*ATTENTION* Firmware V2

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.

DECRIPTION

FA5R is a temperature controller for ventilated freezer rooms with deFrost control and smart defrost function. It has two temperature sensors for the cabinet and the evaporator, five relays: compressor 30A, fan 5A, deFrost 5A, lamp 5A, and auxiliary/alarm 10A; one alarm buzzer and two digital inputs for controlling the door of the room (DOOR indication) and for the protection of a person inside the room (indication MAN). Both sensors can be either NTC scale -37÷+110°C (-34÷+230°F) or PTC scale -50÷+110°C (-58÷+230°F) by adjusting a parameter. The controller via the serial input can connect either via Cloud on the CORTEX platform or via pc to the CAMIN Modbus network for full monitoring and data logging of the device.

INDICATIONS AND BUTTON OPERATIONS
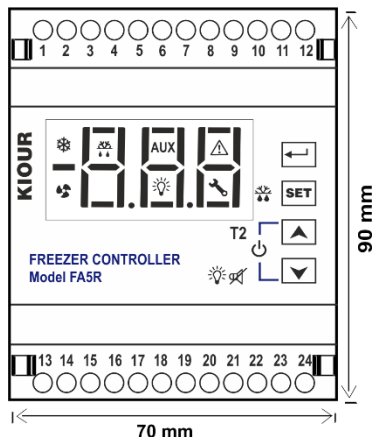
Indications	
❄	compressor ON
𝔖	fan ON
❄❄	deFrost ON
AUX	auxiliary ON
🔆	lamp ON
⚠	alarm ON
🔧	malfunction ON

Keyboard	
↵	enter parameter's menu
SET	display the value of a parameter confirm new value of a parameter manual defrost
▼	down arrow mute buzzer ON/OFF lamp of the room ON/OFF device (see below)
▲ T2	up arrow indication of the evaporator's temperature T2 OFF device (see below)

For more indications regarding the <u>alarms</u> please see the alarm's table at page 5.

ADJUSTING ROOM'S TEMPERATURE – SET POINT

1. Press ↵ to display the first parameter **SPo**.
2. Press SET to display its value. With ▲ ή ▼ change the value of **SPo**.
3. Press SET to save the new value. The cabinet is working properly with the new adjustment.

INDUSTRIAL FACTORY SETTINGS OF CABINET

1. Press ↵ to display the first parameter **SPo**. Press once ▼ and the parameter **Cod** is displayed.
2. Press SET to display its value and press ▲ to enter the value 31. <u>By pressing</u> SET we enter the value in the **Cod** parameter.
3. <u>Press</u> ↵ again to exit the parameter menu, 'YES' is displayed on the screen. All appropriate factory settings are now stored in the device.

⏻ ON/OFF DEVICE

Press for 7 seconds ▼ to activate or deactivate the device.

🔆 ON/OFF LAMP

If we select the *manual operation* of the room lamp, dLA = 0, then to turn it on or off, press for 3 seconds ▼ .
If we select the *automatic operation* of the room lamp, dLA = 1, then the lamp opens and closes based on the door switch. By setting up timer tLA, when the room door closes the lamp stays on until timer tLA elapses.

MANUAL DEFROST

Pressing for 3 seconds SET starts the manual defrost for as long as we have set the **dd2** parameter.
For more information on defrost see the description of parameter **dt6**.

PROGRAMMING A PARAMETER

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

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

TECHNICAL SPECIFICATIONS OF THE THERMOSTAT

Power supply: 230VAC 50/60Hz / Maximum power consumption: 3W
It is recommended using a power supply safety fuse: 0.5A (not included)
Two NTC/PTC temperature sensors room and evaporator coil (NTC -37÷110°C and PTC -50÷110°C) / Accuracy: 0.5°C
Two digital inputs for controlling the door of the room (**DOOR** indication) and for the protection of a person inside the room (**MAN** indication)
Buzzer / Serial input
Compressor relay NO contact 250VAC 30A resistive load / Relays Fan, defrost, lamp NO contact 250VAC 5A / Relay auxiliary SPDT NO contact 250VAC 10A
Maximum 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 sensor and door switch
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
The device is mounted on Ω rail and it is restrained with one plastic bracket / Dimensions 70x90x65mm
Firmware: V2

SERIAL INPUT

FA5R connects via serial input to the following options:

- Cloud IoT CORTEX platform: connection to the cloud and the CORTEX platform for monitoring - recording and managing the thermostat from your mobile, tablet or any computer, notifications via email and Viber SMS
- CAMIN program: local connection and monitoring - recording and management of the thermostat through the CAMIN program installed on a local computer.
- Mini Logger recorder: the thermostat can be connected to the recorder and record based on selected minutes on a microSD memory card, its temperatures and the state of the relays and alarms. It is connected via a cable to the serial input and we program the parameter Add = 1.
- Memory key: the parameter values are stored in the memory key or recorded by it in the thermostat.

SMART DEFROST

Smart defrost operates in parallel and independently from the conventional defrost. Both defrost modes can operate at the same time based on the respective settings. By enabling smart defrost, it is recommended to adjust conventional defrost to operate in safe mode - for example once every 48 hours: parameter No 22, dFr = 48. If smart defrost is not executed, then the conventional defrost will start after 48 hours from the last successful defrost. Each time a smart defrost is executed, the timer of the conventional defrost is renewed.
Smart defrost is activated from parameter No 29, dSE = 1.
It is recommended during the start-up of the temperature controller, to execute a smart defrost cycle, parameter No 30, dSb = 1.

CONNECTIONS - 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.

Dimensions are in mm. The device is mounted on Ω rail and it is restrained with one plastic bracket
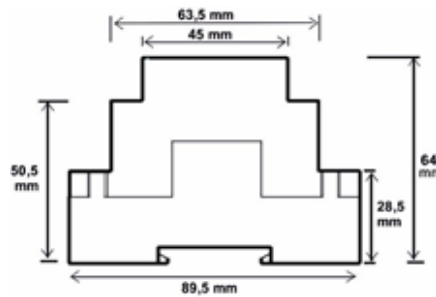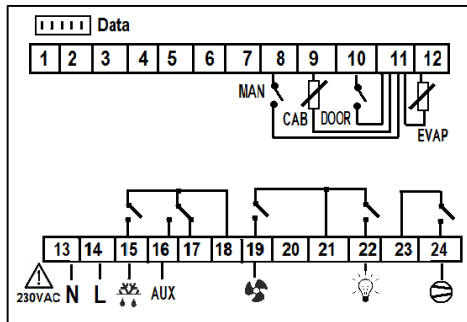
PARAMETER TABLE

No		description	min	max	FA5R	UOM
1	SPo	SET POINT: temperature control of the cabinet	LSP	HSP	-21.0	°C/°F
2	Cod	Enter password code Cod = 22 and press ⌄ to enter the other parameters	0	255	0	-
ANALOG INPUTS - TEMPERATURE						
3	diF	Differential of room temperature SPo (thermostat delay)	0.1	25.0	3.0	°C/°F
4	LSP	Lower setting limit of SPo	-50.0	+150	-21.0	°C/°F
5	HSP	Maximum setting limit of SPo	-50.0	+150	-10.0	°C/°F
6	dEC	Temperature indication as integer or decimal, where 0 = integer / 1 = decimal	0	1	1=decimal	-
7	SEn	*Sensor type NTC/PTC* 0 = PTC / 1 = NTC	0	1	1=NTC	-
8	SE1	Room sensor offset	-10.0	+10.0	0.0	°C/°F
9	SE2	Evaporator sensor offset	-10.0	+10.0	0.0	°C/°F
10	tdS	Delay in displaying the actual room temperature on the screen when the door is opened	0	255	0	min

11	oS2	*Evaporator's sensor operation* 0 = OFF sensor 1 = ON sensor When the sensor is OFF, by pressing ⬆️(T2) it is displayed "**---**". During defrosting, when the evaporator sensor is off, the defrost end temperature is the cabinet temperature.	0	1	1= activated	-
12	C_F	Temperature measurement unit: toggling between °C/°F do not adjust the SPo automatically, it must be changed by the user: 0 = °C / 1 = °F	0	1	0=°C	°C/°F

ALARMS

13	ALo	**lower alarm limit** temperature of the cabinet	-50.0	+150	-25.0	°C/°F
14	AHi	**higher alarm limit** temperature of the cabinet	-50.0	+150	0.0	°C/°F
15	At2	*Time delay in activating "AHi", "ALo" and the buzzer among them.* *This setting does not apply to sensor failure and door alarm.* -1 = OFF buzzer 0 = immediately buzzer is ON 1 to 120 min = delay in buzzer activation	-01	120	20	min
16	AF1	*Alarm setting* 0 = automatic deactivation, where the alarm stops once the cause of the alarm disappears. 1 = manual deactivation, where the alarm indication remains even if the cause of the alarm disappears and it's cleared only by pressing ▼. In any case by pressing ▼, the buzzer stops and ⚠ turns on to state that the cause of the alarm still exists. Muting the alarm buzzer by pressing ▼ once is valid until all alarms disappear.	0	1	0 = automatic	-

DIGITAL INPUT – DOOR SWITCH

17	dLd	*Door switch operation* 0 = OFF / 1 = NC (normally close contact) / 2 = NO (normally open contact) If cabinet's door is open during defrost for more than timer tdo, then defrost relay turns OFF and resumes once door is closed. Defrost duration based on timer dd2 keeps counting from the beginning of defrost.	0	2	1=ON με NC	-
18	tdo	*Time delay in deactivating the compressor once the door opens*	1	250	120	sec
19	tAd	*Time delay in activating door alarm "dor" once the door opens* If timer tAd is smaller than timer tdo, then the alarm "dor" is activated after timer tdo elapses.	0	250	0	min
20	dLA	*Adjust lamp function* 0 = manual: lamp turns on - off by holding down for 3 seconds ▼ 1 = automatic: the lamp opens and closes based on the door switch. When the door switch is OFF, the lamp is OFF.	0	1	1=automatic	-
21	tLA	Delay time in switching off the lamp once the door closes. This function is activated only if lamp function is se to automatic mode, parameter dLA.	0	60	0	min

DEFROST

22	dt6	*Type of defrost* 0 = electrical: compressor OFF, resistance ON 1 = hot gas: compressor ON, resistance ON - - - - - - - - - - - *Defrost with the evaporator's temperature sensor ON* Automatic or manual defrost ends either with time adjusted from the parameter dd2 or with defrost end temperature dE5, whatever comes first. Automatic or manual defrost does not start if the evaporator temperature is greater than the defrost end temperature dE5. *Defrost with the evaporator's temperature sensor OFF* Defrost end temperature is the room temperature. Automatic defrost ends either with time adjusted from the parameter dd2, or with defrost end temperature dE5, whatever comes first. Manual defrost starts regardless of the room's temperature and ends after time adjusted in parameter dd2 elapses.	0	1	0 = electric	-
23	dFr	*Time between two successive defrost, where dFr = 0, defrost is deactivated.*	0	100	6	hours
24	dd2	Defrost duration (manual and automatic)	1	120	30	min
25	dE5	*Defrost end temperature – evaporator temperature - sensor EVAP T2* In case of deactivated evaporator sensor, defrost end temperature is the room temperature. In case of evaporator's sensor malfunction (LF2), there is no check of defrost end temperature and defrosting is completed after timer adjusted in parameter dd2 elapses.	0.0	100	30.0	°C/°F
26	dP3	*Dripping time, where the compressor is OFF after defrost.* The fan starts based on the parameters Fd3 and Fd4.	0	15	2	26
27	dY4	*Display indication during defrost* -2 = SPo + diF value is displayed when room temperature is greater than SPo + diF -1 = "dFr" is displayed when room temperature is greater than SPo + diF 0 = room temperature is displayed 1 to 40 minutes = "dFr" is displayed from 1 to 40 minutes from the initiation of defrost	-2	40	-1	min
28	dt5	*Time delay in restraining indication "dFr" (parameter dY4=-1) or indication SET POINT + diF (parameter dY4=-2) on screen after defrost ends* Indication "dFr" disappears once room's temperature is smaller than SET POINT + diF.	0	150	0	min

SMART DEFROST – more details on page 2

29	dSE	*Smart defrost function* 0 = OFF 1 = ON	0	1	0	-
30	dSb	*A defrost cycle is executed once the device starts-up* 0 = OFF 1 = ON	0	1	1	-

31	dS2	Minimum time between two successive smart defrosts	1	255	60	min
32	dS1	Time constant: a steady increase in the constant, delays more the start of the smart defrost and increases the ice on the evaporator	1	20	3	min
33	dSt	Temperature constant: a steady increase in the constant, delays more the start of the smart defrost and increases the ice on the evaporator	0.5	5.0	1.0	°C/°F
COMPRESSOR						
34	Co1	Compressor's minimum time ON	0	15	0	min
35	CP2	Compressor's minimum time OFF	0	15	3	min
36	CF3	*Compressor's operation in case of room's sensor malfunction LF1* -1 = compressor OFF 0 = compressor ON while defrost starts based on timer dFr and ends based on timer dd2 or temperature dE5, whichever comes first. 1 to 150 min = compressor time ON while defrost starts based on timer dFr and ends based on timer dd2 or temperature dE5, whichever comes first.	-1	15	3	min
37	CF4	Compressor time OFF in case of room's sensor malfunction	1	150	3	min
FAN						
38	Ft2	*Evaporator's fan operation* -2 = continuously ON for evaporator's temperature smaller than temperature Fo1 -1 = continuously ON 0 = parallel operation to the compressor 1÷15 min = parallel operation with the compressor and when the compressor is OFF, the fan stops after the selected minutes	-2	15	-1= ON continuously	min
39	Fo1	*Evaporator's temperature controlling the fan operation during defrost and normal operation.* If the evaporator's sensor is OFF, the parameter does not operate. For more information check the parameters Ft2, Fd3 and Fd4.	-50.0	+100	-2.0	°C/°F
40	Fd3	*Evaporator's fan operation <u>during defrost the with evaporator's sensor ON (parameter oS2 = 1)</u>* 0 = OFF and starts with the compressor if the evaporator's temperature is smaller than Fo1 1 = ON when the evaporator's temperature is smaller than Fo1 2 = always ON in both types of defrost (electrical / hot gas) If the <u>evaporator's sensor is OFF</u> (parameter oS2 = 0), the fan is OFF during defrost and starts after timer Fd4 elapses.	0	2	0	-
41	Fd4	*Time delay in activating the fan after defrost ends* and only if the evaporator's temperature is smaller than temperature Fo1 (check parameter Fd3).	0	255	0	min
RELAY AUXILIARY / ALARM						
42	AU1	*Relay function AUX/ALARM* 0 = OFF 1 = ON in case of alarm - all alarms activate the relay 2 = ON parallel to the operation of the compressor 3 = pump-down operation in combination with parameter AU2 (see parameter No. 43 AU2)	0	3	0	-
43	AU2	For pump-down operation with parameter AU1 = 3: To the AUX relay we can connect the magnetic of the compressor. Once the room temperature reaches the desired SPo, the compressor remains ON, the AUX relay turns ON and the timer AU2 begins to count down. After timer AU2 elapses, both compressor relay and AUX relay turn OFF.	0	10	0	min
NETWORK - GENERAL SETTINGS						
44	Add	Device address on network	0	255	1	-
45	trE	Response time of the device on network	5	100	40	msec
46	bAU	*Baud rate: 0 = 2400 / 1 = 4800 / 2 = 9600 / 3 = 19200* Enter the new value, exit the parameter menu by pressing ⏎ and toggle the power supply of the device	0	3	3	-
47	Pro	*Cabinet's program (factory settings) is displayed – no access*	-	-	31	-
48	tPE	*Unique product number – no access*	-	-	228	-
49	SrU	*Room service*: after the end of the selected time, 'SrU' is displayed and informs that the room needs service. The thermostat continues to operate normally and its functions are not suspended. -1 = disabled function 0 to 150 weeks = remaining time to activate the 'SrU' room service notification. The countdown starts once a new value is stored. Whenever we enter the parameter, the remaining time until the activation of 'SrU' notification is displayed. To deactivate the notification, insert SrU = -1.	-1	150	-1	weeks

ALARM TABLE

1	**LF1**	Room sensor malfunction
2	**LF2**	Evaporator sensor malfunction
3	**ALo**	Low room temperature
4	**AHi**	High room temperature
5	**dor**	Open door alarm (when the cabinet's door opens, the fan stops)
6	**SOS**	Man inside the room alarm: when the button inside the cabin is pressed, all functions and remaining alarms are deactivated. The button must be reset in order to restart the thermostat.
7	**SrU**	room service notification: timer has elapsed and the cabinet needs a service (see parameter 49, SrU)
8	**EEr**	Error in memory RAM: re-enter the SPo (see ADJUSTING TEMPERATURE – SET POINT page 1)
The alarms are automatically deactivated once the cause of the alarm disappears.		

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