Read this document carefully before using this device. The guarantee will be expired by device damages if you don't attend to the directions in the user manual. Also we don't accept any compensations for personal injury, material damage or capital disadvantages.

ENDA EDT3411 COOLING / DEFROST CONTROLLER

Thank you for choosing **ENDA EDT3411** temperature controllers.

- 77x35mm sized.
- Single NTC probe input.
- Offset value can be entered for NTC input.
- Cooling or heating control selection.
- Defrost duration and interval time settings.
- Delay time and minimum operating time settings for compressor protection.
- Compressor or door alarm control via digital input.
- Upper/Lower limits and delay time assignments for Alarm.
- In case of probe failure, output status can be set to ON, OFF or periodic.
- Upper and Lower setpoint value limits can be adjusted.
- Temperature unit can be selected °C or °F.
- RS485 communication features with Modbus RTU protocol. (Specify at Order).
- Parameter transferring feature via ENDAKEY-RF. (Specify at Order).
- CE Marked according to European standards.

R⊘HS Compliant

CE

Order Code : EDT3411 - □□□ - □□ - □□
1 2 3

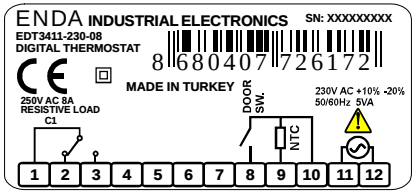
1- Supply Voltage
230.....230V AC
024.....24V AC/DC
012.....12V AC/DC
SM.....10-30VDC / 8-24VAC

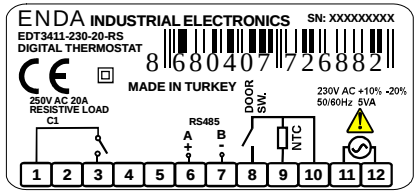
2- Output Selection
08.....8A Relay output
20.....20A Relay output

3- ModBus
Blank.....N/A
RS.....Modbus
(Specify at Order)

CONNECTION DIAGRAM

ENDA EDT3411 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.

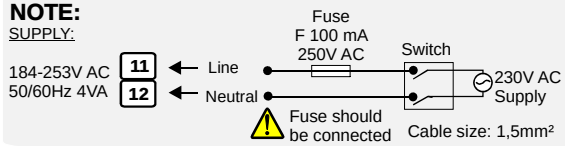




Holding screw 0.4-0.5Nm

Equipment is protected throughout by DOUBLE INSULATION.

NOTE:
SUPPLY:



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.

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TECHNICIAL SPECIFICATIONS

INPUT

Input Type		Scale Range	Accuracy
NTC Resistive Sensor	EN 60751	-60.0...150.0 °C -76.0...302.0°F	± 1% (Full scale) ± 1 digit

ENVIRONMENTAL CONDITIONS

Ambient / Storage Temperature	0 ... +50°C/-25 ... +70°C (with no icing)
Relative Humidity	80% Relative humidity for temperatures up to 31°C, decreasing linearly to 50% at 40°C.
Protection Class	According to EN 60529 ; 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	230V AC +%10-%20, 50/60Hz ; 12V AC/DC ± %10 ; 24V AC/DC ±%10 or 10-30VDC / 8-24VAC ±%10 SMPS
Power Consumption	Max. 3VA
Wiring	2.5mm² screw-terminal connections
Line Resistance	Max. 100ohm
Data Protection	EEPROM (Min. 10 years)
Time Accuracy	-±1% - 1sec.
EMC	EN 61326-1: 2013 (Performance criteria B has been satisfied for EN 61000-4-3 standard)
Safety Requirements	EN 61010-1: 2010 (Pollution degree 2, overvoltage category II).
Scale	3.5 digit, 7-segment 19mm red LED

OUTPUT

C1 Output	8A : NO and NC 250V AC, 8A (resistive load), Control output.
	20A : NO 250V AC, 20A (resistive load), Control output.
Life expectancy for relay	8A : Mechanical 30.000.000; Electrical 300.000 operation. 250V AC, 8A (resistive load).
	20A : Mechanical 30.000.000; Electrical 100.000 operation. 250V AC, 20A (resistive load).

CONTROL

Control type	Single set-point and alarm control
A/D converter	12-bit accuracy, 100ms sampling time
Hysteresis	Adjustable between 0.1 and 15.0 °C/F

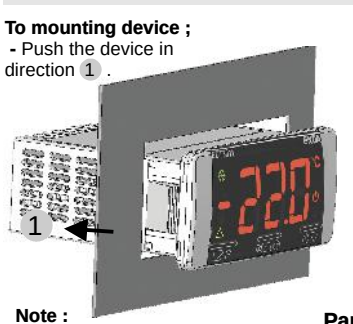
HOUSING

Housing Type	Suitable for flush-panel mounting according to DIN 43 700.
Dimensions	W77xH35xD61mm
Weight	Approx. 215g (after packing)
Enclosure Material	Self extinguishing plastics

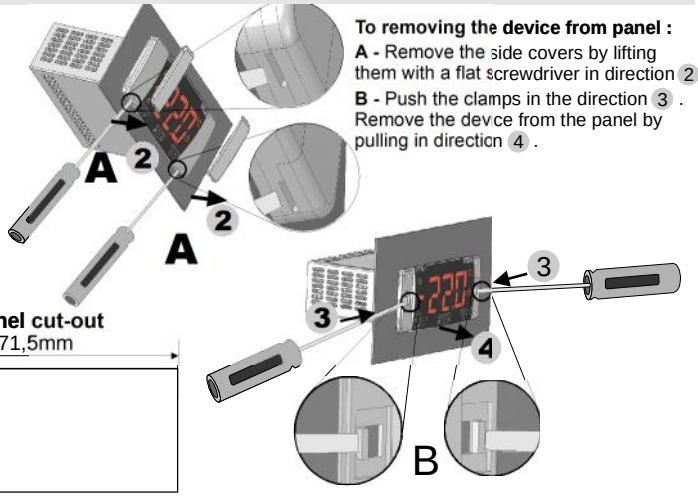
Avoid any liquid contact when the device is switched on.
DO NOT clean the device with solvent (thinner, gasoline, acid etc.) and / or abrasive cleaning agents.

Removal of the device from the front

To mounting device ;
- Push the device in direction 1 .



To removing the device from panel :
A - Remove the side covers by lifting them with a flat screwdriver in direction 2
B - Push the clamps in the direction 3 . Remove the device from the panel by pulling in direction 4 .



Note :
1) Panel thickness should be maximum 7mm.
2) If there is no 60mm free space at the back side of the device, it would be difficult to remove it from the panel.

Panel cut-out

PROGRAMMING DIAGRAM

RUNNING MODE

4.0 **Temperature value**

If this key is pressed for 2 seconds, SP message appears on display and access to temperature settings.

If this key is pressed for 4 seconds, "Programming Mode" is entered.

SP — **Default Value** 0.0 — [△] / [▽] — **C1 Set Value** -18.0 → -18.1 → -18.2 → -18.1

If any of these keys are pressed, temperature set value flashes. → Temperature set values can be adjusted by using [△] [▽] keys.

If no key is pressed within 4 seconds, "Running Mode" is entered.

During in "Programming Mode", if no key is pressed within 30 seconds, settings automatically saved and device returns to the "Running Mode" (to the home screen).
Alternatively by pressing [△] key for 4 seconds in "Programming Mode", settings automatically saved and "Running Mode" (to the home screen) is entered.

[⏻▽] If this key is pressed for 2 seconds, device will turned ON or OFF.

[△] The buzzer can be silenced by pressing 1 second during an alarm. Manual defrost operation runs or stops when this key is pressed for 4 seconds.

PROGRAMMING MODE

GENERAL SETTINGS

-Cn

Default Value		
0.0	oI	**Probe Calibration** Can be adjusted between -25.0 and 25.0
0.0	PI	**Decimal Point Selection.** 0 = Without decimal 0.0 = With decimal
°C	P2	**Temperature Unit** °C = Celsius °F = Fahrenheit
t.d	PS	**Indicator Selection in "Running Mode"** t.d = Indicates cabin temperature. SPd = Indicates SP value
n.o	I1	**Digital Input Polarity** no = Will be activated when switch position is closed. nc = Will be activated when switch position is opened.
3	I5	**Digital Input Behavior** 0 = No act. 1 = External alarm is active. At the end of I7 time, IA flashes on the screen until the external alarm is OFF. 2 = External alarm is active. At the end of the I7 time, the compressor is stopped until the external alarm is turned off and IA flashes on the display. 3 = Door is open. Compressor is stopped until the door closes and Id flashes on the screen when I7 time is up.
30	I7	**Digital Input Delay Time** Can be adjusted between 0 and 120 minutes. Can be adjusted between.
1	Ad	**Device Adress Communication address for ModBus devices.** Can be adjustable between 1 and 247.
9.6	br	**Rs485 Communication Speed** If oFF is selected ModBus communication disable. Can be adjusted 2400, 4800, 9600, 19200 and 38400 baudrate values.

TEMPERATURE SETTINGS

-rE

Default Value		
2.0	r0	**Operating Temperature Hysteresis.** Can be adjusted between **0.1** and **15.0** .
-60.0	r1	**Minimum Temperature** Can be adjusted between -60.0 and r2 .
150.0	r2	**Maximum Temperature** Can be adjusted between r1 and 150.0.
0	r5	**Cooling / Heating Selection** **0** = C1 Cooling control output (Defrost is active). **1** = C1 Heating control output (Defrost is not active).

Shown as unframed-background parameters are not visible when heating is selected.

Parameter visible	Parameter invisible

COMPRESSOR SETTINGS

-CP

If this key is pressed for 2 seconds in any parameter menu, it is returned to the Programming Mode.

Default Value		
1	C0	**Compressor Power-up Delay Time** Can be adjusted between 0 and 199 minutes.
3	C2	**Required Minimum Stop Duration for Compressor** Can be adjusted between 0 and 199.
0	C3	**Required Minimum Running Duration for Compressor** Can be adjusted between 0 and 199.
10	C4	**Compressor Stop Time In Case of Probe Failure.** Can be adjusted between 0 and 199. Can be adjusted between 0 and 199 seconds, when r5 parameter set as heating.
10	C5	**Compressor Running Time In Case of Probe Failure.** Can be adjusted between 0 and 199. Can be adjusted between 0 and 199 seconds, when r5 parameter set as heating.

DEFROST SETTINGS

-dE

Default Value		
8	d0	**Defrost Intervals.** Can be adjusted between 0 and 199 hours. Defrost process will not be performed if the parameter is set to 0. Please check dB parameter.
30	d3	**Defrost Running Time** Can be adjusted between 0 and 199 hours. Defrost process will not be performed if the parameter is set to 0.
d.no	d4	**Defrost Timing on Power-up.** d.no = Defrost not performed at power-up d.YE = Defrost performed at power-up
0	d5	**Defrost Power-up Start Delay Time** Can be adjusted between 0 and 199 minutes. It will be valid if the d4 parameter set as d.YE
1	d6	**Indicator Value Selection During Defrost.** 0 = Cabin temperature is displayed. 1 = Displayed if the cabin temperature is below SP + r0, otherwise SP + r0 is displayed. When the defrost ends, the display value does not change until the cabin temperature falls below SP+r0 .
0	d8	**Defrost Interval Types.** 0 = Defrosting timer (d0) counts during the device is running. 1 = Defrosting timer (d0) counts during the compressor is running.

ALARM SETTINGS

-AL

Default Value		
-60.0	A1	**Low Temperature Alarm Set Value.** Can be adjusted between -60.0 and 150.0°C. Hysteresis value is 2°C / 4°F.
Ab5	A2	**Low Temperature Alarm Selection.** no = No alarm rEL = Dependening on SP value. Ab5 = Independent alarm.
	A4	**Hight Temperature Alarm Set Value.** Can be adjusted between -60.0 and 150.0°C. Hysteresis value is 2°C / 4°F.
Ab5	A5	**Hight Temperature Alarm Selection.** no =No Alarm rEL =Dependent on SP value. Ab5 = Independent alarm.
120	A6	**High Temperature Alarm Delay Time After Power-up.** Can be adjusted between 0 and 240 minutes.
15	A7	**Temperature Alarm Delay Time.** Can be Adjusted between 0 and 240 minutes.
15	A8	**High Temperature Alarm Delay Time After Defrost.** Can be adjusted between 0 and 240 minutes.

CAUTION ! During defrost process, alarms will not be activated. If the door is open, the high temperature alarm will not be active.

SECURITY SETTINGS

-SC

Default Value		
0	SCd	**In order to access security menu, 311 should be entered.**

During in SCd = 0 , by holding down the [▽] key then pressing the [▽] key for 3 seconds, dEF parameter is displayed and default settings apllied.

PYE	Cn.S	**-Cn Menu Security Level** non = Menu invisible. PYE = Can be modified. PnP = Read only.
PYE	rE.S	**-rE Menu Security Level** non = Menu invisible. PYE = Can be modified. PnP = Read only.
PYE	CP.S	**-CP Menu Security Level** non = Menu invisible. PYE = Can be modified. PnP = Read only.
PYE	dE.S	**-dE Menu Security Level** non = Menu invisible. PYE = Can be modified. PnP = Read only.
PYE	AL.S	**-AL Menu Security Level** non = Menu invisible. PYE = Can be modified. PnP = Read only.
PYE	SP.S	**SP Menu Security Level** PYE = Can be modified. PnP = Read only.

SETTING UP THE PARAMETERS

r2 [✎] 50.0 [▽] 49.9 [△] 50.0 [✎]

If [✎] key is pressed, the current value of the parameter appears by flashing on display.

[▽] [△] By using "UP" or "DOWN" navigation keys, selected parameter can be adjusted to the desired value.

[✎] After the setting up the parameters, if set key is pressed again, adjusted parameter name appears on display.

During a parameter adjustment, If one of the [▽] or [△] navigation key is pressed continuously for 0.6 seconds, adjusted value to be changed increases or decreases rapidly.
If it continues to press for longer than 0.6 seconds, hundered digits will increases or decreases rapidly.
If the key released and wait for a second, then process returns to the units digit.

ERROR MESSAGES

PFA	Sensor Broken (Cannot Communicate with the Sensor)	P5C	NTC Sensor Short Circuit
---	Measured Temperature Above the Scale	AH	High Temperature Alarm
		AL	Low Temperature Alarm
---	Measured Temperature Below the Scale	IA	External Alarm active
		Id	Door Open

DEVICE to ENDAKEY-RF Parameter Transfer

If the [✎] key is pressed for 4 seconds, the device switch to "Programming Mode". If keep pressing the key for 6 seconds, then the message Hrd appears on display and the device wait for the reading from the ENDAKEY. Meanwhile, ENDAKEY should touch the upper left corner of the device and pressing the button on the ENDAKEY. PYE message appears on the display if the reading process succeeds and returned to the "Running Mode". If reading is not performed successfully, the device waits for 1 minute and returns to the "Running Mode".

ENDAKEY-RF to DEVICE Parameter Transfer

If the button on the ENDAKEY is pressed and ENDAKEY will transfer the parameters to the device then the PYE message is displayed. And the device switches to the "Running Mode".

"ENDAKEY-RF" is Supplied separately and it must be specified at order if required.

Move **ENDAKEY-RF** towards the top left of the device in direction 1

EDT3411-EN-29092021

ENDA EDT3411 COOLING / DEFROST CONTROLLER
MODBUS PROTOCOL ADDRESS MAP

1.1 Holding Registers

	Parameter Number	Holding Register Adress Decimal (Hex)	Data Type	Data Content	Read / Write Permission	Default Value
Configuration Parameters	**H0**	0000d (0000h)	Word	SP : Temperature setpoint value.	R / W	0
	H1	0001d (0001h)	Word	O1 : Offset value for temperature sensor (Can be set between -25.0 and 25.0).		0
	H2	0002d (0002h)		P1 : Decimal point (place) selection (0 = No Decimal point added , 1 = Enable).	R / W	1
	H3	0003d (0003h)	Word	P2 : °C / °F unit selection (0 = °C, 1 = °F).	R / W	0
	H4	0004d (0004h)	Word	P5 : Display parameter selection in Running Mode. (0 = Current temperature of the cabinet , 1 = SP temperature value).	R / W	0
	H5	0005d (0005h)	Word	I1 : Relay state selection for digital input. (0 = N.O. , 1 = N.C.)	R / W	0
	H6	0006d (0006h)	Word	I5 : Action selection for digital input. 0 = No action, 1 = External alarm active. (When the I7 time is over, 'iA' message flashes until the input activation is removed.) 2 = External alarm active. (When the I7 time is over, 'iA' message flashes until the input activation is removed and the compressor will shut OFF.) 3 = Door open. (Compressor output is OFF until the door is closed. And 'id' message flashes until at the end of the I7 duration.)	R / W	3
	H7	0007d (0007h)	Word	I7 : Digital input delay time duration (Can be set between 0 and 120minutes). Digital input activation will be delayed according to the set time duration.	R / W	30
	H8	0008d (0008h)	Word	Ad : ModBus address	R / W	1
	H9	0009d (0009h)	Word	br : Modbus baud rate : 0 = Disable, 1 = 2400 bps, 2 = 4800 bps, 3 = 9600 bps, 4 = 19200 bps, 5 = 38400 bps, 6 = 57600 bps	R / W	3
Main Regulator Parameters	**H10**	0010d (000Ah)	Word	R0 : Temperature setpoint hysteresis (Can be set between 0.1 and 15.0 °C or °F).	R / W	20
	H11	0011d (000Bh)	Word	R1 : Minimum setpoint value (Can be set between -50.0°C and R2 (H12) parameter value).	R / W	-50.0
	H12	0012d (000Ch)	Word	R2 : Maximum setpoint value (Can be set between R1 (H11) parameter value and 150.0°C).	R / W	150.0
Compressor Parameters	**H13**	0013d (000Dh)	Word	C0 : Compressor delay time duration on power-up (Can be set between 0 and 199 minutes).	R / W	0
	H14	0014d (000Eh)	Word	C2 : Minimum stop time duration for compressor (Can be set between 0 and 199 minutes).	R / W	3
	H15	0015d (000Fh)	Word	C3 : Minimum operating time duration for compressor (Can be set between 0 and 199 seconds).	R / W	0
	H16	0016d (0010h)	Word	C4 : Stop time duration for the compressor on probe failure (Can be set between 0 and 199 minutes).	R / W	10
	H17	0017d (0011h)	Word	C5 : Operating time duration for the compressor on probe failure (Can be set between 0 and 199 minutes).	R / W	10
Defrost Parameters	**H18**	0018d (0012h)	Word	D0 : Interval time duration for the defrosting process (Can be set between 0 and 99 hours. 0 = No Defrosting).	R / W	8
	H19	0019d (0013h)	Word	D3 : Defrosting time duration (Can be set between 1 and 99 minutes).	R / W	30
	H20	0020d (0014h)	Word	D4 : Defrosting process behaviour on power-up (0 = No Defrosing, 1 = Yes)	R / W	0
	H21	0021d (0015h)	Word	D5 : Defrosting delay time duration on power-up (If D4 is set to 1, feature will be enabled. Can be set between 0 and 199 minutes).	R / W	0
	H22	0022d (0016h)	Word	D6 : Temperature displaying selection during defrosting (0 = Yes, 1 = Will be displayed if the temperature value below setpoint value, if not, temperature setpoint value (SP) will be displayed).	R / W	1
	H23	0023d (0017h)	Word	D8 : Defrost interval time procedure (If set to 0, D0 counts the time with the power-up. If set to 1, D0 counts the time when the compressor starts).	R / W	0
Alarm Parameters	**H24**	0024d (0018h)	Word	A1 : Lower temperature alarm setpoint value (Can be set between -50.0 and 150.0°C).	R / W	10.0
	H25	0025d (0019h)	Word	A2 : Lower temperature alarm type selection (0 = No Alarm, 1 = Relative Alarm (SP -A1) , 2 = Independent Alarm).	R / W	1
	H26	0026d (001Ah)	Word	A4 : Upper temperature alarm setpoint value (Can be set between -50.0 and 150.0°C).	R / W	10.0
	H27	0027d (001Bh)	Word	A5 : Upper temperature alarm type selection (0 = No Alarm, 1 = Relative Alarm (SP +A4) , 2 = Independent Alarm).	R / W	1
	H28	0028d (001Ch)	Word	A6 : Alarm start delay time duration on power-up (Can be set between 0 and 199 minutes).	R / W	120
	H29	0029d (001Dh)	Word	A7 : Temperature alarm delay time duration (Can be set between 0 and 199 minutes).	R / W	15
	H30	0030d (001Eh)	Word	A8 : Alarm delay time duration after the defrosting process (Can be set between 0 and 199 minutes).	R / W	15
Security Parameters	**H31**	0031d (001Fh)	Word	-Cn (Configuration) menu security level. Can be set between 0 and 2. 0 = Menu Invisible, 1 = Menu parameters can be modified, 2 = Menu parameters are read only.	R / W	1
	H32	0032d (0020h)	Word	-rE (Regulator) menu security parameter (can be set like H31 parameter).	R / W	1
	H33	0033d (0021h)	Word	-CP (Compressor) menu security parameter (can be set like H31 parameter).	R / W	1
	H34	0034d (0022h)	Word	-dE (Defrost) menu security parameter (can be set like H31 parameter).	R / W	1
	H35	0035d (0023h)	Word	-AL (Alarm) menu security parameter (can be set like H31 parameter).	R / W	1
	H36	0036d (0024h)	Word	SP (H0) parameter security level. Can be set between 1 and 2. 1 = Menu parameters can be modified, 2 = Menu parameters are read only.	R / W	1

1.2 Function Parameter Memory Map

H800	0800d (0320h)	Word	Function control parameter. When the following codes are written to this parameter, corresponding operation is performed : (23040d 5A00h) = No action. (23041d 5A01h) = Returns to default (All parameters are returned to the default value). (23042d 5A02h) = Manual defrost starts or stops. (23043d 5A03h) = The device is turned ON or OFF. (23044d 5A04h) = The buzzer is switched off. (23045d 5A05h) = Device restarts.	R / W	0

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ENDA EDT3411 COOLING / DEFROST CONTROLLER
MODBUS PROTOCOL ADDRESS MAP

1.3 Input Registers

Parameter Number	Input Register Adress Decimal (Hex)	Data Type	Parameter Description	Read / Write Permission
I0	0000d (0000h)	Word	Measured temperature value (Decimal).	**R**

1.4 Discrete Inputs

Parameter Number	Discrete Input Address	Data Type	Parameter Description	Read / Write Permission
D0	(0000)h	Bit	Compressor active/inactive indicator (0 = Inactive , 1 = Active (Standing by for compressor output).	**R**
D1	(0001)h	Bit	Compressor output indicator (0 = OFF ,1 = ON).	**R**
D2	(0002)h	Bit	Low temperature alarm active/inactive indicator (0 = Inactive, 1 = Active (Standing by for Alarm output).	**R**
D3	(0003)h	Bit	High temperature alarm active/inactive indicator (0 = Inactive, 1 = Active (Standing by for Alarm output).	**R**
D4	0004d (0004h)	Bit	Low temperature alarm output indicator (0 = OFF, 1 = ON).	**R**
D5	0005d (0005h)	Bit	High temperature alarm output indicator (0 = OFF, 1 = ON).	**R**
D6	0006d (0006h)	Bit	Defrost output indicator (0 = OFF ,1 = ON).	**R**
D7	0007d (0007h)	Bit	ON/OFF status indicator (0 = OFF, 1 = ON).	**R**
D8	0008d (0008h)	Bit	Digital input status indicator (0 = Input inactive, 1 = Input active).	**R**
D9-D15	0012d (000Ch) 0015d (000Fh)	Bit	Reserved	**R**

1.5 Memory Map for Software Revision Input Registers

Software Revision	0920d (0398h)	14 Word	Software name and update is read in ASCII format and as 14 word. For example : EM4400-01 28 Feb 2015. Memory Formats : Word 1 Word 2 Word 3 Word 4 Word 5 Word 6 Word 7 Word 8 Word 9 Word 10 Word 11 Word 12 Word 13 Word 14 ME 44 00 0- 1 82F be 210.5 **NOTE :** **To view each word correctly by changing the byte sequences should be displayed as ASCII TEXT**	**R**

MODBUS ERROR MESSAGES

Modbus protocol has two types error, communication error and operating error. Reason of the communication error is data corruption in transmission. Parity and CRC control should be done to prevent communication error. Receiver side checks parity and CRC of the data. If they are wrong, the message will be ignored. If format of the data is true but function doesn't perform for any reason, operating error occurs. Slave realizes error and sends error message. Most significant bit of function is changed '1' to indicate error in error message by slave. Error code is sent in data section. Master realizes error type via this message.

ModBus Error Codes

Error Code	Name	Meaning
{01}	ILLEGAL FUNCTION	The function code received in the query is not an allowable action for the slave. If a Poll Program Complete command was issued, this code indicates that no program function preceded it.
{02}	ILLEGAL DATA ADDRESS	The data address received in the query is not an allowable address for the slave.
{03}	ILLEGAL DATA VALUE	A value contained in the query data field is not an allowable value for the slave.

Message Sample ;

Structure of command message (Byte Format)

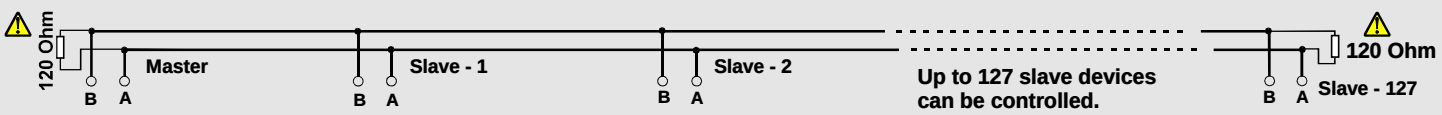
Device Address		**(0A)h**
Function Code		**(01)h**
Beginning address of coils.	**MSB**	**(04)h**
	LSB	**(A1)h**
Number of coils (N)	**MSB**	**(00)h**
	LSB	**(01)h**
CRC DATA	**LSB**	**(AC)h**
	MSB	**(63)h**

Structure of response message (Byte Format)

Device Address		**(0A)h**
Function Code		**(81)h**
Error Code		**(02)h**
CRC DATA	**LSB**	**(B0)h**
	MSB	**(53)h**

Komut mesajında görüldüğü gibi (4A1)h = 1185 nolu Coilin bilgisi istenmiş ancak 1185 adresli herhangi bir coil olmadığı için (02) nolu hata kodu (Geçersiz Veri Adresi) gönderilmiştir.

* 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.***