ENDA EPC PID PROFILE CONROLLER SERIES
MODBUS PROTOCOL ADDRESS MAP

1.1 Memory map for Holding Registers

Holding Register addresses Desimal (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)	C.HYS	Readable / Writable
0001d (0001h)	Byte	Hysteresis of the Alarm1 output (Adjustable between 1 and 50 °C/F)	A1.HY	Readable / Writable
0002d (0002h)	Byte	Hysteresis of the Alarm2 output (Adjustable between 1 and 50 °C/F)	A2.HY	Readable / Writable
0003d (0003h)	Byte	Proportional band set value (Adjustable between 0% and 100%)	Pb.	Readable / Writable
0004d (0004h)	Byte	Control period (Adjustable between 4 and 250)	Ct.	Readable / Writable
0005d (0005h)	Byte	Type of input (0 = PT100 ,1= PT100 decimal, 2 = J , 3 = K ,4 = T, 5 = S , 6 = R ,7 = 0-20mA , 8=4-20mA	inP.	Readable / Writable
0006d (0006h)	Byte	Ratio of output power at the set point (Adjustable between 0% and 100%)	P.SEt.	Readable / Writable
0007d (0007h)	Byte	Control menu accsess level code (0 = Invisible, 1= Modification can be done 2 or 3 = Only visible).	A.Con.	Readable / Writable
0008d (0008h)	Byte	Parameter's of A.Lr. 1 menu security level parameter (nonE= Invisible,YES= Modification can be done,P.no=Only visible.)	A.AL.1.	Readable / Writable
0009d (0009h)	Byte	Paramater's of A.Lr.2 menu security level parameter (nonE= Invisible,YES=Modification can be done,P.no=Only visible.)	A.AL.2.	Readable / Writable
0010d (000Ah)	Byte	Configuration menu accsess level code (0 = Invisible, 1= Modification can be done 2 or 3 = Only visible).	A.CnF.	Readable / Writable
0011d (000Bh)	Byte	Self-tune menu accsess level code (0 = Invisible, 1= Modification can be done 2 or 3 = Only visible).	A.tun.	Readable / Writable
0012d (000Ch)	Byte	Type of Alarm1 (0= Independent; 1= Deviation ; 2= Band)	A1.tP.	Readable / Writable
0013d (000Dh)	Byte	Type of Alarm2 (0= Independent; 1= Deviation ; 2= Band)	A2.tP.	Readable / Writable
0014d (000Eh)	Byte	%Value for output during a sensor failure (Adjustable between 0% and 100%)	Pr.Er.	Readable / Writable
0015d (000Fh)	Byte	Device address for RS485 (Adjustable between 1 and 247)	d.Adr.	Readable / Writable
0016d (0010h)	Byte	Baud rate (0= None;1=1200bps ; 2=2400bps ; 3=4800bps ; 4=9600bps; 5=19200bps)	bAud.	Readable / Writable
0017d (0011h)	Byte	Filter coefficient (1 = Most quick response time 32 = Most slow response time)	FL.Co.	Readable / Writable
0018d (0012h)	Byte	Type of control output (0 = Out1;1 = SSr. ; 2 = 0-20 ; 3 = 4-20)	C.otS.	Readable / Writable
0019d (0013h)	Byte	Time base set parameter (0 = Second,1 = Minute)	t.bAS.	Readable / Writable
0020d (0014h)	Byte	Action of Parameter on parameter (0 = Stop,1 = Continue)	P.on.t.	Readable / Writable
0021d (0015h)	Byte	Maximum segment number (Can be adjustable 0-8.)	S.nun.	Readable / Writable
0022d (0016h)	Byte	Display selection parameter (Can be adjustable 0-10.)	d.SEL.	Readable / Writable
0023d (0017h)	Byte	Self tune control parameter (0 = Self tune stop,1 = Self tune start)	S.tu.E.	Readable / Writable
0256d (0100h)	Word	The temperature set value will be done self tune.	C.SEt	Readable / Writable
0257d (0101h)	Word	Alarm1 set value	A1.SE.	Readable / Writable
0258d (0102h)	Word	Alarm2 set value	A2.SE.	Readable / Writable
0259d (0103h)	Word	Integral time (0.1 100.0 min)	t i.	Readable / Writable
0260d (0104h)	Word	Derivative time (0.01 -10.00 min)	td.	Readable / Writable
0261d (0105h)	Word	Set point lower limit	C.Lo.L.	Readable / Writable
0262d (0106h)	Word	Set point upper limit	C.H i.L.	Readable / Writable
0263d (0107h)	Word	Offset value (Adjustable between -99 C and +99 C)	OFFS.	Readable / Writable
0264d (0108h)	Word	Alarm1 value lower limit	A1.L.L.	Readable / Writable
0265d (0109h)	Word	Alarm1 value upper limit	A1.H.L.	Readable / Writable
0266d (010Ah)	Word	Alarm2 value lower limit	A2.L.L.	Readable / Writable
0267d (010Bh)	Word	Alarm2 value upper limit	A2.H.L.	Readable / Writable
0268d (010Ch)	Word	Segment increment temperature band.(Can be adjustable between the 0 and set point upper limit.)	SE. iP.	Readable / Writable

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Holding Register addresses Desimal (Hex)	Data Type	Data Content	Parameter Name	Read / Write permission
0512d (0200h)	Word	1.Segment target temperature value	t.tE. 1	Readable / Writable
0513d (0201h)	Word	1.Segment time value	t 1. 1	Readable / Writable
0514d (0202h)	Word	2.Segment target temperature value	t.tE.2	Readable / Writable
0515d (0203h)	Word	2.Segment time value	t 1.2	Readable / Writable
0516d (0204h)	Word	3.Segment target temperature value	t.tE.3	Readable / Writable
0517d (0205h)	Word	3.Segment time value	t 1.3	Readable / Writable
0518d (0206h)	Word	4.Segment target temperature value	t.tE.4	Readable / Writable
0519d (0207h)	Word	4.Segment time value	t 1.4	Readable / Writable
0520d (0208h)	Word	5.Segment target temperature value	t.tE.5	Readable / Writable
0521d (0209h)	Word	5.Segment time value	t 1.5	Readable / Writable
0522d (020Ah)	Word	6.Segment target temperature value	t.tE.6	Readable / Writable
0523d (020Bh)	Word	6.Segment time value	t 1.6	Readable / Writable
0524d (020Ch)	Word	7.Segment target temperature value	t.tE.7	Readable / Writable
0525d (020Dh)	Word	7.Segment time value	t 1.7	Readable / Writable
0526d (020Eh)	Word	8.Segment target temperature value	t.tE.8	Readable / Writable
0527d (020Fh)	Word	8.Segment time value	t 1.8	Readable / Writable
0528d (0210h)	Word	AL2 outputs set value MSB | Seg8 | Seg7 | Seg6 | Seg5 | Seg4 | Seg3 | Seg2 | Seg1 | 15 14 13 12 11 10 9 8 AL1 outputs set value LSB | Seg8 | Seg7 | Seg6 | Seg5 | Seg4 | Seg3 | Seg2 | Seg1 | 7 6 5 4 3 2 1 0 EXAMPLE: If MSB, Seg2=1, while the 2.segment working;AL2=0. If LSB, Seg5=1, while the 5.segment working;AL1=0.	-----	

1.2 Memory map for Coils

Coil addresses	Data type	Data content	Parameter Name	Read / Write permission
(0000)h	Bit	Alarm2 Situation (0 = Active Low ,1 =Active High)	A2.St.	Readable / Writable
(0001)h	Bit	In probe failure, Alarm2 output's position (0 = Low , 1 = High)	A2.P.E.	Readable / Writable
(0002)h	Bit	Alarm1 Situation (0 = Active Low ,1 =Active High)	A 1.St.	Readable / Writable
(0003)h	Bit	In probe failure,Alarm1 output's position (0 = Low , 1 = High)	A 1.P.E.	Readable / Writable
(0004)h	Bit	The control output's configuration (0 = Heat ; 1 = Cool)	C.StA.	Readable / Writable
(0005)h	Bit	Temperature unit (0 = °C ; 1 = °F)	Un it.	Readable / Writable
(0007)h	Bit	Consistently control (If C.con= 0 is not consistently temperature) control,If C.con=1 has a consistently temperature control.)	C.con.	Readable / Writable

1.3 Memory map for Function Coils (Only,It can write with 05 (Write Single Coil) function.

Coil addresses	Data Type	Data Content	Parameter Name	Read / Write permission
0256d (0100h)	Bit	Start / Hold Function (1 = Start / Hold , 0 = Invalid data)	------	Only Writable
0257d (0101h)	Bit	Stop Function (1 = Stop, 0 = Invalid data)	------	Only Writable

1.4 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
(0001)h	Word	Analog output percent (%).Between the 0-100.	--	Only Readable
(0002)h	Word	Profile timer value (Second or minute)	--	Only Readable
(0003)h	Word	Segment number value (Can be taked values between 0-7.)	--	Only Readable

1.5 Memory Map for Discrete Input

Discrete input addresses	Data Type	Data content	Parameter Name	Read / Write permission
(0000)h...(0002)h	Bit	This addresses are not available	--	Only Readable
(0003)h	Bit	Control/Alarm2 output situation (0 = OFF ,1 = ON)	--	Only Readable
(0004)h	Bit	Alarm1 output situation (0 = OFF , 1 = ON)	--	Only Readable
(0006)h...(000B)h	Bit	This addresses are not available	--	Only Readable
0012d (000Ch)	Bit	SSR output situation (0 = OFF ,1 = ON)	--	Only Readable
(000D)h...(000F)h	Bit	This addresses are not available	--	Only Readable
0016d (0010h)	Bit	Run situation (0 = Run off ,1 = Run on)	--	Only Readable
0017d (0011h)	Bit	Hold situation (0 = Hold off ,1 = Hold 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 suppoted 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.