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.

ENDA EDT5412A DIGITAL THERMOSTAT

Thank you for choosing **ENDA EDT5412A** Digital Thermostat.

- 54x94mm.
- On-Off control.
- Relay output selection for Defrosting or Lighting control.
- Single NTC probe input.
- Offset value can be entered for NTC input.
- Compressor protection parameters.
- In case of probe failure, compressor operation can be set to ON, OFF or periodic.
- Upper and Lower setpoint values can be set.
- Defrost duration and intervals can be set.
- 6 different warning tone selections.
- Upper and Lower alarm limits can be set to depend on setpoint value.
- Temperature unit monitoring selection (°C or °F).
- External alarm feature via digital input.
- Defrosting / Lighting startup feature via digital input or manually selection.
- Transfer device parameter settings with ENDAKEY. -no power-up required.
- RS485 ModBus protocol communication feature (optional).
- CE Marked according to European Norms.

CE RoHS Compliant

Order Code : EDT5412A - □□□ - □□ - □□
(1) (2) (3)

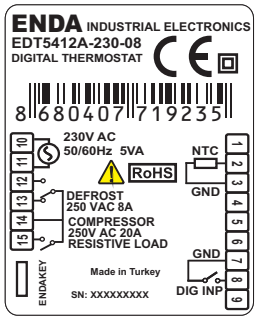
1 - Supply Voltage	2-Output	3 - Modbus
230.....230V AC	20.....20A Relay output	RS...Modbus (Specify at order)
LV.....10-30V DC / 8-24V AC	08.....08A Relay output	

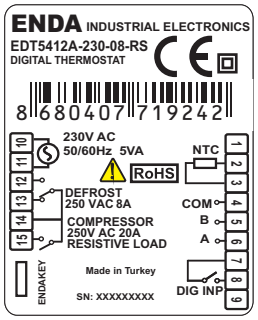
ENDA EDT5412A Series are rail mounted devices. Make sure that the device is used only for the intended purpose. The electrical connections must be carried out by qualified staff and must be according to the relevant locally applicable regulations. During installation, all of the cables that are connected 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 operating temperature is not exceeded. The cables (signal, data, sensor, etc.) should not be close to the power cables or components.

Please see page 3 for Modbus Conncetion diagram.

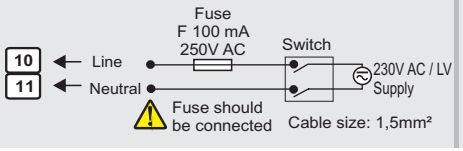
Equipment is protected throughout by **DOUBLE INSULATION**

Holding screw
0.4-0.5Nm.





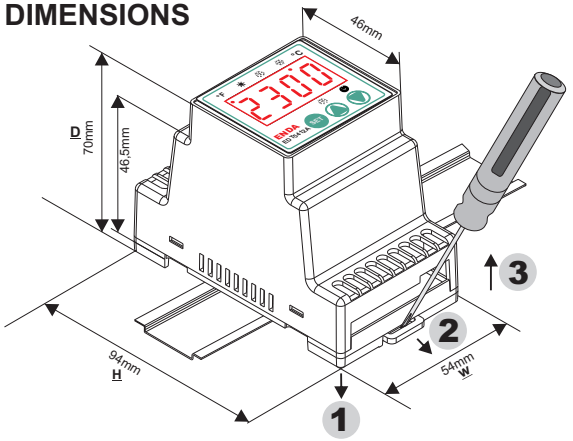
NOTE:
SUPPLY:
184-253V AC veya 10-30V DC/ 8-24V AC 50/60Hz 5VA



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.

ENVIRONMENTAL CONDITIONS	
Ambient / Storage Temperature	0 ... +50°C/-25 ... 70°C (without icing)
Relative Humidity	Relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C.
Protection Class	According to EN60529; Front panel : IP65 Rear Panel : IP20
Height	Max. 2000m
KEEP AWAY device from exposed to corrosive, volatile and flammable gases or liquids and DO NOT USE the device in similar hazardous locations.	
ELECTRICAL CHARACTERISTICS	
Supply Voltage	230V AC 50/60Hz ; 10-30V DC / 8-24V AC SMPS.
Power Consumption	Max. 5VA
Connection	2.5mm² screw-terminal connections
Scale	-60.0 ... +150.0°C (-76.0 ... +302.0°F)
Sensitivity	0.1°C (Can be selected as 0.1ºC or 1ºC.)
Accuracy	±1°C
Time Accuracy	±1%
Display	4 digits, 12.5mm, 7 segment LED
EMC	EN 61326-1: 2013
Safety requirements	EN 61010-1: 2010 (Pollution degree 2, overvoltage category II)
OUTPUTS	
Compressor Relay Output	For EDT5412A-X-R; Relay: NO+NC 250V AC,8A (for resistive load), 1/2hp, 0.37kW 240V AC (for inductive load) For EDT5412A-X-P; Relay: NO 277V AC,20A (for resistive load), 2hp, 1.49kW 250V AC (for inductive load)
Defrosting and Lighting Relay Output	For EDT5412A-X-R; Relay : NO+NC 250V AC, 8A (for resistive load), 1/2hp, 0.37kW 240V AC (for inductive load)
Life Expectancy for Compressor Relay Output	For EDT5412A-X-R; Without load 30.000.000 switching; 250V AC, 8A (resistive load) 100.000 switching. For EDT5412A-X-P; Without load 10.000.000 switching; 277V AC, 20A (resistive load) 100.000 switching.
Life Expectancy for Defrosting and Lighting Relay Output	For EDT5412A-X-R; Without load 30.000.000 switching; 250V AC, 8A (resistive load) 100.000 switching.
CONTROL	
Control Type	Single set-point control
Control Algorithm	On-Off control
Hysteresis	Adjustable between 1 ... 20.0°C.
HOUSING	
Housing Type	Suitable for flush -panel mounting
Dimensions	**W**54x**H**94x**D**70mm
Weight	Approx. 190g (After packing)
Enclosure Material	Self extinguishing plastics.
Avoid any liquid contact while the device is switched on. DO NOT clean the device with solvent (thinner, gasoline, acid etc.) and / or abrasive cleaning agents.	

DIMENSIONS



Mounting the device to the rail :

Push the device in direction **1** and provide to keep it locked on the rail.

Removing the device from rail ;

Push the rail lock on the device in direction **2** with a screwdriver and pull the device in direction **3**.

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°F FAHRENHEIT LED : Lights up when the parameter value or the measured temperature is in ° F.
This LED lights up if a parameter is displayed in the hidden menu, if also available in the user menu.

HEATING LED : Lights up when the output is active during heating control.

DEFROST LED : Lights up during the defrost process is running.

COMPRESSOR LED : Lights up if the compressor output is active and it flashes while waiting for compressor delay time.

SET Used for displaying and configuring a selected parameter value.

Used for increasing the setpoint value and changing parameters.
When held down for a few seconds, configured numeric value increases faster.

Used for decreasing the setpoint value and changing parameters.
When held down for a few seconds, configured numeric value decreases faster.

FRONT PANEL COMMANDS

1. Viewing and Changing The Setpoints

-24.0 Measurement value → -30.0 → ▼ → -29.9 → ▲ → -30.0

If SET key is pressed for 3 seconds in "Running Mode", setpoint value is displayed and it can be changed by using ▼▲ navigation keys.

2. Locking / Unlocking the Keys

-24.0 Measurement value → SET ▼ → LOC Locked / unL Unlocked

To locking or unlocking the keypad, SET ▼ keys are pressed together for 2 seconds. LOC or unL message will appears for valid status.
During LOC status, just the setpoint value will appear if the SET key is pressed.

3.Manual Defrost Settings

When ▲ key is pressed for 2 seconds in “Running Mode” while the oTYP parameter is set to dEF , defrost process will start or stop manually.
The defrosting process will be disabled if the ddur parameter is set to 0.

4.Manual Lighting Settings

When ▲ key is pressed for 2 seconds while the oTYP parameter is set to LGHt , the lighting output status changes (active or inactive).

5.Activating / Inactivating The Control Outputs

-24.0 Measurement value → ▼ → C.dIS Control output inactive. / C.Enb Control output active.

In "Running Mode", if the ▼ key is pressed for 2 seconds C.dIS message appears, control outputs become inactive and the device runs as indicator.
If ▼ key is pressed for 2 seconds during control outputs are inactive C.Enb message appears and the control operation continued.

6. Changing the Parameter Values

If ▼▲ keys are pressed together for 2 seconds, LP1 message appears and the user menu is entered, and the first parameter of the user menu is displayed. The parameter value can be displayed by pressing SET key and can be changed by using ▼▲ navigation keys.
If no operation is performed for 3 seconds while a parameter value displayed or by pressing to SET key, the parameter name will be re-displayed.
If ▼▲ keys are pressed together while the parameter name displayed, "Running Mode" is entered immediately.

Programming Mode

LP1 ⇄ LP2

7. Hidden Menu

If ▼ key is pressed for 7 seconds, LP2 message appears and the hidden menu is entered, and r2 parameter is displayed.
The parameter value can be displayed by pressing SET key and can be changed by using ▼▲ navigation keys.
Parameter accessing and/or saving operation can be performed as same as user menu.

8. Transferring the Parameters Between Menus

By pressing to SET ▼ keys together for 2 seconds, the parameter can be transferred to user menu. Up to 8 parameters can be transferred to the user menu.

uPL … HYS ⇄ uPL … C.FoS

If SET ▼ keys are pressed for 2 seconds, parameter will be removed from user menu. °F LED is continuously lit if a parameter is present in the hidden menu.
If no parameter is stored in the user menu, nP message will be displayed.

ERROR MESSAGES

PFA	No communication with the thermostat probe. Probe and/or cable broken or not connected)
PbC	Thermostat probe or connection line short-circuited.
----	Temperature value is lower than the scale.
----	Temperature value is higher than the scale.

ALARM SITUATION

-24.0 Displayed measuring value flashes if an alarm condition occurs. If Snd parameter **is not** set to 0 , buzzer will sound. Buzzer can be silenced by pressed ▲ key.

EA External alarm is active but the outputs are not affected.

SA External alarm is active and the relay outputs are in OFF situation. Buzzer can be silenced by pressed any key.

FACTORY DEFAULTS

Power-up the device by pressing and holding down the ▼ key for factory defaults. dPAr message will be displayed if the operation success.

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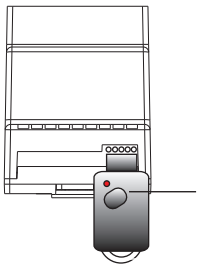
TRANSFERRING THE PARAMETERS



TRANSFERRING THE PARAMETERS FROM ENDAKEY TO DEVICE

While in "Running Mode", if ▼ 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.

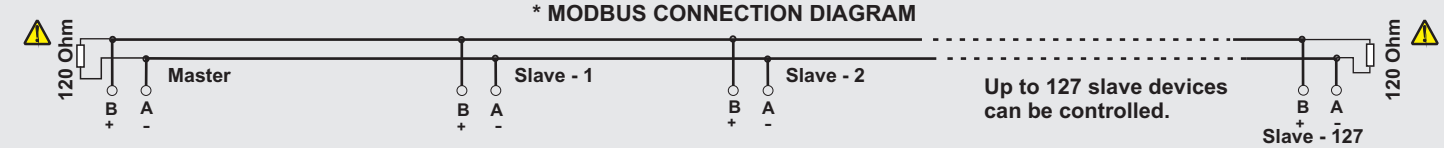
TRANSFERRING THE PARAMETERS FROM DEVICE TO ENDAKEY

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

NOTE 1 : No power-up required for transfering 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.

CONTROL PARAMETERS		MIN.	MAX.	UNIT	DEFAULT
uPL	The upper limit of the setpoint	-60.0	uPL	°C	150
LoL	The lower limit of the setpoint	LoL	150.0	°C	-60
HYS	Switch hysteresis for compressor (hysteresis)	0.1	20.0	°C	2
oFF	The offset value for the refrigeration	-20.0	20.0	°C	0
CONFIGURATION PARAMETERS					
o.tYP	Defrost / Lighting relay, output type selection. dEF : Relay assigned as defrosting function. LGHt : Relay assigned as lighting function.	dEF	LGHt		dEF
Unit	Temperature unit	°C	°F		°C
dPnt	Decimal point. no= Not displayed, e.g. 22°C, YES= Displayed e.g. 22.3°C.)	no	YES		no
Snd	Type of buzzer sound. 6 different tones can be selected. If Snd parameter **is not** set to 0 , buzzer will sound.	0	6		0
d. inP	Digital input types. nd:Digital input not used. EA: External alarm. EA message flashes on display. Output will not changed. SA: Important external alarm. SA message flashes on display. Relay output is turned off. dF: Defrost operation starting. LGHt: Lighting operation starting.	nd	LGHt		nd
dd i	Digital input delay. The period of the digital inputs to be active.	0:00	99:00		0:00
dPo	Digital input polarity. CL = While a digital input contact is closed, it is activated. oP= While a digital input is opened, it is activated.	CL	oP		CL
COMPRESSOR PROTECTION PARAMETERS					
C.Pon	Delay time for the compressor after power is on.	0:00	99:00	min:sec	1:00
C.FoS	Delay time required for the compressor to restart following a stop.	0:00	99:00	min:sec	1:00
C.PPn	On time for the compressor output in the case of probe failure.	0:00	99:00	min:sec	0:00
C.PPF	Off time for the compressor output in the case of probe failure	0:00	99:00	min:sec	1:00
DEFROST CONTROL PARAMETERS					
d.Snt	Smart Defrost selection (no : Defrost counter (between 2 defrost duration) decrease irrespective of d. int status of the compressor. YES : Defrost counter decreases as long as compressor work).	no	YES		no
d.tYP	Defros type selection. ELC : Electric defrost (compressor is switched off), GAS : Hot gas defrost (compressor is on).	ELC	GAS		ELC
d.dur	Defrost duration. If d.dur=0 , automatic and manual defrost is disabled.	0:00	99:00	min:sec	1:00
d. int	The time between 2 consecutive defrosts.	0:00	99:00	hr:min	1:00
d.dSP	Display configuration during defrost. rE = Real temperature value will be displayed. Lc = The latest temperature value will be displayed before the defrosting process. This value remains constant until the defrost is finished.	Lc.	rE		Lc.
d.drE	Actual temperature displaying delay time duration, after the defrost process is terminated.	0:00	99:00	min:sec	1:00
d.Pon	Defrost operation start procedure at power-up. no= The defrost process **will not** start with the power-up. YES= The defrost process will start with the power-up.	no	YES		no
d.dPo	Defrosting process delay time duration at power-up.	0:00	99:00	min:sec	1:00
d.drt	Dripping (discharge) duration.	0:00	99:00	min:sec	2:00
ALARM CONTROL PARAMETERS					
A.uPL	Upper-level alarm. This parameter should be re-programmed if A.tYP parameter is changed.	A.LoL	150.0	°C	150
A.LoL	Lower-level alarm. This parameter should be re-programmed if A.tYP parameter is changed.	-60.0	A.uPL	°C	-60
A.HYS	Alarm hysteresis.	0.1	20.0	°C	2
A.tYP	Alarm configuration. Abs = Independent alarm. Alarm values are A.LoL and A.uPL rEF = Relative alarm. Alarm values are SEt-A.LoL and SEt+A.uPL **NOTE :** Upper and Lower alarm level variables are determined according to the " A.tYP " parameter. If A.tYP = Abs , A.LoL and A.uPL . If A.tYP = rEF, LoL = SEt-A.LoL and A.uPL .	Abs	rEF		Abs
A.dFL	Displaying delay time duration, in case of an alarm condition.	0:00	99:00	min:sec	0:00
A.dPo	Delay time duration of alarm message display at power-up.	0:00	99:00	hr:min	0: 10
MODBUS COMMUNICATION PARAMETERS					
Adr5	Modbus slave device address for device	1	247		1
bAud	Modbus communication speed (Baud rate, 0 : oFF, 1 : 1200, 2 : 2400, 3 : 4800, 4 : 9600, 5 : 19.20)	oFF	19.20	Bps	9600

* MODBUS CONNECTION DIAGRAM



Termination should be accomplished by attaching 120 Ohm resistors to the start and at the end of the communication line.

** Applies to devices with Modbus function.*

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ENDA EDT5412A DIGITAL THERMOSTAT MODBUS PROTOCOL ADDRESS MAP

1.1 HOLDING REGISTERS

Holding Register Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission
Decimal	Hex				
0000d	0x0000	word	Set value	SEt	Read / Write
0001d	0x0001	word	Set point upper limit	uPL	Read / Write
0002d	0x0002	word	Upper level alarm	A.uPL	Read / Write
0003d	0x0003	word	Set point lower limit	LoL	Read / Write
0004d	0x0004	word	Lower level alarm	A.LoL	Read / Write
0005d	0x0005	word	The offset value for the cooling	oFF	Read / Write
0006d	0x0006	word	Cooling hysteresis	HyS	Read / Write
0007d	0x0007	word	Switch hysteresis for alarm	A.HyS	Read / Write
0008d	0x0008	word	Type of buzzer sound	Snd	Read / Write
0009d	0x0009	word	Digital input types .0=nd;1=EA;2=bA;3=dF;4=LGht	d.inP	Read / Write
0010d	0x000A	word	Digital input delay	dd i	Read / Write
0011d	0x000B	word	Delay time for the compressor after power is on.	C.Pon	Read / Write
0012d	0x000C	word	Delay time required for the compressor to restart following a stop.	C.FoS	Read / Write
0013d	0x000D	word	On time for the compressor output in the case of probe failure	C.PPn	Read / Write
0014d	0x000E	word	Off time for the compressor output in the case of probe failure	C.PPF	Read / Write
0015d	0x000F	word	Defrost duration	d.dur	Read / Write
0016d	0x0010	word	The time between 2 consecutive defrosts.	d. int	Read / Write
0017d	0x0011	word	Delay time for defrosting after power is on.	d.dPo	Read / Write
0018d	0x0012	word	After the cooling process of cooling start-up delay	d.drE	Read / Write
0019d	0x0013	word	Dripping (discharge) time	d.drt	Read / Write
0020d	0x0014	word	Time delay to display alarm message after alarm is on.	A.dFL	Read / Write
0021d	0x0015	word	Time delay to display alarm message after power is on.	A.dPo	Read / Write

1.2 INPUT REGISTERS

Input Register Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission
Decimal	Hex				
0000d	0x0000	word	Measured temperature value (°C / °F)	--	Read

* Holding and Input Register parameters of type integer, those “signed integer” is defined as the decimal port of and associated with these parameters. (So,”14.0” is a parameter value of “140” will be read in). Relevant parameters for a period of “mm:ss” type ones in seconds, “hh:mm” while those species defined in minutes.

1.3 DISCRATE INPUTS

Discrate Inputs Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission
Decimal	Hex				
0000d	0x0000	bit	Control output status (0=OFF; 1=ON)	--	Read
0001d	0x0001	bit	Defrost output status (0=OFF; 1=ON)	--	Read

1.4 COILS

Coil Addresses		Data Type	Data Content	Parameter Name	Read/Write Permission
Decimal	Hex				
00d	0x00	Bit	Defrost / Lighting output selection. OFF = dEF . ON = LGht	o.tyP	Read / Write
01d	0x01	Bit	Temperature unit. OFF = °C , ON = °F	Un it	Read / Write
02d	0x02	Bit	Decimal point . OFF=no . ON=yES	d.Pnt	Read / Write
03d	0x03	Bit	Digital input polarity. OFF = cL . ON = oP	dPo	Read / Write
04d	0x04	Bit	Smart Defrost selection. OFF = no , ON= yES	d.Snt	Read / Write
05d	0x05	Bit	Defrost type selection OFF = ELC , ON = GAS	d.tyP	Read / Write
06d	0x06	Bit	Display configuration during defrost. OFF = Lc , ON = rE	d.dSP	Read / Write
07d	0x07	Bit	Defrosting process begins with energy. OFF = no , ON = yES	d.Pon	Read / Write
08d	0x08	Bit	Alarm configuration. OFF = Abs , ON = Relative alarm rEF	A.tyP	Read / Write