

# ENDA ETC PID TEMPERATURE CONTROLLER SERIES

## MODBUS ADDRESS MAP

### 1.1 Memory map for Holding Registers

Holding Register addresses Decimal (Hex)	Data type	Data content	Parameter Name	Read / Write permission
0000d (0000h)	Byte	Hysteresis of the control output (Adjustable between 1 and 50 °C/F)	<i>C.HYS</i>	Readable / Writable
0001d (0001h)	Byte	Hysteresis of the Alarm1 output (Adjustable between 1 and 50 °C/F)	<i>A1.HY</i>	Readable / Writable
0002d (0002h)	Byte	Hysteresis of the Alarm2 output (Adjustable between 1 and 50 °C/F)	<i>A2.HY</i>	Readable / Writable
0003d (0003h)	Byte	Proportional band set value (Adjustable between 0% and 100%)	<i>Pb.</i>	Readable / Writable
0004d (0004h)	Byte	Control period (Adjustable between 4 and 250)	<i>Ct.</i>	Readable / Writable
0005d (0005h)	Byte	Type of input (0 = PT100 ,1= PT100 decimal, 2 = J , 3 = K ,4 = T, 5 = S , 6 = R)	<i>inP.</i>	Readable / Writable
0006d (0006h)	Byte	Ratio of output power at the set point (Adjustable between 0% and 100%)	<i>PSEt.</i>	Readable / Writable
0007d (0007h)	Byte	Control menu access level code (0 = Invisible, 1= Modification can be done 2 or 3 = Only visible).	<i>ACon.</i>	Readable / Writable
0008d (0008h)	Byte	Alarm menu access level code (0 = Invisible, 1= Modification can be done 2 or 3 = Only visible).	<i>ARAL.</i>	Readable / Writable
0009d (0009h)	Byte	Configuration menu access level code (0 = Invisible, 1= Modification can be done 2 or 3 = Only visible).	<i>ACnF.</i>	Readable / Writable
0010d (000Ah)	Byte	Self-tune menu access level code (0 = Invisible, 1= Modification can be done 2 or 3 = Only visible).	<i>Atun.</i>	Readable / Writable
0011d (000Bh)	Byte	Type of Alarm1 (0= Independent; 1= Deviation ; 2= Band)	<i>A1tP.</i>	Readable / Writable
0012d (000Ch)	Byte	Type of Alarm2 (0= Independent; 1= Deviation ; 2= Band)	<i>A2tP.</i>	Readable / Writable
0013d (000Dh)	Byte	%Value for output during a sensor failure (Adjustable between 0% and 100%)	<i>PrEr.</i>	Readable / Writable
0014d (000Eh)	Byte	Device address for RS485 (Adjustable between 1 and 247)	<i>dAdr.</i>	Readable / Writable
0015d (000Fh)	Byte	Baud rate ( 0= None;1=1200bps ; 2=2400bps ; 3=4800bps ; 4=9600bps; 5=19200bps)	<i>bAud.</i>	Readable / Writable
0016d (0010h)	Byte	Filter coefficient (1 = Most quick response time 32 = Most slow response time)	<i>FLCo.</i>	Readable / Writable
0017d (0011h)	Byte	Type of control output ( 0 = Out1;1 = SSR. )	<i>CotS.</i>	Readable / Writable
0018d (0012h)	Byte	Soft start timer set value ( Adjustable between 0 and 250 minutes)	<i>SStS.</i>	Readable / Writable
0019d (0013h)	Word	Temperature set point value	<i>CSEt.</i>	Readable / Writable
0020d (0014h)	Word	Alarm1 set point value	<i>A1SE.</i>	Readable / Writable
0021d (0015h)	Word	Alarm2 set point value	<i>A2SE.</i>	Readable / Writable
0022d (0016h)	Word	Integral time (0.1 100.0 min)	<i>ti.</i>	Readable / Writable
0023d (0017h)	Word	Derivative time (0.01 -10.00 min)	<i>td.</i>	Readable / Writable
0024d (0018h)	Word	Set point lower limit	<i>CLoL.</i>	Readable / Writable
0025d (0019h)	Word	Set point upper limit	<i>CHiL.</i>	Readable / Writable
0026d (001Ah)	Word	Offset value (Adjustable between -99 C and +99 C)	<i>OFFS.</i>	Readable / Writable
0027d (001Bh)	Word	Alarm1 value lower limit	<i>A1LL.</i>	Readable / Writable
0028d (001Ch)	Word	Alarm1 value upper limit	<i>A1HL.</i>	Readable / Writable
0029d (001Dh)	Word	Alarm2 value lower limit	<i>A2LL.</i>	Readable / Writable
0030d (001Eh)	Word	Alarm2 value upper limit	<i>A2HL.</i>	Readable / Writable

## 1.2 Memory map for Coils

Coil addresses	Data type	Data content	Parameter Name	Read / Write permission
(0000)h	Bit	State of Alarm2 (0 = Active Low , 1 =Active High)	<i>ALSt.</i>	Readable / Writable
(0001)h	Bit	State of Alarm2 in the case of sensor failure (0 = Low , 1 = High )	<i>ALPE.</i>	Readable / Writable
(0002)h	Bit	State of Alarm1 (0 = Active Low , 1 =Active High)	<i>ALSt.</i>	Readable / Writable
(0003)h	Bit	State of Alarm1 in the case of sensor failure (0 = Low , 1 = High )	<i>ALPE.</i>	Readable / Writable
(0004)h	Bit	Configuration of the control output ( 0 = Heat ; 1 = Cool)	<i>CSA.</i>	Readable / Writable
(0005)h	Bit	Temperature unit (0 = °C ; 1 = °F)	<i>Unit.</i>	Readable / Writable

## 1.3 Memory map for Input Registers

Input register address	Data type	Data content	Parameter Name	Read / Write permission
(0000)h	Word	Process value( °C or °F )	--	Only Readable

## 1.4 Memory map for Discrete input

Discrete input addresses	Data type	Data content	Parameter Name	Read / Write permission
(0000)h...(0002)h	Bit	Don't use.	--	Only Readable
(0003)h	Bit	State of control output (0 = OFF , 1 = ON)	--	Only Readable
(0004)h	Bit	State of Alarm1 output (0 = OFF , 1 = ON )	--	Only Readable
(0005)h...(000B)h	Bit	Don't use.	--	Only Readable
(000C)h	Bit	State of SSR output (0 = OFF , 1 = ON )	--	Only Readable

## 2. MODBUS ERROR MESSAGE

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	Explanation
{01}	Wrong function	When the function code which is not supported by slave is sent, this error code is sent.
{02}	Wrong data address	When the data which is required becomes outside of address map of slave, this error code is sent.
{03}	Wrong data value	When the data which is sent is outside the boundary of modbus protocol, this error code is sent.

### Message example

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

As you see in command message, coil information of (4A1)h = 1185 is required but there isn't any coil with 1185 address. Therefore error code with number (02) (wrong data address) sends.