resistance ON.
12	AF1	Alarm's working mode. Values 0 and 1. 0=Auto, 1=Manual. At the auto set up (0) the disappearance of the ALARM stops the buzzer etc. At the manual set up (1) , the disappearance of the ALARM does not stop the buzzer and the indication of the ALARM is displayed. In any case by pressing the down button we stop the buzzer and the indication of ALARM but the flashing line of the display of the hundreds indicates that there is still an ALARM. The RESET is valid until the disappearance of the last ALARM.
13	At2	At2 = -1 : The alarms of the room's temperature do not activate the buzzer At2 = 0 : The alarms of the room's temperature activate the buzzer immediately At2 = 1 - 120 min : The alarms of the room's temperature are activated after the time of the parameter's value expires. The ALARMS of the sensor's fault and of the open door are activated immediately.
14	Fo1	Below this evaporator's temperature, the Fan is activated after the dfrost, Values: -50 - +50 °C/°F
15	Ft2	Normal working of FAN Ft2 = -1 : The fan works continually. Ft2 = 0 : The fan starts and stops at the same time with the compressor. Ft2 = 1-15 min : The fan operates at the same time with the compressor and stops after specific time, indicated by the parameter's value.
16	Fd3	Fan working mode at dfrost Fd3 = 0 : During the dfrost, the Fan is OFF. It turns ON after the compressor is ON and if the temperature of the evaporator is lower than the parameter's value, Fo1 Fd3 = 1 : The fan is ON if the evaporator's temperature is lower than Fo1 Fd3 = 2 : The fan is ON in both types of dfrost (ELE - GAS)
17	Co1	Minimum working time of the compressor, Values: 0 - 15 min
18	CP2	Minimum stop time of the compressor, Values: 0 - 15 min
19	CF3	Working mode of the compressor with a room's sensor malfunction CF3 = -1 : The compressor stops working. CF3 = 0 : The compressor is always ON. The dfrost works according to time. CF3 = 1-150 min : The compressor works with fixed times, ON and OFF , that are defined from the parameters CF3 and CF4 . The dfrost, also, works according to time.
20	CF4	Working mode of the compressor with a room's sensor malfunction CF4 = 1-150 min. Stop time of the compressor.
21	SE1	Zero adjustment of sensor No 1. (Room), Values: -20 - +20 °C/°F
22	SE2	Zero adjustment of sensor No 2. (Evaporator), Values: -20 - +20 °C/°F
23	SEr	Doesn't work
24	LSP	Lower limit temperature of SET POINT, Values: -50 - +100 °C/°F
25	HSP	Maximum limit temperature of SET POINT, Values: -50 - +100 °C/°F
26	C_F	0 = °C ATTENTION! The changes between °C and °F do not change the value of the parameters. (ex. SET 1 = °F POINT 10 °C is 10 °F)
27	br	Baud Rate
28	trE	time respond: the respond time of the instrument, Values in mSec with default 20 mSec
29	Add	Address of instrument at the network operation, Values: 1 - 255

Guarantee of good operation: Two (2) years.

Guarantee terms. The guarantee is valid if the operating instructions are followed.

The **repairing** and the **service** of the instrument must be done by an authorized technician.

The guarantee covers only the repairing or the replacement of the instrument.