ELECTRONIC METER

SMW110-C07E
SMW110-C47E

MODBUS® RTU Interface Specifications

SPEC. NO. : MED-T0061

MITSUBISHI ELECTRIC AUTOMATION (THAILAND) CO., LTD

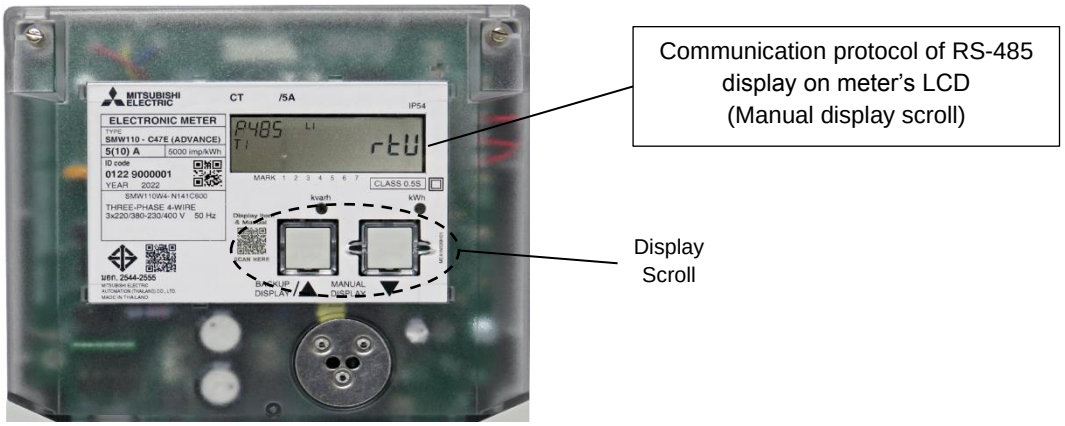
CONTENTS

1. Functions

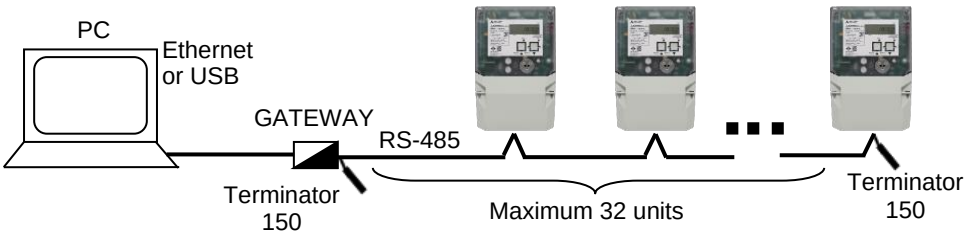
SMW110 meter can communicate with client device using RTU transmission mode of MODBUS protocol. Communication is available through RS-485 which supports multiple SMW110 meter connected on a network. It is a two wire connection communication speed are 4800/9600/19200 bps. SMW110 meter is capable to communicate via optical and AMR port (in RS-485 MODBUS mode) simultaneously.

2. Checking before usage

Before communicating with Modbus, Check LCD display show the communication protocol of RS-485 (P485) as “rtU”. If LCD display show the communication protocol of RS-485 as other, user must change protocol from other to rtU by using “Modbus Meter Setting” software.
(Download setting software from our website: www.meath-co.com/meter/sara_doc.php?cat=22)



3. System Configurations



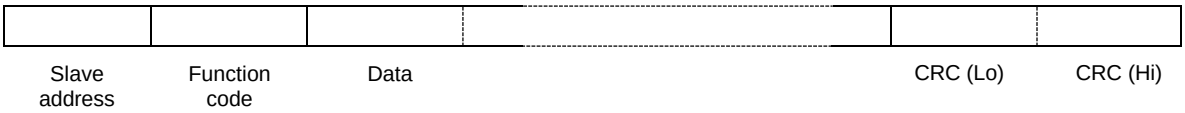
4. Technical Characteristic

Item	Specifications	
Physical interface	RS-485 2wires half duplex	
Protocol	RTU mode	
Transmission wiring type	Multi-point bus (daisy-chain)	
Baud rate	4800, 9600, 19200 bps	(Default is 4800 bps)
Data bit	8	
Stop bit	1	
Parity	Even, None	(Default is Even)
CRC polynomial	0xA001	
Slave address	1 to 247 (F7h)	(see detail in Appendix A)
Response time	0ms to 20,000ms (programmable)	(Default is 10 ms)
Distance	1,200 m	
Max. number	32	
Terminator	150Ω 1/2W	
Recommended cable	Shielded twisted pair, recommend LiYCY 2x0.25 mm^2	

5. Specification for Communication

5.1 Standard Communication Frame

The standard communication frame consists of:



Slave address : 01h to F7h
Function code : 03h Read Holding Registers (maximum 250 bytes)
: 10h Write multiple registers
Data : 8 bit HEX data
: The Cyclical Redundancy Check (CRC) field is two bytes, containing a 16-bit binary value.

<NOTE>

Procedure for generating CRC:

1. Load a 16-bit register with FFFF hex (all 1's). This is called the CRC register.
2. Exclusive OR the first 8-bit byte of the message with the low-order byte of the 16-bit CRC register, putting the result in the CRC register.
3. Shift the CRC register one bit to the right (toward the LSB), zero-filling the MSB. Extract and examine the LSB.
4. (If the LSB was 0): Repeat Step 3 (another shift).
   (If the LSB was 1): Exclusive OR the CRC register with the polynomial value 0xA001 (1010 0000 0000 0001).
5. Repeat Step 3 and 4 until 8 shifts have been performed. When this is done, a complete 8-bit byte will have been processed.
6. Repeat Step 2 through 5 for the next 8-bit byte of the message. Continue this until all byte will have been processed.
7. The final content of the CRC register is the CRC value.
8. When the CRC is placed into the message, its upper and lower bytes must be swapped as described above.

5.2 Bit Sequence

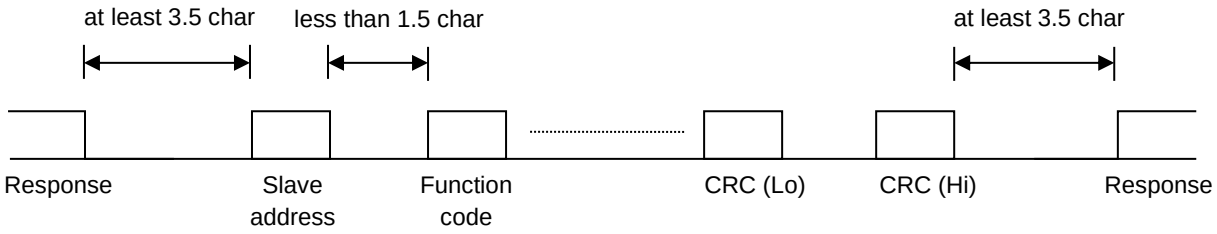
With RTU character framing, the bit sequence is below.

<Example> With Parity Checking and Stop bit is1.

Start	1	2	3	4	5	6	7	8	Parity	Stop
	LSB							MSB		

5.3 MODBUS Message RTU Framing

A MODBUS message is placed by transmitting device into a frame that has a known beginning and ending point. This allows devices to receive a new frame to begin at the start of the message, and to know when the message is completed. Partial messages must be detected and errors must be set as a result. In RTU mode, message frames are separated by a silent interval of at least 3.5 characters items.



6. Framing of Query and Response

6.1 Read Holding Registers (03h)

- Query framing

H	03H	Hi	Lo	Hi	Lo	Lo	Hi
Slave address		Starting address		Quantity of registers		CRC	

- Slave address : 01h to F7h
- Starting address : 2 bytes
- Quantity of registers : 2 bytes (Maximum 125)
- CRC : 2 bytes

- Response framing (Maximum 255 bytes)

H	03H		Hi	Lo	Hi	Lo		Lo	Hi
Slave address		Byte count	Data 1		Data 2			CRC	

- Byte count : Byte count of response data (Maximum 250).

<Example1> In case of reading Active Power Total* value Slave address is 78h.

- Query framing

78H	03H	0FH	AEH	00H	02H	ADH	57H
Slave address		Starting address		Quantity of registers		CRC (=57ADh)	

* Register address Active Power Total is 0FAEh ~ 0FAFh (see section 8.1)

- Response framing

78H	03H	04H	HH	HL	LH	LL	Lo	Hi
Slave address		Byte count	Active Power Total value				CRC	

<Example2> In case of reading Frequency Phase 1* value to Frequency Phase 3* value. Slave address is 78h.

Query framing

78H	03H	0FH	D8H	00H	03H	8DH	4DH
Slave address		Starting address		Quantity of registers		CRC (=4D8Dh)	

* Register address of Frequency Phase 1, 2 and 3 is 0FD8h, 0FDh and 0FDAh respectively (see section 8.1)

- Response framing

78H	03H	06H	Hi	Lo	Hi	Lo	Hi	Lo	Lo	Hi
Slave address		Byte count	Frequency Phase 1 value		Frequency Phase 2 value		Frequency Phase 3 value		CRC	

<Example3> In case of reading Display Wh (imp+exp) total*. Slave address is 78h.

- Query framing

78H	03H	0FH	AAH	00H	02H	ECH	96H
Slave address		Starting address		Quantity of registers		CRC (=96ECh)	

* Register address of Display Wh (imp+exp) total is 0FAAh~0FABh. (see section 8.1)

- Response framing

78H	03H	04H	HH	HL	LH	LL	Lo	Hi
Slave address		Byte count	Display Wh (imp+exp) total value				CRC	

Note: More detail about reading energy data can see in important note, section 8.1

6.2 Write Multiple Registers (10h)

- Query framing

H	10H	Hi	Lo	Hi	Lo		Hi	Lo	Hi	Lo		Lo	Hi
Slave address		Starting address		Quantity of registers		Byte count	Data1		Data2			CRC	

- Slave address : 01h to F7h
- Starting address : 2 bytes
- Quantity of registers : Maximum 123
- Byte count : Maximum 246
- Data1~ : Write data (Minimum 2 bytes)
- CRC : 2 bytes

- Response framing

H	10H	Hi	Lo	Hi	Lo	Lo	Hi
Slave address		Starting address		Quantity of registers		CRC	

<Example> In case of setting Slave Address*. Change Slave Address from 78h to 01h.

- Query framing

78H	10H	10H	00H	00H	01H	02H	00H	01H	Lo	Hi
Slave address		Starting address		Quantity of registers		Byte count	Data1		CRC	

* Register address of Slave Address is 1000h. (see section 8.1)

- Response framing

78H	10H	10H	00H	00H	01H	Lo	Hi
Slave address		Starting address		Quantity of registers		CRC	

7. Exception Codes

ERROR	Meaning	Exception code
Framing error	Query framing is incorrect.	No response is returned.
Overrun error	1 byte data length is incorrect.	
Parity error	1 byte data is incorrect.	
CRC error	Framing data is incorrect.	
Illegal function	The function code received in the query was except 03h and 10h.	01h
Illegal data address	The data address received in the query is not an allowable address for the slave.	02h
Illegal data value	The data value received in the query is not an allowable data value for the slave.	03h

- Response framing

H	※1	Exception code	Lo	Hi
Slave address	Function code		CRC	

※1 Function code: In an exception response, the server sets the MSB of the function code.

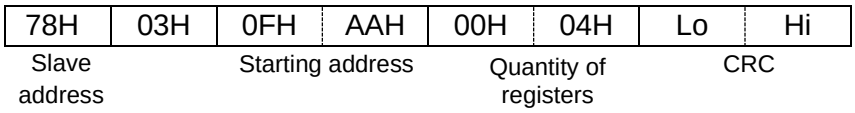
<Example>

Function code	Function code in an exception response
03h	83h
10h	90h

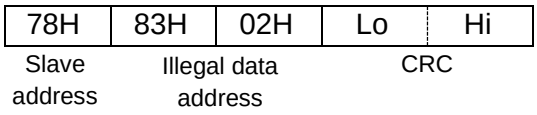
Example of illegal data address is shown as follows.

<Example> In case of reading from Display Wh (imp+exp) total (register address 0FAAh) to undefined register (address 0FADh). Slave address is 78h.

- Query framing



- Response framing



8. Data

8.1 List of Parameters

At the list of parameters, precautions are following.

※1 R/W : Read and writes register.
R : Reads only register.
W : Write without password
WP : Write with password.

※2 Support register are different by the model.
○ : Applicable
× : Reserved, please ignore value from the Reserved area.

Register Address		Byte Count	Access ※1	Register Name	Range	Units	Applicable ※2	
Dec	Hex						SMW110-C07E	SMW110-C47E
44003	0FA2h	8	R/W	Current Date/Time	00YYMMDDhhmmss00	-	O	O
44007	0FA6h	2	R	Digit no. to display energy (5 to 8 digit)	5 to 8	-	O	O
44008	0FA7h	2	R	Unit of display energy 0: Wh, varh, 1: kWh, kvarh, (default) 2: MWh, Mvarh	0 to 2	-	O	O
44009	0FA8h	2	R	Decimal place no. of display energy (0 to 3 decimal place)	0 to 3	-	O	O
44010	0FA9h	2	R	Imax (1 to 255)	1 to 255	A	O	O
44011	0FAAh	4	R	Display Wh (imp+exp) Total	0 to 99,999,999	Note4	O	O
44013 - 44014	0FACh - 0FADh	Reserved					×	×
44015	0FAEh	4	R	All Phase Instant. Active power (Abs(Import) - Abs(Export))	-2,147,483,648 to 2,147,483,647	0.001 kW	O	O
44017	0FB0h	4	R	Phase 1 Instant. Active power (Abs(Import) - Abs(Export))		0.001 kW	O	O
44019	0FB2h	4	R	Phase 2 Instant. Active power (Abs(Import) - Abs(Export))		0.001 kW	O	O
44021	0FB4h	4	R	Phase 3 Instant. Active power (Abs(Import) - Abs(Export))		0.001 kW	O	O

Register Address		Byte Count	Access ※1	Register Name	Range	Units	Applicable ※2	
Dec	Hex						SMW110-C07E	SMW110-C47E
44023	0FB6h	4	R	All Phase Instant. Reactive power (Abs(Import) - Abs(Export))	-2,147,483,648 to 2,147,483,647	0.001 kVar	O	O
44025	0FB8h	4	R	Phase 1 Instant. Reactive power (Abs(Import) - Abs(Export))		0.001 kVar	O	O
44027	0FBAh	4	R	Phase 2 Instant. Reactive power (Abs(Import) - Abs(Export))		0.001 kVar	O	O
44029	0FBCh	4	R	Phase 3 Instant. Reactive power (Abs(Import) - Abs(Export))		0.001 kVar	O	O
44039	0FC6h	4	R	VRMS Phase 1	0 to 16,777,215	0.01 V	O	O
44041	0FC8h	4	R	VRMS Phase 2		0.01 V	O	O
44043	0FCAh	4	R	VRMS Phase 3		0.01 V	O	O
44045	0FCCh	4	R	IRMS Phase 1		0.01 A	O	O
44047	0FCEh	4	R	IRMS Phase 2		0.01 A	O	O
44049	0FD0h	4	R	IRMS Phase 3		0.01 A	O	O
44053	0FD4h	2	R	Power factor Total	-100 to 100	0.01	O	O
44054	0FD5h	2	R	Power factor Phase 1		0.01	O	O
44055	0FD6h	2	R	Power factor Phase 2		0.01	O	O
44056	0FD7h	2	R	Power factor Phase 3		0.01	O	O
44057	0FD8h	2	R	Frequency Phase 1	0 to 65,535	0.01 Hz	O	O
44058	0FD9h	2	R	Frequency Phase 2		0.01 Hz	O	O
44059	0FDAh	2	R	Frequency Phase 3		0.01 Hz	O	O
44060	0FDBh	2	R	THD V Phase 1		0.01%	O	O
44061	0FDCh	2	R	THD V Phase 2		0.01%	O	O
44062	0FDDh	2	R	THD V Phase 3		0.01%	O	O
44063	0FDEh	2	R	THD I Phase 1		0.01%	O	O
44064	0FDFh	2	R	THD I Phase 2		0.01%	O	O
44065	0FE0h	2	R	THD I Phase 3		0.01%	O	O

Register Address		Byte Count	Access ※1	Register Name	Range	Units	Applicable ※2	
Dec	Hex						SMW110-C07E	SMW110-C47E
44066	0FE1h	2	R	PHASE ANGLE (V1-V2)	0 to 65,535	0.01°	O	O
44067	0FE2h	2	R	PHASE ANGLE (V3-V1)		0.01°	O	O
44068	0FE3h	2	R	PHASE ANGLE (V1-I1)		0.01°	O	O
44069	0FE4h	2	R	PHASE ANGLE (V2-I2)		0.01°	O	O
44070	0FE5h	2	R	PHASE ANGLE (V3-I3)		0.01°	O	O
44071	0FE6h	2	R	Ib (Normal current)	0 to 255	0.1 A	O	O
44072	0FE7h	2	R	Error code status (Bit mark of event status occurring) - Bit 0 Program Failure - Bit 1 RAM Failure - Bit 2 FRAM Failure - Bit 3 Flash Failure - Bit 4 OSC Failure - Bit 5 RTC Failure - Bit 6 Low Battery	0 to 127	-	O	O
44073	0FE8h	2	R	Meter model 0: General 1: Advance model (SMW110-C07E, SMW110-C47E) 2: Basic model (SMW110-C01E, SMW110-C41E) 3: Smart meter model	0 to 3	-	O	O
44074	0FE9h	4	R/WP	Multiplier (CT Ratio) (default = 1)	1 to 5,000	-	O	O
44076	0FEBh	8	R	Meter Serial Number Long (default = 0)	0 to FFFFFFFFFFFFFFFFh	-	O	O
44097	1000h	2	R/W	Slave address (See detail Appendix A)	1 to 247	-	O	O
44098	1001h	2	R/W	MODBUS Response time setting (default = 10 ms)	0 to 20,000	ms	O	O

Register Address		Byte Count	Access ※1	Register Name	Range	Units	Applicable ※2	
Dec	Hex						SMW110-C07E	SMW110-C47E
44099	1002h	2	R/W	Baud rate (bps) 0: 4800 bps (default), 1: 9600bps, 2: 19200bps	0 to 2	-	O	O
44100	1003h	2	R/W	Parity bit 0: Even parity (default) 1: None parity	0 to 1	-	O	O
44102	1005h	4	W	Password Login	0 to 4,294,967,295	-	O	O
44104	1007h	4	WP	Password Setting (default = 00000000h)		-	O	O
44106	1009h	2	R/WP	Energy and Demand Resolution 0: 10^0 = 1 Wh/W (default) 3: 10^3 = 1 kWh/kW	0 to 3	-	O	O
45113	13F8h	4	R	All Phase Import active energy (Q1 + Q4)	0 to 999,999,999	Note5	O	O
45115	13FAh	4	R	Phase 1 Import active energy (Q1 + Q4)		Note5	O	O
45117	13FCh	4	R	Phase 2 Import active energy (Q1 + Q4)		Note5	O	O
45119	13FEh	4	R	Phase 3 Import active energy (Q1 + Q4)		Note5	O	O
45121	1400h	4	R	All Phase Import active energy (Q1 + Q4), Rate 1		Note5	O	O
45123	1402h	4	R	All Phase Import active energy (Q1 + Q4), Rate 2		Note5	O	O
45125	1404h	4	R	All Phase Import active energy (Q1 + Q4), Rate 3		Note5	O	O
45151	141Eh	2	R	Number of billing (Billing reset count)	0 to 99	-	O	O
45153	1420h	2	R	Last billing date, time (Previous 1)	00YYMMDDhhmmss00	-	O	O

Register Address		Byte Count	Access ※1	Register Name	Range	Units	Applicable ※2	
Dec	Hex						SMW110-C07E	SMW110-C47E
45157	1424h	4	R	Previous 1 All Phase Import active energy (Q1 + Q4)	0 to 999,999,999	Note5	O	O
45159	1426h	4	R	Previous 1 All Phase Import active energy (Q1 + Q4), Rate 1		Note5	O	O
45161	1428h	4	R	Previous 1 All Phase Import active energy (Q1 + Q4), Rate 2		Note5	O	O
45163	142Ah	4	R	Previous 1 All Phase Import active energy (Q1 + Q4), Rate 3		Note5	O	O
45251	1482h	4	R	Previous 2 All Phase Import active energy (Q1 + Q4)	0 to 999,999,999	Note5	O	O
45253	1484h	4	R	Previous 2 All Phase Import active energy (Q1 + Q4), Rate 1		Note5	O	O
45255	1486h	4	R	Previous 2 All Phase Import active energy (Q1 + Q4), Rate 2		Note5	O	O
45257	1488h	4	R	Previous 2 All Phase Import active energy (Q1 + Q4), Rate 3		Note5	O	O

Important Note

1: Registered addresses not listed in the table above are not available. and then meter will respond with exception response code 02 indicated data address is illegal.

2: In case write data exceeds the specified range, meter will response that write complete, but the data will not change.

3: Password protection,

- If the correct password is not supplied, meter will respond after writing register data write with password (WP) with exception response code 02 indicated address is illegal.
- Password login must be written 2 data registers by starts at register 44102 (1005h) only, if written to another register, meter will response with exception response code 02 indicated data address is illegal.
- If writing multiple register consist of password login, meter will response with exception response code 02 indicated data address is illegal.
- If writing multiple register consist of password setting, meter will response with exception response code 02 indicated data address is illegal.
- After set password setting, it will need to log in again every time.

4: The unit of energy data is depended on Unit of display energy (Address 0FA7h) and the number of decimal places is depended on Decimal place no. of display energy (Address 0FA8h).

$$Real\ output\ data = Read\ data \times 10^{(-Decimal\ place\ no.\ of\ display\ energy)}\ Unit.$$

<Example1> In case of reading Display Wh (imp+exp) Total value and Unit of display energy to Decimal place no. of display energy. Slave address is 78h.

- Reading Display Wh (imp+exp) Total value (Address 0FAAh ~ 0FABh)
  - Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	0FH	AAH	00H	02H	ECH	96H

  - Response framing (Display Wh (imp+exp) Total value = **0012 D687h (1234567)**)

Slave address	Function code	Byte count	**Display Wh (imp+exp) Total value**				CRC	
78H	03H	04H	**00H**	**12H**	**D6H**	**87H**	ACH	F3H

- Reading Unit of display energy to Decimal place no. of display energy (Address 0FA7h, 0FA8h).
  - Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	0FH	A7H	00H	02H	7DH	55H

  - Response framing (Unit of display energy = **0001h (1: kWh)**, Decimal place no. of display energy = **0002h (2)**)

Slave address	Function code	Byte count	**Unit**		**Decimal place.**		CRC	
78H	03H	04H	**00H**	**01H**	**00H**	**02H**	C2H	F5H

∴ Real output data of Display Wh (imp+exp) Total value = $\mathbf{1234567 \times 10^{-2} = 12,345.67\ kWh}$

5: The unit of Energy, Demand, Max. Demand and Cumulative Max. Demand depending on Energy and Demand Resolution (Address 1009h).

$$Real\ output\ data\ = Read\ data \times 10^{(\text{Energy and Demand Resolution})}$$

<Example1> In case of reading All Phase Import active energy (Q1 + Q4) value and Energy and Demand Resolution. Slave address is 78h.

- Reading All Phase Import active energy (Q1 + Q4) value (Address 13F8h ~ 13F9h)
  - Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	13H	F8H	00H	02H	4AH	D7H

  - Response framing (All Phase Import active energy (Q1 + Q4) value = **0009 FBF1h (654321)**)

Slave address	Function code	Byte count	**All Phase Import active energy (Q1 + Q4)**				CRC	
78H	03H	04H	**00H**	**09H**	**FBH**	**F1H**	40H	42H

- Reading Energy and Demand Resolution (Address 1009h)
  - Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	10H	09H	00H	01H	5BH	61H

  - Response framing (Energy and Demand Resolution = **0003h (3: 1kWh/kW)**)

Slave address	Function code	Byte count	**Energy and Demand Resolution**		CRC	
78H	03H	02H	**00H**	**03H**	65H	8FH

∴ Real output data of All Phase Import active energy (Q1 + Q4) = $\mathbf{654321 \times 10^{3} = 654,321\ kWh}$.

For previous data, if no billing data, data of previous 1 and 2, it will be 0. And if there is 1 billing data, the data of previous 2 will be 0.

<Example2> In case of no billing data, Reading Previous 1, 2 All Phase Import active energy (Q1 + Q4) value and Energy and Demand Resolution. Slave address is 78h.

- Reading Previous 1 All Phase Import active energy (Q1 + Q4) value (Address 1424h ~ 1425h)

  ▪ Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	14H	24H	00H	02H	8AH	59H

  ▪ Response framing (Previous 1 All Phase Import active energy (Q1 + Q4) value = **0000 0000h (0)**)

Slave address	Function code	Byte count	**Previous 1 All Phase Imp. active energy**				CRC	
78H	03H	04H	**00H**	**00H**	**00H**	**00H**	12H	F4H

- Reading Previous 2 All Phase Import active energy (Q1 + Q4) value (Address 1482h ~ 1483h)

  ▪ Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	14H	82H	00H	02H	6AH	7AH

  ▪ Response framing (Previous 2 All Phase Import active energy (Q1 + Q4) value = **0000 0000h (0)**)

Slave address	Function code	Byte count	**Previous 2 All Phase Imp. active energy**				CRC	
78H	03H	04H	**00H**	**00H**	**00H**	**00H**	12H	F4H

- Reading Energy and Demand Resolution (Address 1009h)

  ▪ Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	10H	09H	00H	01H	5BH	61H

  ▪ Response framing (Energy and Demand Resolution = **0003h (3: 1kWh/kW)**)

Slave address	Function code	Byte count	**Energy and Demand Resolution**		CRC	
78H	03H	02H	**00H**	**03H**	65H	8FH

∴ Real output data of Previous 1 All Phase Import active energy (Q1 + Q4) = $0 \times 10^3 = 0\ kWh$.

Real output data of Previous 2 All Phase Import active energy (Q1 + Q4) = $0 \times 10^3 = 0\ kWh$.

<Example3> In case of 1 billing data, Reading Previous 1, 2 All Phase Import active energy (Q1 + Q4) value and Energy and Demand Resolution. Slave address is 78h.

- Reading Previous 1 All Phase Import active energy (Q1 + Q4) value (Address 1424h ~ 1425h)

  - Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	14H	24H	00H	02H	8AH	59H

  - Response framing (Previous 1 All Phase Import active energy (Q1 + Q4) value = **0009 FBF1h (654321)**)

Slave address	Function code	Byte count	**Previous 1 All Phase Imp. active energy**				CRC	
78H	03H	04H	**00H**	**09H**	**FBH**	**F1H**	40H	42H

- Reading Previous 2 All Phase Import active energy (Q1 + Q4) value (Address 1482h ~ 1483h)

  - Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	14H	82H	00H	02H	6AH	7AH

  - Response framing (Previous 2 All Phase Import active energy (Q1 + Q4) value = **0000 0000h (0)**)

Slave address	Function code	Byte count	**Previous 2 All Phase Imp. active energy**				CRC	
78H	03H	04H	**00H**	**00H**	**00H**	**00H**	12H	F4H

- Reading Energy and Demand Resolution (Address 1009h)

  - Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	10H	09H	00H	01H	5BH	61H

  - Response framing (Energy and Demand Resolution = **0003h (3: 1kWh/kW)**)

Slave address	Function code	Byte count	**Energy and Demand Resolution**		CRC	
78H	03H	02H	**00H**	**03H**	65H	8FH

∴ Real output data of Previous 1 All Phase Import active energy (Q1 + Q4) = $\mathbf{654321 \times 10^3 = 654,321\ kWh}$.

Real output data of Previous 2 All Phase Import active energy (Q1 + Q4) = $\mathbf{0 \times 10^3 = 0\ kWh}$.

<Example4> In case of 2 billing data, Reading Previous 1, 2 All Phase Import active energy (Q1 + Q4) value and Energy and Demand Resolution. Slave address is 78h.

- Reading Previous 1 All Phase Import active energy (Q1 + Q4) value (Address 1424h ~ 1425h)
  - Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	14H	24H	00H	02H	8AH	59H

  - Response framing (Previous 1 All Phase Import active energy (Q1 + Q4) value = **0001 E240h (123456)**)

Slave address	Function code	Byte count	**Previous 1 All Phase Imp. active energy**				CRC	
78H	03H	04H	**00H**	**01H**	**E2H**	**40H**	0AH	64H

- Reading Previous 2 All Phase Import active energy (Q1 + Q4) value (Address 1482h ~ 1483h)
  - Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	14H	82H	00H	02H	6AH	7AH

  - Response framing (Previous 2 All Phase Import active energy (Q1 + Q4) value = **0009 FBF1h (654321)**)

Slave address	Function code	Byte count	**Previous 2 All Phase Imp. active energy**				CRC	
78H	03H	04H	**00H**	**09H**	**FBH**	**F1H**	40H	42H

- Reading Energy and Demand Resolution (Address 1009h)
  - Query framing

Slave address	Function code	Starting address		Quantity of registers		CRC	
78H	03H	10H	09H	00H	01H	5BH	61H

  - Response framing (Energy and Demand Resolution = **0003h (3: 1kWh/kW)**)

Slave address	Function code	Byte count	**Energy and Demand Resolution**		CRC	
78H	03H	02H	**00H**	**03H**	65H	8FH

∴ Real output data of Previous 1 All Phase Import active energy (Q1 + Q4) = $\mathbf{123456 \times 10^3 = 123,456\ kWh}$.

Real output data of Previous 2 All Phase Import active energy (Q1 + Q4) = $\mathbf{654321 \times 10^3 = 654,321\ kWh}$.

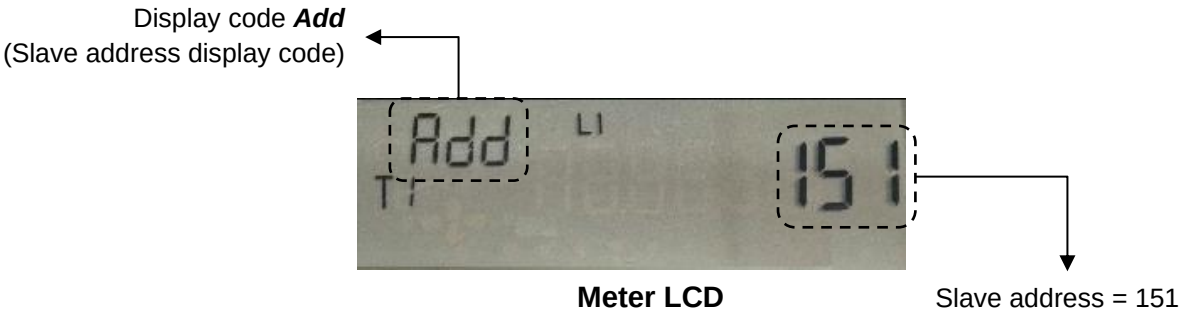
6: Recommend user shall setting Multiplier (CT Ratio) and Energy and Demand Resolution as table below,

Multiplier (CT ratio) (0FE9h)	**Energy and Demand Resolution (1009h)**
1 to 400	0: 1 Wh/1W
1 to 5,000	3: 1 kWh/kW

Appendix A Slave Address

A slave address of any meter is shown on meter LCD by manual scrolling display. The slave address shown by display item, code Add.

<Example A1>



Note:

A slave address must be unique on a Modbus serial bus. If some slave addresses are duplicated on bus, slave address changing must be done by software “Modbus Meter Setting” (download setting software from our website: www.meath-co.com/meter/sara_doc.php?cat=22)

Meter Technical Support

0-2540-6992

support.025406992 (Line ID)

Working Hours: Mon.– Fri. / 8.00a.m.–5.00p.m.