

### 3. MODBUS RTU PROTOCOL

#### MODBUS RTU PROTOCOL

Standard message format of MODBUS RTU is as below :

T	ADDRESS 8 BITS	FUNCTION 8 BITS	DATA N x 8 BITS	CRCH	CRCL	T
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Starting and finishing of T times, which are as much as 3.5 characters time, are time periods of data lines which must be constant for evaluating by devices at the line if the message starts or finishes.

**Address** area, which is between 1 and 247, shows the serial address of device at the line.

**Data** area contains the data which is sent to device from slave to master or from master to slave.

**CRC** is a determination method of error which is used at the MODBUS RTU Protocol and it has 2 bytes

#### 3.1 Modbus Functions:

<b>03H</b>	REGISTER READING	<b>14H</b>	LOG DATA RECORD READING
<b>06H</b>	SINGLE REGISTER WRITING	<b>2BH</b>	DEVICE INFORMATION READING
<b>10H</b>	MULTIPLE REGISTER WRITING		

Register Reading (03H) function is used to read measured parameters and transformer ratios. If a register is tried to read except for values, device sends error message.

Example : This message must be sent to the device for reading the phase-neutral voltage of Phase 1;

**01** Device address  
**03** Function  
**00** MSB address  
**00** LSB address  
**00** Register numbers MSB  
**01** Register numbers LSB  
**84** CRC MSB  
**0A** CRC LSB

Single register writing command (06) is used to set the transformer ratios or clear any of min., max. or demand values. Current transformer ratio can be entered between 1 and 5000 and voltage transformer ratio can be entered between 1 and 4000. Only "0" (zero) value can be entered to the demand values.

For setting the CT ratio as 100;

**01** Device address  
**06** Function  
**01** MSB address  
**00** LSB address  
**00** Data MSB  
**64** Data LSB  
**89** CRC MSB  
**DD** CRC LSB

Multiple register writing command (10H) is used to change more than one register value. For setting the CT ratio as 100 and voltage transformer ratio as 2;

**01** Device address  
**10** Function  
**01** MSB address  
**00** LSB address  
**00** Register number MSB  
**02** Register number LSB  
**04** Byte number  
**00** Data MSB  
**64** Data LSB  
**00** Data MSB  
**C8** Data LSB  
**BE** CRC MSB  
**76** CRC LSB

#### RESPONSE

**01** Device address  
**10** Function  
**01** Register address (high)  
**00** Register address (low)  
**00** Number of registers (high)  
**02** Number of registers (low)  
**40** CRC (high)  
**34** CRC (low)

Parameters are transmitted as 16 bit hexadecimal.

For example:

- 230,6 V voltage value of the device is received as 2306 (0902H) and real value is obtained by multiplying to its multiplier (x0,1) and VT ratio
- 1,907A current value is received as 1907 (0773H) and it is multiplied by 0,001 and CT ratio
- -0,78 P.F. value is received as FCF4H. (16 bit signed integer)
- Energy values are sent as 2 words in 16 bit register table.  
 Energy value = (High x 10.000) + Low  
 Example :           **Low High**  
 06237819 kWh = 1E8BH 026FH

### 3.2 Features of connection cable:

- Screened
- 24 AWG or more thickness
- DC resistance : =<100 ohm/km
- Characteristic impedance : 100 ohm for 100kHz
- Capacitor between two conductors : =< 60 pF/m
- Capacitor between one conductor and earth : =< 120 pF/m

### 3.3 I/O Relay Status Register.

I/O Relay Status register is used to observe the status of device outputs

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	Relay2	Relay1

(Only for MPR60S/MPR60S-21/41)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0	0	0	0	0	Input2	Input1	Relay2	Relay1

(Only for MPR60S-10/20/40)

- When Relay 1 is switched on, 0 (zero) bit of I/O Relay Status Register is read as 1 and when Relay 1 is not switched on it is read as 0.
- When Relay 2 is switched on, 1st bit of I/O Relay Status Register is read as 1 and when Relay 2 is not switched on it is read as 0.
- If Relay Functions (Setup register:011AH/012DH) is set to "1" then Relay 1/2 functions as "Digital Output 1/2".

For switch **ON** Relay 1     **Example**     : 01 06 00 4C 00 01 CRC  
 For switch **ON** Relay 2     **Example**     : 01 06 00 4C 00 02 CRC  
 For switch **ON** both relays **Example**     : 01 06 00 4C 00 03 CRC  
 For switch **OFF** both relays **Example**     : 01 06 00 4C 00 00 CRC

### 3.4 Learning of device informations (2BH)

Following data packet is sent to device to learn the device code, program version, manufacturer name and manufacturer web site :

**01 2B 0E 01 00 70 77**

### 3.5 Reading and writing to data logs from device (14H)

Modbus RTU 14H function is used to transmit measured parameters to the computer, when the device is not connected with computer.

**01 14 07 06 00 00 00 02 00 01 99 24**

**01** Device address  
**14** Function  
**07** Byte number  
**06** Reference type  
**00** File number MSB } 0-15  
**00** File number LSB }  
**00** Record number MSB } 0-999  
**02** Record number LSB }  
**00** Record length MSB } 1  
**01** Record length LSB }  
**99** CRC MSB  
**24** CRC LSB

**Answer**  
**01** Device address  
**14** Function  
**46** Data length  
**20** Record length  
**06** Reference type  
**00** Record number MSB  
**02** Record number LSB  
**02** Record date Day  
**10** Record date Month  
**05** Record date Year  
**19** Record date Hour  
**07** Record date Minute  
**23** Record date Second  
**08** Data 01 MSB  
**BC** Data 01 LSB  
**08** Data 02 MSB  
**95** Data 02 LSB  
 : : : :  
**00** Data 28 MSB  
**00** Data 28 LSB  
**71** CRC MSB  
**B0** CRC LSB



**Warning : Data logs must be deleted individually for each file.**  
**For deleting the data logs at the File 0, below request must be sent.**  
**Request : 01 06 04 01 00 00 D9 3A**  
**Response : 01 06 04 01 00 00 D9 3A**  
 record numbers

\* Please refer to page 12 for energy log table.

	Log format	Type	Range
1	Index Hi	Word	0..999
	Index Lo		
2	Day Hi	Word	1..31
	Month Lo		
3	Year Hi	Word	00..99
	Hour Lo		
4	Minute Hi	Word	00..59
	Second Lo		
5	Data 01 Hi	Word	0..65535
	Data 01 Lo		
6	Data 02 Hi	Word	0..65535
	Data 02 Lo		
:	:		
31	Data 28 Hi	Word	0..65535
	Data 28 Lo		
32	CRC	Word	CRC16

### 3.6 File Record Information Table

It shows the number of records, open file and total number of recordings of the files which have data logs.

ADDRESS	DESCRIPTION	DIMENSION
0400H	File which is recorded now. (0-14)	word
0401H	Record numbers at File 0	word
0402H	Record numbers at File 1	word
:	:	:
0410H	Record numbers at energy file	word
0411H	Total record numbers	word

### 3.7 Energy Log

Index	Energy Log Format	Dimension	Multiplier	Range	Unit
1	Index	Word	Data	0..999	-
2	Day(Hi)	Word	Data	1..31	d
	Month(Lo)			1..12	m
3	Year(Hi)	Word	Data	00..99	y
	Hour (Lo)			00..23	h
4	Minute(Hi)	Word	Data	00..59	m
	Second (Lo)			00..59	s
5	Import Active Energy(Lo)	Word	Data	-	kWh/MWh
6	Import Active Energy(Hi)	Word	Data x 10000	99999999	
7	Export Active Energy (Lo)	Word	Data	-	kWh/MWh
8	Export Active Energy(Hi)	Word	Data x 10000	99999999	
9	Inductive Reactive Energy(Lo)	Word	Data	-	kVArh/MVArh
10	Inductive Reactive Energy(Hi)	Word	Data x 10000	99999999	
11	Capacitive Reactive Energy(Lo)	Word	Data	-	kVArh/MVArh
12	Capacitive Reactive Energy(Hi)	Word	Data x 10000	99999999	
13	Voltage High LN1	Word	Data x VT x 0.1	0...Vmax	V
14	Voltage High LN2	Word	Data x VT x 0.1	0...Vmax	V
15	Voltage High LN3	Word	Data x VT x 0.1	0...Vmax	V
16	Current High Demand L1	Word	Data x CT x 0.001	0...Imax	A
17	Current High Demand L2	Word	Data x CT x 0.001	0...Imax	A
18	Current High Demand L3	Word	Data x CT x 0.001	0...Imax	A
19	Current Demand L1	Word	Data x CT x 0.001	0...Imax	A
20	Current Demand L2	Word	Data x CT x 0.001	0...Imax	A
21	Current Demand L3	Word	Data x CT x 0.001	0...Imax	A
22	Total Curent High Demand	Word	Data x CT x 0.001	0...Imax	A
23	Energy Counter Unit	Word	Data	0:Kilo/1:Mega	-
24	Total Current Demand	Word	Data x CT x 0.001	0...Imax	A
25	Total Active Power Demand	Signed Word	Data x VT x CT	0..±Ptmax	W
26	Total Reactive Power Demand	Signed Word	Data x VT x CT	0..±Qtmax	VAr
27	Total Appearnt Power Demand	Word	Data x VT x CT	0..Stmax	VA
28	Frequency	Word	Data x 0.01	45.00..65.00	Hz
29	Total Power Factor	Signed Word	Data x 0.001	-1.000..1.000	-
30	Current Transformer Ratio	Word	Data	1..2000	-
31	Voltage Transformer Ratio	Word	Data x 0.1	1..4000.0	-
32	Energy Pack CRC	Word	Data	CRC 16	-

### 3.8 ERROR CODES

If an inappropriate message is sent to device in MODBUS-RTU protocol, device sends an error message.

Error codes are mentioned below :

#### 01 Invalid Function

This message is received when a function is used which is not supported by device.

#### Example :

Request 01 07 04 01 00 00 CRC

Response **01** Device address

**87** 80 h + 07h

constant invalid function code

**01** Error code

**82** CRC (high)

**30** CRC (low)

#### 02 Invalid Register

This message is received when an address is wanted to reach which is not found in register table of device.

#### Example :

Request 01 06 50 00 00 CRC

Response **01** Device address

**86** 80 h + 06h

constant function code

**02** Error code

**C3** CRC (high)

**A1** CRC (low)

#### 03 Invalid Data :

This message is received when data is not found in required value intervals which is wanted to write.

#### Example :

Request 01 03 00 00 00 FF CRC

Response **01** Device address

**83** 80 h + 03h

constant function code

**03** Error code

**01** CRC (high)

**31** CRC (low)

### 3.9 MPR-SW; Interface Program

MPR-SW is a recording and analysis program which is designed to use with all Entes products which has RS-485 outputs. MPR-SW Program records each parameter of the connected Entes products with programmable time intervals, draws graphics, billing for the energy consumption between adjustable dates, with 2 way communication. Maximum 247 devices can communicate with one software.

Device takes 64 samples in each period. For 50 Hz, it takes 3200 samples in one second and for 60 Hz, it takes 3840 samples in one second.

### 3.10 Data Register Map (16 bit)

ADDRESS	DESCRIPTION	DIMENSION (16 bit)	MULTIPLIER	RANGE	UNIT
0000H	Voltage LN1	Word	Data x VT x 0.1	0 .. Vmax	V
0001H	Voltage LN2	Word	Data x VT x 0.1	0 .. Vmax	V
0002H	Voltage LN3	Word	Data x VT x 0.1	0 .. Vmax	V
0003H	Current LN1	Word	Data x CT x 0.001	0 .. Imax	A
0004H	Current LN2	Word	Data x CT x 0.001	0 .. Imax	A
0005H	Current LN3	Word	Data x CT x 0.001	0 .. Imax	A
0006H	Total Current	Word	Data x CT x 0.001	0 .. Imax	A
0007H	Active Power L1	Signed Int	Data x VT x CT	0 .. ±Pmax	W
0008H	Active Power L2	Signed Int	Data x VT x CT	0 .. ±Pmax	W
0009H	Active Power L3	Signed Int	Data x VT x CT	0 .. ±Pmax	W
000AH	Reactive Power L1	Signed Int	Data x VT x CT	0 .. ±Qmax	VAr
000BH	Reactive Power L2	Signed Int	Data x VT x CT	0 .. ±Qmax	VAr
000CH	Reactive Power L3	Signed Int	Data x VT x CT	0 .. ±Qmax	VAr
000DH	Apparent Power L1	Word	Data x VT x CT	0 .. Smax	VA
000EH	Apparent Power L2	Word	Data x VT x CT	0 .. Smax	VA
000FH	Apparent Power L3	Word	Data x VT x CT	0 .. Smax	VA
0010H	Power Factor L1	Signed Int	Data x 0.001	-1.000 .. 1.000	-
0011H	Power Factor L2	Signed Int	Data x 0.001	-1.000 .. 1.000	-
0012H	Power Factor L3	Signed Int	Data x 0.001	-1.000 .. 1.000	-
0013H	Cos L1	Signed Int	Data x 0.001	-1.000 .. 1.000	-
0014H	Cos L2	Signed Int	Data x 0.001	-1.000 .. 1.000	-
0015H	Cos L3	Signed Int	Data x 0.001	-1.000 .. 1.000	-
0016H	Voltage L12	Word	Data x VT x 0.1	0 .. Vmax	V
0017H	Voltage L23	Word	Data x VT x 0.1	0 .. Vmax	V
0018H	Voltage L31	Word	Data x VT x 0.1	0 .. Vmax	V
0019H	Voltage LN	Word	Data x VT x 0.1	0 .. Vmax	V
001AH	Voltage LL	Word	Data x VT x 0.1	0 .. Vmax	V
001BH	Frequency	Word	Data x 0.01	45.00 .. 65.00	Hz
001CH	Total Active Power	Signed Int	Data x VT x CT	0 .. ±Pt max	W
001DH	Total Reactive Power	Signed Int	Data x VT x CT	0 .. ±Qt max	VAr
001EH	Total Apparent Power	Word	Data x VT x CT	0 .. St max	VA
001FH	THD V1	Word	Data x 0.1	0 .. 900	%
0020H	THD V2	Word	Data x 0.1	0 .. 900	%
0021H	THD V3	Word	Data x 0.1	0 .. 900	%
0022H	THD V3P	Word	Data x 0.1	0 .. 900	%
0023H	THD I1	Word	Data x 0.1	0 .. 900	%
0024H	THD I2	Word	Data x 0.1	0 .. 900	%
0025H	THD I3	Word	Data x 0.1	0 .. 900	%
0026H	THD I3P	Word	Data x 0.1	0 .. 900	%
0027H	*Voltage High LN1	Word	Data x VT x 0.1	0 .. Vmax	V
0028H	*Voltage High LN2	Word	Data x VT x 0.1	0 .. Vmax	V
0029H	*Voltage High LN3	Word	Data x VT x 0.1	0 .. Vmax	V
002AH	*Voltage Low LN1	Word	Data x VT x 0.1	0 .. Vmax	V
002BH	*Voltage Low LN2	Word	Data x VT x 0.1	0 .. Vmax	V
002CH	*Voltage Low LN3	Word	Data x VT x 0.1	0 .. Vmax	V
002DH	*Demand Current High L1	Word	Data x CT x 0.001	0 .. Imax	A
002EH	*Demand Current High L2	Word	Data x CT x 0.001	0 .. Imax	A
002FH	*Demand Current High L3	Word	Data x CT x 0.001	0 .. Imax	A
0030H	*Demand Current Low L1	Word	Data x CT x 0.001	0 .. Imax	A
0031H	*Demand Current Low L2	Word	Data x CT x 0.001	0 .. Imax	A
0032H	*Demand Current Low L3	Word	Data x CT x 0.001	0 .. Imax	A
0033H	*Demand Current L1	Word	Data x CT x 0.001	0 .. Imax	A
0034H	*Demand Current L2	Word	Data x CT x 0.001	0 .. Imax	A
0035H	*Demand Current L3	Word	Data x CT x 0.001	0 .. Imax	A
0036H	*Demand Total Current High	Word	Data x CT x 0.001	0 .. Imax	A
0037H	*Demand Total Current Low	Word	Data x CT x 0.001	0 .. Imax	A
0038H	*Demand Total Current	Word	Data x CT x 0.001	0 .. Imax	A
0039H	*Demand Total Active Power	Signed Int	Data x VT x CT	0 .. Pt max	W
003AH	*Demand Total Reactive Power	Signed Int	Data x VT x CT	0 .. Qt max	VAr
003BH	*Demand Total Apparent Power	Word	Data x VT x CT	0 .. St max	VA
003CH	*Import Active Energy Lo	Word	(Data +)	-	-
003DH	*Import Active Energy Hi	Word	Data x 10000	99999999	kWh/MWh
003EH	*Export Active Energy Lo	Word	(Data +)	-	-
003FH	*Export Active Energy Hi	Word	Data x 10000	99999999	kWh/MWh
0040H	*Inductive Reactive Energy Lo	Word	(Data +)	-	-
0041H	*Inductive Reactive Energy Hi	Word	Data x 10000	99999999	kVAh/MVAh
0042H	*Capacitive Reactive Energy Lo	Word	(Data +)	-	-
0043H	*Capacitive Reactive Energy Hi	Word	Data x 10000	99999999	kVAh/MVAh
0044H	Hour	Word	Data	0 .. 23	h
0045H	Minute	Word	Data	0 .. 59	m
0046H	Second	Word	Data	0 .. 59	s
0047H	Day	Word	Data	0 .. 31	day
0048H	Month	Word	Data	0 .. 12	month
0049H	Year	Word	Data	00 .. 99	year
004AH	Current Transformer Ratio	Word	Data	1 .. 5000	-
004BH	Voltage Transformer Ratio	Word	Data x 0.1	1.0 .. 4000.0	-
004CH	IO Relay Status (only MPR60S/60S-21/41)	Binary	Data & 0x0003	b0:Relay1,b1:Relay2	-
	IO Relay and Control Status (only MPR60S-10/20/40)	Binary	Data & 0x000F	b0:Relay1,b1:Relay2 b2:Input1, b3:Input2	-
004DH	Total Power Factor	Signed Int	Data x 0.001	-1.000 .. 1.000	-
004EH	Neutral Current	Word	Data x CT x 0.001	0..IN max.	A
004FH	*Demand Total Active Power High	Signed Int	Data x VT x CT	0 .. +Pt max	W
0050H	*Demand Total Reactive Power High	Signed Int	Data x VT x CT	0 .. +Qt max	VAr
0051H	*Demand Total Apparent Power High	Word	Data x VT x CT	0 .. St max	VA
0052H	*Demand Total Active Power Low	Signed Int	Data x VT x CT	0 .. +Pt max	W
0053H	*Demand Total Reactive Power Low	Signed Int	Data x VT x CT	0 .. +Qt max	VAr
0054H	*Demand Total Apparent Power Low	Word	Data x VT x CT	0 .. St max	VA

Word : 16bit Unsigned (0..65,535)  
Signed Int : 16bit Signed (-32,768 .. 32,767)

\* Writable registers (Only "0" (zero) value can be written)

### 3.11 Data Register Map (32 bit)

(Following values are multiplied by Voltage and Current Transformer Ratios)

ADDRESS	DESCRIPTION	DIMENSION (32 bit)	MULTIPLIER	RANGE	UNIT
4000H	Voltage LN1	Long	Data x 0.01	0 .. Vmax x VT	V
4002H	Voltage LN2	Long	Data x 0.01	0 .. Vmax x VT	V
4004H	Voltage LN3	Long	Data x 0.01	0 .. Vmax x VT	V
4006H	Current LN1	Long	Data x 0.001	0 .. Imax x CT	A
4008H	Current LN2	Long	Data x 0.001	0 .. Imax x CT	A
400AH	Current LN3	Long	Data x 0.001	0 .. Imax x CT	A
400CH	Total Current	Long	Data x 0.001	0 .. Imax x CT	A
400EH	Active Power L1	Signed Long	Data x 0.01	0 .. ±Pmax x VT x CT	W
4010H	Active Power L2	Signed Long	Data x 0.01	0 .. ±Pmax x VT x CT	W
4012H	Active Power L3	Signed Long	Data x 0.01	0 .. ±Pmax x VT x CT	W
4014H	Reactive Power L1	Signed Long	Data x 0.01	0 .. ±Qmax x VT x CT	VAR
4016H	Reactive Power L2	Signed Long	Data x 0.01	0 .. ±Qmax x VT x CT	VAR
4018H	Reactive Power L3	Signed Long	Data x 0.01	0 .. ±Qmax x VT x CT	VAR
401AH	Apparent Power L1	Long	Data x 0.01	0 .. Smax x VT x CT	VA
401CH	Apparent Power L2	Long	Data x 0.01	0 .. Smax x VT x CT	VA
401EH	Apparent Power L3	Long	Data x 0.01	0 .. Smax x VT x CT	VA
4020H	Power Factor L1	Signed Long	Data x 0.001	-1.000 .. 1.000	-
4022H	Power Factor L2	Signed Long	Data x 0.001	-1.000 .. 1.000	-
4024H	Power Factor L3	Signed Long	Data x 0.001	-1.000 .. 1.000	-
4026H	Cos L1	Signed Long	Data x 0.001	-1.000 .. 1.000	-
4028H	Cos L2	Signed Long	Data x 0.001	-1.000 .. 1.000	-
402AH	Cos L3	Signed Long	Data x 0.001	-1.000 .. 1.000	-
402CH	Voltage L12	Long	Data x 0.01	0 .. Vmax x VT	V
402EH	Voltage L23	Long	Data x 0.01	0 .. Vmax x VT	V
4030H	Voltage L31	Long	Data x 0.01	0 .. Vmax x VT	V
4032H	Voltage LN	Long	Data x 0.01	0 .. Vmax x VT	V
4034H	Voltage LL	Long	Data x 0.01	0 .. Vmax x VT	V
4036H	Frequency	Long	Data x 0.01	45.00 .. 65.00	Hz
4038H	Total Active Power	Signed Long	Data x 0.01	0 .. ±Pt max x VT x CT	W
403AH	Total Reactive Power	Signed Long	Data x 0.01	0 .. ±Qt max x VT x CT	VAR
403CH	Total Apparent Power	Long	Data x 0.01	0 .. St max x VT x CT	VA
403EH	THD V1	Long	Data x 0.1	0 .. 900	%
4040H	THD V2	Long	Data x 0.1	0 .. 900	%
4042H	THD V3	Long	Data x 0.1	0 .. 900	%
4044H	THD V3P	Long	Data x 0.1	0 .. 900	%
4046H	THD I1	Long	Data x 0.1	0 .. 900	%
4048H	THD I2	Long	Data x 0.1	0 .. 900	%
404AH	THD I3	Long	Data x 0.1	0 .. 900	%
404CH	THD I3P	Long	Data x 0.1	0 .. 900	%
404EH	*Voltage High LN1	Long	Data x 0.01	0 .. Vmax x VT	V
4050H	*Voltage High LN2	Long	Data x 0.01	0 .. Vmax x VT	V
4052H	*Voltage High LN3	Long	Data x 0.01	0 .. Vmax x VT	V
4054H	*Voltage Low LN1	Long	Data x 0.01	0 .. Vmax x VT	V
4056H	*Voltage Low LN2	Long	Data x 0.01	0 .. Vmax x VT	V
4058H	*Voltage Low LN3	Long	Data x 0.01	0 .. Vmax x VT	V
405AH	*Demand Current High L1	Long	Data x 0.001	0 .. Imax x CT	A
405CH	*Demand Current High L2	Long	Data x 0.001	0 .. Imax x CT	A
405EH	*Demand Current High L3	Long	Data x 0.001	0 .. Imax x CT	A
4060H	*Demand Current Low L1	Long	Data x 0.001	0 .. Imax x CT	A
4062H	*Demand Current Low L2	Long	Data x 0.001	0 .. Imax x CT	A
4064H	*Demand Current Low L3	Long	Data x 0.001	0 .. Imax x CT	A
4066H	*Demand Current L1	Long	Data x 0.001	0 .. Imax x CT	A
4068H	*Demand Current L2	Long	Data x 0.001	0 .. Imax x CT	A
406AH	*Demand Current L3	Long	Data x 0.001	0 .. Imax x CT	A
406CH	*Demand Total Current High	Long	Data x 0.001	0 .. Imax x CT	A
406EH	*Demand Total Current Low	Long	Data x 0.001	0 .. Imax x CT	A
4070H	*Demand Total Current	Long	Data x 0.001	0 .. Imax x CT	A
4072H	*Demand Total Active Power	Signed Long	Data x 0.01	0 .. Pt max x VT x CT	W
4074H	*Demand Total Reactive Power	Signed Long	Data x 0.01	0 .. Qt max x VT x CT	VAR
4076H	*Demand Total Apparent Power	Long	Data x 0.01	0 .. St max x VT x CT	VA
4078H	*Import Active Energy	Long	Data	99999999	kWh/MWh
407AH	*Export Active Energy	Long	Data	99999999	kWh/MWh
407CH	*Inductive Reactive Energy	Long	Data	99999999	kVarh/MVarh
407EH	*Capacitive Reactive Energy	Long	Data	99999999	kVarh/MVarh
4080H	Hour	Long	Data	0 .. 23	h
4082H	Minute	Long	Data	0 .. 59	m
4084H	Second	Long	Data	0 .. 59	s
4086H	Day	Long	Data	0 .. 31	day
4088H	Month	Long	Data	0 .. 12	month
408AH	Year	Long	Data	00 .. 99	year
408CH	Current Transformer Ratio	Long	Data	1 .. 5000	-
408EH	Voltage Transformer Ratio	Long	Data x 0.1	1.0 .. 4000.0	-
4090H	IO Relay Status (only MPR60S/60S-21/41)	Binary	Data & 0x0003	b0:Relay1,b1:Relay2	-
	IO Relay and Control Status (only MPR60S-10/20/40)		Data & 0x000F	b0:Relay1,b1:Relay2 b2:Input1, b3:Input2	
4092H	Total Power Factor	Signed Long	Data x 0.001	-1.000 .. 1.000	-
4094H	Neutral Current	Long	Data x 0.001	0 .. IN max.	A
4096H	*Demand Total Active Power High	Signed Long	Data x 0.01	0 .. +Pt max x VT x CT	W
4098H	*Demand Total Reactive Power High	Signed Long	Data x 0.01	0 .. +Qt max x VT x CT	VAR
409AH	*Demand Total Apparent Power High	Long	Data x 0.01	0 .. St max x VT x CT	VA
409CH	*Demand Total Active Power Low	Signed Long	Data x 0.01	0 .. +Pt max x VT x CT	W
409EH	*Demand Total Reactive Power Low	Signed Long	Data x 0.01	0 .. +Qt max x VT x CT	VAR
40A0H	*Demand Total Apparent Power Low	Long	Data x 0.01	0 .. St max x VT x CT	VA

Long : 32bit Unsigned (Hi:Lo) 0..4294967295  
Signed Long : 32bit Signed (Hi:Lo) -2,147,483,648 .. 2,147,483,647  
\* Writable registers (Only "0" (zero) value can be written)

### 3.12 Setup Register Map (16 bit) (for MPR60S)

ADDRESS	DESCRIPTION	DIMENSION (16bit)	MULTIPLIER	UNIT
0100H	Current Transformer Ratio	Word	Data	
0101H	Voltage Transformer Ratio	Word	Data x 0.1	
0102H	Net Type	Word	0:3P4W 1:3P3W 2:ARON	
0103H	Reserved	Word	Data	
0104H	3.Pulse-A Prm.	Word	Data	kWh
0105H	3.Pulse-A Duration	Word	Data	ms
0106H	4.Pulse-R Prm.	Word	Data	kVArh
0107H	4.Pulse-R Duration	Word	Data	ms
0108H	Relay1 Parameter1	Word	Data	
0109H	Relay1 Hi1	Word	Data	
010AH	Relay1 Lo1	Word	Data	
010BH	Relay1 Delay1	Word	Data	sec.
010CH	Relay1 Hysteresis1	Word	Data	
010DH	Reserved	Word	Data	
010EH	Relay1 Parameter2	Word	Data	
010FH	Relay1 Hi2	Word	Data	
0110H	Relay1 Lo2	Word	Data	
0111H	Relay1 Delay2	Word	Data	sec.
0112H	Relay1 Hysteresis2	Word	Data	
0113H	Reserved	Word	Data	
0114H	Relay1 Parameter3	Word	Data	
0115H	Relay1 Hi3	Word	Data	
0116H	Relay1 Lo3	Word	Data	
0117H	Relay1 Delay3	Word	Data	sec.
0118H	Relay1 Hysteresis3	Word	Data	
0119H	Reserved	Word	Data	
011AH	Relay1 Function	Word	0:Alarm / 1:Digital Output	
011BH	Relay2 Parameter1	Word	Data	
011CH	Relay2 Hi1	Word	Data	
011DH	Relay2 Lo1	Word	Data	
011EH	Relay2 Delay1	Word	Data	sec.
011FH	Relay2 Hysteresis1	Word	Data	
0120H	Reserved	Word	Data	
0121H	Relay2 Parameter2	Word	Data	
0122H	Relay2 Hi2	Word	Data	
0123H	Relay2 Lo2	Word	Data	
0124H	Relay2 Delay2	Word	Data	sec.
0125H	Relay2 Hysteresis2	Word	Data	
0126H	Reserved	Word	Data	
0127H	Relay2 Parameter3	Word	Data	
0128H	Relay2 Hi3	Word	Data	
0129H	Relay2 Lo3	Word	Data	
012AH	Relay2 Delay3	Word	Data	sec.
012BH	Relay2 Hysteresis3	Word	Data	
012CH	Reserved	Word	Data	
012DH	Relay2 Function	Word	0:Alarm / 1:Digital Output	
012EH	Reserved	Word	Data	
012FH	Reserved	Word	Data	
0130H	Reserved	Word	Data	
0131H	Log Period	Word	Data	sec.
0132H	Log Event	Word	0:Off / 1:On	
0133H	Log Energy Period	Word	Data	sec.
0134H	Log Par 1	Word	Data	
0135H	Log Par 2	Word	Data	
:	:	:	Data	
014FH	Log Par 28	Word	Data	
:	Reserved	Word	Data	
0156H	Demand Time	Word	Data	minute
0157H	Hour	Word	Data	h
0158H	Minute	Word	Data	m
0159H	Second	Word	Data	s
015AH	Reserved	Word	Data	
015BH	Day	Word	Data	day
015CH	Month	Word	Data	month
015DH	Year	Word	Data	year
015EH	Reserved	Word	Data	
015FH	Reserved	Word	Data	
0160H	Total Energy / Separately	Word	0:Total/1:Separately	
0161H	Serial Number (1,2)	Word (Hi/Lo)	Char.1 / Char.2	ASC II
0162H	Serial Number (3,4)	Word (Hi/Lo)	Char.3 / Char.4	ASC II
0163H	Serial Number (5,6)	Word (Hi/Lo)	Char.5 / Char.6	ASC II
0164H	Serial Number (7,8)	Word (Hi/Lo)	Char.7 / Char.8	ASC II
0165H	Reserved	Word	Data	
0166H	Reserved	Word	Data	
0167H	Reserved	Word	Data	
0168H	Reserved	Word	Data	
0169H	Reserved	Word	Data	
016AH	Reserved	Word	Data	
016BH	Reserved	Word	Data	
016CH	Energy Counter Unit	Word	0:Kilo / 1:Mega	

### 3.13 Setup Register Map (16bit) (for MPR60S-10)

ADDRESS	DESCRIPTION	DIMENSION (16bit)	MULTIPLIER	UNIT
0100H	Current Transformer Ratio	Word	Data	
0101H	Voltage Transformer Ratio	Word	Data x 0.1	
0102H	Net Type	Word	0:3P4W 1:3P3W 2:ARON	
0103H	Reserved	Word	Data	
0104H	Reserved	Word	Data	
0105H	Reserved	Word	Data	
0106H	Reserved	Word	Data	
0107H	Reserved	Word	Data	
0108H	Relay1 Parameter1	Word	Data	
0109H	Relay1 Hi1	Word	Data	
010AH	Relay1 Lo1	Word	Data	
010BH	Relay1 Delay1	Word	Data	sec.
010CH	Relay1 Hysteresis1	Word	Data	
010DH	Reserved	Word	Data	
010EH	Relay1 Parameter2	Word	Data	
010FH	Relay1 Hi2	Word	Data	
0110H	Relay1 Lo2	Word	Data	
0111H	Relay1 Delay2	Word	Data	sec.
0112H	Relay1 Hysteresis2	Word	Data	
0113H	Reserved	Word	Data	
0114H	Relay1 Parameter3	Word	Data	
0115H	Relay1 Hi3	Word	Data	
0116H	Relay1 Lo3	Word	Data	
0117H	Relay1 Delay3	Word	Data	sec.
0118H	Relay1 Hysteresis3	Word	Data	
0119H	Reserved	Word	Data	
011AH	Relay1 Function	Word	0:Alarm / 1:Digital Output	
011BH	Relay2 Parameter1	Word	Data	
011CH	Relay2 Hi1	Word	Data	
011DH	Relay2 Lo1	Word	Data	
011EH	Relay2 Delay1	Word	Data	sec.
011FH	Relay2 Hysteresis1	Word	Data	
0120H	Reserved	Word	Data	
0121H	Relay2 Parameter2	Word	Data	
0122H	Relay2 Hi2	Word	Data	
0123H	Relay2 Lo2	Word	Data	
0124H	Relay2 Delay2	Word	Data	sec.
0125H	Relay2 Hysteresis2	Word	Data	
0126H	Reserved	Word	Data	
0127H	Relay2 Parameter3	Word	Data	
0128H	Relay2 Hi3	Word	Data	
0129H	Relay2 Lo3	Word	Data	
012AH	Relay2 Delay3	Word	Data	sec.
012BH	Relay2 Hysteresis3	Word	Data	
012CH	Reserved	Word	Data	
012DH	Relay2 Function	Word	0:Alarm / 1:Digital Output	
012EH	Reserved	Word	Data	
012FH	Reserved	Word	Data	
0130H	Reserved	Word	Data	
0131H	Log Period	Word	Data	sec.
0132H	Log Event	Word	0:Off / 1:On	
0133H	Log Energy Period	Word	Data	sec.
0134H	Log Par 1	Word	Data	
0135H	Log Par 2	Word	Data	
:	:	:	Data	
014FH	Log Par 28	Word	Data	
:	Reserved	Word	Data	
0156H	Demand Time	Word	Data	minute
0157H	Hour	Word	Data	h
0158H	Minute	Word	Data	m
0159H	Second	Word	Data	s
015AH	Reserved	Word	Data	
015BH	Day	Word	Data	day
015CH	Month	Word	Data	month
015DH	Year	Word	Data	year
015EH	Reserved	Word	Data	
015FH	Reserved	Word	Data	
0160H	Total Energy / Separately	Word	0:Total/1:Separately	
0161H	Serial Number (1,2)	Word (Hi/Lo)	Char.1 / Char.2	ASC II
0162H	Serial Number (3,4)	Word (Hi/Lo)	Char.3 / Char.4	ASC II
0163H	Serial Number (5,6)	Word (Hi/Lo)	Char.5 / Char.6	ASC II
0164H	Serial Number (7,8)	Word (Hi/Lo)	Char.7 / Char.8	ASC II
0165H	Input 1 Function	Word	0:Real Time / 1:Lacth	
0166H	Input 2 Function	Word	0:Real Time / 1:Lacth	
0167H	Reserved	Word	Word	
0168H	Reserved	Word	Word	
0169H	Reserved	Word	Data	
016AH	Reserved	Word	Data	
016BH	Reserved	Word	Data	
016CH	Energy Counter Unit	Word	0:Kilo / 1:Mega	

### 3.14 Setup Register Map (16 bit) (for MPR60S-20)

ADDRESS	DESCRIPTION	DIMENSION (16bit)	MULTIPLIER	UNIT
0100H	Current Transformer Ratio	Word	Data	
0101H	Voltage Transformer Ratio	Word	Data x 0.1	
0102H	Net Type	Word	0:3P4W 1:3P3W 2:ARON	
0103H	Reserved	Word	Data	
0104H	Reserved	Word	Data	
0105H	Reserved	Word	Data	
0106H	Reserved	Word	Data	
0107H	Reserved	Word	Data	
0108H	Relay1 Parameter1	Word	Data	
0109H	Relay1 Hi1	Word	Data	
010AH	Relay1 Lo1	Word	Data	
010BH	Relay1 Delay1	Word	Data	sec.
010CH	Relay1 Hysteresis1	Word	Data	
010DH	Reserved	Word	Data	
010EH	Relay1 Parameter2	Word	Data	
010FH	Relay1 Hi2	Word	Data	
0110H	Relay1 Lo2	Word	Data	
0111H	Relay1 Delay2	Word	Data	sec.
0112H	Relay1 Hysteresis2	Word	Data	
0113H	Reserved	Word	Data	
0114H	Relay1 Parameter3	Word	Data	
0115H	Relay1 Hi3	Word	Data	
0116H	Relay1 Lo3	Word	Data	
0117H	Relay1 Delay3	Word	Data	sec.
0118H	Relay1 Hysteresis3	Word	Data	
0119H	Reserved	Word	Data	
011AH	Relay1 Function	Word	0:Alarm / 1:Digital Output	
011BH	Relay2 Parameter1	Word	Data	
011CH	Relay2 Hi1	Word	Data	
011DH	Relay2 Lo1	Word	Data	
011EH	Relay2 Delay1	Word	Data	sec.
011FH	Relay2 Hysteresis1	Word	Data	
0120H	Reserved	Word	Data	
0121H	Relay2 Parameter2	Word	Data	
0122H	Relay2 Hi2	Word	Data	
0123H	Relay2 Lo2	Word	Data	
0124H	Relay2 Delay2	Word	Data	sec.
0125H	Relay2 Hysteresis2	Word	Data	
0126H	Reserved	Word	Data	
0127H	Relay2 Parameter3	Word	Data	
0128H	Relay2 Hi3	Word	Data	
0129H	Relay2 Lo3	Word	Data	
012AH	Relay2 Delay3	Word	Data	sec.
012BH	Relay2 Hysteresis3	Word	Data	
012CH	Reserved	Word	Data	
012DH	Relay2 Function	Word	0:Alarm / 1:Digital Output	
012EH	Analog Output Parameters	Word	Data	
012FH	Analog Output Low	Word	Data	
0130H	Analog Output High	Word	Data	
0131H	Log Period	Word	Data	sec.
0132H	Log Event	Word	0:Off / 1:On	
0133H	Log Energy Period	Word	Data	sec.
0134H	Log Par 1	Word	Data	
0135H	Log Par 2	Word	Data	
:	:	:	Data	
014FH	Log Par 28	Word	Data	
:	Reserved	Word	Data	
0156H	Demand Time	Word	Data	minute
0157H	Hour	Word	Data	h
0158H	Minute	Word	Data	m
0159H	Second	Word	Data	s
015AH	Reserved	Word	Data	
015BH	Day	Word	Data	day
015CH	Month	Word	Data	month
015DH	Year	Word	Data	year
015EH	Reserved	Word	Data	
015FH	Reserved	Word	Data	
0160H	Total Energy / Separately	Word	0:Total/1:Separately	
0161H	Serial Number (1,2)	Word (Hi/Lo)	Char.1 / Char.2	ASC II
0162H	Serial Number (3,4)	Word (Hi/Lo)	Char.3 / Char.4	ASC II
0163H	Serial Number (5,6)	Word (Hi/Lo)	Char.5 / Char.6	ASC II
0164H	Serial Number (7,8)	Word (Hi/Lo)	Char.7 / Char.8	ASC II
0165H	Input 1 Function	Word	0:Real Time / 1:Lacth	
0166H	Input 2 Function	Word	0:Real Time / 1:Lacth	
0167H	Analog Output Type	Word	0: 2-10V / 1: 0-10V	
0168H	Reserved	Word	Data	
0169H	Reserved	Word	Data	
016AH	Reserved	Word	Data	
016BH	Reserved	Word	Data	
016CH	Energy Counter Unit	Word	0:Kilo / 1:Mega	



### 3.15 Setup Register Map (16 bit) (for MPR60S-21)

ADDRESS	DESCRIPTION	DIMENSION (16bit)	MULTIPLIER	UNIT
0100H	Current Transformer Ratio	Word	Data	
0101H	Voltage Transformer Ratio	Word	Data x 0.1	
0102H	Net Type	Word	0:3P4W 1:3P3W 2:ARON	
0103H	Reserved	Word	Data	
0104H	3.Pulse-A Prm.	Word	Data	kWh
0105H	3.Pulse-A Duration	Word	Data	ms
0106H	4.Pulse-R Prm.	Word	Data	kVArh
0107H	4.Pulse-R Duration	Word	Data	ms
0108H	Relay1 Parameter1	Word	Data	
0109H	Relay1 Hi1	Word	Data	
010AH	Relay1 Lo1	Word	Data	
010BH	Relay1 Delay1	Word	Data	sec.
010CH	Relay1 Hysteresis1	Word	Data	
010DH	Reserved	Word	Data	
010EH	Relay1 Parameter2	Word	Data	
010FH	Relay1 Hi2	Word	Data	
0110H	Relay1 Lo2	Word	Data	
0111H	Relay1 Delay2	Word	Data	sec.
0112H	Relay1 Hysteresis2	Word	Data	
0113H	Reserved	Word	Data	
0114H	Relay1 Parameter3	Word	Data	
0115H	Relay1 Hi3	Word	Data	
0116H	Relay1 Lo3	Word	Data	
0117H	Relay1 Delay3	Word	Data	sec.
0118H	Relay1 Hysteresis3	Word	Data	
0119H	Reserved	Word	Data	
011AH	Relay1 Function	Word	0:Alarm / 1:Digital Output	
011BH	Relay2 Parameter1	Word	Data	
011CH	Relay2 Hi1	Word	Data	
011DH	Relay2 Lo1	Word	Data	
011EH	Relay2 Delay1	Word	Data	sec.
011FH	Relay2 Hysteresis1	Word	Data	
0120H	Reserved	Word	Data	
0121H	Relay2 Parameter2	Word	Data	
0122H	Relay2 Hi2	Word	Data	
0123H	Relay2 Lo2	Word	Data	
0124H	Relay2 Delay2	Word	Data	sec.
0125H	Relay2 Hysteresis2	Word	Data	
0126H	Reserved	Word	Data	
0127H	Relay2 Parameter3	Word	Data	
0128H	Relay2 Hi3	Word	Data	
0129H	Relay2 Lo3	Word	Data	
012AH	Relay2 Delay3	Word	Data	sec.
012BH	Relay2 Hysteresis3	Word	Data	
012CH	Reserved	Word	Data	
012DH	Relay2 Function	Word	0:Alarm / 1:Digital Output	
012EH	Analog Output Parameters	Word	Data	
012FH	Analog Output Low	Word	Data	
0130H	Analog Output High	Word	Data	
0131H	Log Period	Word	Data	sec.
0132H	Log Event	Word	0:Off / 1:On	
0133H	Log Energy Period	Word	Data	sec.
0134H	Log Par 1	Word	Data	
0135H	Log Par 2	Word	Data	
:	:	:	Data	
014FH	Log Par 28	Word	Data	
:	Reserved	Word	Data	
0156H	Demand Time	Word	Data	minute
0157H	Hour	Word	Data	h
0158H	Minute	Word	Data	m
0159H	Second	Word	Data	s
015AH	Reserved	Word	Data	
015BH	Day	Word	Data	day
015CH	Month	Word	Data	month
015DH	Year	Word	Data	year
015EH	Reserved	Word	Data	
015FH	Reserved	Word	Data	
0160H	Total Energy / Separately	Word	0:Total/1:Separately	
0161H	Serial Number (1,2)	Word (Hi/Lo)	Char.1 / Char.2	ASC II
0162H	Serial Number (3,4)	Word (Hi/Lo)	Char.3 / Char.4	ASC II
0163H	Serial Number (5,6)	Word (Hi/Lo)	Char.5 / Char.6	ASC II
0164H	Serial Number (7,8)	Word (Hi/Lo)	Char.7 / Char.8	ASC II
0165H	Reserved	Word	Data	
0166H	Reserved	Word	Data	
0167H	Analog Output Type	Word	0: 2-10V / 1: 0-10V	
0168H	Reserved	Word	Data	
0169H	Reserved	Word	Data	
016AH	Reserved	Word	Data	
016BH	Reserved	Word	Data	
016CH	Energy Counter Unit	Word	0:Kilo / 1:Mega	

### 3.16 Setup Register Map (16 bit) (for MPR60S-40)

ADDRESS	DESCRIPTION	DIMENSION (16bit)	MULTIPLIER	UNIT
0100H	Current Transformer Ratio	Word	Data	
0101H	Voltage Transformer Ratio	Word	Data x 0.1	
0102H	Net Type	Word	0:3P4W 1:3P3W 2:ARON	
0103H	Reserved	Word	Data	
0104H	Reserved	Word	Data	
0105H	Reserved	Word	Data	
0106H	Reserved	Word	Data	
0107H	Reserved	Word	Data	
0108H	Relay1 Parameter1	Word	Data	
0109H	Relay1 Hi1	Word	Data	
010AH	Relay1 Lo1	Word	Data	
010BH	Relay1 Delay1	Word	Data	sec.
010CH	Relay1 Hysteresis1	Word	Data	
010DH	Reserved	Word	Data	
010EH	Relay1 Parameter2	Word	Data	
010FH	Relay1 Hi2	Word	Data	
0110H	Relay1 Lo2	Word	Data	
0111H	Relay1 Delay2	Word	Data	sec.
0112H	Relay1 Hysteresis2	Word	Data	
0113H	Reserved	Word	Data	
0114H	Relay1 Parameter3	Word	Data	
0115H	Relay1 Hi3	Word	Data	
0116H	Relay1 Lo3	Word	Data	
0117H	Relay1 Delay3	Word	Data	sec.
0118H	Relay1 Hysteresis3	Word	Data	
0119H	Reserved	Word	Data	
011AH	Relay1 Function	Word	0:Alarm / 1:Digital Output	
011BH	Relay2 Parameter1	Word	Data	
011CH	Relay2 Hi1	Word	Data	
011DH	Relay2 Lo1	Word	Data	
011EH	Relay2 Delay1	Word	Data	sec.
011FH	Relay2 Hysteresis1	Word	Data	
0120H	Reserved	Word	Data	
0121H	Relay2 Parameter2	Word	Data	
0122H	Relay2 Hi2	Word	Data	
0123H	Relay2 Lo2	Word	Data	
0124H	Relay2 Delay2	Word	Data	sec.
0125H	Relay2 Hysteresis2	Word	Data	
0126H	Reserved	Word	Data	
0127H	Relay2 Parameter3	Word	Data	
0128H	Relay2 Hi3	Word	Data	
0129H	Relay2 Lo3	Word	Data	
012AH	Relay2 Delay3	Word	Data	sec.
012BH	Relay2 Hysteresis3	Word	Data	
012CH	Reserved	Word	Data	
012DH	Relay2 Function	Word	0:Alarm / 1:Digital Output	
012EH	Analog Output Parameters	Word	Data	
012FH	Analog Output Low	Word	Data	
0130H	Analog Output High	Word	Data	
0131H	Log Period	Word	Data	sec.
0132H	Log Event	Word	0:Off / 1:On	
0133H	Log Energy Period	Word	Data	sec.
0134H	Log Par 1	Word	Data	
0135H	Log Par 2	Word	Data	
:	:	:	Data	
014FH	Log Par 28	Word	Data	
:	Reserved	Word	Data	
0156H	Demand Time	Word	Data	minute
0157H	Hour	Word	Data	h
0158H	Minute	Word	Data	m
0159H	Second	Word	Data	s
015AH	Reserved	Word	Data	
015BH	Day	Word	Data	day
015CH	Month	Word	Data	month
015DH	Year	Word	Data	year
015EH	Reserved	Word	Data	
015FH	Reserved	Word	Data	
0160H	Total Energy / Separately	Word	0:Total/1:Separately	
0161H	Serial Number (1,2)	Word (Hi/Lo)	Char.1 / Char.2	ASC II
0162H	Serial Number (3,4)	Word (Hi/Lo)	Char.3 / Char.4	ASC II
0163H	Serial Number (5,6)	Word (Hi/Lo)	Char.5 / Char.6	ASC II
0164H	Serial Number (7,8)	Word (Hi/Lo)	Char.7 / Char.8	ASC II
0165H	Input 1 Function	Word	0:Real Time / 1:Lacth	
0166H	Input 2 Function	Word	0:Real Time / 1:Lacth	
0167H	Analog Output Type	Word	0: 4-20mA / 1: 0-20mA	
0168H	Reserved	Word	Data	
0169H	Reserved	Word	Data	
016AH	Reserved	Word	Data	
016BH	Reserved	Word	Data	
016CH	Energy Counter Unit	Word	0:Kilo / 1:Mega	

### 3.17 Setup Register Map (16 bit) (for MPR60S-41)

ADDRESS	DESCRIPTION	DIMENSION (16bit)	MULTIPLIER	UNIT
0100H	Current Transformer Ratio	Word	Data	
0101H	Voltage Transformer Ratio	Word	Data x 0.1	
0102H	Net Type	Word	0:3P4W 1:3P3W 2:ARON	
0103H	Reserved	Word	Data	
0104H	3.Pulse-A Prm.	Word	Data	kWh
0105H	3.Pulse-A Duration	Word	Data	ms
0106H	4.Pulse-R Prm.	Word	Data	kVArh
0107H	4.Pulse-R Duration	Word	Data	ms
0108H	Relay1 Parameter1	Word	Data	
0109H	Relay1 Hi1	Word	Data	
010AH	Relay1 Lo1	Word	Data	
010BH	Relay1 Delay1	Word	Data	sec.
010CH	Relay1 Hysteresis1	Word	Data	
010DH	Reserved	Word	Data	
010EH	Relay1 Parameter2	Word	Data	
010FH	Relay1 Hi2	Word	Data	
0110H	Relay1 Lo2	Word	Data	
0111H	Relay1 Delay2	Word	Data	sec.
0112H	Relay1 Hysteresis2	Word	Data	
0113H	Reserved	Word	Data	
0114H	Relay1 Parameter3	Word	Data	
0115H	Relay1 Hi3	Word	Data	
0116H	Relay1 Lo3	Word	Data	
0117H	Relay1 Delay3	Word	Data	sec.
0118H	Relay1 Hysteresis3	Word	Data	
0119H	Reserved	Word	Data	
011AH	Relay1 Function	Word	0:Alarm / 1:Digital Output	
011BH	Relay2 Parameter1	Word	Data	
011CH	Relay2 Hi1	Word	Data	
011DH	Relay2 Lo1	Word	Data	
011EH	Relay2 Delay1	Word	Data	sec.
011FH	Relay2 Hysteresis1	Word	Data	
0120H	Reserved	Word	Data	
0121H	Relay2 Parameter2	Word	Data	
0122H	Relay2 Hi2	Word	Data	
0123H	Relay2 Lo2	Word	Data	
0124H	Relay2 Delay2	Word	Data	sec.
0125H	Relay2 Hysteresis2	Word	Data	
0126H	Reserved	Word	Data	
0127H	Relay2 Parameter3	Word	Data	
0128H	Relay2 Hi3	Word	Data	
0129H	Relay2 Lo3	Word	Data	
012AH	Relay2 Delay3	Word	Data	sec.
012BH	Relay2 Hysteresis3	Word	Data	
012CH	Reserved	Word	Data	
012DH	Relay2 Function	Word	0:Alarm / 1:Digital Output	
012EH	Analog Output Parameter	Word	Data	
012FH	Analog Output Low	Word	Data	
0130H	Analog Output High	Word	Data	
0131H	Log Period	Word	Data	sec.
0132H	Log Event	Word	0:Off / 1:On	
0133H	Log Energy Period	Word	Data	sec.
0134H	Log Par 1	Word	Data	
0135H	Log Par 2	Word	Data	
:	:	:	Data	
014FH	Log Par 28	Word	Data	
:	Reserved	Word	Data	
0156H	Demand Time	Word	Data	minute
0157H	Hour	Word	Data	h
0158H	Minute	Word	Data	m
0159H	Second	Word	Data	s
015AH	Reserved	Word	Data	
015BH	Day	Word	Data	day
015CH	Month	Word	Data	month
015DH	Year	Word	Data	year
015EH	Reserved	Word	Data	
015FH	Reserved	Word	Data	
0160H	Total Energy / Separately	Word	0:Total/1:Separately	
0161H	Serial Number (1,2)	Word (Hi/Lo)	Char.1 / Char.2	ASC II
0162H	Serial Number (3,4)	Word (Hi/Lo)	Char.3 / Char.4	ASC II
0163H	Serial Number (5,6)	Word (Hi/Lo)	Char.5 / Char.6	ASC II
0164H	Serial Number (7,8)	Word (Hi/Lo)	Char.7 / Char.8	ASC II
0165H	Reserved	Word	Data	
0166H	Reserved	Word	Data	
0167H	Analog Output Type	Word	0: 4-20mA / 1: 0-20mA	
0168H	Reserved	Word	Data	
0169H	Reserved	Word	Data	
016AH	Reserved	Word	Data	
016BH	Reserved	Word	Data	
016CH	Energy Counter Unit	Word	0:Kilo / 1:Mega	