



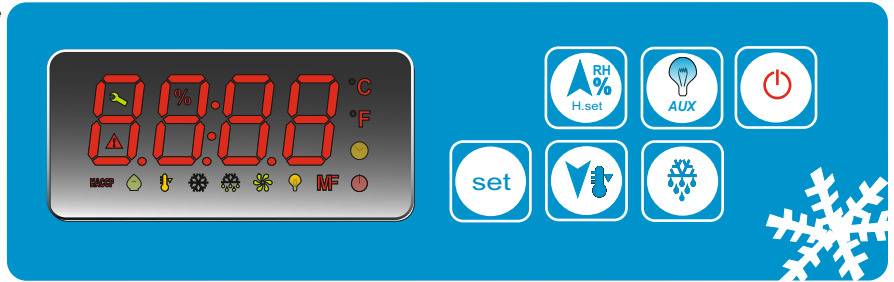
Please read this document carefully before using this product. The guarantee will be invalidated if the device is damaged by not following instructions detailed in the manual. The company shall not be responsible for any damage or losses however caused, which may be experienced as a result of the installation or use of this product.

# END003/004/214 DIGITAL THERMOSTAT

Thank you for choosing END003/004/214 Temperature Controller.



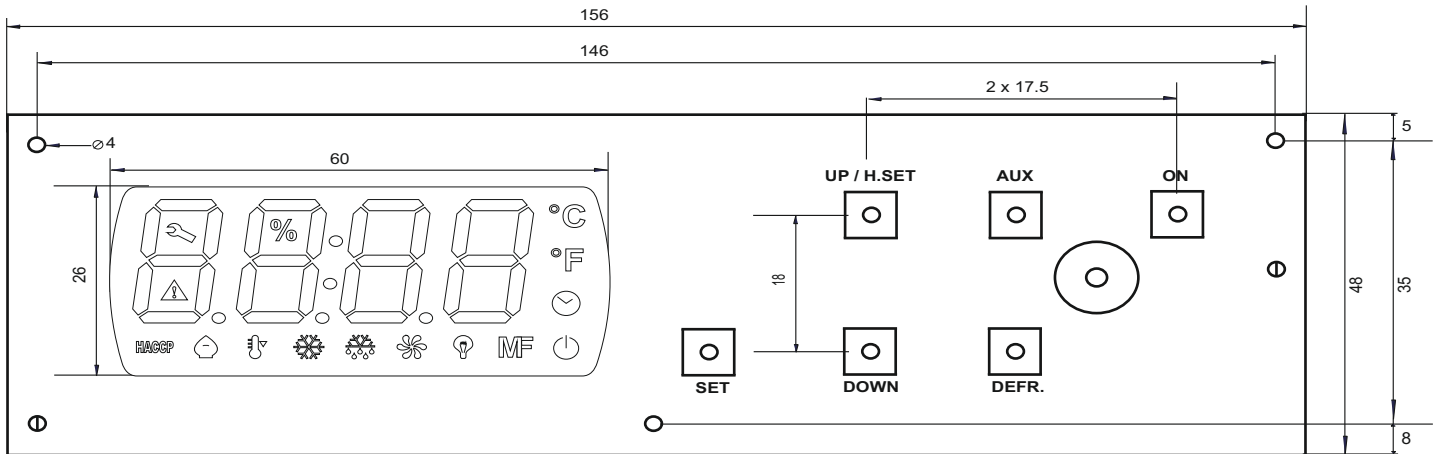
- \* ON / OFF Cooling control
- \* 4 Relay Output for Cooling, Fan, AUX, Defrost  
(In the END003 product the defrost / aux output is taken from the same place and there are 3 relay outputs)
- \* AUX Output can be set to Alarm or Lighting  
(Defrost output can not be used in END004 and END214 products.)
- \* 3 NTC Probe inputs for Cell, Evaporator and Condenser
- \* Digital Input (Door Switch)
- \* Multifunction digital input (It is only available in END214.)
- \* Offset value can be entered for NTC input
- \* Compressor protection parameters can be entered.
- \* In case of probe failure, output status can be set to ON, OFF or periodic.
- \* Manuel fast cooling feature
- \* Manuel or depending on Time and Evaporator defrost feature
- \* Defrost duration and intervals can be set.
- \* Upper and Lower setpoint limits can be set.
- \* Real Time Clock feature (It is only available in END214.)
- \* Temperature unit can be displayed as ° F or ° C .
- \* RS485 - ModBus RTU communication feature



- \* Up to 3 HACCP alarm record can be stored. (9 alarm record in END214)
- \* Android App (In Google Play™ Store : END214 Connect) (It is only available at END214.)
- \* CE marked according to European Norms.

**RoHS  
Compliant**

## DIMENSIONS



**!** Dimension unit is "mm".

## TECHNICAL FEATURES

### ENVIRONMENTAL CONDITIONS

Ambient/Storage Temp.	0 ... +50°C/-25 ... 70°C (Without icing)
Relative Humidity	80% Relative humidity for temperatures up to 31°C, decreasing linearly to 50% at 40°C.
Protection Class	EN 60529
Height	Max 2000m

**!** Do not use the device in locations subject to corrosive and flammable gasses

### ELECTRICAL CHARACTERISTIC

Supply Voltage	230V AC +%10 -%20, 50/60Hz
Power Consumption	Max 2VA
Connection	2.5 ve 1.75 mm <sup>2</sup> lik screw-terminal connection
Scale	-60.0 ... +150.0°C (-76.0 ... +302.0°F)
Sensitivity	0.1°C (Can be selected as 0.1°C or 1°C )
Accuracy	±1°C
Time Accuracy	±%1
Display	4 Digits, 60x26mm 7 Segment Led, 15 Warning Led.
EMC	EN 61326-1: 2013
Safety Requirements	EN 61010-1: 2010 (Pollution Degree 2, Overvoltage Category II)

### RELAYS

Compressor Relay Output	for Resistive load : NO 277V AC 20A , for inductive load: 2hp 250V AC Relay Life: Unload 10.000.000 switching, 277V AC 20A resistive load 100.000 switching.
Fan Relay Output	for Resistive load : NO 250V AC 8A 1/2hp 240V AC Relay Life : Unload 30.000.000 switching, 250V AC, 8A resistive load 100.000 switching
AUX Relay Output	for Resistive load : NO/NC 250V AC 8A , inductive load: 1/2hp 240V AC Relay Life: Unload 30.000.000 switching, 250V AC, 8A resistive load 100.000 switching
Defrost Relay Output (!)END003 does not exist	for Resistive load : NO/NC 250V AC 8A , inductive load: 1/2hp 240V AC Relay Life: Unload 30.000.000 switching, 250V AC, 8A resistive load 100.000 switching

### OUTPUTS

Control Type	Setpoint Control ,Compressor with digital Input ,Defrost,Output Control Of Fan.
Control Method	On-Off Control
Hysteresis	Adjustable between 0.1 ... 20.0°C.

## FRONT PANEL COMMANDS

LED	Description	LED/ BUTTON	Description
	<b>ON / OFF Led</b> - If led is on , device don't work. - If led is off , device work.		<b>Lighting Led</b> -if AUX is set as lighting and output is active, led is on. If lighting activated by digital input,led is blinking.
	<b>Compressor Led</b> - If led is on , compressor is on. - If led is blinking, then protecting delay active - If led is off , compressor is off.	<b>MF</b>	<b>Multifunction Led</b> -If AUX is set as other options (Check u1 Param) and output is active ,led is on.If output activated by digital input, led is blinking.
	<b>Defrost Led</b> - If led is on , defrost is in progress. - If led is blinking, dripping in progress. - If led is off , defrost is off.		<b>Clock Led</b> -When the time and date are set, led blinks. <i>(It is only available in END214.)</i>
	<b>Fan Led</b> - If led is on , fan is on. - If led is blinking, then protecting delay active - If led is off , fan is off.		<b>Energy Saving Led</b> -It is on when energy saving mode is active <i>(It is only available in END214.)</i>
°C	<b>Celcius Led</b> - If it is on, temperature unit is Celcius.	SET	-Show setpoint in run mode, -Show the value of the selected parameter in programming mode, confirm the value of the changed parameter.
°F	<b>Fahrenayt Led</b> - If it is on , temperature unit is Fahrenheit.	UP/H.SET	-Show and change humidification value in work mode,navigating between parameters, changing the value of a selected parameter in programming mode -Adjust low,medium and high humidity when pressed for 3 second
	<b>Overcooling Led</b> -If it is on ,overcooling progress is active.	DOWN	-Show and reset alarm values in work mode,navigating between parameters, changing the value of a selected parameter.
HACCP	<b>HACCP Alarm Led</b> - Blinks when a new alarm has occurred and turns on when the last alarm is checked. Turns off if all alarm conditions are checked.	AUX	- Controlling of AUX output in work mode, controlling of keylock with ON button. - Only use for Aux output while parameter u1 = 0,1,2 is set .
	<b>Alarm Led</b> - If it is on, there is an alarm or error condition.	DEFR	-Controlling manel defrost in work mode
	<b>Service Maintenance Led</b> - If it is on, compressor has worked more than specified set. - If it is blinking, Android mobil device connected to the END214 . <i>(It is only available in END214.)</i>	ON	-Controlling of device in work mode., -Return to work mode on configuration and other menus. -Controlling of keylock with AUX button.

### Viewing and Changing The Set Value



In operating mode (without key lock). In this state, set value is changed with UP and DOWN keys. If no operation is performed for 15 seconds or the SET key is pressed

### Switching the device on / off manually

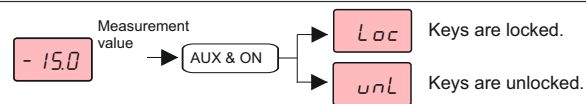
When in operation mode (no key lock), pressing the ON button for 2 seconds will turn the indicator off / on and only the power led is on / off. In sleep mode, temperature measurement and control are disabled, outputs are turned off.

### Display of Evaporator and Condenser Temperatures



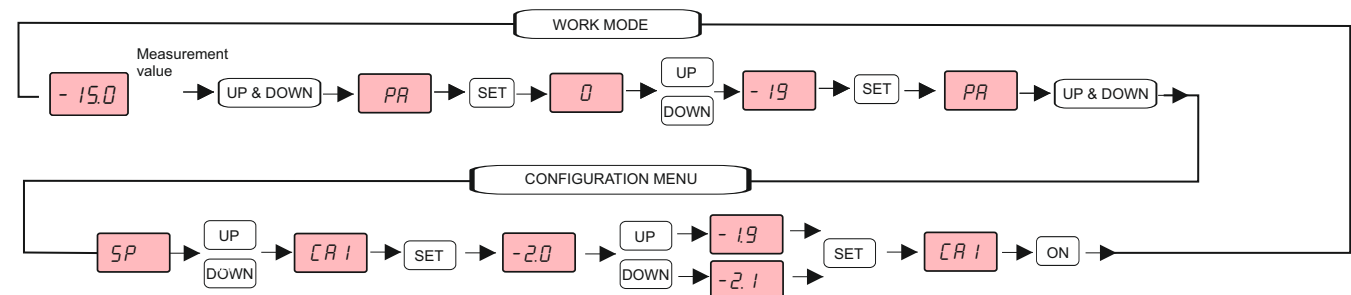
If you press the DOWN key while operating mode (no key lock), the menu that the alarm and other information shows is entered. From here, press the UP and DOWN keys and Pb2 (evaporator temperature) and Pb3 (condenser temperature) can be displayed by pressing the SET key. If no button is pressed for 60 seconds or if the ON key is pressed, the operation mode is returned.

### Locking and Unlocking Keys



If the AUX & ON buttons are pressed together for 2 seconds, the Loc message is displayed and the keys are locked. If the AUX & ON buttons are pressed again for 2 seconds while the key is locked, the unL message is displayed and the key lock is opened and the normal operation is in progress. When keys are locked, a Loc message is displayed if a key other than the SET key is pressed.

### Setting of Configuration Parameters



If the UP & DOWN keys are pressed together for 4 seconds in run mode (no key lock), the display shows the password (PA) message. Press SET button and UP and DOWN keys to set password to " -19 " and press SET button, then PA message again. Press UP & DOWN keys for 4 seconds at once to enter configuration menu. Press UP and DOWN keys to navigate through the menu and display the desired parameter message. If the SET key is pressed, the value of that parameter is displayed. The value of the parameter can be changed with UP and DOWN buttons. When the PA message is displayed and you want to return to the operating mode at any point in the operation, you must press the ON button or wait for 60 seconds without pressing any key.

### Silencing the Buzzer

When an alarm condition occurs, an audible alarm is triggered. The audible alarm can be switched off by pressing any key.

### Manuel Defrost Progress

Manual defrost operation is started by pressing and holding DEFR key for 4 seconds in the operation mode (when the key is not locked, when overcooling is not working and the evap. temperature is lower than the defrost termination temperature)..

### Manuel Overcooling

In the operating mode (when there is no key lock, the device is not in defrost mode and the dripping duration is not active), pressing DOWN key for 4 seconds starts or stops overcooling. At this time, the set value is reduced by the r5 parameter, and it operates according to the new set point set by the time set in parameter r6. During this time the defrost will not in progress.

### Humidification Operations (this function works if F0 = 5)

#### The principle of running:

In the low-scale humidification mode, the fan runs while the compressor is running. When the compressor stops, the fan stops with delay until the parameter F9 is reached.

When the compressor is running in the medium-scale humidification mode, the fan starts to run. When the compressor stops, the fan stops with a delay of the parameter F9, then the fan stops for F4 parameter time, and runs periodically for F5 parameter time.

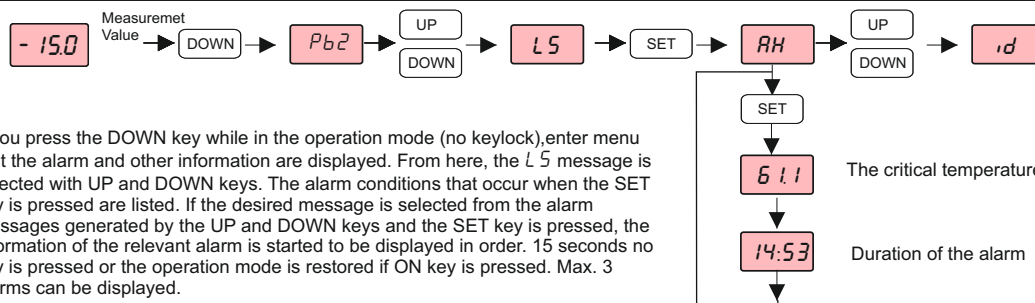
In high-scale humidification mode the fan runs continuously.



If the UP key is pressed in the run mode (without key lock), the message is displayed if the message *rhL* (low-scale humidification), *rhn* (medium-scale humidification) or *rhh* (high-humidity humidification) is valid. If no button is pressed for 3 seconds, it returns to the operation mode.

If you press and hold the Up key for 4 seconds in run mode (without key lock), the display shows *rhL* (low-scale humidification), *rhn* (medium-scale humidification), *rhh* (high-humidity humidification) messages. The desired activation can be adjusted in this way. 3 seconds no keylock are pressed or the ON key is pressed to return to the operating mode (the same operations can also be performed by changing the F6 parameter)

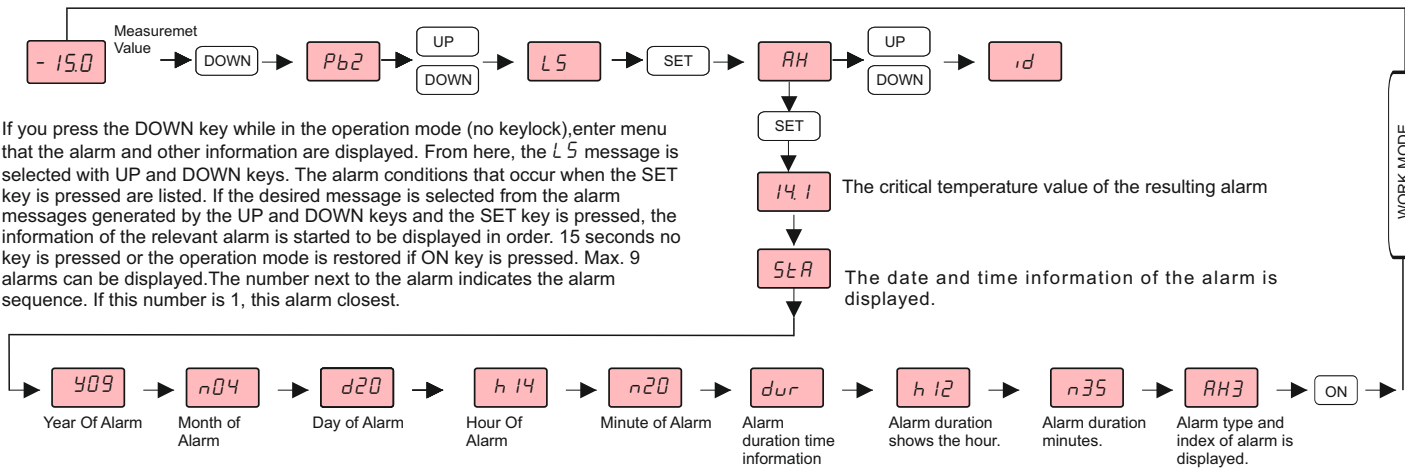
### Display of HACCP Alarms (For END003 and END004)



If you press the DOWN key while in the operation mode (no keylock), enter menu that the alarm and other information are displayed. From here, the *L5* message is selected with UP and DOWN keys. The alarm conditions that occur when the SET key is pressed are listed. If the desired message is selected from the alarm messages generated by the UP and DOWN keys and the SET key is pressed, the information of the relevant alarm is started to be displayed in order. 15 seconds no key is pressed or the operation mode is restored if ON key is pressed. Max. 3 alarms can be displayed.

The critical temperature value of the alarm  
Duration of the alarm (hour:min)

### Display of HACCP Alarms (For END214)

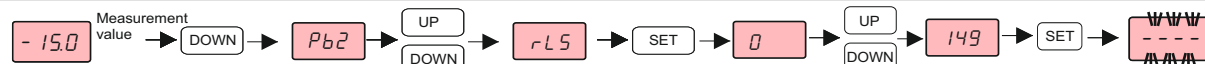


If you press the DOWN key while in the operation mode (no keylock), enter menu that the alarm and other information are displayed. From here, the *L5* message is selected with UP and DOWN keys. The alarm conditions that occur when the SET key is pressed are listed. If the desired message is selected from the alarm messages generated by the UP and DOWN keys and the SET key is pressed, the information of the relevant alarm is started to be displayed in order. 15 seconds no key is pressed or the operation mode is restored if ON key is pressed. Max. 9 alarms can be displayed. The number next to the alarm indicates the alarm sequence. If this number is 1, this alarm closest.

The critical temperature value of the resulting alarm  
The date and time information of the alarm is displayed.

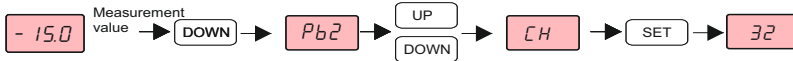
WORK MODE

### Resetting Alarms



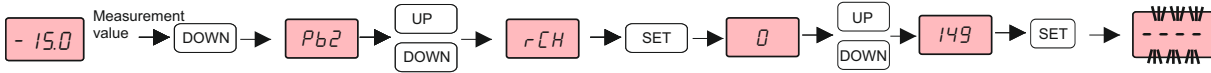
If you press the DOWN key while in the operation mode (no key lock), enter menu that the alarm and other information are displayed. From here, the *rLS* message is selected with the UP and DOWN keys. When the SET key is pressed and the UP and DOWN keys are set to "149" password and the SET key is pressed, the message --- is displayed and the alarm statuses are reset and returned to the operation mode. When the *rLS* message is displayed and you want to return to the operating mode at any point in the operation, you must press the ON or dont operation for 15 seconds. When the alarms are reset, if there is an alarm running in the current state, the alarm status is canceled by starting from the beginning.

### Display of Compressor Run Time



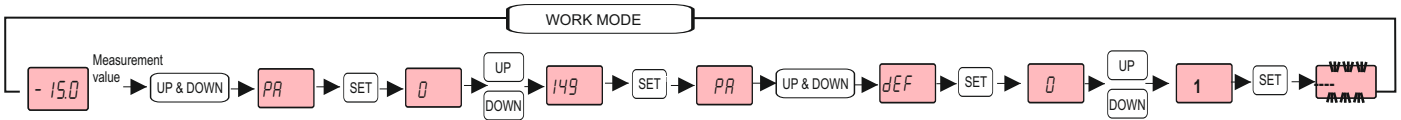
If the DOWN key is pressed, enter menu that the alarm and other information are displayed. The UP and DOWN keys are used to select the CH message. Pressing the SET key will display the running time of the compressor. When the CH message is displayed and you want to return to the operating mode at any point in the operation, you must press the ON or wait for 15 seconds without pressing any key at any point in the operation. The compressor run time can be stored up to 9999 hours.

### Reset of Compressor Run Time



If the DOWN key is pressed during operation mode (no keylock), enter menu that the alarm and other information are displayed. From here, the rCH message is selected with the UP and DOWN keys. Pressing the SET key and pressing the SET key with the UP and DOWN keys adjusts the password to "149" and the message WWWW is displayed and the compressor operation time is reset and the operation mode is reset. When the rCH message is displayed and you want to return to the operating mode at any point in the operation, you must press the ON or wait for 15 seconds without pressing any key at any point in the operation.

### Restore Factory Settings



Press and hold the UP & DOWN keys together for 4 seconds in run mode (no key lock), the display shows the password (PR) message. Press SET key and UP and DOWN keys to set password to "149" and press SET key, then PR message again. Press and hold UP and DOWN keys for 4 seconds to display DEF message. Press SET key and UP and DOWN keys to set value to "1" and press SET key, the device starts to work again with the factory settings. Once the PR message is displayed and you want to return to the operating mode without any action, you must press or wait for 15 seconds without pressing any key at any point in the operation. When the device is reset to factory settings, the device must be de-energized to see the effect of the parameters on the device.

### Display of Revision Number



If the SET & UP & DOWN keys are pressed together in run mode (no keylock), the display revision number is displayed.

### Error - Warning - Alarm - Information Messages Definitions

Indicator	contents	Indicator	contents
	<b>Cell Probe Error</b> - Check the sensor connection. - Compressor works according to C4 and C5 parameters. - Defrost is not affected.		<b>Defrosting alarm switched off because max. time has been reached</b> - Check the parameters d2, d3, d11. - Any key must be pressed to return to operating mode.
	<b>Evaporator probe Error</b> - Check the sensor connection. - If P3 is set to 1, defrost does not work. Even if the F0 parameter 3 or 4 is selected, the fan operates as this parameter set 2.		<b>Low-scale humidification message</b> - To change the default settings, see Humidification Operations
	<b>Condenser Probe Error</b> - Check the sensor connection. - The condenser probe overheat alarm (COH) is not active. - Condenser probe overheating compressor shutdown alarm (Csd) is not active.		<b>Medium-scale humidification message</b> - To change the default settings, see Humidification Operations
	<b>Low temperature HACCP alarm</b> - Check the parameters A0, A1, A2.		<b>High-scale humidification message</b> - To change the default settings, see Humidification Operations
	<b>High temperature HACCP alarm</b> - Check parameters A4, A5.		<b>Keylock message</b> - To change the key settings, see Locking and Unlocking Keys Operations.
	<b>Door HACCP alarm</b> - Check the digital input. - Check parameters i0, i1, i2, i4.		<b>Message to return to the factory settings and the related information is reset</b> - The device starts working according to the factory settings. - If the transaction is done, new information starts to be stored.
	<b>Condenser overheated alarm</b> - Check the condenser probe. - Check the C6 parameter.		<b>ENDA-KEY data transfer error</b> - Expressions are not affected, parameters are not affected.
	<b>Compressor blocked alarm</b> - Check the C7 parameter. - Compressor and fan do not work. - Turning the device off and on is necessary to return to working		<b>ENDA-KEY data transfer message</b> - The device works according to the new parameters.
	<b>Power supply interruption alarm</b> - Check parameters A10, A12. <i>(It is only available in END214.)</i>		<b>Pressure switch alarm</b> <i>(It is only available in END214.)</i> - Check the digital input. - Check parameters i5, i6, i7, i8 and i9.
	<b>Multifunction input alarm</b> <i>(It is only available in END214.)</i> - Check the digital input. - Check parameters i5, i6.		<b>Clock error</b> <i>(It is only available in END214.)</i> - re-set the day and real time - In this case the real-time functions will not work.

## PARAMETER LIST

### CONFIGURATION PARAMETRES

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
SP	Working setpoint; see also r0	°C/°F	r 1	r 2	2
CR1	Offset cell probe	°C/°F	-250	250	00
CR2	Offset evaporator probe	°C/°F	-250	250	00
CR3	Offset condenser probe	°C/°F	-250	250	00
P1	Decimal point 0 = NO 1 = YES		0	1	1
P2	Temperature Unit 0 : °C 1 : °F		0	1	0
P3	evaporator probe function 0 : probe absent 1 : defrosting probe and probe for evaporator fan thermostatisation 2 : probe for evaporator fan thermostatisation		0	2	1
P4	enabling of condenser probe 0 : NO 1 : YES		0	1	1
P8	delay in display of variations in temperature detected by the probes	ds	0	250	5

### MAIN CONTROL PARAMETERS

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
r0	Working setpoint differential	°C/°F	0.1	200	30
r1	Minimum working setpoint	°C/°F	-600	r 2	-20
r2	Maximum working setpoint	°C/°F	r 1	1500	80
r3	Locking of working setpoint calibration 0 : NO 1 : YES		0	1	0
r4	Increase in temperature during Energy Saving function; see also i5, i10, HE1 and HE2 <i>(This parameter is only available in END214)</i>	°C/°F	00	990	20
r5	Decrease in temperature during Overcooling function	°C/°F	00	1500	30
r6	Duration of Overcooling function	min	0	240	120
r7	Minimum difference "cell temperature - working setpoint" (when the instrument switches on) such as to provoke the exclusion of the consequent value of the evaporator temperature among the ones used for the calculation of the relative average (if only d8=3)	°C/°F	00	1500	100
r8	Cooling or heating action. 0 : Cooling 1 : Heating		0	1	0

### COMPRESSOR PARAMETERS

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
C0	Delay in switching on of compressor after the instrument switches on	min	0	240	0
C1	The time required for the compressor to restart after the "Pr1" fault has elapsed.	min	0	240	0
C2	Minimum duration of compressor switch off time	min	0	240	2
C3	Minimum duration of compressor switch on time	sec	0	240	0
C4	Duration of compressor switch off during cell probe error (code "Pr1")	min	0	240	10
C5	Duration of compressor switch on during cell probe error (code "Pr1")	min	0	240	10
C6	Condenser temperature is higher than that at which the condenser overheating alarm is activated (code "COH" - hysteresis: 2°C)	°C/°F	00	1500	600
C7	Condenser temperature is higher than the limit at which the compressor blocked alarm is activated (code "CSd" hysteresis: 2°C)	°C/°F	00	1500	630
C8	Compressor alarm delay locked (code "CSd")	min	0	15	1
C10	Number of operating hours is higher than the limit at which the need for maintenance is signaled. 0 = function absent	hr	0	10	0

## DEFROST PARAMETERS

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
d0	If d8 = 0, 1 or 2, defrosting interval If d8 = 3, maximum defrost interval  <b>0 = interval defrosting will never be activated</b>	hr	0	99	6
d1	Type of defrosting <b>0 = ELECTRIC</b> - during defrosting the compressor will remain off and the defrosting output will be activated; evaporator fan activity will depend on parameter F2 <b>1 = BY HOT GAS</b> - during defrosting the compressor will be switched on and the defrosting output will be activated; evaporator fan activity will depend on parameter F2 <b>2 = VIA STOPPING OF COMPRESSOR</b> - during defrosting the compressor will remain switched off and the defrosting output will remain deactivated; evaporator fan activity will depend on par. F2		0	2	0
d2	If the evaporator temperature is greater than this value, defrost does not operate ( <b>P3 = 1</b> )	°C/°F	-600	1500	80
d3	Defrost Duration P3 = 0 or 2, defrosting duration P3 = 1, maximum defrosting duration	min	0	99	20
d4	Defrosting when instrument is switched on <b>0 = NO</b> <b>1 = YES</b>		0	1	0
d5	The time it takes for the defrost to become active after device is energized	min	0	99	0
d6	Temperature displayed during defrosting <b>0</b> : cell temperature <b>1</b> : "SP + r0" is shown if cabin temperature is less than "SP + r0", cell temperature is shown if cell temperature is bigger than "SP+r0" <b>2</b> : During the defrost, "dEF" flashes on the screen		0	2	1
d7	Dripping duration (during dripping the compressor will remain switched off and the defrosting output will remain deactivated; if d16 = 0, evaporator fan activity will depend on parameter F2; if d16 ≠ 0, the evaporator fan will remain switched off)	min	0	15	2
d8	Defrost activation type <b>0</b> : defrosting will be activated once the instrument has altogether been running for time d0 <b>1</b> : defrosting will be activated once the compressor has altogether been switched on for time d0 <b>2</b> : defrosting will be activated once the evaporator temperature has altogether been below temperature d9 for time d0(P2<d9) <b>3</b> : ADAPTABLE: <b>-Learning Mode:</b> In this step no defrosting is performed and the ideal evaporator temperature average of the system is calculated.(check r7,d17,i11,i12) <b>-Normal Work Mode:</b> - <b>Cond1</b> :If the sum of the time when Evap. temperature is lower than the calculated Evap. temperature is greater than the set value of d18, defrost becomes active. - <b>Cond2:</b> evaporatör probu sıcaklığı,hesaplanan evap.sıcaklığı- d19 par. farkından küçük ise defrost aktif olur. - <b>Cond3:</b> After rapid cooling, the defrost becomes active. - <b>Cond4:</b> If the door has been opened more than the time set by the relevant parameters, defrost will be activated (i13, i14 must be checked) <b>*After the defrost is activated, it returns to the learning mode again and these operations are carried out periodically.</b> <b>4</b> : The real time defrost will be active at the times specified in the parameters.(H1...H6)		0	3 <sup>(1)</sup>	0
d9	Evaporator temperature is higher than that at which the defrost interval counter is suspended ( <b>only if d8 = 2</b> )	°C/°F	-990	990	00
d11	Defrosting alarm switches off once maximum time limit has been reached (dFd ve Pr2) <b>1</b> :Yes		0	1	0
d15	Minimum time that the compressor must be switched on before defrosting can be activated ( <b>only if d1 = 1</b> )	min	0	99	0
d16	Predripping duration (during predripping the compressor will remain switched off, the defrosting output will be activated and the evaporator fan will remain switched off)	min	0	99	0
d17	Number of evaporator temperature values used for the calculation of the relative average ( <b>for the defrost activation; only if d8 = 3</b> ); <b>also look at r7, i11 and i12</b>		1	10	2
d18	Defrosting interval ( <b>only if d8 = 3 and for condition 1</b> ) 0 = defrosting for condition 1 will never be activated	min	0	99	40
d19	Evaporator temperature above which the defrost is activated (relative to the evaporator temperatures average, or "evaporator temperatures average - d19") <b>(only if d8 = 3 and for condition 2); also look at d17</b>	°C/°F	00	1500	30
d20	Minimum consecutive time the compressor must be switched on such as to provoke the defrost activation <b>0: the defrost will never be activated</b>	min	0	500	240
d21	Minimum consecutive time the compressor must be switched on after the instrument switches on(on condition that the difference "cell temp. - working setpoint" is higher temperature r7) and after function Overcooling is activated such as to provoke the defrost activation <b>(This parameter is only available in END214)</b>	min	0	500	150
d22	Evaporator temp. above which the defrosting interval is suspended ( <b>also look at d8,d17</b> )	°C/°F	00	100	20
d23	Evaporator temperatures average increase during function Energy Saving ( <b>for defrost activation; only if d8 = 3</b> ); <b>also look at d17</b> <b>(This parameter is only available in END214)</b>	°C/°F	00	100	10



(1) Upper limit is "3" in END003 and END004, upper limit is "4" in EN214.

## ALARM PARAMETERS

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
R0	Temperature associated with the minimum temperature alarm (code "AL") 0 = cell temperature 1 = evaporator temperature		0	1	0
R1	Temperature below that at which the minimum temperature alarm is activated	°C/°F	-990	990	70
R2	Type of minimum temperature alarm (code "AL") 0 = alarm absent 1 = relative to working setpoint (that is "working setpoint - A1"; consider A1 without sign) 2 = absolute (that is A1)		0	2	1
R4	Temperature higher than that at which the maximum temperature alarm is activated	°C/°F	-990	990	70
R5	Type of maximum temperature alarm (code "AH") 0 = alarm absent 1 = relative to working setpoint (that is "working setpoint + A4"; consider A1 without sign) 2 = absolute (that is A4)		0	2	1
R6	Delay in maximum temperature alarm (code "AH") after the instrument is switched on	min	0	240	120
R7	Temperature alarm delay (code "AL" and code "AH")	min	0	240	30
R8	Delay in maximum temperature alarm (code "AH") following the conclusion of defrosting and following the conclusion	min	0	240	60
R9	Delay in maximum temp. alarm("AH") following the disactivation of the door microswitch	min	0	240	60
R10	Duration of interruption in the power supply that occurs when the instrument has been running for long enough to cause the storage of the power interruption alarm when the power supply is restored. (code "PF") <b>(This parameter is only available in END214)</b>	min	0	240	30
R11	Differential of parameters A1 and A4	°C/°F	0.1	150	10
R12	Kind of signal for power interruption alarm (code "PF"); also look at A10 0 = the alarm will not be signalled 1 = the display will show the code "PF" flashing and the buzzer will be activated 2 = the display will show the code "PF" flashing and the buzzer will be activated (this last on condition that the power interruption duration is higher than time A10) <b>(This parameter is only available in END214)</b>		0	2	1

## FAN PARAMETERS-1/2

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
F0	Evaporator fan activity during normal operation 0 = switched off 1 = switched on; see also F13, F14 and i10 2 = in parallel with the compressor; see also F9, F13, F14 and i10 3 = dependent on F1 (16) 4 = switched off if the compressor is switched off, dependent on F1 if the compressor is switched on; see also F9 5 = dependent on F6; see also F1, F9 and F10		0	5	5
F1	Evaporator temperature above the limit at which the evaporator fan is switched off <b>(only if F0 = 3, 4 or 5); see also F8</b>	°C/°F	-600	1500	80
F2	Evaporator fan activity during defrosting and dripping 0 = switched off 1 = switched on (setting parameter d7 to 0 is recommended) 2 = dependent on F0		0	2	0
F3	Maximum duration of evaporator fan disactivation; see also F7 (during evaporator fan disactivation the compressor can be switched on, the defrosting output will remain disactivated and the evaporator fan will remain switched off) <b>(This parameter is only available in END214)</b>	min	0	15	2
F4	Time duration that evaporator fan is switched off during operation for a low percentage of relative humidity when the compressor is switched off; <b>see also F5 (only if F0 = 5)</b>	sec	0	240	65
F5	Time duration that evaporator fan is switched on during operation for a low percentage of relative humidity when the compressor is switched off; <b>see also F4 (only if F0 = 5)</b>	sec	0	240	5
F6	Operation for low or high percentage of relative humidity <b>(only if F0 = 5)</b> 0 = <b>LOW RELATIVE HUMIDITY</b> - the evaporator fan will operate in parallel with the compressor 1 = <b>MEDIUM RELATIVE HUMIDITY</b> - the evaporator fan will operate in parallel with the compressor; <b>see also F4 and F5</b> 2 = <b>HIGH RELATIVE HUMIDITY</b> - the evaporator fan will always be switched on		0	2	2
F7	Evaporator temperature below limit at which the evaporator fan is disactivated (relative to working setpoint, that is "working setpoint + F7"); see also F3 <b>(This parameter is only available in END214)</b>	°C/°F	-990	990	50

## FAN PARAMETERS-2/2

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF
F8	Parameter F1 differential ( <b>Check F1 parameter</b> )	°C/°F	00	200	20
F9	Delay in the switching off of evaporator fan following the switching off of the compressor ( <b>only if F0 = 2, 4 and 5</b> )	sec	0	240	0
F10	Evaporator temperature below the limit at which the evaporator fan is switched off ( <b>only if F0 = 3, 4 or 5</b> ); <b>see also F8</b>	°C/°F	-990	990	-350
F11	Condenser temperature above that at which the condenser fan is switched on ("F11 + 2.0 °C/4 °F, only if u1 = 6 and provided the compressor is switched on); <b>see also F12</b>	°C/°F	00	990	150
F12	Delay in switching off of the condenser fan following the switching off of the condenser ( <b>only if u1=6</b> ) ( <b>see also F11</b> )	sec	0	240	30
F13	Time the evaporator fan remains turned off during function Energy Saving; <b>see also F14 and i10 (only if F0 = 1 or 2)</b> ( <i>This parameter is only available in END214</i> )	min	0	240	5
F14	Time the evaporator fan remains turned on during function Energy Saving; <b>see also F13 and i10 (only if F0 = 1 or 2)</b> ( <i>This parameter is only available in END214</i> )	min	0	240	5

## DIGITAL INPUT PARAMETERS - 1/2

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
i0	Effect caused by the activation of the door microswitch input: <b>0</b> : no effect <b>1</b> : the compressor and evaporator fan will be switched off <b>2</b> : the evaporator fan will be switched off <b>3</b> : the cell light will be switched on (only if u1 = 0, until the input is deactivated) <b>4</b> : the compressor and evaporator fan will be switched off (at most for time i3 or until the input is deactivated) and the cell light will be switched on (only if u1 = 0, until the input is deactivated) <b>5</b> : the evaporator fan will be switched off (at most until time i3 or until the input has been deactivated) and the cell light will be switched on (only if u1 = 0, until the input is deactivated)  <b>NOT: 3,4 and 5 options are only available in END214</b>		0	5 <sup>(1)</sup>	2
i1	Type of door microswitch input contact <b>0</b> = normally open (active input with closed contact) <b>1</b> = normally close (active input with open contact)		0	1	1
i2	Delay in signaling of door microswitch input alarm ( <b>code "id"</b> ) <b>-1</b> = the alarm will not be signaled	min	- 1	120	2
i3	Maximum duration of the effect caused by activation of the door microswitch on the compressor and the evaporator fan <b>-1= the effect will last until the input is deactivated</b>	min	- 1	120	10
i4	Storage of door microswitch input alarm (code "id") (20) <b>0</b> = NO <b>1</b> = YES		0	1	1
i5	Effect caused by the activation of the multifunction input ( <i>This parameter is only available in END214</i> ) <b>0</b> : no effect <b>1</b> : <b>SYNCHRONISATION OF DEFROSTING PERIODS</b> - once time d5 has passed defrosting will be activated <b>2</b> : <b>ACTIVATION OF ENERGY SAVING FUNCTION</b> - the Energy Saving function will be activated (until the input is deactivated), provided the Overcooling function is running; see also r4 <b>3</b> : <b>ACTIVATION OF MULTIFUNCTION INPUT ALARM</b> - once time i7 has passed the display will show the flashing code "iA" and the buzzer will be activated (until the input is deactivated) <b>4</b> : <b>ACTIVATION OF THE PRESSURE SWITCH ALARM</b> - the compressor will be switched off, if u1 = 6 the condenser fan will be switched on, the display will show the flashing code "iA" and the buzzer will be activated (until the input is deactivated); when the input has been activated the number of times established with parameter i8 the regulators will be switched off, if u1 = 6 the condenser fan will be switched on, the display will show the flashing code "iSd" and the buzzer will be activated (until the input is deactivated and the instrument is switched off and re-started or until the power supply is interrupted); see also i7 and i9 <b>5</b> : <b>SWITCHING ON THE AUXILIARY OUTPUT</b> - the auxiliary output will be switched on (only if u1= 2, until the input is deactivated) <b>6</b> : <b>SWITCHING OFF THE INSTRUMENT</b> - the instrument will be switched off (until the input is deactivated)		0	6	2
i6	Type of multifunction input contact ( <i>This parameter is only available in END214</i> ) <b>0</b> = normally open (active input with closed contact) <b>1</b> = normally close (active input with open contact)		0	1	0
i7	If i5 = 3, multifunction input alarm delay ( <b>code "iA"</b> ) If i5 = 4, delay in compressor switching on after the deactivation of the multifunction input ( <i>This parameter is only available in END214</i> )	min	0	120	0
i8	Number of multifunction input alarms (code "iA") such to cause a pressure switch alarm ( <b>code "iSd"</b> ) (if i5 = 4) <b>0</b> = alarm absent <i>(This parameter is only available in END214)</i>		0	15	0



(1) Upper limit is 2 in END003 and END004 , upper limit is 5 in END214.



## DIGITAL INPUT PARAMETERS - 1/2

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
i9	Time that must pass in absence of multifunction output alarms (code "iA") so that the alarm counter is reset (only if i5 = 4) <i>(This parameter is only available in END214)</i>	min	1	999	240
i10	Time without activations of the door switch input (on condition that the cabinet temperature has reached the working setpoint) in order that function Energy Saving is activated automatically (it has effect on the evaporator fan only if F0 = 1 or 2) 0 = the function will never automatically be activated <i>(This parameter is only available in END214)</i>	min	0	999	0
i11	Minimum time the door switch input must be activated such as to provoke the exclusion of the consequent value of the evaporator temperature among the ones used for the calculation of the relative average (for the defrost activation; only if d8 = 3); also look at d17	sec	0	240	10
i12	Minimum time the door switch input must be activated altogether such as to provoke the exclusion of the consequent value of the evaporator temp. among the ones used for the calculation of the relative average (for the defrost activation; only if d8 = 3); also look at d17	sec	0	240	60
i13	Number of door switch input activations such as to provoke the defrost activation 0 = the defrost will never be activated because of the door switch input activation		0	240	80
i14	Minimum duration of the door switch input activation such as to provoke the defrost activation 0 = the defrost will never be activated because of the door switch input activation	min	0	240	32

## AUX ÇIKIŞI PARAMETRELERİ

AD	PARAMETRE AÇIKLAMASI	BİRİM	ENAZ	ENÇOK	BAŞ.
u1	Controlling of AUX Output : 0 : Cell light - in this case the AUXILIARY key and parameters i0 and u2 will be activated 1 : Demister resistors - in this case the AUXILIARY key and parameter u6 will be activated 2 : Auxiliary output - in this case the AUXILIARY key and params. i5 and u2 will be activated 3 : Alarm outputs - in this case parameter u4 will be activated 4 : Door resistors - in this case parameter u5 will be activated 5 : Evaporator valve - in this case parameters u7 and u8 will be activated 6 : Condenser fan - in this case parameters P4, F11 and F12 will be activated 7 : Defrost out <i>(NOT: There isn't 7. option in END004 and END214.)</i>		0	7 (1)	7 (2)
u2	Enabling of manual switch on/switch off of the cell light or the auxiliary output when the instrument is switched off (only if u1 = 0 or 2) 1 = YES		0	1	1
u4	Enabling of alarm output disactivation with the silencing of the buzzer (only if u1 = 3) 1 = YES		0	1	1
u5	Cell temperature below that at which the door resistors are switched on (if u1 = 4)	°C/°F	-990	990	-10
u6	Operating time of demister resistors (only if u1 = 1)	min	0	120	5
u7	Cell temperature below that at which the evaporator valve is disactivated (only if u1=5)	°C/°F	00	990	20
u8	Type of evaporator valve contact (only if u1=5) 0 : normally open (valve active with contact closed) 1 : normally closed (valve active with contact open)		0	1	1
u9	Enabling of buzzer 0 : Inactive 1 : Active		0	1	1



- (1) Upper limit is "7" in END003, upper limit is "6" in END004 and END214.  
(2) Default value is "7" in END003, default value is "0" in END004 and END214.

## REAL-TIME ENERGY SAVING PARAMETERS (only in END214)

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
HE1	Time of activation of the Energy Saving in real time function; see also r4 and HE2	sa:dk	00:00	23:59	23:00
HE2	Duration of the Energy Saving in real time function; see also r4 and HE1 00:00 = the Energy Saving in real time function will not be activated	sa:dk	00:00	23:59	07:00

### REAL-TIME DEFROST PARAMETERS (only in END214)

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
<i>Hd1</i>	time of activation of first defrosting period in real time (only if d8 = 4) ---:-- = the first defrosting in real time will not be activated	sa:dk	00:00	23:59	---:--
<i>Hd2</i>	time of activation of second defrosting period in real time (only if d8 = 4) ---:-- = the second defrosting in real time will not be activated	sa:dk	00:00	23:59	---:--
<i>Hd3</i>	time of activation of third defrosting period in real time (only if d8 = 4) ---:-- = the third defrosting in real time will not be activated	sa:dk	00:00	23:59	---:--
<i>Hd4</i>	time of activation of fourth defrosting period in real time (only if d8 = 4) ---:-- = the fourth defrosting in real time will not be activated	sa:dk	00:00	23:59	---:--
<i>Hd5</i>	time of activation of fifth defrosting period in real time (only if d8 = 4) ---:-- = the fifth defrosting in real time will not be activated	sa:dk	00:00	23:59	---:--
<i>Hd6</i>	time of activation of sixth defrosting period in real time (only if d8 = 4) ---:-- = the sixth defrosting in real time will not be activated	sa:dk	00:00	23:59	---:--

### DATA-LOGGING PARAMETRES (only in END214)

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
<i>u i E n</i>	Communication Type: 0 : Modbus 1 : Wifi		0	1	1
<i>r E 0</i>	Data logging interval	min	0	240	10
<i>r E 1</i>	Temperature selection for data-logging 0 : Cabin temperature 1 : Evaporator temperature 2 : Condenser temperature 4 : Cabinet and evaporator temperature 5 : All		0	5	5

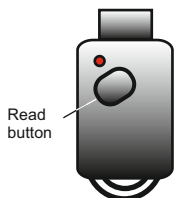
### SECURITY PARAMETERS (only in END214)

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
<i>PR1</i>	User Password for Android Application		-99	999	426
<i>PR2</i>	Service Password for Android Application		-99	999	824

### Rs485 MODBUS COMMUNICATION PARAMETERS

NAME	PARAMETER DESCRIPTION	UNIT	MIN	MAX	DEF.
<i>LR</i>	Slave Device Address		1	247	247
<i>Lb</i>	BaudRate 0 : 2400 1 : 4800 2 : 9600 3 : 19200	Bps	0	3	2

#### ENDA-KEY Parametre Aktarımı



#### TRANSFERRING THE PARAMETERS FROM ENDAKEY TO DEVICE

While in "Running Mode", if **[AUX]** key on device or "Read" button on "ENDAKEY" is pressed, "*dL*" message appears on display and parameters are read and transferred to the device. If the parameter transfer is successful, the "*rEF*" message appears and the device begins to work with the loaded parameter values. If the parameters are wrong, incorrect or "ENDAKEY" is faulty, "*Err*" message appears. Parameters will not be changed on device.

#### TRANSFERRING THE PARAMETERS FROM DEVICE TO ENDAKEY

While in "Running Mode", if **[DEFR]** key is pressed on device, "*uL*" message appears on display and parameters are read and transferred to the device. If process success, "*Suc*" message appears. In case of failure, "*Err*" message appears. Parameters will not be changed on device.

**NOTE 1 :** No power-up required for transferring the parameter by using "ENDAKEY". For long battery life, "ENDAKEY" must be disconnected from device after the transferring process.

**NOTE 2 :** Please specify at order "ENDAKEY" if required.

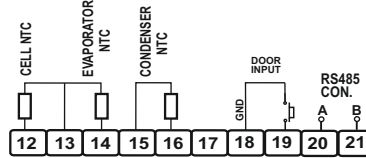
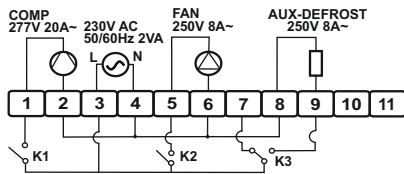
## CONNECTION DIAGRAM



END003/004/214 is intended for installation in control panels. Make sure that the device is used only for intended purpose. The electrical connections must be carried out by a qualified staff and must be according to the relevant locally applicable regulations. During an installation, all of the cables that are connected to the device must be free of electrical power. The device must be protected against inadmissible humidity, vibrations, severe soiling and make sure that the operation temperature is not exceeded. The cables should not be close to the power cables or components.

### END003 DIGITAL THERMOSTAT

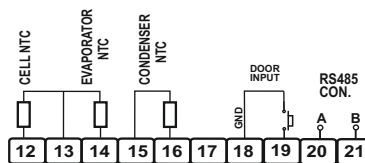
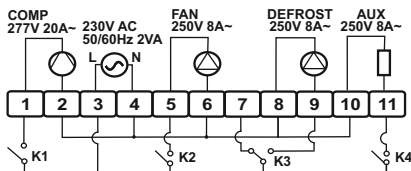
RoHS



Made in Turkey

### END004 DIGITAL THERMOSTAT

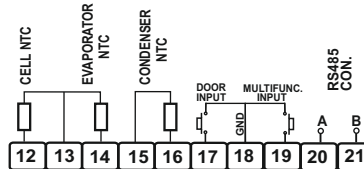
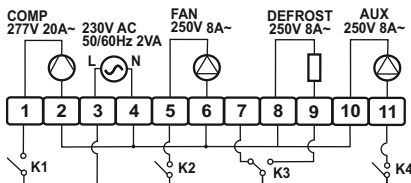
RoHS



Made in Turkey

### END214 DIGITAL THERMOSTAT

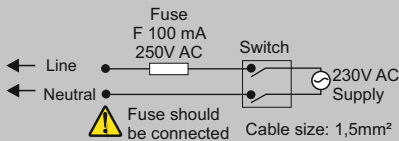
RoHS



Made in Turkey

#### SUPPLY:

184-253V AC  
50/60Hz 4VA



Fuse should be connected

Cable size: 1,5mm<sup>2</sup>

#### Note:

- 1) Mains supply cords shall meet the requirements of IEC 60227 or IEC 60245.
- 2) In accordance with the safety regulations, the power supply switch shall bring the identification of the relevant instrument and it should be easily accessible by the operator.

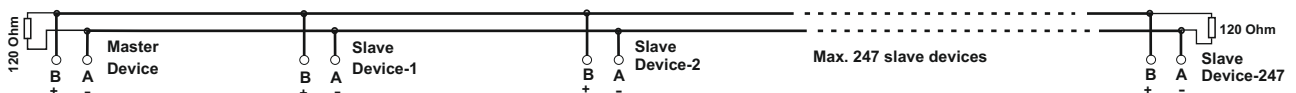


Equipment is protected throughout by DOUBLE INSULATION.



Holding screw 0.4-0.5Nm

## ModBus COMMUNICATION WIRING SCHEME



The start and end of the communication line must be terminated with a 120 Ohm resistor.

# END003 - END004 DIGITAL THERMOSTAT MODBUS PROTOCOL ADDRESS MAP

## 1.1 HOLDING REGISTERS

Holding Register Addresses		Data Type	Data Content	Parameter Name	R/W Permission
Decimal	Hex				
0000d	0x0000	word	System control set value (°C/°F)	SP	Read/Write
0001d	0x0001	word	Cabinet probe offset value (°C/°F)	CR1	Read/Write
0002d	0x0002	word	Evaporator probe offset value (°C/°F)	CR2	Read/Write
0003d	0x0003	word	Condenser probe offset value (°C/°F)	CR3	Read/Write
0004d	0x0004	word	Evaporator probe function 0:Not Applicable 1:for defrost and fan control 2:for fan control	P3	Read/Write
0005d	0x0005	word	Temperature value refresh time to be displayed	P8	Read/Write
0006d	0x0006	word	System control setpoint hysteresis (°C/°F)	r0	Read/Write
0007d	0x0007	word	System control set value lower limit (°C/°F)	r1	Read/Write
0008d	0x0008	word	System control set value upper limit (°C/°F)	r2	Read/Write
0009d	0x0009	word	In fast cooling mode the set value is reduced by this value (°C/°F)	r5	Read/Write
0010d	0x000A	word	Fast cooling mode time	r6	Read/Write
0011d	0x000B	word	Ideal evap. during the calculation (cabin temperature-Set) If the value is bigger than the value, the measured value of the evap. (°C/°F)	r7	Read/Write
0012d	0x000C	word	The time it takes for the compressor to enter the circuit after power is applied	[0	Read/Write
0013d	0x000D	word	In order for the compressor to restart after the Pr1 fault has elapsed time to pass.	[1	Read/Write
0014d	0x000E	word	After the stop,time that the compressor must go through before it can start again.	[2	Read/Write
0015d	0x000F	word	The minimum time required for the compressor to run.	[3	Read/Write
0016d	0x0010	word	Compressor dead time in case of cabinet probe failure	[4	Read/Write
0017d	0x0011	word	Compressor open time in case of cabinet probe failure	[5	Read/Write
0018d	0x0012	word	If the condenser temperature is higher than this value, the condenser temperature alarm "COH "becomes active(hysteresis 2°C) (°C/°F)	[6	Read/Write
0019d	0x0013	word	If the condenser temperatures are higher than this value, the compressor temperature alarm "Csd" becomes active(hysteresis 2°C) (°C/°F)	[7	Read/Write
0020d	0x0014	word	The duration of the alarm after the compr. alarm "CSd" has been activated	[8	Read/Write
0021d	0x0015	word	Compressor operating time limit	[10	Read/Write
0022d	0x0016	word	Time between two consecutive defrosts	d0	Read/Write
0023d	0x0017	word	Defrost type 0: Electric 1: Gas 2: Compressor off	d1	Read/Write
0024d	0x0018	word	If the evaporator temp is bigger than this value, defrost will not work(°C/°F)	d2	Read/Write
0025d	0x0019	word	Defrost time	d3	Read/Write
0026d	0x001A	word	The time it takes for the defrost to become active after it is energized	d5	Read/Write
0027d	0x001B	word	Displayed during display during defrost 0: Cabin temperature 1: "SP + r0" if cabin temperature is less than "SP + r0", cabin temperature "SP + r0" the cabin temperature is shown 2: the "dEF" mark flashes	d6	Read/Write
0028d	0x001C	word	Drip discharge time	d7	Read/Write
0029d	0x001D	word	Defrost activation type 0: time between two defrosts it will be ignored. 1: time between two defrosts only compressor as long as it works. 2: time between two defrosts only evaporator the probe temperature is reduced as long as the condition is less than d9 par. 3: Adaptive defrost 4: Real-time defrost	d8	Read/Write
0030d	0x001E	word	If evap. probe temperature is greater than this parameter value, defrost counter will not decrease (°C/°F)	d9	Read/Write
0031d	0x001F	word	For the defrosting to be active, the time required for the compressor min.	d15	Read/Write
0032d	0x0020	word	Pre-melting time	d16	Read/Write
0033d	0x0021	word	The number of samples used for evaporator probe temperature averaging	d17	Read/Write
0034d	0x0022	word	The time the evap. temperature is below the calculated ideal evap. temperature defrost is activated if the sum has reached this set time.	d18	Read/Write
0035d	0x0023	word	Evap. probe temperature is less than "calculated evap. temperature-d19" defrost is active(°C/°F)	d19	Read/Write
0036d	0x0024	word	Two consecutive compressors in order to activate defrosting min.time	d20	Read/Write
0037d	0x0025	word	Adaptive defrost evap. probe termination temperature (°C/°F)	d22	Read/Write
0038d	0x0026	word	Min temperature alarm (AL) activation value (°C/°F)	R1	Read/Write

# END003 - END004 DİJİTAL TERMOSTAT

Holding Register Adresleri		Veri Tipi	Verinin İçeriği	Parametre Adı	Okuma /Yazma İzni
Decimal	Hex				
0039d	0x0027	word	Min temperature alarm (AL) tipi 0: No Alarm 1:Alarm activation value "SP- A1 " 2:Alarm activation value becomes A1	R2	Read/Write
0040d	0x0028	word	Max. Temperature alarm (AH) activation value (°C/°F)	R4	Read/Write
0041d	0x0029	word	Max. Temperature alarm (AH) type	R5	Read/Write
0042d	0x002A	word	Maximum temperature alarm (AH) display delay after power up	R6	Read/Write
0043d	0x002B	word	Temperature alarm (AH,AL) display delay	R7	Read/Write
0044d	0x002C	word	After the defrost has finished, the max. temperature alarm (AH) alarm display delay	R8	Read/Write
0045d	0x002D	word	After the door alarm has been deactivated, the Max. temp. alarm (AH) alarm display delay	R9	Read/Write
0046d	0x002E	word	Max min Temperature alarms (AL, AH) hysteresis (°C/°F)	R11	Read/Write
0047d	0x002F	word	Evaporator fan activity during normal operation 0 = switched off 1 = switched on; see also F13, F14 and i10 2 = in parallel with the compressor; see also F9, F13, F14 and i10 3 = dependent on F1 (16) 4 = switched off if the compressor is switched off, dependent on F1 if the compressor is switched on; see also F9 5 = dependent on F6; see also F1, F9 and F10	F0	Read/Write
0048d	0x0030	word	Fan stop temperature. If the evaporator temperature is above this value, fan will not work. (°C/°F)	F1	Read/Write
0049d	0x0031	word	Evaporator fan activity during defrosting and dripping 0 = switched off 1 = switched on (setting parameter d7 to 0 is recommended) 2 = dependent on F0	F2	Read/Write
0050d	0x0032	word	Time duration that evaporator fan is switched off during operation for a low percentage of relative humidity when the compressor is switched off	F4	Read/Write
0051d	0x0033	word	Time duration that evaporator fan is switched on during operation for a low percentage of relative humidity when the compressor is switched off	F5	Read/Write
0052d	0x0034	word	Operation for low or high percentage of relative humidity (only if F0 = 5) 0 = LOW RELATIVE HUMIDITY 1 = MEDIUM RELATIVE HUMIDITY 2 = HIGH RELATIVE HUMIDITY	F6	Read/Write
0053d	0x0035	word	Fan stop temperature hysteresis (°C/°F)	F8	Read/Write
0054d	0x0036	word	The time required for the fan to shut down after the compressor has switched off	F9	Read/Write
0055d	0x0037	word	If the evaporator temperature is below the value set by this parameter, fan will not work (°C/°F)	F10	Read/Write
0056d	0x0038	word	If the condenser probe temperature is greater than the value set by this parameter the fan works (°C/°F)	F11	Read/Write
0057d	0x0039	word	Time to close the fan due to the condenser probe	F12	Read/Write
0058d	0x003A	word	Effect caused by the activation of the door microswitch input: 0 : no effect 1 : the compressor and evaporator fan will be switched off 2 : the evaporator fan will be switched off 3 : the cell light will be switched on (only if u1 = 0, until the input is deactivated) 4 : the compressor and evaporator fan will be switched off (at most for time i3 or until the input is deactivated) and the cell light will be switched on (only if u1 = 0, until the input is deactivated) 5 : the evaporator fan will be switched off (at most until time i3 or until the input has been deactivated) and the cell light will be switched on (only if u1 = 0, until the input is deactivated)	i0	Read/Write
0059d	0x003B	word	Door digital input alarm (Id) display delay	i2	Read/Write
0060d	0x003C	word	After the door digital input is activated, the effect of compressor and fan max time	i3	Read/Write
0061d	0x003D	word	minimum time the door switch input must be activated such as to provoke the exclusion of the consequent value of the evaporator temp. among the ones used for the calculation of the relative average	i11	Read/Write
0062d	0x003E	word	minimum time the door switch input must be activated altogether such as to provoke the exclusion of the consequent value of the evaporator temp. among the ones used for the calculation of the relative average	i12	Read/Write
0063d	0x003F	word	number of door switch input activations such as to provoke the defrost activation	i13	Read/Write
0064d	0x0040	word	minimum duration of the door switch input activation such as to provoke the defrost activation	i14	Read/Write
0065d	0x0041	word	Controlling of AUX Output : 0 : Cell light - in this case the AUXILIARY key and parameters i0 and u2 will be activated 1 : Demister resistors - in this case the AUXILIARY key and parameter u6 will be activated 2 : Auxiliary output - in this case the AUXILIARY key and params. i5 and u2 will be activated 3 : Alarm outputs - in this case parameter u4 will be activated 4 : Door resistors - in this case parameter u5 will be activated 5 : Evaporator valve - in this case parameters u7 and u8 will be activated 6 : Condenser fan - in this case parameters P4, F11 and F12 will be activated 7 : Defrost out	u1	Read/Write
0066d	0x0042	word	cell temperature below that at which the door resistors are switched on	u5	Read/Write
0067d	0x0043	word	operating time of demistor resistors	u6	Read/Write
0068d	0x0044	word	cell temperature below that at which the evaporator valve is deactivated	u7	Read/Write

## END003 - END004 DIGITAL THERMOSTAT

### 1.2 INPUT REGISTERS

Input Register Adresleri		Data Type	Data Content	Parameter Name	R/W Permission
Decimal	Hex				
0000d	0x0000	word	Measured cabinet probe temperature value (°C / °F)	--	Read only
0001d	0x0001	word	Measured evaporator probe temperature value (°C / °F)	--	Read only
0002d	0x0002	word	Measured condenser probe temperature value (°C / °F)	--	Read only

In the Holding and Input Register parameters, integer types are defined as signed integers, and these parameters are in decimal (A parameter of "14.0" will be read as "140".) The time-related parameters "min: sec" read as sec and "hr: min" read as minutes.

## END003 - END004 DIGITAL THERMOSTAT

### 1.3 DISCRETE INPUTS

Discrete Inputs Adresleri		Data Type	Data Content	Parameter Name	R/W Permission
Decimal	Hex				
0000d	0x0000	bit	Compressor relay output status (0=OFF; 1=ON)	--	Read only
0001d	0x0001	bit	Fan relay output status (0=OFF; 1=ON)	--	Read only
0002d	0x0002	bit	AUX relay output status (0=OFF; 1=ON)	--	Read only
0003d	0x0003	bit	Defrost relay output status (0=OFF; 1=ON)	--	Read only

## END003 - END004 DIGITAL THERMOSTAT

### 1.4 COILS

Coil Adresleri		Data Type	Data Content	Parameter Name	R/W Permission
Decimal	Hex				
00d	0x00	Bit	Decimal point display <b>0</b> = NO <b>1</b> = YES	<i>P1</i>	Read/Write
01d	0x01	Bit	Temperature Type <b>0</b> = °C <b>1</b> = °F	<i>P2</i>	Read/Write
02d	0x02	Bit	Use Condenser probe <b>0</b> = NO <b>1</b> = YES	<i>P4</i>	Read/Write
03d	0x03	Bit	System control set value change lock operation <b>0</b> = NO <b>1</b> = YES	<i>r3</i>	Read/Write
04d	0x04	Bit	System Control Type <b>0</b> = cooling <b>1</b> = heating	<i>r8</i>	Read/Write
05d	0x05	Bit	Start Defrost with energy <b>0</b> = NO <b>1</b> = YES	<i>d4</i>	Read/Write
06d	0x06	Bit	Device manual on-off button control	--	Read/Write
07d	0x07	Bit	If the defrost alarm has reached the max display time <b>0</b> = OFF <b>1</b> = ON	<i>d11</i>	Read/Write
08d	0x08	Bit	Min temperature alarm (AL) control probe <b>0</b> = cell temp. <b>1</b> = evap. temp.	<i>A0</i>	Read/Write
09d	0x09	Bit	Door digital input activation <b>0</b> = normally open <b>1</b> = normally close	<i>,1</i>	Read/Write
10d	0x0A	Bit	Door digital input alarm (Id) storage <b>0</b> = NO <b>1</b> = YES	<i>,4</i>	Read/Write
11d	0x0B	Bit	Switching the AUX outputs off and on while manual is off. <b>0</b> = NO <b>1</b> = YES	<i>u2</i>	Read/Write
12d	0x0C	Bit	Cancel alarm output and silence buzzer when alarm occurs <b>0</b> = NO <b>1</b> = YES	<i>u4</i>	Read/Write
13d	0x0D	Bit	Evaporator output activation <b>0</b> = normally open <b>1</b> = normally close	<i>u8</i>	Read/Write
14d	0x0E	Bit	Activating the buzzer <b>0</b> = NO <b>1</b> = YES	<i>u9</i>	Read/Write

# END214 DIGITAL THERMOSTAT MODBUS PROTOCOL ADDRESS MAP

## 1.1 HOLDING REGISTERS

Holding Register Addresses		Data Type	Data Content	Parameter Name	R/W Permission
Decimal	Hex				
0000d	0x0000	word	System control set value (°C/°F)	<i>SP</i>	Read/Write
0001d	0x0001	word	Cabinet probe offset value (°C/°F)	<i>CR1</i>	Read/Write
0002d	0x0002	word	Evaporator probe offset value (°C/°F)	<i>CR2</i>	Read/Write
0003d	0x0003	word	Condenser probe offset value (°C/°F)	<i>CR3</i>	Read/Write
0004d	0x0004	word	Evaporator probe function 0:Not Applicable 1:for defrost and fan control 2:for fan control	<i>P3</i>	Read/Write
0005d	0x0005	word	Temperature value refresh time to be displayed	<i>P8</i>	Read/Write
0006d	0x0006	word	System control setpoint hysteresis (°C/°F)	<i>r0</i>	Read/Write
0007d	0x0007	word	System control set value lower limit (°C/°F)	<i>r1</i>	Read/Write
0008d	0x0008	word	System control set value upper limit (°C/°F)	<i>r2</i>	Read/Write
0009d	0x0009	word	Temperature increase during energy saving function (°C/°F)	<i>r4</i>	Read/Write
0010d	0x000A	word	In fast cooling mode the set value is reduced by this value (°C/°F)	<i>r5</i>	Read/Write
0011d	0x000B	word	Fast cooling mode time	<i>r6</i>	Read/Write
0012d	0x000C	word	Ideal evap. during the calculation (cabin temperature-Set) If the value is bigger than the value, the measured value of the evap. (°C/°F)	<i>r7</i>	Read/Write
0013d	0x000D	word	The time it takes for the compressor to enter the circuit after power is applied	<i>C0</i>	Read/Write
0014d	0x000E	word	In order for the compressor to restart after the Pr1 fault has elapsed time to pass.	<i>C1</i>	Read/Write
0015d	0x000F	word	After the stop,time that the compressor must go through before it can start again.	<i>C2</i>	Read/Write
0016d	0x0010	word	The minimum time required for the compressor to run.	<i>C3</i>	Read/Write
0017d	0x0011	word	Compressor dead time in case of cabinet probe failure	<i>C4</i>	Read/Write
0018d	0x0012	word	Compressor open time in case of cabinet probe failure	<i>C5</i>	Read/Write
0019d	0x0013	word	If the condenser temperature is higher than this value, the condenser temperature alarm "COH "becomes active(hysteresis 2°C) (°C/°F)	<i>C6</i>	Read/Write
0020d	0x0014	word	If the condenser temperatures are higher than this value, the compressor temperature alarm "Csd" becomes active(hysteresis 2°C) (°C/°F)	<i>C7</i>	Read/Write
0021d	0x0015	word	The duration of the alarm after the compr. alarm "CSd" has been activated	<i>C8</i>	Read/Write
0022d	0x0016	word	Compressor operating time limit	<i>C10</i>	Read/Write
0023d	0x0017	word	Time between two consecutive defrosts	<i>d0</i>	Read/Write
0024d	0x0018	word	Defrost type 0: Electric 1: Gas 2: Compressor off	<i>d1</i>	Read/Write
0025d	0x0019	word	If the evaporator temp is bigger than this value, defrost will not work(°C/°F)	<i>d2</i>	Read/Write
0026d	0x001A	word	Defrost time	<i>d3</i>	Read/Write
0027d	0x001B	word	The time it takes for the defrost to become active after it is energized	<i>d5</i>	Read/Write
0028d	0x001C	word	Displayed during display during defrost 0: Cabin temperature 1: "SP + r0" if cabin temperature is less than "SP + r0", cabin temperature "SP + r0" the cabin temperature is shown 2: the "dEF" mark flashes	<i>d6</i>	Read/Write
0029d	0x001D	word	Drip discharge time	<i>d7</i>	Read/Write
0030d	0x001E	word	Defrost activation type 0: time between two defrosts it will be ignored. 1: time between two defrosts only compressor as long as it works. 2: time between two defrosts only evaporato the probe temperature is reduced as long as the condition is less than d9 par. 3: Adaptive defrost 4: Real-time defrost	<i>d8</i>	Read/Write
0031d	0x001F	word	If evap. probe temperature is greater than this parameter value, defrost counter will not decrease (°C/°F)	<i>d9</i>	Read/Write
0032d	0x0020	word	For the defrosting to be active, the time required for the compressor min.	<i>d15</i>	Read/Write
0033d	0x0021	word	Pre-melting time	<i>d16</i>	Read/Write
0034d	0x0022	word	The number of samples used for evaporator probe temperature averaging	<i>d17</i>	Read/Write
0035d	0x0023	word	The time the evap. temperature is below the calculated ideal evap. temperature defrost is activated if the sum has reached this set time.	<i>d18</i>	Read/Write
0036d	0x0024	word	Evap. probe temperature is less than "calculated evap. temperature-d19" defrost is active(°C/°F)	<i>d19</i>	Read/Write
0037d	0x0025	word	Two consecutive compressors in order to activate defrosting min.time	<i>d20</i>	Read/Write
0038d	0x0026	word	After the device has been switched on,consecutive time that the compressor must be active	<i>d21</i>	Read/Write

# END214 DIGITAL THERMOSTAT

## 1.1 HOLDING REGISTERS

Holding Register Adresleri		Data Type	Data Content	Parameter Name	R/W Permission
Decimal	Hex				
0039d	0x0027	word	Adaptive defrost evap. probe termination temperature (°C/°F)	<i>d22</i>	Read/Write
0040d	0x0028	word	Evaporator temperatures average increase during function Energy Saving	<i>d23</i>	Read/Write
0041d	0x0029	word	Min temperature alarm (AL) activation value (°C/°F)	<i>R 1</i>	Read/Write
0042d	0x002A	word	Min temperature alarm (AL) tipi 0: No Alarm 1:Alarm activation value "SP- A1 " 2:Alarm activation value becomes A1	<i>R 2</i>	Read/Write
0043d	0x002B	word	Max. Temperature alarm (AH) activation value (°C/°F)	<i>R 4</i>	Read/Write
0044d	0x002C	word	Max. Temperature alarm (AH) type	<i>R 5</i>	Read/Write
0045d	0x002D	word	Maximum temperature alarm (AH) display delay after power up	<i>R 6</i>	Read/Write
0046d	0x002E	word	Temperature alarm (AH,AL) display delay	<i>R 7</i>	Read/Write
0047d	0x002F	word	After the defrost has finished, the max. temperature alarm (AH) alarm display delay	<i>R 8</i>	Read/Write
0048d	0x0030	word	After the door alarm has been deactivated, the Max. temp. alarm (AH) alarm display delay	<i>R 9</i>	Read/Write
0049d	0x0031	word	To activate the power cut-off alarm when the power supply is switched on electricity generated after the device has been operated for a sufficiently long time feed interruption time	<i>R 10</i>	Read/Write
0050d	0x0032	word	Max min Temperature alarms (AL, AH) hysteresis (°C/°F)	<i>R 11</i>	Read/Write
0051d	0x0033	word	Power interruption alarm type 0 = the alarm will not be signalled 1 = the display will show the code "PF" flashing and the buzzer will be activated 2 = the display will show the code "PF" flashing and the buzzer will be activated (this last on condition that the power interruption duration is higher than time A10)	<i>R 12</i>	Read/Write
0052d	0x0034	word	Evaporator fan activity during normal operation 0 = switched off 1 = switched on; see also F13, F14 and i10 2 = in parallel with the compressor; see also F9, F13, F14 and i10 3 = dependent on F1 (16) 4 = switched off if the compressor is switched off, dependent on F1 if the compressor is switched on; see also F9 5 = dependent on F6; see also F1, F9 and F10	<i>F 0</i>	Read/Write
0053d	0x0035	word	Fan stop temperature. If the evaporator temperature is above this value, fan will not work. (°C/°F)	<i>F 1</i>	Read/Write
0054d	0x0036	word	Evaporator fan activity during defrosting and dripping 0 = switched off 1 = switched on (setting parameter d7 to 0 is recommended) 2 = dependent on F0	<i>F 2</i>	Read/Write
0055d	0x0037	word	Max time the evap. fan has been disabled	<i>F 3</i>	Read/Write
0056d	0x0038	word	Time duration that evaporator fan is switched off during operation for a low percentage of relative humidity when the compressor is switched off	<i>F 4</i>	Read/Write
0057d	0x0039	word	Time duration that evaporator fan is switched on during operation for a low percentage of relative humidity when the compressor is switched off	<i>F 5</i>	Read/Write
0058d	0x003A	word	Operation for low or high percentage of relative humidity ( <b>only if F0 = 5</b> ) 0 = LOW RELATIVE HUMIDITY 1 = MEDIUM RELATIVE HUMIDITY 2 = HIGH RELATIVE HUMIDITY	<i>F 6</i>	Read/Write
0059d	0x003B	word	The lower limit of the evap temp. at which the evap fan is deactivated(°C/°F)	<i>F 7</i>	Read/Write
0060d	0x003C	word	Fan stop temperature hysteresis (°C/°F)	<i>F 8</i>	Read/Write
0061d	0x003D	word	The time required for the fan to shut down after the compressor has switched off	<i>F 9</i>	Read/Write
0062d	0x003E	word	If the evaporator temperature is below the value set by this parameter, fan will not work (°C/°F)	<i>F 10</i>	Read/Write
0063d	0x003F	word	If the condenser probe temperature is greater than the value set by this parameterthe fan works (°C/°F)	<i>F 11</i>	Read/Write
0064d	0x0040	word	Time to close the fan due to the condenser probe	<i>F 12</i>	Read/Write
0065d	0x0041	word	The period during which the evap fan is turned off during the Energy Efficiency function	<i>F 13</i>	Read/Write
0066d	0x0042	word	The time during which the evap fan is on during the Energy Efficiency func.	<i>F 14</i>	Read/Write
0067d	0x0043	word	Effect caused by the activation of the door microswitch input: 0 : no effect 1 : the compressor and evaporator fan will be switched off 2 : the evaporator fan will be switched off 3 : the cell light will be switched on (only if u1 = 0, until the input is deactivated) 4 : the compressor and evaporator fan will be switched off (at most for time i3 or until the input is deactivated) and the cell light will be switched on (only if u1 = 0, until the input is deactivated) 5 : the evaporator fan will be switched off (at most until time i3 or until the input has been deactivated) and the cell light will be switched on (only if u1 = 0, until the input is deactivated)	<i>,0</i>	Read/Write
0068d	0x0044	word	Door digital input alarm (Id) display delay	<i>,2</i>	Read/Write
0069d	0x0045	word	After the door digital input is activated, the effect of compressor and fan max time	<i>,3</i>	Read/Write



## END214 DIGITAL THERMOSTAT

### 1.1 HOLDING REGISTERS

Holding Register Adresleri		Data Type	Data Content	Parameter Name	R/W Permission
Decimal	Hex				
0070d	0x0046	word	Effect caused by the activation of the multifunction input 0 : no effect 1 : SYNCHRONISATION OF DEFROSTING PERIODS 2 : ACTIVATION OF ENERGY SAVING FUNCTION 3 : ACTIVATION OF MULTIFUNCTION INPUT ALARM 4 : ACTIVATION OF THE PRESSURE SWITCH ALARM 5 : SWITCHING ON THE AUXILIARY OUTPUT 6 : SWITCHING OFF THE INSTRUMENT	,5	Read/Write
0071d	0x0047	word	if i5 = 3, multifunction input alarm delay (code "iA") if i5 = 4, delay in compressor switching on after the disactivation of the multifunction input	,7	Read/Write
0072d	0x0048	word	number of multifunction input alarms	,8	Read/Write
0073d	0x0049	word	time that must pass in absence of multifunction output alarms	,9	Read/Write
0074d	0x004A	word	Time without activations of the door switch input	,10	Read/Write
0075d	0x004B	word	minimum time the door switch input must be activated such as to provoke the exclusion of the consequent value of the evaporator temp. among the ones used for the calculation of the relative average	,11	Read/Write
0076d	0x004C	word	minimum time the door switch input must be activated altogether such as to provoke the exclusion of the consequent value of the evaporator temp. among the ones used for the calculation of the relative average	,12	Read/Write
0077d	0x004D	word	number of door switch input activations such as to provoke the defrost activation	,13	Read/Write
0078d	0x004E	word	minimum duration of the door switch input activation such as to provoke the defrost activation	,14	Read/Write
0079d	0x004F	word	Controlling of AUX Output : 0 : Cell light - in this case the AUXILIARY key and parameters i0 and u2 will be activated 1 : Demister resistors - in this case the AUXILIARY key and parameter u6 will be activated 2 : Auxiliary output - in this case the AUXILIARY key and params. i5 and u2 will be activated 3 : Alarm outputs - in this case parameter u4 will be activated 4 : Door resistors - in this case parameter u5 will be activated 5 : Evaporator valve - in this case parameters u7 and u8 will be activated 6 : Condenser fan - in this case parameters P4, F11 and F12 will be activated 7 : Defrost out	u1	Read/Write
0080d	0x0050	word	cell temperature below that at which the door resistors are switched on (°C/°F)	u5	Read/Write
0081d	0x0051	word	operating time of demister resistors	u6	Read/Write
0082d	0x0052	word	cell temperature below that at which the evaporator valve is disactivated (°C/°F)	u7	Read/Write
0083d	0x0053	word	time of activation of the Energy Saving in real time function	Hd1	Read/Write
0084d	0x0054	word	duration of the Energy Saving in real time function	Hd2	Read/Write
0085d	0x0055	word	time of activation of first defrosting period in real time	Hd1	Read/Write
0086d	0x0056	word	time of activation of second defrosting period in real time	Hd2	Read/Write
0087d	0x0057	word	time of activation of third defrosting period in real time	Hd3	Read/Write
0088d	0x0058	word	time of activation of fourth defrosting period in real time	Hd4	Read/Write
0089d	0x0059	word	time of activation of fifth defrosting period in real time	Hd5	Read/Write
0090d	0x005A	word	time of activation of sixth defrosting period in real time	Hd6	Read/Write
0091d	0x005B	word	User Password for Android Application	PR1	Read/Write
0092d	0x005C	word	Service Password for Android Application	PR2	Read/Write

**END214 DIGITAL THERMOSTAT****1.2 INPUT REGISTERS**

Input Register Adresleri		Data Type	Data Content	Parameter Name	R/W Permission
Decimal	Hex				
0000d	0x0000	word	Measured cabinet probe temperature value (°C / °F)	--	Read only
0001d	0x0001	word	Measured evaporator probe temperature value (°C / °F)	--	Read only
0002d	0x0002	word	Measured condenser probe temperature value (°C / °F)	--	Read only

In the Holding and Input Register parameters, integer types are defined as signed integers, and these parameters are in decimal (A parameter of "14.0" will be read as "140".) The time-related parameters "min: sec" read as sec and "hr: min" read as minutes.

**END214 DIGITAL THERMOSTAT****1.3 DISCRETE INPUTS**

Discrete Inputs Adresleri		Data Type	Data Content	Parameter Name	R/W Permission
Decimal	Hex				
0000d	0x0000	bit	Compressor relay output status (0=OFF; 1=ON)	--	Read only
0001d	0x0001	bit	Fan relay output status (0=OFF; 1=ON)	--	Read only
0002d	0x0002	bit	AUX relay output status (0=OFF; 1=ON)	--	Read only
0003d	0x0003	bit	Defrost relay output status (0=OFF; 1=ON)	--	Read only

**END214 DIGITAL THERMOSTAT****1.4 COILS**

Coil Adresleri		Data Type	Data Content	Parameter Name	R/W Permission
Decimal	Hex				
00d	0x00	Bit	Decimal point display <b>0</b> = NO <b>1</b> = YES	<i>P1</i>	Read/Write
01d	0x01	Bit	Temperature Type <b>0</b> = °C <b>1</b> = °F	<i>P2</i>	Read/Write
02d	0x02	Bit	Use Condenser probe <b>0</b> = NO <b>1</b> = YES	<i>P4</i>	Read/Write
03d	0x03	Bit	System control set value change lock operation <b>0</b> = NO <b>1</b> = YES	<i>r3</i>	Read/Write
04d	0x04	Bit	System Control Type <b>0</b> = cooling <b>1</b> = heating	<i>r8</i>	Read/Write
05d	0x05	Bit	Start Defrost with energy <b>0</b> = NO <b>1</b> = YES	<i>d4</i>	Read/Write
06d	0x06	Bit	Device manual on-off button control	-	Read/Write
07d	0x07	Bit	If the defrost alarm has reached the max display time <b>0</b> = OFF <b>1</b> = ON	<i>d11</i>	Read/Write
08d	0x08	Bit	Min temperature alarm (AL) control probe <b>0</b> = cell temp. <b>1</b> = evap. temp.	<i>R0</i>	Read/Write
09d	0x09	Bit	Door digital input activation <b>0</b> = normally open <b>1</b> = normally close	<i>,1</i>	Read/Write
10d	0x0A	Bit	Door digital input alarm (Id) storage <b>0</b> = NO <b>1</b> = YES	<i>,4</i>	Read/Write
11d	0x0B	Bit	Switching the AUX outputs off and on while manual is off. <b>0</b> = NO <b>1</b> = YES	<i>u2</i>	Read/Write
12d	0x0C	Bit	Cancel alarm output and silence buzzer when alarm occurs <b>0</b> = NO <b>1</b> = YES	<i>u4</i>	Read/Write
13d	0x0D	Bit	Evaporator output activation <b>0</b> = normally open <b>1</b> = normally close	<i>u8</i>	Read/Write
14d	0x0E	Bit	Activating the buzzer <b>0</b> = NO <b>1</b> = YES	<i>u9</i>	Read/Write
15d	0x0F	Bit	Communication mode selection <b>0</b> = wifi <b>1</b> = modbus	<i>u1E</i>	Read/Write
16d	0x10	Bit	Multi function input contact type <b>0</b> = normally open <b>1</b> = normally close	<i>,5</i>	Read/Write