

# LUMEL

DIN RAIL MOUNT

THREE PHASE ENERGY METER

**NMID11, NMID11LITE, NMID11MBUS**  
**NMID12, NMID12LITE, NMID12MBUS**  
**NMID13, NMID13LITE, NMID13MBUS**



USER MANUAL



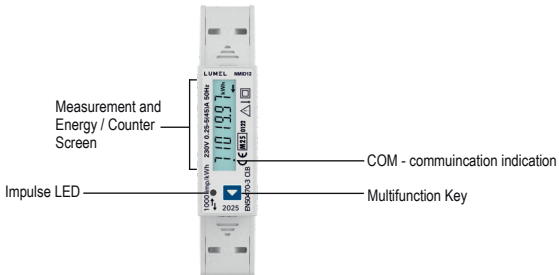
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## 1. INTRODUCTION

The Energy Meter is a DIN Rail mounted Digital Meter, primarily for bidirectional Active, Reactive and Apparent Energy measurement intended for use in industrial, commercial and residential electrical energy metering. It also accurately measures important electrical parameters like TRMS Voltage, TRMS Current, Frequency, Active / Reactive and Apparent Power, and Power Factor in Single Phase Networks. The meter is engineered using advanced microcontroller technology and is suitable for electrical parameter measurement and monitoring in 1 Phase 2 Wire Networks. It supports maximum 45 A current measurement on direct connected meters and 1A / 5A and 100mA current measurement on external CT connected meters. It displays parameters on bright intuitive LCD and also has Pulse Outputs and Impulse LED for energy monitoring. It supports Tariff Counters selectable via Tariff Input or MODBUS / MBUS Communication as per model. It has inbuilt industry standard MODBUS RTU and MBUS for remote monitoring.



## 2. LCD Display

### 2.1. Introduction

The meter displays more than 40 measurement parameters including Total Energies, Tariff, Partial and also other important electrical parameters like Max Demand, Voltage, Current, Frequency, Active Power, Reactive Power, Apparent Power and Power Factor on individual screens. The user can easily scroll the Parameter By Pressing key and By Pressing and Holding key for 5 Seconds on screen 2 option the user can see Tariff & Demand Parameters. again Pressing and Holding key for 5 Seconds on screen 1 option it back to the Main Parameter . For Setup menu the user need to Press & Hold the Key on measurement parameters screen. Refer Table 1 & Table 2 for list all the Measurement Parameters available on Display and MODBUS and MBUS.

### 2.2. LCD Display Symbols and Indications

The LCD has bold seven segment digits with bright white backlit for display of measurement parameters. Special symbols and units are provided for effective display and easy onsite configuration. Indications for current reversal, communication status, active tariff available on screen. Measurement screen can be set as automatic scrolling or manual scrolling.

#### 2.2.1 Communication Indication

The meter provides communication based on MODBUS and MBUS protocol for remote data acquisition of measurement data and configuration. If meter is properly communicating with host than it is indicated by symbol as shown:



The dot symbol on LCD indicates that the meter is communicating.

## 2.2.2 Tariff Energies Indication



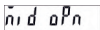
This Instrument comes with 2 tariff based on Tariff Inputs or Modbus or MBUS. In the image given here, it indicates that the instrument is currently displaying the selected energy parameter (Import Active Energy) of Tariff 1.

These Tariff energies and Demand parameters are available on display screen 2, For opening the Screen 2 Press and hold the Key for 5 Seconds on Display 2 Option

**Tariff Indication :** Meter has tariff function and indicated by symbol **T**, The digit after this symbol indicates tariff number either 1 or 2.

**Other Labels:** **Σ** - Indicates Total parameter , **←** - indicates Import parameter ,  
**→** - indicates export parameter.

## 2.2.3 MID Setup Indication

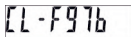


This screen indicates that the MID setup **OPEN**, user need to set CT Primary and CT Secondary to **LOCK** the setup. This parameters are configured and programmed at the site only in first 15 minutes after entering into CT Primary or CT secondary edit mode and get locked as per MID standards.

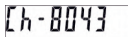
## 2.2.4 Start-up Screens



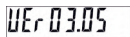
Display check screen



CRC Lower Byte screen



CRC Higher Byte screen



Software version screen

NOTE : CRC will be calculated after 3 minutes of power ON the meter.

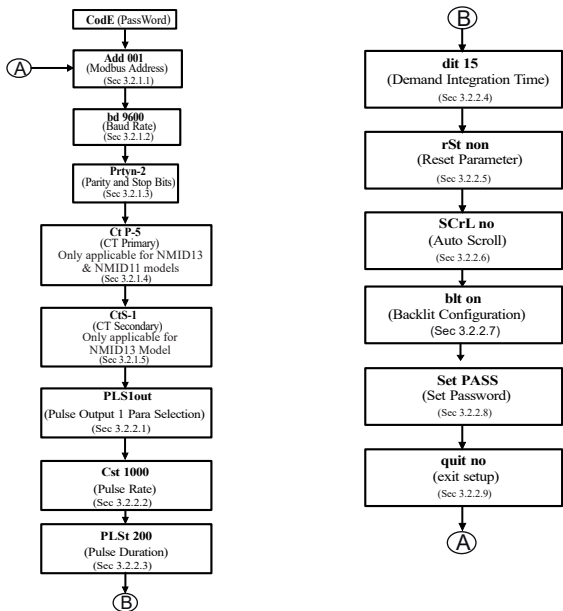
**TABLE 1 : Measurement Parameters:**  
**Screen 1**

| Parameter No. | Parameters                     | On Display | On Modbus |
|---------------|--------------------------------|------------|-----------|
| 1             | Total Active Energy            | ✓          | ✓         |
| 2             | Import Active Energy           | ✓          | ✓         |
| 3             | Export Active Energy           | ✓          | ✓         |
| 4             | Import Reactive Energy         | ✓          | ✓         |
| 5             | Export Reactive Energy         | ✓          | ✓         |
| 6             | Total Reactive Energy          | ✓          | ✓         |
| 7             | Total Apparent Energy          | ✓          | ✓         |
| 8             | Partial Import Active Energy   | ✓          | ✓         |
| 9             | Partial Export Active Energy   | ✓          | ✓         |
| 10            | Partial Total Active Energy    | ✓          | ✓         |
| 11            | Partial Import Reactive Energy | ✓          | ✓         |
| 12            | Partial Export Reactive Energy | ✓          | ✓         |
| 13            | Partial Total Reactive Energy  | ✓          | ✓         |
| 14            | Partial Total Apparent Energy  | ✓          | ✓         |
| 15            | Voltage                        | ✓          | ✓         |
| 16            | Current                        | ✓          | ✓         |
| 17            | Active Power                   | ✓          | ✓         |
| 18            | Reactive Power                 | ✓          | ✓         |
| 19            | Apparent Power                 | ✓          | ✓         |
| 20            | Power Factor                   | ✓          | ✓         |
| 21            | Frequency                      | ✓          | ✓         |
| 22            | Cst - xxxx                     | ✓          | ✓         |
| 23            | Add - xxx                      | ✓          | ✓         |
| 24            | bd - xxxx                      | ✓          | ✓         |
| 25            | Pd - Pd count of meter         | ✓          | ✓         |
| 26            | Active tariff status           | ✓          | ✓         |
| 27            | Serial Number                  | ✓          | ✓         |
| 28            | Display Test                   | ✓          | --        |

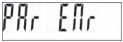
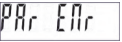
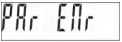
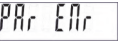
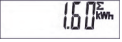
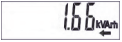
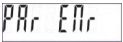
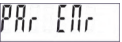
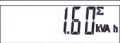
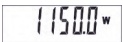
**TABLE 1 : Measurement Parameters (contd.):**  
**Screen 2**

| <b>Parameter No.</b> | <b>Parameters</b>         | <b>On Display</b> | <b>On Modbus</b> |
|----------------------|---------------------------|-------------------|------------------|
| 29                   | CRC of meter              | ✓                 | ✓                |
| 30                   | T1 Import Active Energy   | ✓                 | ✓                |
| 31                   | T1 Export Active Energy   | ✓                 | ✓                |
| 32                   | T1 Total Active Energy    | ✓                 | ✓                |
| 33                   | T1 Import Reactive Energy | ✓                 | ✓                |
| 34                   | T1 Export Reactive Energy | ✓                 | ✓                |
| 35                   | T1 Total Reactive Energy  | ✓                 | ✓                |
| 36                   | T1 Total Apparent Energy  | ✓                 | ✓                |
| 37                   | T2 Import Active Energy   | ✓                 | ✓                |
| 38                   | T2 Export Active Energy   | ✓                 | ✓                |
| 39                   | T2 Total Active Energy    | ✓                 | ✓                |
| 40                   | T2 Import Reactive Energy | ✓                 | ✓                |
| 41                   | T2 Export Reactive Energy | ✓                 | ✓                |
| 42                   | T2 Total Reactive Energy  | ✓                 | ✓                |
| 43                   | T2 Total Apparent Energy  | ✓                 | ✓                |
| 44                   | Import W Max Demand       | ✓                 | ✓                |
| 45                   | Export W Max Demand       | ✓                 | ✓                |
| 46                   | Import VAr Max Demand     | ✓                 | ✓                |
| 47                   | Export VAr Max Demand     | ✓                 | ✓                |
| 48                   | Import VA Max Demand      | ✓                 | ✓                |
| 49                   | Export VA Max Demand      | ✓                 | ✓                |
| 50                   | Current Max Demand        | ✓                 | ✓                |

## 2.3 Setup Parameters Screens Navigation Map



2.4 Measurement Parameters Screens

|                                                                                  |                                                                                   |                                                                                   |                                                                                   |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|  |  |  |  |
| Total Active Energy                                                              | Import Active Energy                                                              | Export Active Energy                                                              | Import Reactive Energy                                                            |
|  |  |  |  |
| Export Reactive Energy                                                           | Total Reactive Energy                                                             | Total Apparent Energy                                                             | Partial Import Active Energy                                                      |
|  |  |  |  |
|  |  |  |  |
| Partial Export Active Energy                                                     | Partial Total Active Energy                                                       | Partial Import Reactive Energy                                                    | Partial Export Reactive Energy                                                    |
|  |  |  |  |
|  |  | Voltage                                                                           | Current                                                                           |
| Partial Total Reactive Energy                                                    | Partial Total Apparent Energy                                                     |                                                                                   |                                                                                   |
|  |  |  |  |
| Active Power                                                                     | Reactive Power                                                                    | Apparent Power                                                                    | Power Factor                                                                      |

50.00 Hz

Frequency

151 1000

Pulse Constant

Addr 001

Modbus Device Address

bdr 9600

Baud Rate

Pd- 13

Power Drop

ErrF-1P  
Err-111

Tariff Status-Input  
Based & Error Indication

ErrF-nd

Tariff Status-  
Modbus Based

Sr-2312  
000001

Serial Number

0.00000000 Σ T12  
kWHz  
kVAh

Display Check

hR: dnd  
150 kW ←

Import Active Power  
Max Demand

hR: dnd  
150 kW →

Export Active Power  
Max Demand

hR: dnd  
150 kVar ←

Import Reactive Power  
Max Demand

hR: dnd  
150 kVar →

Export Reactive Power  
Max Demand

hR: dnd  
150 kVA ←

Import Apparent Power  
Max Demand

hR: dnd  
150 kVA →

Export Apparent Power  
Max Demand

hR: dnd  
450 A

Current  
Max Demand

### 3. PROGRAMMING

The following sections comprise step by step procedures for configuring the Energy Meter according to individual user requirements. To access the set-up screens press and hold key for 5 seconds on any measurement parameter screen. This will take the User into the Password Protection Entry Stage (Section 3.1).

#### 3.1 Password Protection

Password protection can be enabled to prevent unauthorized access to set-up screens, when default password protection is not enabled. Password protection is enabled by selecting a four digit number other than 0000, setting a password of 0000 disables the password protection.



Enter Password, prompt for first digit. Press the key to scroll the value of first digit from 0 through to 9, Press & Hold key to advance to next digit.



Enter Password, first digit entered, prompt for second digit.  
Press the key to scroll the value of first digit from 0 through to 9  
Press & Hold the key to advance to next digit.



Enter Password, second digit entered, prompt for third digit.  
Press the key to scroll the value of first digit from 0 through to 9.  
Press & Hold the key to advance to next digit.



Enter Password, third digit entered, prompt for fourth digit. .  
Press the key to scroll the value of first digit from 0 through to 9.  
Press & Hold the key to advance to verification of the password.



password confirmed and Pressing key advances to the "Setup Menu" entry stage. ( See Section 3.2).

#### Password Incorrect.



When this Screen appears and first digit is blinking means the unit has not accepted the Password entered. it gives one more chance to enter the password and after this meter will quit setup menu.

## 3.2 Setup Menu selection

### 3.2.1 Communication Parameter Selection

#### 3.2.1.1 Address Setting

The image shows a small LCD screen with the text "Add 001" displayed in a monospaced font. The screen is rectangular with a thin border.

This screen allows the user to set address for the meter. The allowable range of addresses for MODBUS is 1 to 247 and for MBUS is 1 to 250.

Press & Hold the key to set the address of meter.

pressing the key to advance to the "Baud Rate" setup screen.

Press & Hold the key to enter into edit mode, prompt for first digit.

The image shows a small LCD screen with the text "Add 001" displayed in a monospaced font. The screen is rectangular with a thin border.

Press the keys to scroll the value of the first digit. Press & Hold the key to advance to next digit.

Similarly, enter second and third digits of address. After entering third digit, Press & Hold the key confirms the selection and shows "Done" screen.

The default setting is '001'.

#### 3.2.1.2 Baud Rate

The image shows a small LCD screen with the text "bd 9600" displayed in a monospaced font. The screen is rectangular with a thin border.

This screen allows the user to set Baud Rate. The values displayed on screen are in bits per second.

Pressing key accepts the present value and advance to the "Parity and Stop Bit Selection" screen (see Section 3.2.2.3).

Pressing & Holding the key advances to the "Baud Rate Edit" mode and pressing the scroll key scrolls the value through 2400, 4800, 9600, 19200 and 38400 baud for MODBUS and 300, 600, 1200, 2400, 4800 and 9600 baud for MBUS.

Pressing & Holding the key sets the value and shows the "Baud Rate" screen (see Section 3.2.1.2).

NOTE: Default value is set as '9600'.

#### 3.2.1.3 Parity and Stop Bit

The image shows a small LCD screen with the text "Prty n-2" displayed in a monospaced font. The screen is rectangular with a thin border.

This screen allows the user to set Parity & number of stop bits

Pressing the key accepts the present value and advances to "CT Primary Parameters" screen (see section 3.2.1.4)

Pressing & Holding the key advances to the "Parity & Stop bit Edit" mode & pressing the keys scrolls the value through: *nonE1*: no parity with one stop bit, *nonE2*: no parity with two stop bit, *EVEn*: even parity with one stop bit, *odd*: odd parity with one stop bit. For MBUS EVEn1: Even parity is setable. Pressing & Holding the key sets the value and advances to "CT Primary" setup screen (see Section 3.2.1.4). Default value for MODBUS is set as '*nonE1*'.

#### 3.2.1.4 CT Primary (only applicable for NMID13 & NMID11 Models )



This screen allows the user to set CT Primary value for the meter. The valid range of value for NMID13 is 1 - 1000 and for NMID11 is 5-1000.

Pressing key accepts the present value and advance to the "CT Secondary" setup screen. Press and hold the key to enter into edit mode, prompt for first digit. Press the key to scroll the value of the first digit. Press and hold key to advance to next digit.

Similarly, enter second and third digits CT Primary value. After entering last digit, Pressing the key confirms the selection and shows "Done" screen.

The default setting is '5'.

**NOTE : The parameter can be set in first 15 minutes after entering into CT Primary or CT secondary edit mode and get locked for lifetime.**

#### 3.2.1.5 CT Secondary (only applicable for NMID13 Model)



This screen allows the user to set CT Secondary value for the meter. The option values of CT secondary are 1 Ampere or 5 Ampere.

Press key to set the CT Secondary value .

Press and hold key to enter into edit mode. Pressing key again scrolls the value through 1A or 5A. confirms the selection by pressing key, then shows "Done" screen.

Pressing key sets the value and advances to "output parameter Selection" screen (see Section 3.2.2.).

The default setting is '5'.

**NOTE : The parameter can be set in first 15 minutes after entering into CT Primary or CT secondary edit mode and get locked for lifetime**

## 3.2.2 Output Parameter Selection

### 3.2.2.1. Pulse Output



This screen is used to set the pulse1 ie SO1 output parameter.

Pressing key accept the current values and advances to "pulse rate Selection" menu. Pressing & Holding key advances to the " pulse output 1 Parameter edit " mode & pressing the key scrolls the value through: *IMP KWH, EXP KWH, IMP KVARh, EXP KVARh, IND KVARh, CAP KVARh* , TOTAL KWH , TOTAL KVARH (see Table 3 on page 18)

Pressing & Holding the key sets the value and advances to "pulse rate selection" screen. Default value is IMP KWH - *import kwh*

### 3.2.2.2. Pulse Rate



This screen applies to the Pulse Output option only. The screen allows user to set the following pulse rates: 1 pulse per 1 (1kWh) / 10 (1kWh) / 100 (1kWh) / 1000 (1kWh). Pressing key accepts the present selection and takes to the "Pulse Duration Selection" menu (See section 3.2.2.3).

Pressing & Holding the key advances to "Pulse Rate Edit" mode & pressing the key will scrolls the value through the values *1, 10, 100 and 1000*.

Pressing & Holding the key set the value and advances to "Pulse Duration" screen (see Section 3.2.2.3).

**NOTE:** For NMID13 SO pulse are always based on CT ratio 5/5 A and for NMID11 SO pulse are always based on CT Secondary 100mA.

### 3.2.2.3 Pulse Duration



This screen applies only to the Pulse Output. This screen allows the user to set pulse Output energization time in milliseconds.

Pressing the key accepts the present value and advance to "Demand integration time" screen ( see section 3.2.2.4).

Pressing & Holding the key advances to "Pulse Duration Edit" mode and pressing the key scroll the value through *60, 100 and 200* milliseconds.

Pressing & Holding the key selects the value and advances to "Demand integration time" menu (see Section 3.2.2.4).

Default value is set to '200' ms.

### 3.2.2.4 Demand Integration Time

The image shows a small LCD screen with the text 'dlt 15' displayed in a simple, pixelated font. The 'dlt' is in lowercase and '15' is in digits.

This screen is used to set the period over which current and power readings are to be integrated. The Unit of displayed value is minutes.

Pressing the key accepts the present value and advance to "Reset Parameter" screen.

Pressing & Holding the key advances to "Demand integration time Edit" mode and pressing the key scroll the value through *5, 10, 15, 30 minutes*.

Pressing & Holding the key selects the value and advances to "Reset Parameter" menu (see Section 3.2.2.5).

Default value is set to '15' *minute*.

### 3.2.2.5 Reset Parameter Selection

The image shows a small LCD screen with the text 'rst non' displayed in a simple, pixelated font. 'rst' is in lowercase and 'non' is in lowercase letters.

This screen is used to reset different parameters.

Pressing the key accepts the present value and advance to "Auto Scroll" screen. Pressing & Holding the key advances to "Reset Parameter Edit" mode and pressing the keys scroll through *none*, partial energy, demand, power down counter and all.

Pressing the enter key selects the value and advances to "Auto scroll" menu (see Section 3.2.2.6).

### 3.2.2.6 Auto Scrolling

The image shows a small LCD screen with the text 'scrL no' displayed in a simple, pixelated font. 'scrL' is in lowercase and 'no' is in lowercase letters.

This screen allows user to enable auto screen scrolling.

Pressing the key accepts the present status and advance to the "backlit configuration" screen (see Section 3.2.2.7).

Pressing & Holding the key advances to "Auto scroll Edit" mode and pressing the key scroll through *no, 10, 20, 30 sec*.

No - Auto scroll is disabled

10, 20, 30 - Autoscroll activated and number here displays Time in seconds between two screens in autoscroll. Pressing & Holding the key selects the value and advances to "backlit configuration" menu (see Section 3.2.2.7).

### 3.2.2.7 Backlit Configuration

The image shows a small LCD screen with the text 'bLk on' displayed in a simple, pixelated font. 'bLk' is in lowercase and 'on' is in lowercase letters.

This screen allows user to set backlit configuration.

Pressing the key accepts the present status and advance to the "Change Password" screen (see Section 3.2.2.8).

Pressing & Holding the key advances to "backlit configuration edit" mode and pressing the key scroll through on, off, *act*.

1) on - backlit set to continues on mode.

2) off - backlit set to continues off mode. 3) act - backlit set to on for 10 Sec. when user press the key. Pressing & Holding the key selects the value and advances to "Change Password" menu (see Section 3.2.2.8).

### 3.2.2.8 New / Change Password



This screen allows user to set password screen scrolling.  
Pressing & Holding the key accepts the present status and advance to the "quit screen" screen (see Section 3.2.2.9).



Pressing & Holding the key advances to "Set password Edit" mode and pressing the key scroll the value of first digit from 0 through to 9.



Pressing & Holding the key selects the value and advances to set second digit. pressing the key scroll the value of second digit from 0 through to 9.



Pressing & Holding the key selects the value and advances to set third digit. pressing the key scroll the value of third digit from 0 through to 9.



Pressing & Holding the key selects the value and advances to set forth digit. pressing the key scroll the value of fourth digit from 0 through to 9.



Pressing & Holding the key selects the value and advances to Password conformation.

### 3.2.2.9 Quit Setup Menu



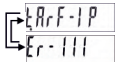
This screen allows user to Exit from Setup Menu.  
Pressing & Holding the key advances to "quit setup" edit mode  
pressing the key scroll the options yes or no.

Pressing & Holding the key will conforms the selection.

if YES selected then meter will quit from setup, selecting the NO option it will advanced to address setup screen (see Section 3.2.1.1).

## 4. Troubleshooting

### 4.1 Error Screen



The Error Screen is designed to display error codes in the format "Er-XXX". Each digit in the error code represents a specific type of error. The first digit indicates a program flash CRC mismatch error, the second digit signifies an EEPROM full or error, and the third digit represents a calibration error. If any of these errors occur, the corresponding digit changes from 0 to 1. For instance, if a program flash CRC mismatch error occurs, the error code displayed will be "Er-100" or if a program EEPROM gets full or malfunction, the error code displayed will be "Er-010". Conversely, if no errors are detected, the screen will display "Er-000". This clear and concise error indication system ensures efficient troubleshooting and maintenance of the energy meter. This screen is multiplexed with Tariff Input Screen and will toggle back and forth.

**NOTE: If any of the above errors occurs, please contact technical support**

## 5. Tariff Selection :

The meter is provided Tariff Selection Via Tariff Inputs or Modbus or MBus for selection of active tariff respectively for energy meter energy metering.

### 5.1 Tariff Selection:

#### Relationship between Tariff Input and ActiveTariff

| Tariff Input 1 | Tariff number |
|----------------|---------------|
| LOW            | Tariff 1      |
| HIGH           | Tariff 2      |

## 6. SO Output :

The Meter is provided with one opto-isolated pulse outputs that can be configured for any one of the Active, Reactive and Apparent Energy parameters. Refer TABLE 3 for parameters for pulse output. The pulse width and rate of pulse out is onsite programmable.

### 6.1 Pulse Output :

Pulse Output is opto-coupler based SO which can be used to drive an external mechanical counter for energy measurement. The Pulse Output can be configured to the parameters mentioned in TABLE 3 through setup parameter screen.

**TABLE 3 : Parameters for Pulse Output**

| Parameter Number | Parameter                  | 1P 2W |
|------------------|----------------------------|-------|
| 1                | Import Active Energy       | ✓     |
| 2                | Export Active Energy       | ✓     |
| 3                | Import Reactive Energy     | ✓     |
| 4                | Export Reactive Energy     | ✓     |
| 5                | Inductive Reactive Energy  | ✓     |
| 6                | Capacitive Reactive Energy | ✓     |
| 7                | Total active energy        | ✓     |
| 8                | Total kvarh energy         | ✓     |

## 7. RS 485 (ModBus) Output :

The Energy Meter supports MODBUS (RS485) RTU protocol (2-wire) .

Connection should be made using twisted pair shielded cable. All "A" and "B" connections are daisy chained together. Loop (ring) topology does not require any termination load. Line topology may or may not require terminating loads depending on the type and length of cable used. The impedance of the termination load should match the impedance of the cable and be at both ends of the line. The cable should be terminated at each end with a 120 ohm (1/4 Watt min.) resistor.

RS 485 network supports maximum length of 1.2km. Including the Master, a maximum of 32 instruments can be connected in RS485 network. The permissible address range for The Meter is between 1 and 247 for 32 instruments. Broadcast Mode (address 0) is not allowed.

Each byte in RTU mode has following format:

|                             |                                                                                                                                                      |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | 8-bit binary, hexadecimal 0-9, A-F<br>2 hexadecimal characters contained in each 8-bit field of the message                                          |
| <b>Format of Data Bytes</b> | 4 bytes (32 bits) per parameter.<br>Floating point format ( to IEEE 754)<br>Most significant byte first (Alternative least significant byte first)   |
| <b>Error Checking Bytes</b> | 2 byte Cyclical Redundancy Check (CRC)                                                                                                               |
| <b>Byte format</b>          | 1 start bit,<br>8 data bits, least significant bit sent first<br>1 bit for even/odd parity<br>1 stop bit if parity is used; 1 or 2 bits if no parity |

Communication Baud Rate is user selectable from the front panel between 2400,4800,9600,19200,38400 bps.

### Function code :

|          |                        |                                                  |
|----------|------------------------|--------------------------------------------------|
| 03 (HEX) | Read Holding Registers | Read content of read /write location ( 4X )      |
| 04 (HEX) | Read input Registers   | Read content of read only location ( 3X )        |
| 10 (HEX) | Presets Registers      | Set the content of read / write locations ( 4X ) |

**Exception Cases** : An exception code will be generated when Meter receives ModBus query with valid parity & error check but which contains some other error ( e.g. Attempt to set floating point variable to an invalid value) The response generated will be "Function Code" ORed with HEX (80H) . The exception codes are listed below

|    |                      |                                                                                                    |
|----|----------------------|----------------------------------------------------------------------------------------------------|
| 01 | Illegal function     | The function code is not supported by Meter                                                        |
| 02 | Illegal Data Address | Attempt to access an invalid address or an attempt to read or write part of a floating point value |
| 03 | Illegal DataValue    | Attempt to set a floating point variable to an invalid value                                       |

### 7.1 Accessing 3X and 4X register for reading measured values:

Two consecutive 16 bit registers represent one parameter. Refer **TABLE 4** for the addresses of 3X and 4X registers used for parameters measured by the instrument. Each parameter is held in the 3X as well as 4X registers. Modbus Code 03 and 04 are used to access all parameters in 3X and 4X registers respectively.

#### Example :

To read parameter,

Voltage from 3X: Start address= 00 00 Number of registers = 02

Current from 4X: Start address= 00 06 Number of registers = 02

**Note : Number of registers = Number of parameters x 2**

Each query for reading the data must be restricted to 40 parameters or less. Exceeding the 40 parameter limit will cause a ModBus exception code to be returned.

#### Query for 3X read:

|                |               |                    |                   |                        |                        |          |          |
|----------------|---------------|--------------------|-------------------|------------------------|------------------------|----------|----------|
| 01 (Hex)       | 04 (Hex)      | 00 (Hex)           | 00(Hex)           | 00 (Hex)               | 02(Hex)                | 71 (Hex) | CB (Hex) |
| Device Address | Function Code | Start Address High | Start Address Low | Number of Registers Hi | Number of Registers Lo | CRC Low  | CRC High |

#### 3X Response: Voltage (230V)

|                |               |            |                          |                         |                          |                         |          |          |
|----------------|---------------|------------|--------------------------|-------------------------|--------------------------|-------------------------|----------|----------|
| 01 (Hex)       | 04 (Hex)      | 04 (Hex)   | 43 (Hex)                 | 66 (Hex)                | 00 (Hex)                 | 00 (Hex)                | 0E (Hex) | 1F (Hex) |
| Device Address | Function Code | Byte Count | Data Register1 High Byte | Data Register1 Low Byte | Data Register2 High Byte | Data Register2 Low Byte | CRC Low  | CRC High |

Byte Count : Total number of data bytes received.

#### Query for 4X read:

|                |               |                    |                   |                        |                        |          |          |
|----------------|---------------|--------------------|-------------------|------------------------|------------------------|----------|----------|
| 01 (Hex)       | 03 (Hex)      | 00 (Hex)           | 06(Hex)           | 00 (Hex)               | 02(Hex)                | 24 (Hex) | 0A (Hex) |
| Device Address | Function Code | Start Address High | Start Address Low | Number of Registers Hi | Number of Registers Lo | CRC Low  | CRC High |

#### 4X Response: Current (5 A)

| 01 (Hex)       | 03 (Hex)      | 04 (Hex)   | 40 (Hex)                 | A0 (Hex)                | 00 (Hex)                 | 00 (Hex)                | EF (Hex) | D1 (Hex) |
|----------------|---------------|------------|--------------------------|-------------------------|--------------------------|-------------------------|----------|----------|
| Device Address | Function Code | Byte Count | Data Register1 High Byte | Data Register1 Low Byte | Data Register2 High Byte | Data Register2 Low Byte | CRC Low  | CRC High |

Byte count : No. of Bytes Demanded by user in query.

Start Address High : Most significant 8 bits of starting address of the parameter requested.

Start Address low : Least significant 8 bits of starting address of the parameter requested.

Number of register Hi : Most significant 8 bits of Number of registers requested.

Number of register Lo : Least significant 8 bits of Number of registers requested.

Data register 1 High Byte : Most significant 8 bits of Data register 1 of the parameter requested.

Data register 1 Low Byte : Least significant 8 bits of Data register 1 of the parameter requested.

Data register 2 High Byte : Most significant 8 bits of Data register 2 of the parameter requested.

Data register 2 Low Byte : Least significant 8 bits of Data register 2 of the parameter requested.

**(Note : Two consecutive 16 bit register represent one parameter.)**

**TABLE 4 : 3 X and 4 X register addresses for measured parameters**

| Address (3X) | Address (4X) | Parameter Number | Parameter      | Units           | Hex Address |          |
|--------------|--------------|------------------|----------------|-----------------|-------------|----------|
|              |              |                  |                |                 | High Byte   | Low Byte |
| 30001        | 40001        | 0                | Voltage        | Volts           | 00          | 00       |
| 30003        | 40003        | 1                | -              | -               | 00          | 02       |
| 30005        | 40005        | 2                | -              | -               | 00          | 04       |
| 30007        | 40007        | 3                | Current        | Amp             | 00          | 06       |
| 30009        | 40009        | 4                | -              | -               | 00          | 08       |
| 30011        | 40011        | 5                | -              | -               | 00          | 0A       |
| 30013        | 40013        | 6                | Active Power   | W               | 00          | 0C       |
| 30015        | 40015        | 7                | -              | -               | 00          | 0E       |
| 30017        | 40017        | 8                | -              | -               | 00          | 10       |
| 30019        | 40019        | 9                | Apparent Power | VA              | 00          | 12       |
| 30021        | 40021        | 10               | -              | -               | 00          | 14       |
| 30023        | 40023        | 11               | -              | -               | 00          | 16       |
| 30025        | 40025        | 12               | Reactive Power | VA <sub>r</sub> | 00          | 18       |
| 30027        | 40027        | 13               | -              | -               | 00          | 1A       |

**TABLE 4 : Continued**

| Address<br>(3X) | Address<br>(4X) | Parameter<br>Number | Parameter                             | Units | Hex Address |          |
|-----------------|-----------------|---------------------|---------------------------------------|-------|-------------|----------|
|                 |                 |                     |                                       |       | High Byte   | Low Byte |
| 30029           | 40029           | 14                  | -                                     | -     | 00          | 1C       |
| 30031           | 40031           | 15                  | Power Factor                          | -     | 00          | 1E       |
| 30033           | 40033           | 16                  | -                                     | -     | 00          | 20       |
| 30035           | 40035           | 17                  | -                                     | -     | 00          | 22       |
| 30037           | 40037           | 18                  | -                                     | -     | 00          | 24       |
| 30071           | 40071           | 35                  | Frequency                             | Hz    | 00          | 46       |
| 30073           | 40073           | 36                  | W Import Demand                       | W     | 00          | 48       |
| 30075           | 40075           | 37                  | W Import Max Demand                   | W     | 00          | 4A       |
| 30077           | 40077           | 38                  | W Export Demand                       | W     | 00          | 4C       |
| 30079           | 40079           | 39                  | W Exp. Max Demand                     | W     | 00          | 4E       |
| 30081           | 40081           | 40                  | var Imp.\ Ind Demand                  | VAr   | 00          | 50       |
| 30083           | 40083           | 41                  | var Imp.\ Ind Max Demand              | VAr   | 00          | 52       |
| 30085           | 40085           | 42                  | var Exp. \ Cap Max Demand             | VAr   | 00          | 54       |
| 30087           | 40087           | 43                  | var Exp. \ Cap Max Demand             | VAr   | 00          | 56       |
| 30089           | 40089           | 44                  | va Imp. Demand                        | VA    | 00          | 58       |
| 30091           | 40091           | 45                  | va Imp. Max Demand                    | VA    | 00          | 5A       |
| 30093           | 40093           | 46                  | va Exp. Demand                        | VA    | 00          | 5C       |
| 30095           | 40095           | 47                  | va Exp. Max Demand                    | VA    | 00          | 5E       |
| 30097           | 40097           | 48                  | Current Imp. Demand                   | Amp   | 00          | 60       |
| 30099           | 40099           | 49                  | Current Imp Max. Demand               | Amp   | 00          | 62       |
| 30101           | 40101           | 50                  | -                                     | -     | 00          | 64       |
| 30103           | 40103           | 51                  | -                                     | -     | 00          | 66       |
| 30105           | 40105           | 52                  | -                                     | -     | 00          | 68       |
| 30107           | 40107           | 53                  | Active Import Energy Overflow Count   | -     | 00          | 6A       |
| 30109           | 40109           | 54                  | Active Import Energy                  | kWh   | 00          | 6C       |
| 30111           | 40111           | 55                  | Active Export Energy Overflow Count   | -     | 00          | 6E       |
| 30113           | 40113           | 56                  | Active Export Energy                  | kWh   | 00          | 70       |
| 30115           | 40115           | 57                  | Reactive Import Energy Overflow Count | -     | 00          | 72       |
| 30117           | 40117           | 58                  | Reactive Import Energy                | kVAh  | 00          | 74       |
| 30119           | 40119           | 59                  | Reactive Export Energy Overflow Count | -     | 00          | 76       |
| 30121           | 40121           | 60                  | Reactive Export Energy                | kVAh  | 00          | 78       |
| 30123           | 40123           | 61                  | Total Apparent Energy Overflow Count  | -     | 00          | 7A       |
| 30125           | 40125           | 62                  | Total Apparent Energy                 | kVAh  | 00          | 7C       |
| 30127           | 40127           | 63                  | -                                     | -     | 00          | 7E       |
| 30129           | 40129           | 64                  | -                                     | -     | 00          | 80       |

**TABLE 4 : Continued**

| Address<br>(3X) | Address<br>(4X) | Parameter<br>Number | Parameter                                | Units | Hex Address |          |
|-----------------|-----------------|---------------------|------------------------------------------|-------|-------------|----------|
|                 |                 |                     |                                          |       | High Byte   | Low Byte |
| 30131           | 40131           | 65                  | Total Active Energy Overflow Count       | -     | 00          | 82       |
| 30133           | 40133           | 66                  | Total Active Energy                      | kWh   | 00          | 84       |
| 30135           | 40135           | 67                  | Total Reactive Energy Overflow Count     | -     | 00          | 86       |
| 30137           | 40137           | 68                  | Total Reactive Energy                    | kVArh | 00          | 88       |
| 30139           | 40139           | 69                  | Total Apparent Energy Overflow Count     | -     | 00          | 8A       |
| 30141           | 40141           | 70                  | Total Apparent Energy                    | kVAh  | 00          | 8C       |
| 30143           | 40143           | 71                  | T1 Active Import Energy Overflow Count   | -     | 00          | 8E       |
| 30145           | 40145           | 72                  | T1 Active Import Energy                  | kWh   | 00          | 90       |
| 30147           | 40147           | 73                  | T1 Active Export Energy Overflow Count   | -     | 00          | 92       |
| 30149           | 40149           | 74                  | T1 Active Export Energy                  | kWh   | 00          | 94       |
| 30151           | 40151           | 75                  | T1 Reactive Import Energy Overflow Count | -     | 00          | 96       |
| 30153           | 40153           | 76                  | T1 Reactive Import Energy                | kVArh | 00          | 98       |
| 30155           | 40155           | 77                  | T1 Reactive Export Energy Overflow Count | -     | 00          | 9A       |
| 30157           | 40157           | 78                  | T1 Reactive Export Energy                | kVArh | 00          | 9C       |
| 30159           | 40159           | 79                  | T1 Total Apparent Energy Overflow Count  | -     | 00          | 9E       |
| 30161           | 40161           | 80                  | T1 Total Apparent Energy                 | kVAh  | 00          | A0       |
| 30163           | 40163           | 81                  | -                                        | -     | 00          | A2       |
| 30165           | 40165           | 82                  | -                                        | -     | 00          | A4       |
| 30167           | 40167           | 83                  | T1 Total Active Energy Overflow Count    | -     | 00          | A6       |
| 30169           | 40169           | 84                  | T1 Total Active Energy                   | kWh   | 00          | A8       |
| 30171           | 40171           | 85                  | T1 Total Reactive Energy Overflow Count  | -     | 00          | AA       |
| 30173           | 40173           | 86                  | T1 Total Reactive Energy                 | kVArh | 00          | AC       |
| 30175           | 40175           | 87                  | T1 Total Apparent Energy Overflow Count  | -     | 00          | AE       |
| 30177           | 40177           | 88                  | T1 Total Apparent Energy                 | kVAh  | 00          | B0       |
| 30179           | 40179           | 89                  | T2 Active Import Energy Overflow Count   | -     | 00          | B2       |
| 30181           | 40181           | 90                  | T2 Active Import Energy                  | kWh   | 00          | B4       |
| 30183           | 40183           | 91                  | T2 Active Export Energy Overflow Count   | -     | 00          | B6       |
| 30185           | 40185           | 92                  | T2 Active Export Energy                  | kWh   | 00          | B8       |
| 30187           | 40187           | 93                  | T2 Reactive Import Energy Overflow Count | -     | 00          | BA       |
| 30189           | 40189           | 94                  | T2 Reactive Import Energy                | kVArh | 00          | BC       |
| 30191           | 40191           | 95                  | T2 Reactive Export Energy Overflow Count | -     | 00          | BE       |
| 30193           | 40193           | 96                  | T2 Reactive Export Energy                | kVArh | 00          | C0       |
| 30195           | 40195           | 97                  | T2 Total Apparent Energy Overflow Count  | -     | 00          | C2       |
| 30197           | 40197           | 98                  | T2 Total Apparent Energy                 | kVAh  | 00          | C4       |
| 30199           | 40199           | 99                  | -                                        | -     | 00          | C6       |

**TABLE 4 : Continued**

| Address<br>(3X) | Address<br>(4X) | Parameter<br>Number | Parameter                                     | Units | Hex Address |          |
|-----------------|-----------------|---------------------|-----------------------------------------------|-------|-------------|----------|
|                 |                 |                     |                                               |       | High Byte   | Low Byte |
| 30201           | 40201           | 100                 | -                                             | -     | 00          | C8       |
| 30203           | 40203           | 101                 | T2 Total Active Energy Overflow Count         | -     | 00          | CA       |
| 30205           | 40205           | 102                 | T2 Total Active Energy                        | kWh   | 00          | CC       |
| 30207           | 40207           | 103                 | T2 Total Reactive Energy Overflow Count       | -     | 00          | CE       |
| 30209           | 40209           | 104                 | T2 Total Reactive Energy                      | kVArh | 00          | D0       |
| 30211           | 40211           | 105                 | T2 Total Apparent Energy Overflow Count       | -     | 00          | D2       |
| 30213           | 40213           | 106                 | T2 Total Apparent Energy                      | kVAh  | 00          | D4       |
| 30215           | 40215           | 107                 | Partial Active Import Energy Overflow Count   | -     | 00          | D6       |
| 30217           | 40217           | 108                 | Partial Active Import Energy                  | Wh    | 00          | D8       |
| 30219           | 40219           | 109                 | Partial Active Export Energy Overflow Count   | -     | 00          | DA       |
| 30221           | 40221           | 110                 | Partial Active Export Energy                  | kWh   | 00          | DC       |
| 30223           | 40223           | 111                 | Partial Reactive Import Energy Overflow Count | -     | 00          | DE       |
| 30225           | 40225           | 112                 | Partial Reactive Import Energy                | kVArh | 00          | E0       |
| 30227           | 40227           | 113                 | partial Reactive Export Energy Overflow Count | -     | 00          | E2       |
| 30229           | 40229           | 114                 | Partial Reactive Export Energy                | kVArh | 00          | E4       |
| 30231           | 40231           | 115                 | Partial Total Apparent Energy Overflow Count  | -     | 00          | E6       |
| 30233           | 40233           | 116                 | Partial Total Apparent Energy                 | kVAh  | 00          | E8       |
| 30235           | 40235           | 117                 | -                                             | -     | 00          | EA       |
| 30237           | 40237           | 118                 | -                                             | -     | 00          | EC       |
| 30239           | 40239           | 119                 | Partial Total Active Energy Overflow Count    | -     | 00          | EE       |
| 30241           | 40241           | 120                 | Partial Total Active Energy                   | kWh   | 00          | F0       |
| 30243           | 40243           | 121                 | Partial Total Reactive Energy Overflow Count  | -     | 00          | F2       |
| 30245           | 40245           | 122                 | Partial Total Reactive Energy                 | kArh  | 00          | F4       |
| 30247           | 40247           | 123                 | Partial Total Apparent Energy Overflow Count  | -     | 00          | F6       |
| 30249           | 40249           | 124                 | Partial Total Apparent Energy                 | kVAh  | 00          | F8       |
| 30251           | 40251           | 125                 | -                                             | -     | 00          | FA       |
| 30253           | 40253           | 126                 | -                                             | -     | 00          | FC       |
| 30255           | 40255           | 127                 | No of Interrupts                              | -     | 00          | FE       |
| 30257           | 40257           | 128                 | Impulse Rate                                  | -     | 01          | 00       |
| 30259           | 40259           | 129                 | -                                             | -     | 01          | 02       |
| 30261           | 40261           | 130                 | Tariff Status                                 |       | 01          | 04       |
| 30263           | 40263           | 131                 | Current Direction                             | Amp   | 01          | 06       |

**Note:** In Current Direction address if 0 is shown then current is in right direction i.e. lin and lout at current are matching with the terminals marked. if this address shows 1 then current is in reversed direction.

**TABLE 5 : 3 X long register addresses for measured parameters**

| Address<br>(3X) | Parameter<br>Number | Parameter                               | Units | Hex Address |          |
|-----------------|---------------------|-----------------------------------------|-------|-------------|----------|
|                 |                     |                                         |       | High Byte   | Low Byte |
| 30513           | 1                   | Wh Import Overflow Count                | -     | 02          | 00       |
| 30515           | 2                   | Wh Import                               | kWh   | 02          | 02       |
| 30517           | 3                   | Wh Export Overflow Count                | -     | 02          | 04       |
| 30519           | 4                   | Wh Export                               | kWh   | 02          | 06       |
| 30521           | 5                   | Varh Import Overflow Count              | -     | 02          | 08       |
| 30523           | 6                   | Varh Import                             | kVArh | 02          | 0A       |
| 30525           | 7                   | Varh Export Overflow Count              | -     | 02          | 0C       |
| 30527           | 8                   | Varh Export                             | kVArh | 02          | 0E       |
| 30529           | 9                   | Vah Import Overflow Count               | -     | 02          | 10       |
| 30531           | 10                  | Vah Import                              | kVAh  | 02          | 12       |
| 30533           | 11                  | Vah Export Overflow Count               | -     | 02          | 14       |
| 30535           | 12                  | Vah Export                              | kVAh  | 02          | 16       |
| 30537           | 13                  | Total Active Energy Overflow Count      | -     | 02          | 18       |
| 30539           | 14                  | Total Active Energy                     | kWh   | 02          | 1A       |
| 30541           | 15                  | Total Reactive Energy Overflow Count    | -     | 02          | 1C       |
| 30543           | 16                  | Total Reactive Energy                   | kVArh | 02          | 1E       |
| 30545           | 17                  | Total Apparent Energy Overflow Count    | -     | 02          | 20       |
| 30547           | 18                  | Total Apparent Energy                   | kVAh  | 02          | 22       |
| 30549           | 19                  | T1 Wh Import Overflow Count             | -     | 02          | 24       |
| 30551           | 20                  | T1 Wh Import                            | kWh   | 02          | 26       |
| 30553           | 21                  | T1 Wh Export Overflow Count             | -     | 02          | 28       |
| 30555           | 22                  | T1 Wh Export                            | kWh   | 02          | 2A       |
| 30557           | 23                  | T1 Varh Import Overflow Count           | -     | 02          | 2C       |
| 30559           | 24                  | T1 Varh Import                          | kVArh | 02          | 2E       |
| 30561           | 25                  | T1 Varh Export Overflow Count           | -     | 02          | 30       |
| 30563           | 26                  | T1 Varh Export                          | kVArh | 02          | 32       |
| 30565           | 27                  | T1 Vah Import Overflow Count            | -     | 02          | 34       |
| 30567           | 28                  | T1 Vah Import                           | kVAh  | 02          | 36       |
| 30569           | 29                  | T1 Vah Export Overflow Count            | -     | 02          | 38       |
| 30571           | 30                  | T1 Vah Export                           | kVAh  | 02          | 3A       |
| 30573           | 31                  | T1 Total Active Energy Overflow Count   | -     | 02          | 3C       |
| 30575           | 32                  | T1 Total Active Energy                  | kWh   | 02          | 3E       |
| 30577           | 33                  | T1 Total Reactive Energy Overflow Count | -     | 02          | 40       |
| 30579           | 34                  | T1 Total Reactive Energy                | kVArh | 02          | 42       |
| 30581           | 35                  | T1 Total Apparent Energy Overflow Count | -     | 02          | 44       |
| 30583           | 36                  | T1 Total Apparent Energy                | kVAh  | 02          | 46       |

**TABLE 5 : Continued**

| Address<br>(3X) | Parameter<br>Number | Parameter                                | Units | Hex Address |          |
|-----------------|---------------------|------------------------------------------|-------|-------------|----------|
|                 |                     |                                          |       | High Byte   | Low Byte |
| 30585           | 37                  | T2 Wh Import Overflow Count              | -     | 02          | 48       |
| 30587           | 38                  | T2 Wh Import                             | kWh   | 02          | 4A       |
| 30589           | 39                  | T2 Wh Export Overflow Count              | -     | 02          | 4C       |
| 30591           | 40                  | T2 Wh Export                             | kWh   | 02          | 4E       |
| 30593           | 41                  | T2 Varh Import Overflow Count            | -     | 02          | 50       |
| 30595           | 42                  | T2 Varh Import                           | kVArh | 02          | 52       |
| 30597           | 43                  | T2 Varh Export Overflow Count            | -     | 02          | 54       |
| 30599           | 44                  | T2 Varh Export                           | kVArh | 02          | 56       |
| 30601           | 45                  | T2 Vah Import Overflow Count             | -     | 02          | 58       |
| 30603           | 46                  | T2 Vah Import                            | kVAh  | 02          | 5A       |
| 30605           | 47                  | T2 Vah Export Overflow Count             | -     | 02          | 5C       |
| 30607           | 48                  | T2 Vah Export                            | kVAh  | 02          | 5E       |
| 30609           | 49                  | T2 Total Active Energy Overflow Count    | -     | 02          | 60       |
| 30611           | 50                  | T2 Total Active Energy                   | kWh   | 02          | 62       |
| 30613           | 51                  | T2 Total Reactive Energy Overflow Count  | -     | 02          | 64       |
| 30615           | 52                  | T2 Total Reactive Energy                 | kVArh | 02          | 66       |
| 30617           | 53                  | T2 Total Apparent Energy Overflow Count  | -     | 02          | 68       |
| 30619           | 54                  | T2 Total Apparent Energy                 | kVAh  | 02          | 6A       |
| 30621           | 55                  | Par Wh Import Overflow Count             | -     | 02          | 6C       |
| 30623           | 56                  | Par Wh Import                            | kWh   | 02          | 6E       |
| 30625           | 57                  | Par Wh Export Overflow Count             | -     | 02          | 70       |
| 30627           | 58                  | Par Wh Export                            | kWh   | 02          | 72       |
| 30629           | 59                  | Par Varh Import Overflow Count           | -     | 02          | 74       |
| 30631           | 60                  | Par Varh Import                          | kVArh | 02          | 76       |
| 30633           | 61                  | Par Varh Export Overflow Count           | -     | 02          | 78       |
| 30635           | 62                  | Par Varh Export                          | kVArh | 02          | 7A       |
| 30637           | 63                  | Par Vah Import Overflow Count            | -     | 02          | 7C       |
| 30639           | 64                  | Par Vah Import                           | kVAh  | 02          | 7E       |
| 30641           | 65                  | Par Vah Export Overflow Count            | -     | 02          | 80       |
| 30643           | 66                  | Par Vah Export                           | kVAh  | 02          | 82       |
| 30645           | 67                  | Par Total Active Energy Overflow Count   | -     | 02          | 84       |
| 30647           | 68                  | Par Total Active Energy                  | kWh   | 02          | 86       |
| 30649           | 69                  | Par Total Reactive Energy Overflow Count | -     | 02          | 88       |
| 30651           | 70                  | Par Total Reactive Energy                | kVArh | 02          | 8A       |
| 30653           | 71                  | Par Total Apparent Energy Overflow Count | -     | 02          | 8C       |
| 30655           | 72                  | Par Total Apparent Energy                | kVAh  | 02          | 8E       |

**NOTE:** Energy Overflow count Increments when energy count exceeds 99999.999.

| Overflow | Display Energy |
|----------|----------------|
| < 1      | 99999.99       |
| < 10     | 999999.9       |
| > =10    | 9999999        |

## 7.2 Accessing 3 X register for Long Energy Reading :

For Reading Energy start count in long energy format following query format should be used

**Query: (Query for Reading Active Energy Import Overflow)**

|                            |          |
|----------------------------|----------|
| Device Address             | 01 (Hex) |
| Function Code              | 04 (Hex) |
| Starting Address High      | 02 (Hex) |
| Starting Address Low       | 00 (Hex) |
| Number of Registers High   | 00 (Hex) |
| Number of Registers Low    | 02 (Hex) |
| Byte Count                 | 04 (Hex) |
| Data Register- 1 High Byte | 40 (Hex) |
| Data Register- 1 Low Byte  | 80 (Hex) |
| Data Register- 2 High Byte | 00 (Hex) |
| Data Register- 2 Low Byte  | 00 (Hex) |
| CRC Low                    | BE (Hex) |
| CRC High                   | A7 (Hex) |

**Byte Count :** Total number of data bytes transmitted.

**Data register 1 High Byte :** Most significant 8 bits of Data register 1 of the parameter requested.

**Data register 1 Low Byte :** Least significant 8 bits of Data register 1 of the parameter requested.

**Data register 2 High Byte :** Most significant 8 bits of Data register 2 of the parameter requested.

**Data register 2 Low Byte :** Least significant 8 bits of Data register 2 of the parameter requested.

**(Note : Two consecutive 16 bit register represent one parameter.)**

### Response:

|                          |          |
|--------------------------|----------|
| Device Address           | 01 (Hex) |
| Function Code            | 04 (Hex) |
| Start Address High       | 02 (Hex) |
| Start Address Low        | 00 (Hex) |
| Number of Registers High | 00 (Hex) |
| Number of Registers Low  | 02 (Hex) |
| CRC Low                  | 70 (Hex) |
| CRC High                 | 73 (Hex) |

**Start Address High :** Most significant 8 bits of starting address of the parameter requested.

**Start Address Low :** Least significant 8 bits of starting address of the parameter requested.

**Number of register High :** Most significant 8 bits of Number of registers requested.

**Number of register Low :** Least significant 8 bits of Number of registers requested.

### 7.3 Accessing 4 X register for Reading & Writing Settings:

Each setting is held in the 4X registers. ModBus code 04 is used to read the parameters. Refer **TABLE 6** for 4X Register addresses.

#### Example: Reading Total Energy Counter Formula

Start address = 1776 (Hex)

Number of registers = 02

**Note: Number of registers = Number of Parameters x 2**

#### Query :

|                          |          |
|--------------------------|----------|
| Device Address           | 01 (Hex) |
| Function Code            | 03 (Hex) |
| Start Address High       | 17 (Hex) |
| Start Address Low        | 76 (Hex) |
| Number of Registers High | 00 (Hex) |
| Number of Registers Low  | 02 (Hex) |
| CRC Low                  | 20 (Hex) |
| CRC High                 | 65 (Hex) |

**Start Address High** : Most significant 8 bits of starting address of the parameter requested.

**Start Address Low** : Least significant 8 bits of starting address of the parameter requested.

**Number of register High** : Most significant 8 bits of Number of registers requested.

**Number of register Low** : Least significant 8 bits of Number of registers requested.

**(Note : Two consecutive 16 bit register represent one parameter.)**

#### Response: Total Energy Counter Formula 1

|                            |          |
|----------------------------|----------|
| Device Address             | 01 (Hex) |
| Function Code              | 03 (Hex) |
| Byte Count                 | 04 (Hex) |
| Data Register- 1 High Byte | 3F(Hex)  |
| Data Register- 1 Low Byte  | 80 (Hex) |
| Data Register- 2 High Byte | 00 (Hex) |
| Data Register- 2 Low Byte  | 00 (Hex) |
| CRC Low                    | F7 (Hex) |
| CRC High                   | CF (Hex) |

**Byte Count** : Total number of data bytes received.

**Data register 1 High Byte** : Most significant 8 bits of Data register 1 of the parameter requested.

**Data register 1 Low Byte** : Least significant 8 bits of Data register 1 of the parameter requested.

**Data register 2 High Byte** : Most significant 8 bits of Data register 2 of the parameter requested.

**Data register 2 Low Byte** : Least significant 8 bits of Data register 2 of the parameter requested.

**(Note : Two consecutive 16 bit register represent one parameter.)**

### Example : Writing Total Energy Counter Formula

Counter Formula : 2 Start address = 1776 (Hex)

Number of registers = 02

**Note:** Number of registers = Number of Parameters x 2

#### Query:

|                            |          |
|----------------------------|----------|
| Device Address             | 01 (Hex) |
| Function Code              | 10 (Hex) |
| Starting Address High      | 17 (Hex) |
| Starting Address Low       | 76 (Hex) |
| Number of Registers High   | 00 (Hex) |
| Number of Registers Low    | 02 (Hex) |
| Byte Count                 | 04 (Hex) |
| Data Register- 1 High Byte | 40 (Hex) |
| Data Register- 1 Low Byte  | 00 (Hex) |
| Data Register- 2 High Byte | 00 (Hex) |
| Data Register- 2 Low Byte  | 00 (Hex) |
| CRC Low                    | 8A (Hex) |
| CRC High                   | 91 (Hex) |

**Byte Count :** Total number of data bytes received.

**Data register 1 High Byte :** Most significant 8 bits of Data register 1 of the parameter requested.

**Data register 1 Low Byte :** Least significant 8 bits of Data register 1 of the parameter requested.

**Data register 2 High Byte :** Most significant 8 bits of Data register 2 of the parameter requested.

**Data register 2 Low Byte :** Least significant 8 bits of Data register 2 of the parameter requested.

**(Note : Two consecutive 16 bit register represent one parameter)**

#### Response:

|                          |          |
|--------------------------|----------|
| Device Address           | 01 (Hex) |
| Function Code            | 10 (Hex) |
| Start Address High       | 17 (Hex) |
| Start Address Low        | 76 (Hex) |
| Number of Registers High | 00 (Hex) |
| Number of Registers Low  | 02 (Hex) |
| CRC Low                  | A5 (Hex) |
| CRC High                 | A6 (Hex) |

**Start Address High :** Most significant 8 bits of starting address of the parameter requested.

**Start Address Low :** Least significant 8 bits of starting address of the parameter requested.

**Number of register High :** Most significant 8 bits of Number of registers requested.

**Number of register Low :** Least significant 8 bits of Number of registers requested.

**(Note : Two consecutive 16 bit register represent one parameter)**

**TABLE 6 : 4 X register addresses**

| Parameter No. | Address Register | Parameters                                        | Default Values |
|---------------|------------------|---------------------------------------------------|----------------|
| 1             | 46001            | -                                                 | -              |
| 2             | 46003            | Demand Integration Time                           | 15             |
| 3             | 46005            | -                                                 | -              |
| 4             | 46007            | Total Energy Counter Formula                      | 3              |
| 5             | 46009            | Import/Export Reactive Energy Counter Formula     | 1              |
| 6             | 46011            | Nominal voltage                                   | 230            |
| 7             | 46013            | Nominal Current                                   | Rated Current  |
| 8             | 46015            | Nominal Frequency                                 | 50             |
| 9             | 46017            | Reset Parameters                                  | 0              |
| 10            | 46019            | Setup change Count                                | 0              |
| 11            | 46021            | Lock Setup Change Count<br>(for NMID13 & NMID11 ) | 50             |
| 12            | 46023            | Tariff Configuration                              | 1              |
| 13            | 46025            | Modbus Address                                    | 1              |
| 14            | 46027            | Comsetup Address                                  | 9              |
| 15            | 46029            | -                                                 | -              |
| 16            | 46031            | Autoscroll                                        | 0              |
| 17            | 46033            | Backlit Configuration                             | 1              |
| 18            | 46035            | Password                                          | 0000           |
| 19            | 46037            | So1 Pulse Constant                                | 1000           |
| 20            | 46039            | So1 Pulse Parameters                              | 1              |
| 21            | 46041            | So1 Pulse Width                                   | 200            |
| 22            | 46043            | -                                                 | -              |
| 23            | 46045            | -                                                 | -              |
| 24            | 46047            | -                                                 | -              |

## 4 X register addresses for NMID12 models

| Parameter No. | Address Register | Parameters              | Default Values |
|---------------|------------------|-------------------------|----------------|
| 25            | 46049            | -                       | -              |
| 26            | 46051            | -                       | -              |
| 27            | 46053            | Version Number          | XX.XX          |
| 28            | 46055            | Serial Number Year Date | YYMM           |
| 29            | 46057            | Serial Number Data      | -              |
| 30            | 46059            | CRC Flash               | -              |
| 31            | 46061            | Error bit Address       | -              |
| 32            | 46063            |                         | -              |

## 4 X register addresses for NMID13 & NMID11 models

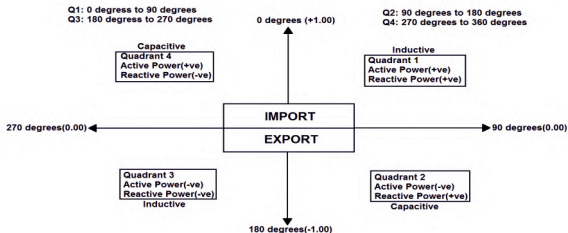
| Parameter No. | Address Register | Parameters              | Default Values |
|---------------|------------------|-------------------------|----------------|
| 25            | 46049            | CT Primary              | 5              |
| 26            | 46051            | CT Secondary            | 5              |
| 27            | 46053            | -                       | -              |
| 28            | 46055            | -                       | -              |
| 29            | 46057            | -                       | -              |
| 30            | 46059            | -                       | -              |
| 31            | 46061            | -                       | -              |
| 32            | 46063            | -                       | -              |
| 33            | 46065            | Version Number          | XX.XX          |
| 34            | 46067            | Serial Number Year Date | YYMM           |
| 35            | 46069            | Serial Number Data      | -              |
| 36            | 46071            | CRC Flash               | -              |
| 37            | 46073            | Error bit Address       | -              |
| 38            | 46075            | -                       | -              |

**TABLE 7 : 4 X register addresses Description**

| Parameter No. | Address Register | Parameters                                                               | Description                                                                                                                                                                                                                                                                                                                                                 |
|---------------|------------------|--------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1             | 46001            | -                                                                        | -                                                                                                                                                                                                                                                                                                                                                           |
| 2             | 46003            | Demand Integration Time (Read\Write)                                     | Demand Period represents demand time in minutes<br>The Applicable values are 5, 10, 15, 30.                                                                                                                                                                                                                                                                 |
| 3             | 46005            | -                                                                        | -                                                                                                                                                                                                                                                                                                                                                           |
| 4             | 46007            | Total Energy counter formula (for Active & Reactive energy) (Read\Write) | This address allow to setup total energy measurement modes. Valid values are: 1:Total Energy = Import only, 2:Total Energy = Export only, 3.Total Energy = Imp+Export (for Import/Export Reactive energy refer 46009 setting)                                                                                                                               |
| 5             | 46009            | Import/Export Reactive Energy / Demand counter formula (Read\Write)      | This address allow to setup reactive energy measurement Modes. Valid values are:<br>1: Import/Export i.e. Import KVARh = Import energy of Q1+Q2 and Export KVARh = Export energy of Q3+Q4,<br>2: Inductive/Capacitive i.e. Import KVARh = Import energy of Q1+Q3 and Export KVARh = Export energy of Q2+Q4 (refer to figure 1 page no. 34 for more detail). |
| 6             | 46011            | Nominal voltage (Read)                                                   | In this address nominal Voltage is set 230V by default.                                                                                                                                                                                                                                                                                                     |
| 7             | 46013            | Nominal Current (Read)                                                   | In this address Rated Current will be Shown.                                                                                                                                                                                                                                                                                                                |
| 8             | 46015            | Nominal Frequency (Read)                                                 | In this address nominal Frequency is set 50Hz by default.                                                                                                                                                                                                                                                                                                   |
| 9             | 46017            | Reset Parameters (Read\Write)                                            | This address allows the user to reset Parameter the valid values are 0: None, 1: Partial Energy, 2: Demand, 3: Power Drop, 4: all.                                                                                                                                                                                                                          |
| 10            | 46019            | Setup Change Count (Read)                                                | Setup change count is increases only if below parameters are changed 1.Demand Integration Time 2.Total Energy Counter Formula 3.Import/Export Reactive Energy / Demand Counter Formula 4.Tariff Configuration 5.AutoScroll 6.Backlite Configuration 7.Password 8.Pulse Constant 9.Pulse Parameters 10.Pulse Width 11.CT Primary 12.CT Secondary.            |
| 11            | 46021            | Lock Setup Change Count (Read)                                           | This address shows time upto 50 minutes initially after changing the CT primary and CT secondary values time will be of 15 minutes once it gets 0 setup will be locked .                                                                                                                                                                                    |
| 12            | 46023            | Tariff Configuration (Read\Write)                                        | This address allows user to configure the tariff input wheather if it is setup from modbus or tariff inputs.The Valid Values are 1: Tariff Input Based 2: Tarrif 3: Tarrif 2.                                                                                                                                                                               |

**TABLE 7 : Continued**

| Parameter No. | Address Register | Parameters                        | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|---------------|------------------|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 13            | 46025            | Modbus Address (Read\Write)       | This register address is used to set device address between 1 to 247.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 14            | 46027            | Comsetup Address (Read\Write)     | This register address is used to setup Rs485 communication parameters like baud rate , parity stop bit. the valid values are in between 0 to 19 ( refer table no. for details of baud rate and parity stop bit.                                                                                                                                                                                                                                                                                                                                                                               |
| 15            | 46029            | -                                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 16            | 46031            | Autoscroll (Read\Write)           | This address is used to setup autoscroll feature the valid values are 0 for No and 10, 20, 30 seconds.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 17            | 46033            | Backlit (Read\Write)              | This address is used to setup backlit configuration. Valid values are 0: backlit set to continuous off, 1: backlit set to continuous on and 2: backlit on when key is pressed                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 18            | 46035            | Password (Read\Write)             | This Address is used to set & Reset the Password Valid Range of Password can be set is 0000-9999.<br>1)if password lock is present & if this location is read it will return zero 2)if password lock is present & to disable this lock first send valid password to this location then write "0000" to this location 3)if password lock is present & to modify 4X parameter first send valid password to this to this location so that 4X parameter will be accessible for modification. 4) if for in any of the above case invalid password is send then meter will return exception error 2 |
| 19            | 46037            | So1 Pulse Constant (Read\Write)   | This address is used to set desired pulse rate for 1 Kwh of SO1 output. The valid Values are 1,10,100,1000.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 20            | 46039            | So1 Pulse Parameters (Read\Write) | This address is used to select parameter for S01 output the valid values in between 1 to 8. refer table 3 for parameters                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 21            | 46041            | So1 Pulse Width (Read\Write)      | This address allows the user to set the pulse duration of S01 output the valid values are 60, 100, 200 in ms.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 22            | 46043            | -                                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 23            | 46045            | -                                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 24            | 46047            | -                                 | -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |



NOTE : If import export energy formula is selected (ie.46009=1) then for reactive demand and energy import term is representing import values (Q1+Q2) and export term represents export values (Q3+Q4)

If inductive capacitive energy formula is selected (ie.46009=2) then for reactive demand and energy import term is representing inductive values (Q1+Q3) and export term represents capacitive values (Q2+Q4)

**Figure 1: Power Quadrant Diagram**

## 4 X register addresses Description for NMID12 models

| Parameter No. | Address Register | Parameters                           | Description                                                                                                                                          |
|---------------|------------------|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 25            | 46049            | -                                    | -                                                                                                                                                    |
| 26            | 46051            | -                                    | -                                                                                                                                                    |
| 27            | 46053            | Version Number (Read)                | This address reads only firmware version of meter.                                                                                                   |
| 28            | 46055            | Serial Number Year Date (Read)       | This address shows the serial number of meter in Year and Month format                                                                               |
| 29            | 46057            | Serial Number Data (Read)            | -                                                                                                                                                    |
| 30            | 46059            | CRC Flash (Read)                     | -                                                                                                                                                    |
| 31            | 46061            | Error bit Address (Read)             | This address shows the error bit                                                                                                                     |
| 32            | 46063            | Show/Hide leading zeros (Read/Write) | This address allow to show/hide leading zeros. Valid values are 0: hide leading zeros of energy counter and 1: show leading zeros of energy counter. |

## 4 X register addresses Description for NMID13 & NMID11 models

| Parameter No. | Address Register | Parameters                     | Description                                                                                                                                          |
|---------------|------------------|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 25            | 46049            | CT Primary (Read)              | This address shows the CT Primary value of meter                                                                                                     |
| 26            | 46051            | CT Secondary (Read)            | This address shows the CT Secondary value of meter                                                                                                   |
| 27            | 46053            | -                              | -                                                                                                                                                    |
| 28            | 46055            | -                              | -                                                                                                                                                    |
| 29            | 46057            | -                              | -                                                                                                                                                    |
| 30            | 46059            | -                              | -                                                                                                                                                    |
| 31            | 46061            | -                              | -                                                                                                                                                    |
| 32            | 46063            | -                              | -                                                                                                                                                    |
| 33            | 46065            | Version Number (Read)          | This address reads only firmware version of meter                                                                                                    |
| 34            | 46067            | Serial Number Year Date (Read) | This address shows the serial number of meter in Year and Month format                                                                               |
| 35            | 46069            | Serial Number Data (Read)      | -                                                                                                                                                    |
| 36            | 46071            | CRC Flash (Read)               | -                                                                                                                                                    |
| 37            | 46073            | Error bit Address (Read)       | This address shows the error bit                                                                                                                     |
| 38            | 46075            | Show/Hide leading zeros (Read) | This address allow to show/hide leading zeros. Valid values are 0: hide leading zeros of energy counter and 1: show leading zeros of energy counter. |

**TABLE 8 : RS 485 Setup Codes**

| Baud Rate | Parity | Stop Bit | Parameter No |
|-----------|--------|----------|--------------|
| 2400      | NONE   | 1        | 0            |
| 2400      | NONE   | 2        | 1            |
| 2400      | EVEN   | 1        | 2            |
| 2400      | ODD    | 1        | 3            |
| 4800      | NONE   | 1        | 4            |
| 4800      | NONE   | 2        | 5            |
| 4800      | EVEN   | 1        | 6            |
| 4800      | ODD    | 1        | 7            |
| 9600      | NONE   | 1        | 8            |
| 9600      | NONE   | 2        | 9            |
| 9600      | EVEN   | 1        | 10           |

**TABLE 8 : Continued**

| Baud Rate | Parity | Stop Bit | Parameter No |
|-----------|--------|----------|--------------|
| 9600      | ODD    | 1        | 11           |
| 19200     | NONE   | 1        | 12           |
| 19200     | NONE   | 2        | 13           |
| 19200     | EVEN   | 1        | 14           |
| 19200     | ODD    | 1        | 15           |
| 38400     | NONE   | 1        | 16           |
| 38400     | NONE   | 2        | 17           |
| 38400     | EVEN   | 1        | 18           |
| 38400     | ODD    | 1        | 19           |

## 7.4 User Assignable Modbus Registers

The Multifunction Meter contains the 14 user assignable registers in the address range of (31025) to (31051) (See Table 9).

Any of the parameter addresses (3X register addresses Table 4) accessible in the instrument can be mapped to these 14 user assignable registers.

Parameters (3X registers addresses ) that resides in different locations may be accessed by the single request by re-mapping them to adjacent address in the user assignable registers area.

**Table 9 : User Assignable 3X & 4X Data Registers**

| Address (3X) | Address (4X) | Assignable Register    | Modbus Start Address (Hex) |          |
|--------------|--------------|------------------------|----------------------------|----------|
|              |              |                        | High Byte                  | Low Byte |
| 31025        | 41025        | Assignable Register 1  | 04                         | 00       |
| 31027        | 41027        | Assignable Register 2  | 04                         | 02       |
| 31029        | 41029        | Assignable Register 3  | 04                         | 04       |
| 31031        | 41031        | Assignable Register 4  | 04                         | 06       |
| 31033        | 41033        | Assignable Register 5  | 04                         | 08       |
| 31035        | 41035        | Assignable Register 6  | 04                         | 0A       |
| 31037        | 41037        | Assignable Register 7  | 04                         | 0C       |
| 31039        | 41039        | Assignable Register 8  | 04                         | 0E       |
| 31041        | 41041        | Assignable Register 9  | 04                         | 10       |
| 31043        | 41043        | Assignable Register 10 | 04                         | 12       |
| 31045        | 41045        | Assignable Register 11 | 04                         | 14       |
| 31047        | 41047        | Assignable Register 12 | 04                         | 16       |
| 31049        | 41049        | Assignable Register 13 | 04                         | 18       |
| 31051        | 41051        | Assignable Register 14 | 04                         | 1A       |

**Table 10 : User Assignable mapping register ( 4X registers)**

| Address (4X) | Assignable Register                    | Modbus Start Address (Hex) |          |
|--------------|----------------------------------------|----------------------------|----------|
|              |                                        | High Byte                  | Low Byte |
| 49501        | Map Address for Assignable Register 1  | 25                         | 1C       |
| 49502        | Map Address for Assignable Register 2  | 25                         | 1D       |
| 49503        | Map Address for Assignable Register 3  | 25                         | 1E       |
| 49504        | Map Address for Assignable Register 4  | 25                         | 1F       |
| 49505        | Map Address for Assignable Register 5  | 25                         | 20       |
| 49506        | Map Address for Assignable Register 6  | 25                         | 21       |
| 49507        | Map Address for Assignable Register 7  | 25                         | 22       |
| 49508        | Map Address for Assignable Register 8  | 25                         | 23       |
| 49509        | Map Address for Assignable Register 9  | 25                         | 24       |
| 49510        | Map Address for Assignable Register 10 | 25                         | 25       |
| 49511        | Map Address for Assignable Register 11 | 25                         | 26       |
| 49512        | Map Address for Assignable Register 12 | 25                         | 27       |
| 49513        | Map Address for Assignable Register 13 | 25                         | 28       |
| 49514        | Map Address for Assignable Register 14 | 25                         | 29       |

**Example : Assigning parameter to user assignable registers**

To access the voltage (3X address (30001) & Current (3X address (30007) through user assignable register assign these addresses to 4x register (Table 10 ) 251C (49501) & 251D (49502) Respectively.

**Assigning Query:**

|                        |           |
|------------------------|-----------|
| Device Address         | 01 (Hex)  |
| Function Code          | 10 (Hex)  |
| Starting Address Hi    | 25 (Hex)  |
| Starting Address Lo    | 1C (Hex)  |
| Number of Registers Hi | 00 (Hex)* |
| Number of Registers Lo | 02 (Hex)* |
| Byte Count             | 04 (Hex)  |

|                           |          |
|---------------------------|----------|
| Data Register-1 High Byte | 00 (Hex) |
| Data Register-1 Low Byte  | 00 (Hex) |
| Data Register-2 High Byte | 00 (Hex) |
| Data Register-2 Low Byte  | 06 (Hex) |
| CRC Low                   | D4 (Hex) |
| CRC High                  | 65 (Hex) |

Voltage  
(3X Address  
30001)  
Current  
(3X Address  
30007)

\* Note : Parameters should be assigned in Multiple of two i.e. 2,4,6,8.....14.

Response :

|                        |          |
|------------------------|----------|
| Device Address         | 01 (Hex) |
| Function Code          | 10 (Hex) |
| Start Address High     | 25 (Hex) |
| Start Address Low      | 1C (Hex) |
| Number of Registers Hi | 00 (Hex) |
| Number of Registers Lo | 02 (Hex) |
| CRC Low                | 8B (Hex) |
| CRC High               | 02 (Hex) |

#### Reading parameter data through user assignable registers:

In assigning query voltage & Current parameters were assigned to 0000 & 0006 which will point to user assignable 3xregisters 0400 and 0402 (table9). So to read voltage and Current data reading query should be as below.

#### Query:

|                        |          |
|------------------------|----------|
| Device Address         | 01 (Hex) |
| Function Code          | 04 (Hex) |
| Start Address High     | 04 (Hex) |
| Start Address Low      | 00 (Hex) |
| Number of Registers Hi | 00 (Hex) |
| Number of Registers Lo | 04 (Hex) |
| CRC Low                | F0 (Hex) |
| CRC High               | F9 (Hex) |

Start address high : Most significant 8 bits of starting address of user assignable register.

Start address low :Least significant 8 bits of starting address of user assignable register.

Number of register Hi : Most significant 8 bits of number of registers requested.

Number of register Lo : Least significant 8 bits of number of registers requested.

**\*\*Note : Two consecutive 16 bit register represent one parameter.  
Since two parameters are requested four registers are required**

Response : (Volt = 230 / Current = 5)

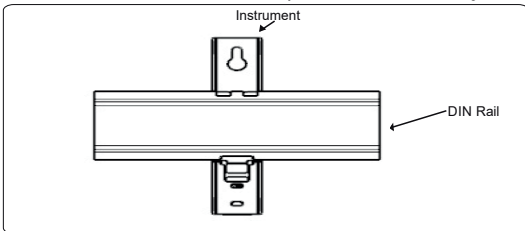
|                           |          |              |
|---------------------------|----------|--------------|
| Device Address            | 01 (Hex) | Voltage Data |
| Function Code             | 04 (Hex) |              |
| Byte count                | 08 (Hex) |              |
| Data Register-1 High Byte | 43 (Hex) |              |
| Data Register-1 Low Byte  | 66 (Hex) | Current Data |
| Data Register-2 High Byte | 00 (Hex) |              |
| Data Register-2 Low Byte  | 00 (Hex) |              |
| Data Register-3 High Byte | 40 (Hex) |              |
| Data Register-3 Low Byte  | A0 (Hex) | Current Data |
| Data Register-4 High Byte | 00 (Hex) |              |
| Data Register-4 Low Byte  | 00 (Hex) |              |
| CRC Low                   | 73 (Hex) |              |
| CRC High                  | CC (Hex) |              |

## 8. MBUS

For detailed information on the M-Bus communication Protocol, please refer to the M-Bus manual.

## 9. Installation

The Instrument should be mounted in a reasonably stable ambient temperature and where the operating temperature is within the range defined by the technical specification. Vibration should be kept to a minimum and the product should not be mounted where it will be subjected to excessive direct sunlight.



### Caution

1. In the interest of safety and functionality this product must be installed by a qualified engineer, abiding by any local regulations.
2. Voltages dangerous to human life are present at some of the terminal connections of this unit. Ensure that all supplies are de-energised before attempting any connection or disconnection.
3. These products do not have internal fuses therefore external fuses must be used to ensure safety under fault conditions.
4. The installer is responsible for selecting appropriate supply side protection overcurrent device so, it is must to ensure that the maximum current rating and characteristics of that device.

### Warning

1. Qualified personnel familiar with applicable codes and regulations must perform the installation.
2. Utilize insulated tools for device installation.
3. Install a fuse, thermal cut-off, or single-pole circuit breaker on the supply line, not on the neutral line.

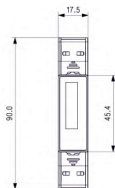
## 9.1 EMC Installation Requirements

This product has been designed to meet the certification of the EU directives when installed to a good code of practice for EMC in industrial environments, e.g.

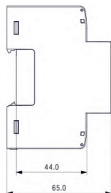
1. Screened output and low signal input leads or have provision for fitting RF suppression components, such as ferrite absorbers, line filters etc., in the event that RF fields cause problems.

- Note :** It is good practice to install sensitive electronic instruments that are performing critical functions, in EMC enclosures that protect against electrical interference which could cause a disturbance in function.
2. Avoid routing leads alongside cables and products that are, or could be, a source of interference.
  3. To protect the product against permanent damage, surge transients must be limited to 2kV pk. It is good EMC practice to suppress differential surges to 2kV at the source. The unit has been designed to automatically recover in the event of a high level of transients. In extreme circumstances it may be necessary to temporarily disconnect the auxiliary supply for a period of greater than 5 seconds to restore correct operation.
  4. ESD precautions must be taken at all times when handling this product.

## 9.2 Case Dimensions



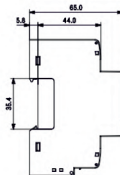
FRONT



SIDE



FRONT



SIDE

For NMID12 & NMID13 Model

For NMID11 Model

## 9.3 Name Plate



## 9.4 Wiring

Input connections are made directly to screw-type terminals with indirect wire pressure. Numbering is clearly marked at the connector location. Choice of cable should meet local regulations.

**Note :** It is recommended to use **wire with** insulated pin type lug for **connection with meter**.

Wire: It is suggested to use wire with a temperature rating of at least 83 Deg. C

Guidelines:

1. To prevent the risk of electric shock, power supply to the equipment must be Kept OFF while doing the wiring Arrangement.
2. Wiring shall be done strictly according to the terminal layout. Confirm that all connections are correct.
3. Use lugged terminals.
4. To reduce electromagnetic interference use of wires with adequate ratings and twists of the same in equal size shall be made with shortest connections.
5. Layout of connecting cables shall be away from any internal EMI source.
6. Cable used for connection to power source, must have across section of 10 mm<sup>2</sup>  
These wires shall have current carrying capacity of 45A.
7. Copper cable should be used (Stranded or Single core cable).
8. Before attempting work on device, ensure absence of voltages using appropriate voltage detection device.

|                                                                                   |                         |                        |
|-----------------------------------------------------------------------------------|-------------------------|------------------------|
|  | ISO 7000-0434B(2004-01) | CAUTION                |
|  | ISO 7000-1641           | Operating Instructions |

**For Direct Connected(NMID12) Model :**

| Connections                               | Cable Size                                              | Torque       |
|-------------------------------------------|---------------------------------------------------------|--------------|
| <b>L-In, L-Out, N</b>                     | 2.5-10 mm <sup>2</sup><br>use insulated pin types lugs  | 0.5 - 1.2 Nm |
| <b>B, A, G, M+, M-, SO1+, SO1-, SO2+.</b> | 1 - 2.5 mm <sup>2</sup><br>use insulated pin types lugs | 0.4 Nm       |

**For CT Connected meters (NMID13) Model :**

| Connections                                                    | Cable Size<br>(mm <sup>2</sup> )                         | Torque<br>Nm |
|----------------------------------------------------------------|----------------------------------------------------------|--------------|
| <b>L, N, I-In, I-out</b>                                       | 1- 2.5 mm <sup>2</sup><br>use insulated pin types lugs   | 0.4 Nm       |
| <b>B, A, G, M+, M-, SO1+, SO1-, SO2+, SO2-, TARIFF INPUTS.</b> | 1 - 2.5 mm <sup>2</sup><br>Stranded with pin types lugs. | 0.4 Nm       |

**For RJ-12 CT Meters (NMID11) Model :**

| Connections                                                   | Cable Size<br>(mm <sup>2</sup> )                         | Torque<br>(Nm) |
|---------------------------------------------------------------|----------------------------------------------------------|----------------|
| <b>L,N</b>                                                    | 1- 2.5 mm <sup>2</sup><br>use insulated pin types lugs   | 0.4 Nm         |
| <b>B, A, G / M+,M-,SO1+, SO1-, SO2+, SO2-, TARIFF INPUTS.</b> | 1 - 2.5 mm <sup>2</sup><br>Standard with pin types lugs. | 0.4 Nm         |

For current use standard RJ12 connector



| PIN NUMBER | 1, 3, 5 | 2, 4, 6 |
|------------|---------|---------|
| CT SIDE    | S1      | S2      |

**\*Note:**

1. Pin number 1, 3, 5 are shorted.
2. Pin number 2, 4, 6 are shorted.

## 9.5 Auxiliary Supply

Meter is direct connected thus doesn't required external power source to operate, The power is derived from the signal source itself

## 9.6 Fusing

It is recommended to choose fuse of a type and with breaking capacity appropriate to the supply and in accordance with local regulations.

## 9.7 Sealing

As per the MID standard It is mandatory to seal the meter after complete connections of the meter to avoid tampering.

In the Packing box 2 utility seal for NMID13 / NMID12 & 3 utility seal for NMID11 are provided.

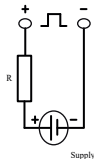
Follow the below procedure for sealing the meter :-

- 1) After all the connections close the upper terminal cover as shown in below figure.
- 2) In order to lock the terminal cover, press at the center of the terminal cover.
- 3) Now, insert the seal cord through the terminal sealing hole of housing & terminal cover.
- 4) Then insert the cord into the security seal hole and rotate the seal cap 2 to 3 times to lock the cord.
- 5) After sealing the meter brake the seal cap.
- 6) Repeat these steps for the lower terminal cover.
- 7) If the meter is NMID11 another sealing required for RJ12 Connector cover.
- 8) After inserting / connection of the RJ12 CT connector into the meter, push the transparent RJ12 Connector cover cap toward down as shown in below figure.
- 9) Now, insert the seal cord through both side of the housing hole & transparent RJ12 Connector cover cap.
- 10) Then insert the cord into the security seal hole and rotate the seal cap 2 to 3 times to lock the cord.
- 11) After sealing the meter brake the seal cap.

## 10. Connection Diagrams

### Connection Terminals Detail:

- 1 :Neutral In For NMID12 AND Line For NMID13 & NMID11
- 2 :Neutral out For NMID12 AND Neutral for NMID13 & NMID11
- 3 :Line In for NMID12 AND Current in for NMID13
- 4 :Line out for NMID12 AND Current out for NMID13
- 5,6 :Pulse Output Terminal
- 7,8 :Tariff input Terminal 7:~, 8:~ (in Tariff input Model)
- :RS485 Terminal 7:A+, 8:B- (in Modbus Model)
- :Mbus Terminal 7:M+, 8:M- (in Mbus model)



SO Connections



Connection Diagram  
for NMID12 model



Connection Diagram  
for NMID13 model



Connection Diagram  
for NMID11 model

## 11. Safety Instructions :

### Warning :



This indicates potential danger that can lead to death, serious injury, or significant material damage if not followed. Ignoring these instructions can cause death, serious injury, or major material damage.

### Caution :



This indicates electric shock risk, which can also result in death, serious injury, or significant material damage. Risk of electric shock. Not taking precautions can result in death, serious injury, or major material damage.

### Qualified Personnel:

- Only qualified individuals should install and operate this device.
- Qualified personnel are those with authorization and knowledge of labeling and grounding electrical equipment according to local safety regulations.

### Intended Use:

- Use the device only as specified in the catalog and user manual.
- Use only with devices and components.

### Proper Handling:

- Ensure proper transport, storage, installation, connection, operation, and maintenance for reliable operation.
- Be aware that parts of the meter may carry dangerous voltages during use.

### Safety Precautions:

1. Use insulated tools suitable for the meter's voltages.
2. Do not connect the meter while the circuit is powered.
3. Install the meter in a dry environment within a suitable IP-rated enclosure.
4. Follow local installation codes and regulations.
5. Avoid installing in explosive areas or places with dust, mildew, or insects.
6. Use wires suitable for the meter's maximum current and ensure correct AC wire connections before powering the meter.
7. Do not touch the meter's connection clamps with bare hands or conductive materials to avoid electric shock.
8. Replace protection covers after installation.
9. Maintenance and repairs should only be performed by qualified personnel.
10. Do not break any seals on the meter as it may affect functionality, accuracy, and void the warranty.
11. Handle the meter carefully to avoid damaging internal components.
12. Ensure all clamps are properly tightened and wires fit securely to avoid bad contact and potential sparks.
13. If required clean the device with a microfiber cloth, keeping liquids away from the components.

## 12. Specification

### Input :

|                                        |                |
|----------------------------------------|----------------|
| Connections:                           | 1 Phase 2 Wire |
| Nominal Voltage                        | 230 VLN        |
| Operating Voltage Range :              | 193 - 253 VLN  |
| Power consumption in Voltage Circuit : | < 2 W (10 VA)  |
| Power consumption in Current Circuit   | < 1 VA         |
| Nominal Frequency                      | 50 Hz          |
| Operating Frequency Range              | 49 Hz To 51 Hz |

### Direct Current (NMID12) Model :

|                                                       |                                                |
|-------------------------------------------------------|------------------------------------------------|
| Starting Current ( $I_{st} = 0.04 \cdot I_{tr}$ )     | 20 mA                                          |
| Minimum Current ( $I_{min}$ ) ( $0.5 \cdot I_{tr}$ )  | 250 mA                                         |
| Transitional Current ( $I_{tr}$ )                     | 0.5 A                                          |
| Nominal Current ( $I_n$ ) ( $10 \cdot I_{tr}$ )       | 5 A                                            |
| Maximum Current ( $I_{max}$ ) = ( $90 \cdot I_{tr}$ ) | 45A                                            |
| Operating Current Range                               | 0.25-5(45) A                                   |
| Short time Over-current                               | 30 $\cdot I_{max}$ for one half-cycle at 50 Hz |

### 1A/5A(NMID13) Model :

|                                                         |                                         |
|---------------------------------------------------------|-----------------------------------------|
| Starting Current ( $I_{st} = 0.04 \cdot I_{tr}$ )       | 2 mA for 1 A / 10 mA for 5 A            |
| Minimum Current ( $I_{min}$ ) ( $0.2 \cdot I_{tr}$ )    | 10 mA for 1A / 50 mA for 5 A            |
| Transitional Current ( $I_{tr}$ )                       | 50 mA for 1 A / 250 mA for 5 A          |
| Nominal Current ( $I_n$ ) ( $20 \cdot I_{tr}$ )         | 1 A / 5 A                               |
| Maximum Current for 1A ( $I_{max} = 120 \cdot I_{tr}$ ) | 6 A                                     |
| for 5A ( $I_{max} = 24 \cdot I_{tr}$ )                  | 6 A                                     |
| Operating Current Range                                 | 10 mA - 1 A (1.2 A) / 50 mA - 5 A (6 A) |
| Short time Over-current                                 | 20 $\cdot I_{max}$ for 0.5 seconds      |

### RJ12(NMID11) Model :

|                                                       |                                    |
|-------------------------------------------------------|------------------------------------|
| Starting Current ( $I_{st} = 0.04 \cdot I_{tr}$ )     | 0.2 mA                             |
| Minimum Current ( $I_{min}$ ) ( $0.2 \cdot I_{tr}$ )  | 1 mA                               |
| Transitional Current ( $I_{tr}$ )                     | 5 mA                               |
| Nominal Current ( $I_n$ ) ( $20 \cdot I_{tr}$ )       | 100 mA                             |
| Maximum Current ( $I_{max}$ ) = ( $24 \cdot I_{tr}$ ) | 120 mA                             |
| Operating Current Range                               | 1 mA - 100 mA(120 mA)              |
| Short time Over-current                               | 20 $\cdot I_{max}$ for 0.5 seconds |

**Accuracy :**

Active Energy (Import/Export)  
Reactive Energy (Import/Export)  
Apparent Energy  
Voltage  
Current  
Frequency  
Active Power  
Reactive Power  
Apparent Power  
Power Factor

Class B as per EN50470-3 : 2022 , Class 1 as per IEC 62053-21  
 $\pm 2.0 \%$   
 $\pm 1.0 \%$   
 $\pm 0.5\%$  of of range max  
 $\pm 0.5\%$  of Nominal value  
 $\pm 0.2\%$  of Mid frequency  
 $\pm 1\%$  of range max  
 $\pm 1\%$  of range max  
 $\pm 1\%$  of range max  
 $\pm 1\%$

**Pulse Outputs :**

SO1  
Contact Ranges  
Pulse Duration  
Pulse Rate  
Impulse Rate

Passive Opto-isolated  
5 - 27V DC, 27 mA DC (max)  
60 / 100 / 200 millisecond  
1 / 10 / 100 / 1000 pulse per kWh  
1000 pulse per kWh

**Communication Interface :****MODBUS :**

Protocol  
Baudrate  
Data Width  
Parity  
Device Address  
Response Time

RS485 MODBUS RTU  
2.4 / 4.8 / 9.6 / 19.2/38.4 kbps  
8  
Stop Bits None -1 / None -2/ Even -1 / Odd -1  
1- 247  
250 millisecond at 9.6 kbps Baudrate

**MBUS :**

Protocol  
Baudrate  
Data Width  
Parity - Stop Bits  
Address

EN13757-3 MBUS  
0.3/ 0.6/ 1.2/ 2.4/ 4.8/ 9.6 kbps  
8  
Even -1  
1.....250

**Display Ranges :**

Active Energy  
Reactive Energy  
Apparent Energy

0.01-99999.99 kWh and Autoranging further  
0.01-99999.99 kVARh  
0.01-99999.99 kVAh

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Active Power                      | 0-99999 W                                                                                                                                                                                                                                                                                                                                                                                         |
| Reactive Power                    | 0-99999 VAR                                                                                                                                                                                                                                                                                                                                                                                       |
| Apparent Power                    | 0-99999 VA                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Tariff Input:</b>              |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Low / High                        | 0V / 230V                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Installation :</b>             |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Enclosure                         | Indoor<br>IP 51 (Front Side) and IP 20 (Terminals Side) (IEC 60529: 2001)<br>(The device should only be mounted within an external enclosure, such as a meter or switch cabinet. This enclosure must offer a minimum of IP 51 protection and should be situated indoors. Only under these conditions protection against dust and water penetration assured in compliance with the IEC 62052-11. ) |
| Housing                           | 2 Module DIN 43880                                                                                                                                                                                                                                                                                                                                                                                |
| Dimensions                        | 17.5 mm X 90 mm X 65 mm (for NMID12 and NMID13 models),<br>17.9 mm X 95.5 mm X 65 mm (for NMID11 models)                                                                                                                                                                                                                                                                                          |
| Weight                            | 150 gm                                                                                                                                                                                                                                                                                                                                                                                            |
| Mounting                          | 35 mm DIN Rail                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Safety :</b>                   |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Safety Standard                   | According to 62052-31:2015                                                                                                                                                                                                                                                                                                                                                                        |
| Installation Category             | III                                                                                                                                                                                                                                                                                                                                                                                               |
| Protective Class                  | II                                                                                                                                                                                                                                                                                                                                                                                                |
| High Voltage Test                 | 4 kV AC, 50Hz for 1 minute between all electrical circuits                                                                                                                                                                                                                                                                                                                                        |
| Impulse Voltage Withstand         | 6.0 kV (1.2 microsecond waveform)                                                                                                                                                                                                                                                                                                                                                                 |
| Pollution Degree                  | 2                                                                                                                                                                                                                                                                                                                                                                                                 |
| Housing Flame Resistance          | Flammability Class V-0 acc. to UL 94, Self                                                                                                                                                                                                                                                                                                                                                        |
| <b>Environmental Conditions :</b> |                                                                                                                                                                                                                                                                                                                                                                                                   |
| Mechanical Environment            | Extinguishing, Non Dripping, free of Halogen                                                                                                                                                                                                                                                                                                                                                      |
| Electromagnetic Environment       | M1                                                                                                                                                                                                                                                                                                                                                                                                |
| Operating Temperature             | E2                                                                                                                                                                                                                                                                                                                                                                                                |
| Storage/Transport Temperature     | -25°C to +55°C                                                                                                                                                                                                                                                                                                                                                                                    |
| Relative Humidity                 | -40°C to +70°C                                                                                                                                                                                                                                                                                                                                                                                    |
| Shock                             | 0... 95% (Non Condensing)<br>Half sine wave, peak acceleration                                                                                                                                                                                                                                                                                                                                    |
| Vibration                         | 30g <sub>r</sub> (300 m/s <sup>2</sup> ), pulse duration 18msec<br>10...150Hz, f<60 Hz 0.075mm constant amplitude, f>60Hz 1g <sub>r</sub><br>constant acceleration, 10 sweep cycles per axis <2000 m max                                                                                                                                                                                          |
| Altitude                          |                                                                                                                                                                                                                                                                                                                                                                                                   |

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