

ATTENTION

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

VD1TX is a temperature controller for cooling – heating applications as well as food drying applications (eg. sausages), suitable for all applications including the ones with anti-explosive standards. The room temperature is controlled with an NTC / PTC sensor (temperature range $37 \div +110^{\circ}\text{C}$). The evaporator sensor input through parameters can adjusted act as a door switch to control the room door. It has an automatic conventional defrost or smart defrost function for energy saving and better control of the defrost process. It has 3 indication digits of temperature display with an accuracy of 0.5°C and 4 buttons. It has a relay 16A 250VAC that through parameters adjusted in operation: cooling or heating or heating with countdown. It has a buzzer that activates in case of alarm. The device is mounted on a panel hole $29 \times 71\text{mm}$ and it is restrained with plastic side brackets. It can connect to the monitoring and controlling network CAMIN via serial input using an interface with MODBUS protocol

INDICATIONS AND BUTTONS FUNCTION



Display indications

	relay ON in cooling mode
	relay ON in heating mode
	defrost ON
	alarm ON
	malfunction ON

Keyboard

	enter/exit the parameter's menu
	display the parameter's value enter parameter's value manual defrost or manual heating with countdown
	up arrow
	down arrow ON/OFF device (check below)

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

ADJUSTING TEMPERATURE – SET POINT

- Press to display the first parameter **SPo**.
- Press to display its value. With or change **SPo** value.
- Press to save the new value. The device is working properly with the new adjustment.

INDUSTRIAL FACTORY SETTINGS

- Press to display **SPo**. By pressing the parameter **Cod** is displayed.
- Press to display its value and press to enter the value **31**. Press to store the value to parameter **Cod**.
- Press 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

To activate or deactivate the device, press for 3 seconds .

MANUAL DEFROST

Press for 3 seconds to start a manual defrost with duration based on the parameter **dd2**. This function also applies in case we have activated the smart defrost.

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)

- Press to enter the parameter menu.
- Choose the parameter you want to adjust by pressing or and press to display its value.
- Press or to change its value and then press to store the new value.
- Press to exit the parameter menu.

TECHNICAL SPECIFICATIONS

Power supply: 230VAC 50/60Hz / Maximum power consumption: 3W / Firmware: V3

It is recommended using a power supply safety fuse: 0.5A (not included)

Room temperature sensor, terminals 5-6, NTC 10K 1% 25°C temperature range $-37 \div +110^{\circ}\text{C}$ ($-34 \div +230^{\circ}\text{F}$) IP68 (or PTC 1K 25°C temperature range $-50 \div +110^{\circ}\text{C}$ ($-58 \div +230^{\circ}\text{F}$) not included) / Accuracy: 0.5°C

Digital door input or input for evaporator temperature sensor, terminals 4-5, NTC 10K 1% 25°C temperature range $-37 \div +110^{\circ}\text{C}$ ($-34 \div +230^{\circ}\text{F}$) IP68 (or PTC 1K 25°C temperature range $-50 \div +110^{\circ}\text{C}$ ($-58 \div +230^{\circ}\text{F}$) not included) / Accuracy: 0.5°C

Serial input 5pin connector

Anti-explosive relay 16A res. 250VAC normally open contact / Max current load 16A

Connections: cable cross section 2.5 mm^2 for all relays / cable cross section from 0.25 to 1.0 mm^2 for the sensors and door switch

Connections with terminal blocks 18A using cable with cable cross section up to 2.5 mm^2 / It is recommended using a torque wrench with maximum torque 0.4Nm

Operating temperature: $-15 \div +55^{\circ}\text{C}$ / Storage temperature: $-20 \div +80^{\circ}\text{C}$

Dimensions $70 \times 35 \times 28\text{mm}$ / The device is mounted on a panel hole $29 \times 71\text{mm}$ and it is restrained with plastic side brackets / Protection IP65 front

SERIAL INPUT

VD1TX can connect to a memory key or to data logger model Mini Logger or to CAMIN network:

- Memory key: parameter's values can be downloaded to the memory key or can be uploaded to the thermostat from the memory key.
- Mini Logger: the thermostat can connect to a data logger and store temperatures, relay status and alarms to a microSD. A cable is used to connect the data logger with the thermostat and parameter Add must be adjusted to 1.
- CAMIN network: the thermostat can connect via a network interface NET-INS-485 to the CAMIN network. CAMIN is a software application designed to collect data, monitor and fully control a network of up to 250 KIOUR thermostats using cable wiring. It can also send SMS and emails in case of an alarm. The network can be developed to a maximum length of 1000 meters.

FOOD DRYING APPLICATIONS (e.g. SAUSAGES) - HEATING MODE WITH COUNTDOWN

When the parameter **rHC = 2**, the relay operates in heating mode based on the parameter **Hod** while "SET" is displayed. By pressing  the relay is activated and the indication "rUn" is displayed. By pressing  we see successively the temperature of the second sensor, if it is activated, as well as the remaining time. When time elapses, the relay is deactivated and "End" is displayed on screen. By pressing  again, the procedure starts over. The thermostat constantly controls the relay based on the adjusted Set Point (SPo). If **SPo** changes during "rUn", automatically the control of the relay is adjusted. If timer "Hod" changes during "rUn" mode, it will not change until the next running cycle.

SMART DEFROST

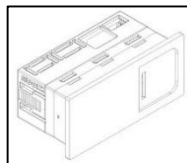
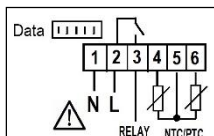
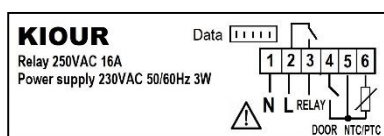
Smart defrost function: The thermostat finds the ideal operating temperature of the evaporator and if the evaporator operates at a temperature lower than the ideal temperature constant dSt than the ideal, and for a time longer than the time constant dS1, defrost begins.

Smart defrosting works in parallel and independently of conventional defrosting. It is automatic and the thermostat decides when to defrost and for how long. It is necessary to connect the evaporator sensor and set the parameter 8, SOI = 0. The two types of defrosts - smart and conventional - can operate simultaneously based on the respective settings. By enabling smart defrosting, the conventional defrost can be set to operate safely - for example one defrost every 48 hours. This time is renewed each time an automatic defrost is performed.

Activate the smart defrost from parameter 24, dSE = 1. It is recommended to start the refrigerator, to make a defrost cycle, where it is activated with parameter 25, dSb = 1. The time constants dS1 and temperature dSt are formed based on the image of the element: if we observe ice, we reduce the constants.

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



Parameter **SOI = 1**: door switch or **SOI = 0**: evaporator sensor terminals 4-5

PARAMETER TABLE

#		description	min	max	VD1TX	M.M
1	SPo	SET POINT: room temperature setting	LSP	HSP	2.0	°C/°F
2	Cod	Password in the following parameters Cod = 22	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	HSP	-2.0	°C/°F
5	HSP	Maximum setting limit of SPo	LSP	+110	8.0	°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	SOI	Set 2 nd input as NTC / PTC evaporator sensor or door switch: 0 = evaporator sensor / 1 = door switch Selecting one setting automatically turns off the alarms and features of the other setting.	0	1	1=door	-
9	SE1	Room sensor offset	-9.9	+15.5	0.0	°C/°F
10	SE2	Evaporator sensor offset	-9.9	+15.5	0.0	°C/°F
11	tdS	Delay in displaying the actual room temperature on the screen when the door is opened	0	60	0	min
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	+110	-4.0	°C/°F
14	AHi	higher alarm limit temperature of the cabinet	-50.0	+110	+15.0	°C/°F
15	At2	Time delay in activating "AHi", "ALo" and the buzzer among them. This setting does not apply to sensor failure "LF1", "LF2" and door alarm "dor".	0	99	20	min
DIGITAL INPUT - DOOR SWITCH						
16	dLd	Door switch operation 0 = OFF / 1 = NC (normally close contact) / 2 = NO (normally open contact) In heating mode the door control is deactivated	0	2	0=OFF	-

17	tdo	Time delay in deactivating the compressor once the door opens and activate the door alarm. Once the door closes, the compressor is activated and the alarm turns off.	0	99	0	min
DEFROST						
18	dFr	Time between two successive defrost, where if dFr = 0 or the relay is in heating mode, defrost is deactivated.	0	50	6	hours
19	dd2	Defrost duration (manual and automatic)	1	90	18	min
20	dE5	Defrost end temperature - room temperature - terminals sensor 5-6 The defrost shut-off temperature is the temperature of the room, regardless of whether we have connected the heat exchanger sensor. Above this room temperature the automatic defrost stops. Manual defrosting starts regardless of the room temperature and is of duration dd2. In case of fault (LF1) of the room sensor, the end of defrost temperature is not checked and is completed after the selected time dd2.	0	25.0	10.0	°C/°F
21	dY4	Display indication during defrost 0 = room temperature is displayed 1 to 40 minutes = "dFr" is displayed from 1 to 40 minutes from the initiation of defrost	0	99	20	min
22	dP3	Dripping time, where the compressor is OFF after defrost	0	10	0	min
23	tdH	Time delay in activating high temperature alarm "AHi" after defrost. The "AHi" alarm is not activated during defrost.	0	99	0	min
SMART DEFROST (more details page 2)						
24	dSE	Smart defrost function 0 = NO 1 = YES	0	1	0	-
25	dSb	Starts a defrost cycle at the start of the device 0 = NO 1 = YES	0	1	1	-
26	dS2	Minimum time between two consecutive smart defrosts	40	255	60	min
27	dS1	Time constants, the steadier the increase, the harder it is to start smart defrosting	1	20	3	min
28	dSt	Temperature constant, the higher the constant, the harder it is to start smart defrosting	0.5	3.0	1.0	°C/°F
COMPRESSOR						
29	CP2	Compressor's minimum time OFF	0	4	3	min
30	CF3	Compressor's operation in case of room's sensor malfunction LF1 and in cooling mode, the compressor operates as follows: 0 = 40% ON compressor (3 minutes ON, 4 minutes OFF) / 1 = ON constantly the compressor. In heating mode with parallel sensor malfunction (LF1), the relay switches off.	0	1	0	-
RELAY						
31	rHC	Relay operation mode, where 0 = cooling / 1 = heating / 2 = heating with countdown based on timer Hod	0	2	0=cooling	-
32	Hod	Countdown timer when the relay is in heating mode with countdown, adjust also parameter rHC = 2	1	255	1	min
NETWORK - GENERAL SETTINGS						
33	Add	Device address on network	0	255	1	-
34	trE	Response time of the device on network	5	100	40	msec
35	bAU	Baud rate: 2 = 9600	-	-	2=9600	-
36	Pro	Cabinet's program (factory settings) is displayed – no access	-	-	1	-
37	tPE	Unique product number – no access	-	-	45	-

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
6	EER	RAM error: re-enter the SPo (see Setting the device temperature - SET POINT previous page)

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

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

