

DESCRIPTION

REF-FR-SPLIT is a freezer controller. It consists of two parts, REF-FR-SP (keyboard) and REF-FR-SB (relays). It is ideal for ventilated refrigerator rooms of low temperatures with deFrost control. A PTC sensor controls room's temperatures in range -50+ +150°C (-58+ +302°F) while a second PTC sensor applies to the evaporator. It has **five relays** (compressor, fan, defrost, door and level control – Patent No.1004976 -) and, it has an OFF mode in which all relays are OFF. It has also defrost control and a buzzer alarm. The controller has a serial input and can connect to the **KIOUR CAMIN** modbus network for full monitoring and data logging of the device.

INDICATIONS AND BUTTON OPERATIONS

Indications	
	compressor ON
	deFrost ON
	fan ON
ALARM	alarm ON

button	Operations	
	pressed once	pressed more than 3 sec
	enter parameter's menu	-
 RESET	temperature scale indication °C/°F mute buzzer reset alarm	ON/OFF device
 T2	indicate evaporator temperature	-
SET dF	cancel the new value of parameter	manual deFrost

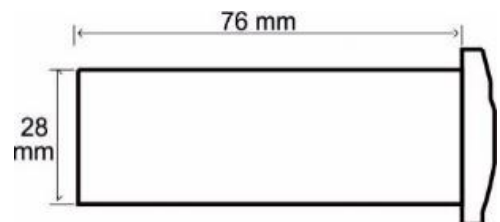
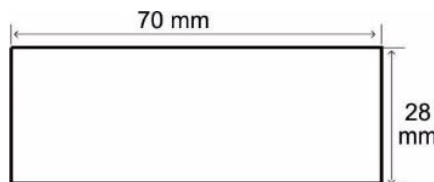
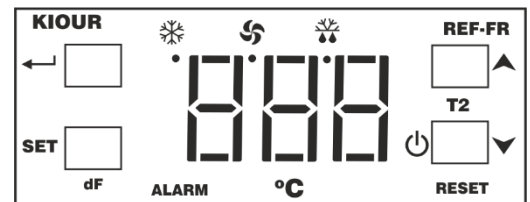
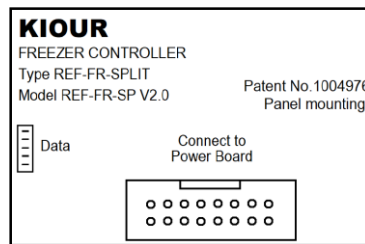
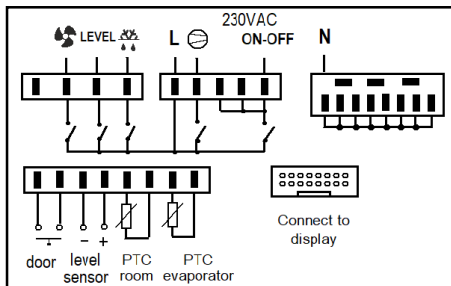
PROGRAMMING THE PARAMETERS

By pressing [←] we enter the parameter's menu.
 The first parameter "SPO" is displayed and with [▲], [▼] we scroll into the parameters with the order they appear to parameters table below.
 By pressing [SET] the value of the parameter is displayed and with the [▲], [▼] we change the value.
 By pressing [←] we **confirm** the new value and the name of the parameter is displayed.
 By pressing [SET] we **cancel** the new value and the name of the parameter is displayed.
 By pressing [←] we **exit** the parameters menu.

TECHNICAL SPECIFICATIONS

Power supply: 12VAC/DC / Maximum power consumption: 3W
 It is recommended to use a power supply safety switch: fuse 0,5A (not included)
 Cabinet's and Evaporator's temperature sensors PTC 1K 25°C / Accuracy: 0.5°C
 Relay compressor 250VAC 30A resistive load 2HP / Relays fan, defrost, ON/OFF and water level 250VAC 10A
 Operating temperature: -15+ +55°C / Storage temperature: -20+ +80°C
 REF-FR-SP mounted through panel hole 29x71mm and is restrained with two plastic side brackets / Connection with flat cable 0.5mm
 REF-FR-SB can be screwed inside the refrigeration / Connection with terminal tabs 6,3mm

CONNECTIONS - DIMENSIONS



SERIAL INPUT

REF-FR-SP can connect to the **key programmer** or to the data logger **Mini Logger** or to the **KIOUR CAMIN** network or to any **modbus network**.

- Key programmer:** controller's parameter values can be saved or retrieved from the programming key. Plug in the programming key to the controller and press at the same time [SET]+[▲]. The device connects to the key and the message "Eo" is displayed. By pressing [▲] the device downloads the parameters from the key and the message "ro" = read O.K. or "rF" = read Fail is displayed. By pressing [▼] the device uploads the parameters to the key and the message "Yo" = Write O.K. or "YF" = Write Fail is displayed. In case of failure (rF or YF) reenter the key to the serial input and repeat the procedure from the beginning. The key can connect to all KIOUR devices. If you try to read the parameters of a different device, message "rF" is displayed. At any time, we can perform the aforesaid operation. After 10sec the key is disconnected.
- Data logger Mini Logger:** the controller is connected to the data logger via cable and by programming the parameter **Add = 1**. Automatically, based on selected minutes, the data logger writes to a microSD memory card the controller's temperatures, status and alarms. **CAMIN network:** the controller can connect to the CAMIN network via an interface **NET-INS-485**. CAMIN is an PC software application designed to collect information, watch and fully control a net of KIOUR devices while sending SMS and email in case of an alarm. The maximum length of the net can be 1000 meters

PARAMETER TABLE

#		description	min	max	REF-FR-SP	UOM
1	SPo	SET POINT: temperature control of the cabinet	LSP	HSP	-21	°C/°F
2	ALo	lower alarm limit temperature of the cabinet	-50	+150	-25	°C/°F
3	AHi	higher alarm limit temperature of the cabinet	-50	+150	0	°C/°F
4	dr1	deFrost repetition time per hour	1	100	6	h
5	Cod	code to enter parameter's menu Cod = 22	0	255	0	-
6	diF	differential relay function	0.1	25	3	°C/°F
7	dd2	maximum operating time of defrost, where 0 min = no deFrost	0	120	20	min
8	dp3	dripping time and pause time of compressor after deFrost	0	15	2	min
9	dY4	deFrost is displayed, where: dY4 = -1 , dFr is displayed if the room's temperature is greater than SPo+diF. dY4 = 0 , room's temperature is displayed continuously dY4 = 1÷40 min , dFr is displayed from the beginning of the deFrost until the selected time expires	-01	40	-01	-
10	dE5	end temperature of deFrost: after failure of the evaporator's sensor(LF2), there is no control from the end temperature of deFrost and deFrost finishes based on time selected from the parameter dd2	0	100	30	°C/°F
11	dt6	Type of deFrost operation: 0 = electrical (compressor OFF, heater ON). 1 = hot gas (compressor ON, heater ON)	0	1	0	-
12	AF1	Alarms operation: 0 = auto, where the disappearance of the cause of the alarm mutes the buzzer, 1 = manual, where the indication remains after the disappearance of the cause. In each case by pressing [MUTE] we mute the buzzer and the flashing of the lower line of the hundred's display indicates that there is still an alarm. The [MUTE] of alarms is valid until the disappearance of the last alarm.	0	1	0	-
13	At2	Buzzer operation , where room's temperature alarms: -01 = do not activate it. 0 = activate it immediately. 1÷120 min = activate it after the selected minutes. For sensor and door failure alarms, do not force the above setting.	-01	120	0	min
14	Fo1	evaporator's temperature, where below Fo1 the fan is ON during deFrost	-50	+100	-2	°C/°F
15	Ft2	Fan operation , where: -01 = It operates continuously. 0 = starts and stops at the same time with the compressor. 1÷15min = operates at the same time with the compressor and stops after the selected minutes.	-01	15	-1	-
16	Fd3	Fan operation during deFrost , where: 0 = does not operate and starts when the compressor starts and if the evaporator's temperature is less than the Fo1. 1 = operates if the evaporator's temperature is less than Fo1. 2 = operates constantly in both types of deFrost, (electrical or hot gas)	0	2	0	-
17	Co1	minimum operation time of compressor	0	15	0	min
18	CP2	minimum OFF time of compressor	0	15	0	min
19	CF3	Compressor's operation when room's sensor malfunction occurs , where: -01 = does not operate. 0 =operates continuously and defrost starts to operate according to chosen time. 1÷150min = operates based on fixed ON and OFF timers which are defined by the parameters CF3 and CF4. The defrost also operates according to time.	-01	150	3	-
20	CF4	Compressor's operation when room's sensor malfunction occurs , where: 1÷150 = the compressor stops according to chosen minutes.	1	15	3	min
21	Se1	zero adjustment of cabinet sensor	-10	+15	0	°C/°F
22	Se2	zero adjustment of evaporator sensor	-10	+15	0	°C/°F
23	Ser	(not in use)	-	-	-	-
24	LSP	minimum temperature limit of SPo	-50	+150	-21	°C/°F
25	HSP	maximum temperature limit of SPo	-50	+150	-10	°C/°F
26	C_F	switch °C/°F (0=°C, 1=°F) ATTENTION: changes between °C/°F do not apply on SPo	0	1	0	°C/°F
27	br	baud rate (9600 mbps)	-	-	-	-
28	trE	time response of the device to the CAMIN network	1	100	20	msec
29	Add	address of the device in the network	0	255	1	-

ALARM TABLE

1	LF1	cabinet sensor malfunction
2	LF2	evaporator sensor malfunction
3	ALo	alarm low temperature in the cabinet
4	AHi	alarm high temperature in the cabinet
5	dor	open door alarm (if the door is open more than 4min the alarm is activated and the compressor stops)

The alarms are automatically deactivated when the cause of the alarm disappears.

Made in Greece.



ATTENTION according to safety standards, the device must be properly positioned and protected from any contact with electrical parts. All parts that provide protection must be fastened in such a way that they cannot be removed without the use of tools. **ATTENTION:** disconnect the power supply of the device before proceeding to any kind of maintenance. **ATTENTION:** do not place the device near heat sources, equipment containing strong magnets, in areas affected by direct sunlight or rain. **ATTENTION:** prevent electrostatic discharges at the side slots of the device and sharp objects from been inserted. **ATTENTION:** separate the signal's cables from the power supply's cables to prevent electromagnetic disorders. Signal cables must never be in the same pipe with the power supply cables. **Use the device only as described in this document, not to 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. Read and keep these instructions.** The device is under two year's guarantee of good operation. 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 preserves the right to adjust its products without further notice.