# Interface Definition

## RISH LM 1350/1360

# DIGITAL MULTIFUNCTION INSTRUMENT
## Installation & Operating Instructions

**Section** **Contents**



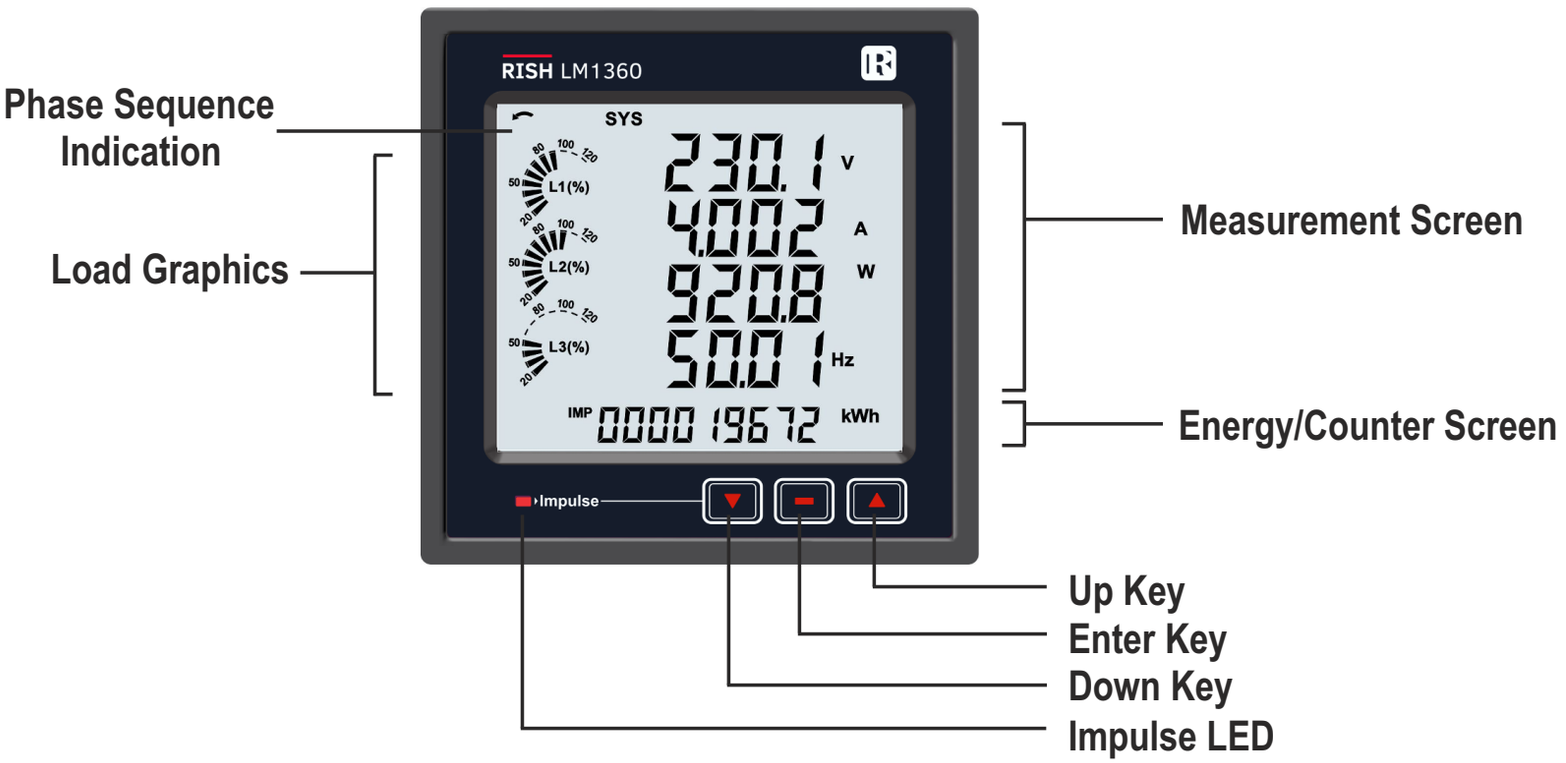
**DMAN-00IM-0662 RevC - 01/2021**

# 1. Introduction

The Multifunction Energy Meter is a panel mounted 96 x 96mm DIN Quadratic Digital Panel Meter, which measures important electrical parameters in 3 ph 4 wire / 3 wire / 1ph Network and replaces the multiple analog panel meters. It measures electrical parameters like AC voltage, Current, Frequency, Power, Energy (Active / Reactive / Apparent), phase angle, power factor,individual harmonics & many more. The instrument integrates accurate measurement technology (All Voltages & current measurements are True RMS upto 31st Harmonic) with LCD display with backlit.

It can be configured & Programmed at site for the following :PT Primary, PT Secondary, CT Primary, CT Secondary , 3 Phase 3W, 3 Phase 4W, 1 Phase 2W system.

The front panel has three push buttons using which the user can scroll through different screens & configure the product. The front panel also has Impulse red led, flashing at rate proportional to measured power.




Operation via standard RS485 is also possible. Through this optional interface all the above mentioned parameters can be configured and programmed. For modbus service, it is essential that device address, baud rate and parity should be configured properly.

This document specifies only the interface between a Master device and Meter for electrical variable through MODBUS over RS485.

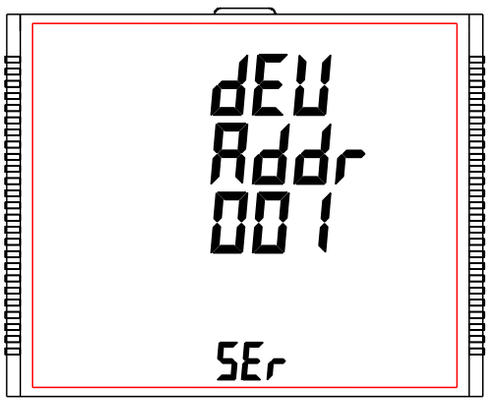
## 2. Communication Parameter Selection Screen

**While using USB port communication the Configuration must be :**

Device address: 001 Baud rate : 57600

Parity : None Stop bit: 1

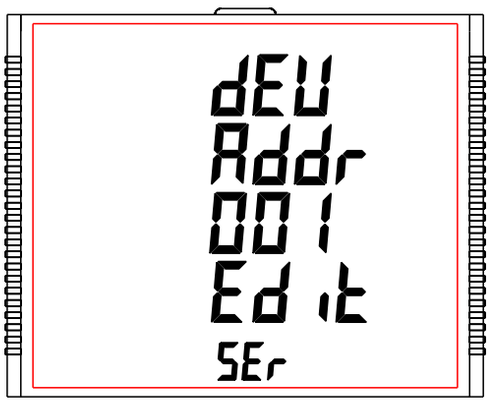
## 2.1 Address Setting




This screen applies to the RS 485 output only. This screen allows the user to set RS 485 address for the meter.

**The allowable range of addresses is 1 to 247.**

Press " ▲ " key to advance to "RS 485 Baud Rate" screen (see Section 2.2) or press the " ▼ " key to advance to the "Quit Communication Parameters" screen (see Section 2.4).

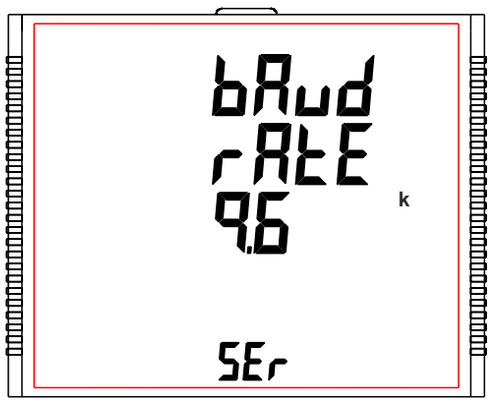



Press " ▬ " to enter into edit mode, prompt for first digit. (Flashing digit indicates cursor position).

Press the " ▲ " and " ▼ " keys to scroll the value of the first digit. Press the " ▬ " key to advance to next digit.

Similarly, enter second and third digits of address. After entering third digit, pressing " ▬ " key confirms the selection and shows "Address Setting" screen (see Section 3.2.2.1).

## 2.2 RS 485 Baud Rate




This screen allows the user to set Baud Rate of RS 485 port. The values displayed on screen are in kbaud.

Pressing " ▲ " key accepts the present value and advance to the "RS 485 Parity Selection" screen (see Section 2.3) and pressing the " ▼ " key accepts the present value and advance to the "Address Setting" screen(see Section 2.1).

Pressing the " ▬ " key advances to the "Baud Rate Edit" mode and " ▲ " & " ▼ " keys scrolls the value through **4.8, 9.6, 19.2, 38.4 and 57.6** kbaud.

Pressing the " ▬ " key sets the value and shows the "RS 485 Baud Rate" screen (see Section 2.2).

## 2.3 RS 485 Parity

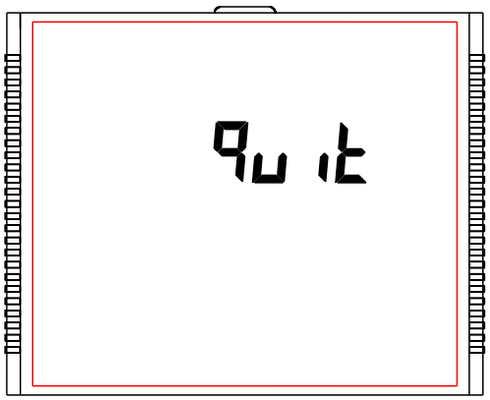
This screen allows the user to set Parity & number of stop bits of RS 485 port.


Pressing " ▲ " key accepts the present value and advances to "Quit Communication Parameters" screen (see section 2.4).
Similarly, pressing " ▼ " key accepts the present value and advances to "RS 485 Baud Rate" screen (see section 2.2).

Pressing the " ▬ " key advances to the "Parity & Stop bit Edit" mode & keys " ▲ " and " ▼ " scrolls the value through:
**no 1** : no parity with one stop bit **no 2** : no parity with two stop bit
**E** : even parity with one stop bit **odd** : odd parity with one stop bit

Pressing " ▬ " key sets the value and advances to "RS 485 Parity Selection" screen (see Section 2.3).

## 2.4 Quit Communication Parameters




This screen allows user to exit from system "Communication Parameter Selection" setup.
Pressing the " ▲ " key advances to "Communication Parameter Selection" screen (see Section 2.1).
Similarly, pressing the " ▼ " key advances to "RS 485 Parity" screen (see Section 2.3).
Pressing the " ▬ " key advances to "Communication Parameter Selection " screen (see Section 2).

## 3. RS 485 ( ModBus ) Output :

THE MULTIFUNCTION INSTRUMENT 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. The screens should also be connected to the "Gnd" terminal. To avoid the possibility of loop currents, an Earth connection should be made at one point on the network. 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.

The maximum latency time of a Meter is 300 ms i.e. this is the amount of time that can pass before the first response character is output.

After sending any query through software (of the Master), it must allow 300ms of time to elapse before assuming that the Meter is not going to respond. If slave does not respond within 300 ms, Master can ignore the previous query and can issue fresh query to the slave.

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 |
| **Format of Data Bytes** | 4 bytes (32 bits) per parameter.<br>Floating point format ( to IEEE 754)<br>Most significant byte first (Alternative least significant byte first) |
| **Error Checking Bytes** | 2 byte Cyclical Redundancy Check (CRC) |
| **Byte format** | 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 4800,9600,19200,38400,57600 bps.

**Function code :**

| | | |
|---|---|---|
| 03 | Read Holding Registers | Read content of read /write location ( 4X ) |
| 04 | Read input Registers | Read content of read only location ( 3X ) |
| 16 | Presets Multiple 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<br>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 |

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

Two consecutive 16 bit registers represent one parameter. Refer **TABLE 1** 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 04 and 03 are used to access all parameters in 3X and 4X registers respectively.

**Example :**

To read parameter,

Voltage2 from 3X: Start address= 00 02 Number of registers = 02

Watt2 from 4X: Start address= 00 0E 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) | 02(Hex) | 00 (Hex) | 02(Hex) | 30 (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 |

**3X Response: Voltage 2 (219.254V)**

| 01 (Hex) | 04 (Hex) | 04 (Hex) | 43 (Hex) | 5B (Hex) | 41 (Hex) | 21 (Hex) | 6F (Hex) | 9B (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) | 0E(Hex) | 00 (Hex) | 02(Hex) | E0 (Hex) | C9 (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: Watt2 (2000 W)**

| 01 (Hex) | 03 (Hex) | 04 (Hex) | 44 (Hex) | FA (Hex) | 00 (Hex) | 00 (Hex) | CE (Hex) | F2 (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 querry.
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 1 : 3 X and 4 X register addresses for measured parameters

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30001 | 40001 | 1 | V1 | 00 | 00 | 00 | 00 |
| 30003 | 40003 | 2 | V2 | 00 | 02 | 00 | 02 |
| 30005 | 40005 | 3 | V3 | 00 | 04 | 00 | 04 |
| 30007 | 40007 | 4 | I1 | 00 | 06 | 00 | 06 |
| 30009 | 40009 | 5 | I2 | 00 | 08 | 00 | 08 |
| 30011 | 40011 | 6 | I3 | 00 | 0A | 00 | 0A |
| 30013 | 40013 | 7 | W1 | 00 | 0C | 00 | 0C |
| 30015 | 40015 | 8 | W2 | 00 | 0E | 00 | 0E |
| 30017 | 40017 | 9 | W3 | 00 | 10 | 00 | 10 |
| 30019 | 40019 | 10 | VA1 | 00 | 12 | 00 | 12 |
| 30021 | 40021 | 11 | VA2 | 00 | 14 | 00 | 14 |
| 30023 | 40023 | 12 | VA3 | 00 | 16 | 00 | 16 |
| 30025 | 40025 | 13 | VAR1 | 00 | 18 | 00 | 18 |
| 30027 | 40027 | 14 | VAR2 | 00 | 1A | 00 | 1A |
| 30029 | 40029 | 15 | VAR3 | 00 | 1C | 00 | 1C |
| 30031 | 40031 | 16 | PF1 | 00 | 1E | 00 | 1E |
| 30033 | 40033 | 17 | PF2 | 00 | 20 | 00 | 20 |
| 30035 | 40035 | 18 | PF3 | 00 | 22 | 00 | 22 |
| 30037 | 40037 | 19 | Angle1 | 00 | 24 | 00 | 24 |
| 30039 | 40039 | 20 | Angle2 | 00 | 26 | 00 | 26 |
| 30041 | 40041 | 21 | Angle3 | 00 | 28 | 00 | 28 |
| 30043 | 40043 | 22 | Volt Avg | 00 | 2A | 00 | 2A |
| 30045 | 40045 | 23 | Volt Sum | 00 | 2C | 00 | 2C |
| 30047 | 40047 | 24 | Current Avg | 00 | 2E | 00 | 2E |
| 30049 | 40049 | 25 | Current Sum | 00 | 30 | 00 | 30 |
| 30051 | 40051 | 26 | Watt Avg | 00 | 32 | 00 | 32 |
| 30053 | 40053 | 27 | Watt Sum | 00 | 34 | 00 | 34 |
| 30055 | 40055 | 28 | VA Avg | 00 | 36 | 00 | 36 |
| 30057 | 40057 | 29 | VA Sum | 00 | 38 | 00 | 38 |
| 30059 | 40059 | 30 | VAr Avg | 00 | 3A | 00 | 3A |

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30061 | 40061 | 31 | VAr Sum | 00 | 3C | 00 | 3C |
| 30063 | 40063 | 32 | PF Avg | 00 | 3E | 00 | 3E |
| 30065 | 40065 | 33 | PF Sum | 00 | 40 | 00 | 40 |
| 30067 | 40067 | 34 | Phase Angle Avg | 00 | 42 | 00 | 42 |
| 30069 | 40069 | 35 | Phase Angle Sum | 00 | 44 | 00 | 44 |
| 30071 | 40071 | 36 | Freq | 00 | 46 | 00 | 46 |
| 30073 | 40073 | 37 | Wh import | 00 | 48 | 00 | 48 |
| 30075 | 40075 | 38 | Wh export | 00 | 4A | 00 | 4A |
| 30077 | 40077 | 39 | VArh Capacitive | 00 | 4C | 00 | 4C |
| 30079 | 40079 | 40 | VArh Inductive | 00 | 4E | 00 | 4E |
| 30081 | 40081 | 41 | VAh | 00 | 50 | 00 | 50 |
| 30085 | 40085 | 43 | kW imp demand | 00 | 54 | 00 | 54 |
| 30087 | 40087 | 44 | max kW imp demand | 00 | 56 | 00 | 56 |
| 30089 | 40089 | 45 | kW exp demand | 00 | 58 | 00 | 58 |
| 30091 | 40091 | 46 | max kW exp demand | 00 | 5A | 00 | 5A |
| 30093 | 40093 | 47 | kVAr Cap. demand | 00 | 5C | 00 | 5C |
| 30095 | 40095 | 48 | max kVAr Cap. demand | 00 | 5E | 00 | 5E |
| 30097 | 40097 | 49 | kVAr Ind. demand | 00 | 60 | 00 | 60 |
| 30099 | 40099 | 50 | max kVAr Ind. demand | 00 | 62 | 00 | 62 |
| 30101 | 40101 | 51 | KVA demand | 00 | 64 | 00 | 64 |
| 30103 | 40103 | 52 | max KVA demand | 00 | 66 | 00 | 66 |
| 30105 | 40105 | 53 | current demand | 00 | 68 | 00 | 68 |
| 30107 | 40107 | 54 | max current demand | 00 | 6A | 00 | 6A |
| 30109 | 40109 | 55 | Wh import Overflow count | 00 | 6C | 00 | 6C |
| 30111 | 40111 | 56 | Wh Import | 00 | 6E | 00 | 6E |
| 30113 | 40113 | 57 | Wh export  Overflow count | 00 | 70 | 00 | 70 |
| 30115 | 40115 | 58 | Wh export | 00 | 72 | 00 | 72 |
| 30117 | 40117 | 59 | VArh Cap. Overflow count | 00 | 74 | 00 | 74 |
| 30119 | 40119 | 60 | VArh Capacitive | 00 | 76 | 00 | 76 |
| 30121 | 40121 | 61 | VArh Ind. Overflow count | 00 | 78 | 00 | 78 |

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Para. No. | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30123 | 40123 | 62 | VARh Inductive | 00 | 7A | 00 | 7A |
| 30125 | 40125 | 63 | VAh Overflow count | 00 | 7C | 00 | 7C |
| 30127 | 40127 | 64 | VAh | 00 | 7E | 00 | 7E |
| 30133 | 40133 | 67 | System Voltage Max | 00 | 84 | 00 | 84 |
| 30135 | 40135 | 68 | System Voltage Min | 00 | 86 | 00 | 86 |
| 30137 | 40137 | 69 | RPM | 00 | 88 | 00 | 88 |
| 30139 | 40139 | 70 | Impulse Rate | 00 | 8A | 00 | 8A |
| 30141 | 40141 | 71 | System Current Max | 00 | 8C | 00 | 8C |
| 30143 | 40143 | 72 | System Current Min | 00 | 8E | 00 | 8E |
| 30145 | 40145 | 73 | Wh imp. depending on update rate* | 00 | 90 | 00 | 90 |
| 30147 | 40147 | 74 | Wh exp. depending on update rate* | 00 | 92 | 00 | 92 |
| 30149 | 40149 | 75 | VArh cap. depending on update rate* | 00 | 94 | 00 | 94 |
| 30151 | 40151 | 76 | VArh ind. depending on update rate* | 00 | 96 | 00 | 96 |
| 30153 | 40153 | 77 | VAh depending on update rate* | 00 | 98 | 00 | 98 |
| 30157 | 40157 | 79 | Wh imp OFC depending on update rate* | 00 | 9C | 00 | 9C |
| 30159 | 40159 | 80 | Wh exp OFC depending on update rate* | 00 | 9E | 00 | 9E |
| 30161 | 40161 | 81 | VArh Cap. OFC depending on update rate * | 00 | A0 | 00 | A0 |
| 30163 | 40163 | 82 | VArh Ind. OFC depending on update rate * | 00 | A2 | 00 | A2 |
| 30165 | 40165 | 83 | VAh OFC depending on update rate* | 00 | A4 | 00 | A4 |
| 30169 | 40169 | 85 | Old Wh imp OFC | 00 | A8 | 00 | A8 |
| 30171 | 40171 | 86 | Old Wh imp | 00 | AA | 00 | AA |
| 30173 | 40173 | 87 | Old Wh exp OFC | 00 | AC | 00 | AC |
| 30175 | 40175 | 88 | Old Wh exp | 00 | AE | 00 | AE |
| 30177 | 40177 | 89 | Old VArh Cap. OFC | 00 | B0 | 00 | B0 |
| 30179 | 40179 | 90 | Old VArh Cap. | 00 | B2 | 00 | B2 |
| 30181 | 40181 | 91 | Old VArh Ind.OFC | 00 | B4 | 00 | B4 |
| 30183 | 40183 | 92 | Old VArh Ind. | 00 | B6 | 00 | B6 |
| 30185 | 40185 | 93 | Old VAh OFC | 00 | B8 | 00 | B8 |
| 30187 | 40187 | 94 | Old VAh | 00 | BA | 00 | BA |

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30201 | 40201 | 101 | V12 | 00 | C8 | 00 | C8 |
| 30203 | 40203 | 102 | V23 | 00 | CA | 00 | CA |
| 30205 | 40205 | 103 | V31 | 00 | CC | 00 | CC |
| 30207 | 40207 | 104 | VTHD-R | 00 | CE | 00 | CE |
| 30209 | 40209 | 105 | VTHD-Y | 00 | D0 | 00 | D0 |
| 30211 | 40211 | 106 | VTHD-B | 00 | D2 | 00 | D2 |
| 30213 | 40213 | 107 | ITHD-R | 00 | D4 | 00 | D4 |
| 30215 | 40215 | 108 | ITHD-Y | 00 | D6 | 00 | D6 |
| 30217 | 40217 | 109 | ITHD-B | 00 | D8 | 00 | D8 |
| 30219 | 40219 | 110 | System V-THD | 00 | DA | 00 | DA |
| 30221 | 40221 | 111 | System I-THD | 00 | DC | 00 | DC |
| 30225 | 40225 | 113 | Neutral Current | 00 | E0 | 00 | E0 |
| 30227 | 40227 | 114 | Run hour | 00 | E2 | 00 | E2 |
| 30229 | 40229 | 115 | On Hour | 00 | E4 | 00 | E4 |
| 30231 | 40231 | 116 | No. of interrupts | 00 | E6 | 00 | E6 |
| 30251 | 40251 | 126 | Old run hour | 00 | FA | 00 | FA |
| 30255 | 40255 | 128 | Old on hour | 00 | FE | 00 | FE |
| 30263 | 40263 | 132 | Old No. of int. | 01 | 06 | 01 | 06 |
| 30267 | 40267 | 134 | Relay 1 status | 01 | 0A | 01 | 0A |
| 30269 | 40269 | 135 | Relay 2 status | 01 | 0C | 01 | 0C |
| 30271 | 40271 | 136 | old max imp W demand | 01 | 0E | 01 | 0E |
| 30273 | 40273 | 137 | old max exp W demand | 01 | 10 | 01 | 10 |
| 30275 | 40275 | 138 | old max Cap. VArh demand | 01 | 12 | 01 | 12 |
| 30277 | 40277 | 139 | old max Ind. VArh demand | 01 | 14 | 01 | 14 |
| 30279 | 40279 | 140 | old max VA demand | 01 | 16 | 01 | 16 |
| 30281 | 40281 | 141 | old max A demand | 01 | 18 | 01 | 18 |

*Note:

1. The values are updated depending on update rate which is settable by user.
For example, if user set update rate 15 min, then the values on these registers (marked with *) will get updated on every 15 min.

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30293 | 40293 | 147 | RTC Minute | 01 | 24 | 01 | 24 |
| 30295 | 40295 | 148 | RTC Hour | 01 | 26 | 01 | 26 |
| 30297 | 40297 | 149 | RTC Day | 01 | 28 | 01 | 28 |
| 30299 | 40299 | 150 | RTC Date | 01 | 2A | 01 | 2A |
| 30301 | 40301 | 151 | RTC Month | 01 | 2C | 01 | 2C |
| 30303 | 40303 | 152 | RTC Year | 01 | 2E | 01 | 2E |
| 30305 | 40305 | 153 | RTC Complete date | 01 | 30 | 01 | 30 |
| 30307 | 40307 | 154 | RTC Complete time | 01 | 32 | 01 | 32 |
| 30333 | 40333 | 167 | Phase indicate | 01 | 4C | 01 | 4C |
| 30337 | 40337 | 169 | Reserved | 01 | 50 | 01 | 50 |
| 30345 | 40345 | 173 | Power Down RTC Minute | 01 | 58 | 01 | 58 |
| 30347 | 40347 | 174 | Power Down RTC Hour | 01 | 5A | 01 | 5A |
| 30349 | 40349 | 175 | Power Down RTC Day | 01 | 5C | 01 | 5C |
| 30351 | 40351 | 176 | Power Down RTC Date | 01 | 5E | 01 | 5E |
| 30353 | 40353 | 177 | Power Down RTC Month | 01 | 60 | 01 | 60 |
| 30355 | 40355 | 178 | Power Down RTC Year | 01 | 62 | 01 | 62 |
| 30357 | 40357 | 179 | Timer 1 On delay | 01 | 64 | 01 | 64 |
| 30359 | 40359 | 180 | Timer 2 On delay | 01 | 66 | 01 | 66 |
| 30361 | 40361 | 181 | Timer 1 Off delay | 01 | 68 | 01 | 68 |
| 30363 | 40363 | 182 | Timer 2 Off delay | 01 | 6A | 01 | 6A |
| 30365 | 40365 | 183 | Timer 1 No. of Cycles | 01 | 6C | 01 | 6C |
| 30367 | 40367 | 184 | Timer 2 No. of Cycles | 01 | 6E | 01 | 6E |
| 30401 | 40401 | 201 | VR Harmonic-1 | 01 | 90 | 01 | 90 |
| 30403 | 40403 | 202 | IR Harmonic-1 | 01 | 92 | 01 | 92 |
| 30405 | 40405 | 203 | VR Harmonic-2 | 01 | 94 | 01 | 94 |

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30407 | 40407 | 204 | IR Harmonic-2 | 01 | 96 | 01 | 96 |
| 30409 | 40409 | 205 | VR Harmonic-3 | 01 | 98 | 01 | 98 |
| 30411 | 40411 | 206 | IR Harmonic-3 | 01 | 9A | 01 | 9A |
| 30413 | 40413 | 207 | VR Harmonic-4 | 01 | 9C | 01 | 9C |
| 30415 | 40415 | 208 | IR Harmonic-4 | 01 | 9E | 01 | 9E |
| 30417 | 40417 | 209 | VR Harmonic-5 | 01 | A0 | 01 | A0 |
| 30419 | 40419 | 210 | IR Harmonic-5 | 01 | A2 | 01 | A2 |
| 30421 | 40421 | 211 | VR Harmonic-6 | 01 | A4 | 01 | A4 |
| 30423 | 40423 | 212 | IR Harmonic-6 | 01 | A6 | 01 | A6 |
| 30425 | 40425 | 213 | VR Harmonic-7 | 01 | A8 | 01 | A8 |
| 30427 | 40427 | 214 | IR Harmonic-7 | 01 | AA | 01 | AA |
| 30429 | 40429 | 215 | VR Harmonic-8 | 01 | AC | 01 | AC |
| 30431 | 40431 | 216 | IR Harmonic-8 | 01 | AE | 01 | AE |
| 30433 | 40433 | 217 | VR Harmonic-9 | 01 | B0 | 01 | B0 |
| 30435 | 40435 | 218 | IR Harmonic-9 | 01 | B2 | 01 | B2 |
| 30437 | 40437 | 219 | VR Harmonic-10 | 01 | B4 | 01 | B4 |
| 30439 | 40439 | 220 | IR Harmonic-10 | 01 | B6 | 01 | B6 |
| 30441 | 40441 | 221 | VR Harmonic-11 | 01 | B8 | 01 | B8 |
| 30443 | 40443 | 222 | IR Harmonic-11 | 01 | BA | 01 | BA |
| 30445 | 40445 | 223 | VR Harmonic-12 | 01 | BC | 01 | BC |
| 30447 | 40447 | 224 | IR Harmonic-12 | 01 | BE | 01 | BE |
| 30449 | 40449 | 225 | VR Harmonic-13 | 01 | C0 | 01 | C0 |
| 30451 | 40451 | 226 | IR Harmonic-13 | 01 | C2 | 01 | C2 |
| 30453 | 40453 | 227 | VR Harmonic-14 | 01 | C4 | 01 | C4 |
| 30455 | 40455 | 228 | IR Harmonic-14 | 01 | C6 | 01 | C6 |
| 30457 | 40457 | 229 | VR Harmonic-15 | 01 | C8 | 01 | C8 |
| 30459 | 40459 | 230 | IR Harmonic-15 | 01 | CA | 01 | CA |
| 30461 | 40461 | 231 | VR Harmonic-16 | 01 | CC | 01 | CC |
| 30463 | 40463 | 232 | IR Harmonic-16 | 01 | CE | 01 | CE |
| 30465 | 40465 | 233 | VR Harmonic-17 | 01 | D0 | 01 | D0 |

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30467 | 40467 | 234 | IR Harmonic-17 | 01 | D2 | 01 | D2 |
| 30469 | 40469 | 235 | VR Harmonic-18 | 01 | D4 | 01 | D4 |
| 30471 | 40471 | 236 | IR Harmonic-18 | 01 | D6 | 01 | D6 |
| 30473 | 40473 | 237 | VR Harmonic-19 | 01 | D8 | 01 | D8 |
| 30475 | 40475 | 238 | IR Harmonic-19 | 01 | DA | 01 | DA |
| 30477 | 40477 | 239 | VR Harmonic-20 | 01 | DC | 01 | DC |
| 30479 | 40479 | 240 | IR Harmonic-20 | 01 | DE | 01 | DE |
| 30481 | 40481 | 241 | VR Harmonic-21 | 01 | E0 | 01 | E0 |
| 30483 | 40483 | 242 | IR Harmonic-21 | 01 | E2 | 01 | E2 |
| 30485 | 40485 | 243 | VR Harmonic-22 | 01 | E4 | 01 | E4 |
| 30487 | 40487 | 244 | IR Harmonic-22 | 01 | E6 | 01 | E6 |
| 30489 | 40489 | 245 | VR Harmonic-23 | 01 | E8 | 01 | E8 |
| 30491 | 40491 | 246 | IR Harmonic-23 | 01 | EA | 01 | EA |
| 30493 | 40493 | 247 | VR Harmonic-24 | 01 | EC | 01 | EC |
| 30495 | 40495 | 248 | IR Harmonic-24 | 01 | EE | 01 | EE |
| 30497 | 40497 | 249 | VR Harmonic-25 | 01 | F0 | 01 | F0 |
| 30499 | 40499 | 250 | IR Harmonic-25 | 01 | F2 | 01 | F2 |
| 30501 | 40501 | 251 | VR Harmonic-26 | 01 | F4 | 01 | F4 |
| 30503 | 40503 | 252 | IR Harmonic-26 | 01 | F6 | 01 | F6 |
| 30505 | 40505 | 253 | VR Harmonic-27 | 01 | F8 | 01 | F8 |
| 30507 | 40507 | 254 | IR Harmonic-27 | 01 | FA | 01 | FA |
| 30509 | 40509 | 255 | VR Harmonic-28 | 01 | FC | 01 | FC |
| 30511 | 40511 | 256 | IR Harmonic-28 | 01 | FE | 01 | FE |
| 30513 | 40513 | 257 | VR Harmonic-29 | 02 | 00 | 02 | 00 |
| 30515 | 40515 | 258 | IR Harmonic-29 | 02 | 02 | 02 | 02 |
| 30517 | 40517 | 259 | VR Harmonic-30 | 02 | 04 | 02 | 04 |
| 30519 | 40519 | 260 | IR Harmonic-30 | 02 | 06 | 02 | 06 |
| 30521 | 40521 | 261 | VR Harmonic-31 | 02 | 08 | 02 | 08 |
| 30523 | 40523 | 262 | IR Harmonic-31 | 02 | 0A | 02 | 0A |
| 30525 | 40525 | 263 | VR Harmonic-32 | 02 | 0C | 02 | 0C |

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30527 | 40527 | 264 | IR Harmonic-32 | 02 | 0E | 02 | 0E |
| 30529 | 40529 | 265 | VY Harmonic-1 | 02 | 10 | 02 | 10 |
| 30531 | 40531 | 266 | IY Harmonic-1 | 02 | 12 | 02 | 12 |
| 30533 | 40533 | 267 | VY Harmonic-2 | 02 | 14 | 02 | 14 |
| 30535 | 40535 | 268 | IY Harmonic-2 | 02 | 16 | 02 | 16 |
| 30537 | 40537 | 269 | VY Harmonic-3 | 02 | 18 | 02 | 18 |
| 30539 | 40539 | 270 | IY Harmonic-3 | 02 | 1A | 02 | 1A |
| 30541 | 40541 | 271 | VY Harmonic-4 | 02 | 1C | 02 | 1C |
| 30543 | 40543 | 272 | IY Harmonic-4 | 02 | 1E | 02 | 1E |
| 30545 | 40545 | 273 | VY Harmonic-5 | 02 | 20 | 02 | 20 |
| 30547 | 40547 | 274 | IY Harmonic-5 | 02 | 22 | 02 | 22 |
| 30549 | 40549 | 275 | VY Harmonic-6 | 02 | 24 | 02 | 24 |
| 30551 | 40551 | 276 | IY Harmonic-6 | 02 | 26 | 02 | 26 |
| 30553 | 40553 | 277 | VY Harmonic-7 | 02 | 28 | 02 | 28 |
| 30555 | 40555 | 278 | IY Harmonic-7 | 02 | 2A | 02 | 2A |
| 30557 | 40557 | 279 | VY Harmonic-8 | 02 | 2C | 02 | 2C |
| 30559 | 40559 | 280 | IY Harmonic-8 | 02 | 2E | 02 | 2E |
| 30561 | 40561 | 281 | VY Harmonic-9 | 02 | 30 | 02 | 30 |
| 30563 | 40563 | 282 | IY Harmonic-9 | 02 | 32 | 02 | 32 |
| 30565 | 40565 | 283 | VY Harmonic-10 | 02 | 34 | 02 | 34 |
| 30567 | 40567 | 284 | IY Harmonic-10 | 02 | 36 | 02 | 36 |
| 30569 | 40569 | 285 | VY Harmonic-11 | 02 | 38 | 02 | 38 |
| 30571 | 40571 | 286 | IY Harmonic-11 | 02 | 3A | 02 | 3A |
| 30573 | 40573 | 287 | VY Harmonic-12 | 02 | 3C | 02 | 3C |
| 30575 | 40575 | 288 | IY Harmonic-12 | 02 | 3E | 02 | 3E |
| 30577 | 40577 | 289 | VY Harmonic-13 | 02 | 40 | 02 | 40 |
| 30579 | 40579 | 290 | IY Harmonic-13 | 02 | 42 | 02 | 42 |
| 30581 | 40581 | 291 | VY Harmonic-14 | 02 | 44 | 02 | 44 |
| 30583 | 40583 | 292 | IY Harmonic-14 | 02 | 46 | 02 | 46 |
| 30585 | 40585 | 293 | VY Harmonic-15 | 02 | 48 | 02 | 48 |

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30587 | 40587 | 294 | IY Harmonic-15 | 02 | 4A | 02 | 4A |
| 30589 | 40589 | 295 | VY Harmonic-16 | 02 | 4C | 02 | 4C |
| 30591 | 40591 | 296 | IY Harmonic-16 | 02 | 4E | 02 | 4E |
| 30593 | 40593 | 297 | VY Harmonic-17 | 02 | 50 | 02 | 50 |
| 30595 | 40595 | 298 | IY Harmonic-17 | 02 | 52 | 02 | 52 |
| 30597 | 40597 | 299 | VY Harmonic-18 | 02 | 54 | 02 | 54 |
| 30599 | 40599 | 300 | IY Harmonic-18 | 02 | 56 | 02 | 56 |
| 30601 | 40601 | 301 | VY Harmonic-19 | 02 | 58 | 02 | 58 |
| 30603 | 40603 | 302 | IY Harmonic-19 | 02 | 5A | 02 | 5A |
| 30605 | 40605 | 303 | VY Harmonic-20 | 02 | 5C | 02 | 5C |
| 30607 | 40607 | 304 | IY Harmonic-20 | 02 | 5E | 02 | 5E |
| 30609 | 40609 | 305 | VY Harmonic-21 | 02 | 60 | 02 | 60 |
| 30611 | 40611 | 306 | IY Harmonic-21 | 02 | 62 | 02 | 62 |
| 30613 | 40613 | 307 | VY Harmonic-22 | 02 | 64 | 02 | 64 |
| 30615 | 40615 | 308 | IY Harmonic-22 | 02 | 66 | 02 | 66 |
| 30617 | 40617 | 309 | VY Harmonic-23 | 02 | 68 | 02 | 68 |
| 30619 | 40619 | 310 | IY Harmonic-23 | 02 | 6A | 02 | 6A |
| 30621 | 40621 | 311 | VY Harmonic-24 | 02 | 6C | 02 | 6C |
| 30623 | 40623 | 312 | IY Harmonic-24 | 02 | 6E | 02 | 6E |
| 30625 | 40625 | 313 | VY Harmonic-25 | 02 | 70 | 02 | 70 |
| 30627 | 40627 | 314 | IY Harmonic-25 | 02 | 72 | 02 | 72 |
| 30629 | 40629 | 315 | VY Harmonic-26 | 02 | 74 | 02 | 74 |
| 30631 | 40631 | 316 | IY Harmonic-26 | 02 | 76 | 02 | 76 |
| 30633 | 40633 | 317 | VY Harmonic-27 | 02 | 78 | 02 | 78 |
| 30635 | 40635 | 318 | IY Harmonic-27 | 02 | 7A | 02 | 7A |
| 30637 | 40637 | 319 | VY Harmonic-28 | 02 | 7C | 02 | 7C |
| 30639 | 40639 | 320 | IY Harmonic-28 | 02 | 7E | 02 | 7E |
| 30641 | 40641 | 321 | VY Harmonic-29 | 02 | 80 | 02 | 80 |
| 30643 | 40643 | 322 | IY Harmonic-29 | 02 | 82 | 02 | 82 |
| 30645 | 40645 | 323 | VY Harmonic-30 | 02 | 84 | 02 | 84 |

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30647 | 40647 | 324 | IY Harmonic-30 | 02 | 86 | 02 | 86 |
| 30649 | 40649 | 325 | VY Harmonic-31 | 02 | 88 | 02 | 88 |
| 30651 | 40651 | 326 | IY Harmonic-31 | 02 | 8A | 02 | 8A |
| 30653 | 40653 | 327 | VY Harmonic-32 | 02 | 8C | 02 | 8C |
| 30655 | 40655 | 328 | IY Harmonic-32 | 02 | 8E | 02 | 8E |
| 30657 | 40657 | 329 | VB Harmonic-1 | 02 | 90 | 02 | 90 |
| 30659 | 40659 | 330 | IB Harmonic-1 | 02 | 92 | 02 | 92 |
| 30661 | 40661 | 331 | VB Harmonic-2 | 02 | 94 | 02 | 94 |
| 30663 | 40663 | 332 | IB Harmonic-2 | 02 | 96 | 02 | 96 |
| 30665 | 40665 | 333 | VB Harmonic-3 | 02 | 98 | 02 | 98 |
| 30667 | 40667 | 334 | IB Harmonic-3 | 02 | 9A | 02 | 9A |
| 30669 | 40669 | 335 | VB Harmonic-4 | 02 | 9C | 02 | 9C |
| 30671 | 40671 | 336 | IB Harmonic-4 | 02 | 9E | 02 | 9E |
| 30673 | 40673 | 337 | VB Harmonic-5 | 02 | A0 | 02 | A0 |
| 30675 | 40675 | 338 | IB Harmonic-5 | 02 | A2 | 02 | A2 |
| 30677 | 40677 | 339 | VB Harmonic-6 | 02 | A4 | 02 | A4 |
| 30679 | 40679 | 340 | IB Harmonic-6 | 02 | A6 | 02 | A6 |
| 30681 | 40681 | 341 | VB Harmonic-7 | 02 | A8 | 02 | A8 |
| 30683 | 40683 | 342 | IB Harmonic-7 | 02 | AA | 02 | AA |
| 30685 | 40685 | 343 | VB Harmonic-8 | 02 | AC | 02 | AC |
| 30687 | 40687 | 344 | IB Harmonic-8 | 02 | AE | 02 | AE |
| 30689 | 40689 | 345 | VB Harmonic-9 | 02 | B0 | 02 | B0 |
| 30691 | 40691 | 346 | IB Harmonic-9 | 02 | B2 | 02 | B2 |
| 30693 | 40693 | 347 | VB Harmonic-10 | 02 | B4 | 02 | B4 |
| 30695 | 40695 | 348 | IB Harmonic-10 | 02 | B6 | 02 | B6 |
| 30697 | 40697 | 349 | VB Harmonic-11 | 02 | B8 | 02 | B8 |
| 30699 | 40699 | 350 | IB Harmonic-11 | 02 | BA | 02 | BA |
| 30701 | 40701 | 351 | VB Harmonic-12 | 02 | BC | 02 | BC |
| 30703 | 40703 | 352 | IB Harmonic-12 | 02 | BE | 02 | BE |
| 30705 | 40705 | 353 | VB Harmonic-13 | 02 | C0 | 02 | C0 |

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30707 | 40707 | 354 | IB Harmonic-13 | 02 | C2 | 02 | C2 |
| 30709 | 40709 | 355 | VB Harmonic-14 | 02 | C4 | 02 | C4 |
| 30711 | 40711 | 356 | IB Harmonic-14 | 02 | C6 | 02 | C6 |
| 30713 | 40713 | 357 | VB Harmonic-15 | 02 | C8 | 02 | C8 |
| 30715 | 40715 | 358 | IB Harmonic-15 | 02 | CA | 02 | CA |
| 30717 | 40717 | 359 | VB Harmonic-16 | 02 | CC | 02 | CC |
| 30719 | 40719 | 360 | IB Harmonic-16 | 02 | CE | 02 | CE |
| 30721 | 40721 | 361 | VB Harmonic-17 | 02 | D0 | 02 | D0 |
| 30723 | 40723 | 362 | IB Harmonic-17 | 02 | D2 | 02 | D2 |
| 30725 | 40725 | 363 | VB Harmonic-18 | 02 | D4 | 02 | D4 |
| 30727 | 40727 | 364 | IB Harmonic-18 | 02 | D6 | 02 | D6 |
| 30729 | 40729 | 365 | VB Harmonic-19 | 02 | D8 | 02 | D8 |
| 30731 | 40731 | 366 | IB Harmonic-19 | 02 | DA | 02 | DA |
| 30733 | 40733 | 367 | VB Harmonic-20 | 02 | DC | 02 | DC |
| 30735 | 40735 | 368 | IB Harmonic-20 | 02 | DE | 02 | DE |
| 30737 | 40737 | 369 | VB Harmonic-21 | 02 | E0 | 02 | E0 |
| 30739 | 40739 | 370 | IB Harmonic-21 | 02 | E2 | 02 | E2 |
| 30741 | 40741 | 371 | VB Harmonic-22 | 02 | E4 | 02 | E4 |
| 30743 | 40743 | 372 | IB Harmonic-22 | 02 | E6 | 02 | E6 |
| 30745 | 40745 | 373 | VB Harmonic-23 | 02 | E8 | 02 | E8 |
| 30747 | 40747 | 374 | IB Harmonic-23 | 02 | EA | 02 | EA |
| 30749 | 40749 | 375 | VB Harmonic-24 | 02 | EC | 02 | EC |
| 30751 | 40751 | 376 | IB Harmonic-24 | 02 | EE | 02 | EE |
| 30753 | 40753 | 377 | VB Harmonic-25 | 02 | F0 | 02 | F0 |
| 30755 | 40755 | 378 | IB Harmonic-25 | 02 | F2 | 02 | F2 |
| 30757 | 40757 | 379 | VB Harmonic-26 | 02 | F4 | 02 | F4 |
| 30759 | 40759 | 380 | IB Harmonic-26 | 02 | F6 | 02 | F6 |
| 30761 | 40761 | 381 | VB Harmonic-27 | 02 | F8 | 02 | F8 |
| 30763 | 40763 | 382 | IB Harmonic-27 | 02 | FA | 02 | FA |
| 30765 | 40765 | 383 | VB Harmonic-28 | 02 | FC | 02 | FC |

**TABLE 1 : Continued...**

| Address (3X) | Address (4X) | Parameter Number | Parameter | Start Address Hex 3X | | Start Address Hex 4X | |
|---|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | High Byte | Low Byte |
| 30767 | 40767 | 384 | IB Harmonic-28 | 02 | FE | 02 | FE |
| 30769 | 40769 | 385 | VB Harmonic-29 | 03 | 00 | 03 | 00 |
| 30771 | 40771 | 386 | IB Harmonic-29 | 03 | 02 | 03 | 02 |
| 30773 | 40773 | 387 | VB Harmonic-30 | 03 | 04 | 03 | 04 |
| 30775 | 40775 | 388 | IB Harmonic-30 | 03 | 06 | 03 | 06 |
| 30777 | 40777 | 389 | VB Harmonic-31 | 03 | 08 | 03 | 08 |
| 30779 | 40779 | 390 | IB Harmonic-31 | 03 | 0A | 03 | 0A |
| 30781 | 40781 | 391 | VB Harmonic-32 | 03 | 0C | 03 | 0C |
| 30783 | 40783 | 392 | IB Harmonic-32 | 03 | 0E | 03 | 0E |

**Note : 1. Parameters 1,2,3 are L-N Voltage for 3P 4W & L-L Voltage for 3P 3W.**

**2. Relay Output 1/ 2 Status shows whether relay is Energized or De-energized.**

**1 :- Relay Energized 0:- Relay De-energized**

## TABLE 2 : 3X and 4X register addresses for 32-bit Integer Energy

| Address (3X) | Address (4X) | Parameter | Start Address Hex 3X | | Start Address Hex | |
|---|---|---|---|---|---|---|
| | | | Hi Byte | Lo Byte | Hi Byte | Lo Byte |
| 30801 | 40801 | Active Energy Import | 03 | 20 | 03 | 20 |
| 30803 | 40803 | Active Energy Export | 03 | 22 | 03 | 22 |
| 30805 | 40805 | Reactive Energy Capacitive | 03 | 24 | 03 | 24 |
| 30807 | 40807 | Reactive Energy Inductive | 03 | 26 | 03 | 26 |
| 30809 | 40809 | Apparent Energy | 03 | 28 | 03 | 28 |
| 30813 | 40813 | Active Energy Import Overflow Count | 03 | 2C | 03 | 2C |
| 30815 | 40815 | Active Energy Export Overflow Count | 03 | 2E | 03 | 2E |
| 30817 | 40817 | Reactive Energy Cap. Overflow Count | 03 | 30 | 03 | 30 |
| 30819 | 40819 | Reactive Energy Ind. Overflow Count | 03 | 32 | 03 | 32 |
| 30821 | 40821 | Apparent Energy Overflow Count | 03 | 34 | 03 | 34 |
| 30825 | 40825 | Active Energy Import on time* | 03 | 38 | 03 | 38 |
| 30827 | 40827 | Active Energy Export on time* | 03 | 3A | 03 | 3A |
| 30829 | 40829 | Reactive Energy Cap. on time* | 03 | 3C | 03 | 3C |

## TABLE 2 : 3X and 4X register addresses for 32-bit Integer Energy

| Address (3X) | Address (4X) | Parameter | Start Address Hex 3X | | Start Address Hex | |
|---|---|---|---|---|---|---|
| | | | Hi Byte | Lo Byte | Hi Byte | Lo Byte |
| 30831 | 40831 | Reactive Energy Imp. on time* | 03 | 3E | 03 | 3E |
| 30833 | 40833 | Apparent Energy on time* | 03 | 40 | 03 | 40 |
| 30837 | 40837 | Active Energy Imp Overflow Count on time* | 03 | 44 | 03 | 44 |
| 30839 | 40839 | Active Energy Exp Overflow Count on time* | 03 | 46 | 03 | 46 |
| 30841 | 40841 | Reac. Energy Cap. Overflow Count on time* | 03 | 48 | 03 | 48 |
| 30843 | 40843 | Reac. Energy Ind. Overflow Count on time* | 03 | 4A | 03 | 4A |
| 30845 | 40845 | Apparent Energy Overflow Count on time* | 03 | 4C | 03 | 4C |
| 30849 | 40849 | Old Active Energy Import Overflow Count | 03 | 50 | 03 | 50 |
| 30851 | 40851 | Old Active Energy Import | 03 | 52 | 03 | 52 |
| 30853 | 40853 | Old Active Energy Export Overflow Count | 03 | 54 | 03 | 54 |
| 30855 | 40855 | Old Active Energy Export | 03 | 56 | 03 | 56 |
| 30857 | 40857 | Old Reactive Energy Cap. Overflow Count | 03 | 58 | 03 | 58 |
| 30859 | 40859 | Old Reactive Energy Cap. | 03 | 5A | 03 | 5A |
| 30861 | 40861 | Old Reac. Energy Ind. Overflow Count | 03 | 5C | 03 | 5C |
| 30863 | 40863 | Old Reac. Energy Inductive | 03 | 5E | 03 | 5E |
| 30865 | 40865 | Old Apparent Energy Overflow Count | 03 | 60 | 03 | 60 |
| 30867 | 40867 | Old Apparent Energy | 03 | 62 | 03 | 62 |

***Note:**

1. The values are updated depending on update rate which is settable by user.
For example, if user set update rate 15 min, then the values on these registers (marked with *) will get updated on every 15 min.

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

Each setting is held in the 4X registers. ModBus code 03 is used to read the current setting & code 16 is used to write/change the setting. Refer **TABLE 3** for 4X Register addresses.

**Example: Reading System type**

System type: Start address = 177A (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 | 7A (Hex) |
| Number of Registers Hi | 00 (Hex) |
| Number of Registers Lo | 02 (Hex) |
| CRC Low | E4 (Hex) |
| CRC High | 09 (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 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.**)

## Response: System Type (3phase 4 wire = 3)

| | |
|---|---|
| Device Address | 01 (Hex) |
| Function Code | 03 (Hex) |
| Byte Count | 04 (Hex) |
| Data Register1 High Byte | 40 (Hex) |
| Data Register1Low Byte | 40 (Hex) |
| Data Register2 High Byte | 00 (Hex) |
| Data Register2 Low Byte | 00 (Hex) |
| CRC Low | EE (Hex) |
| CRC High | 27 (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 System type

System type : Start address = 177A (Hex)
Number of registers = 02

**Query:( Change System type to 3phase 3wire = 2 )**

| | |
|---|---|
| Device Address | 01 (Hex) |
| Function Code | 10 (Hex) |
| Starting Address Hi | 17 (Hex) |
| Starting Address Lo | 7A(Hex) |
| Number of Registers Hi | 00 (Hex) |
| Number of Registers Lo | 02(Hex) |
| Byte Count | 04 (Hex) |
| Data Register-1High 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 | 66 (Hex) |
| CRC High | 10 (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 | 7A(Hex) |
| Number of Registers Hi | 00 (Hex) |
| Number of Registers Lo | 02(Hex) |
| CRC Low | 61 (Hex) |
| CRC High | CA (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 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.**)

## 3.3 Accessing 4 X register for Long Energy Reading & Writing

For setting Energy start count in long energy format following Querry format should be used . for writing energy start count

first send querry to unlock the parameter

**Query:(Query For Unlock to enter Active energy import)**

| | |
|---|---|
| Device Address | 01 (Hex) |
| Function Code | 10 (Hex) |
| Starting Address Hi | 03(Hex) |
| Starting Address Lo | 20(Hex) |
| Number of Registers Hi | 00 (Hex) |
| Number of Registers Lo | 02(Hex) |
| Byte Count | 04 (Hex) |
| Data Register-1High Byte | 00 (Hex) |
| Data Register-1 Low Byte | 00(Hex) |
| Data Register-2 High Byte | 00(Hex) |
| Data Register-2 Low Byte | 01(Hex) |
| CRC Low | 66 (Hex) |
| CRC High | 10 (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 | 10 (Hex) |
| Start Address High | 03 (Hex) |
| Start Address Low | 20(Hex) |
| Number of Registers Hi | 00 (Hex) |
| Number of Registers Lo | 02(Hex) |
| CRC Low | 61 (Hex) |
| CRC High | CA (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 Hi** : Most significant 8 bits of Number of registers requested.
**Number of register Lo** : Least significant 8 bits of Number of registers requested.

Once the unlock Query is send, send query for writing Enery start count.
For Example: Querry for writing energy start count of 999999999 for Active Import Energy
**Note: refer table no. 10 for energy parameter selection.**

**Query:(Query enter Active energy import)**

| | |
|---|---|
| Device Address | 01 (Hex) |
| Function Code | 10 (Hex) |
| Starting Address Hi | 03(Hex) |
| Starting Address Lo | 20(Hex) |
| Number of Registers Hi | 00 (Hex) |
| Number of Registers Lo | 02(Hex) |
| Byte Count | 04 (Hex) |
| Data Register-1High Byte | 3B (Hex) |
| Data Register-1 Low Byte | 9A(Hex) |
| Data Register-2 High Byte | C9(Hex) |
| Data Register-2 Low Byte | FF(Hex) |
| CRC Low | 66 (Hex) |
| CRC High | 10 (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.**)

**Value( 3B ,9A, C9,FF ) reperesents 999999999**.

**Response:**

| | |
|---|---|
| Device Address | 01 (Hex) |
| Function Code | 10 (Hex) |
| Start Address High | 03 (Hex) |
| Start Address Low | 20(Hex) |
| Number of Registers Hi | 00 (Hex) |
| Number of Registers Lo | 02(Hex) |
| CRC Low | 61 (Hex) |
| CRC High | CA (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 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.**)

## TABLE 3 : 4 X register addresses

| Address (Register) | Param-eter No. | Parameter | Read/ Write | Modbus Start Addr. Hex | | Default Value |
|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | |
| 46003 | 1 | Demand integration time | R/Wp | 17 | 72 | 8 |
| 46005 | 2 | Energy Resolution / unit | R/Wp | 17 | 74 | 2 |
| 46011 | 5 | System type | R/Wp | 17 | 7A | 3 |
| 46013 | 6 | Pulse width | R/Wp | 17 | 7C | 100 |
| 46015 | 7 | Reset parameters | R/Wp | 17 | 7E | 0 |
| 46017 | 8 | No. of poles | R/Wp | 17 | 80 | 2 |
| 46019 | 9 | RS485 setup code | R/Wp | 17 | 82 | - |
| 46021 | 10 | Node address | R/Wp | 17 | 84 | 1 |
| 46023 | 11 | Pulse divisor | R/Wp | 17 | 86 | 1 |
| 46033 | 16 | PT primary | R/Wp | 17 | 90 | 415 |
| 46035 | 17 | CT primary | R/Wp | 17 | 92 | 5 |
| 46039 | 19 | Energy digit reset count | R/Wp | 17 | 96 | 8 |
| 46041 | 20 | Register Order/Word Order | R/Wp | 17 | 98 | 0 |
| 46043 | 21 | CTSecondary | R/Wp | 17 | 9A | 5 |
| 46045 | 22 | PTSecondary | R/Wp | 17 | 9C | 415 |
| 46047 | 23 | Relay1 output select | R/Wp | 17 | 9E | 0 |
| 46049 | 24 | Pulse1/Limit1 Parameter select | R/Wp | 17 | A0 | 0 |
| 46051 | 25 | Limit1 Trip point | R/Wp | 17 | A2 | 100 |
| 46053 | 26 | Hysteresis(Limit1) | R/Wp | 17 | A4 | 0.5 |
| 46055 | 27 | Limit1 delay(On) | R/Wp | 17 | A6 | 1 |
| 46057 | 28 | Limit1 delay(Off) | R/Wp | 17 | A8 | 1 |
| 46059 | 29 | Relay2 output select | R/Wp | 17 | AA | 0 |
| 46061 | 30 | Pulse2/Limit2 Parameter select | R/Wp | 17 | AC | 0 |
| 46063 | 31 | Limit2 Trip point | R/Wp | 17 | AE | 100 |
| 46065 | 32 | Hysteresis(Limit2) | R/Wp | 17 | B0 | 0.5 |

## TABLE 3 : continued...

| Address (Register) | Param-eter No. | Parameter | Read/ Write | Modbus Start Addr. Hex | | Default Value |
|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | |
| 46067 | 33 | Limit2 delay(On) | R/Wp | 17 | B2 | 1 |
| 46069 | 34 | Limit2 delay(Off) | R/Wp | 17 | B4 | 1 |
| 46071 | 35 | Password | R/Wp | 17 | B6 | 0000 |
| 46073 | 36 | Limit1 Configuration select | R/Wp | 17 | B8 | 0 |
| 46075 | 37 | Limit2 Configuration select | R/Wp | 17 | BA | 0 |
| 46077 | 38 | Auto scroll | R/Wp | 17 | BC | 0 |
| 46079 | 39 | 30mA Noise cuttoff | R/Wp | 17 | BE | 0 |
| 46081 | 40 | Update rate on MODBUS | R/Wp | 17 | C0 | 15 |
| 46083 | 41 | Factory Reset Mode | R/Wp | 17 | C2 | 0 |
| 46087 | 43 | System Frequency selection | R/Wp | 17 | C6 | 50 |
| 46089 | 44 | Impulse on Energy Selection | R/Wp | 17 | C8 | 1 |
| 46091 | 45 | EnergyPara Select | R/Wp | 17 | CA | 0 |
| 46093 | 46 | Enter Energy Start Count | R/Wp | 17 | CC | 0 |
| 46095 | 47 | Timer 1 Start stop | R/Wp | 17 | CE | 0 |
| 46097 | 48 | Timer 2 Start stop | R/Wp | 17 | D0 | 0 |
| 46127 | 63 | RTC Complete Date | R/Wp | 17 | EE | - |
| 46129 | 64 | RTC Complete Time | R/Wp | 17 | F0 | - |
| 46131 | 65 | RTC Day of week | R | 17 | F2 | 0 |
| 46133 | 66 | Backlite ON/OFF | R/Wp | 17 | F4 | 1 |
| 46135 | 67 | Contrast | R/Wp | 17 | F6 | 3 |
| 46137 | 68 | User screen enable | R/Wp | 17 | F8 | 0 |
| 46139 | 69 | User screen1 | R/Wp | 17 | FA | 1 |
| 46141 | 70 | User screen2 | R/Wp | 17 | FC | 2 |
| 46143 | 71 | User screen3 | R/Wp | 17 | FE | 3 |
| 46145 | 72 | User screen4 | R/Wp | 18 | 00 | 4 |
| 46147 | 73 | User screen5 | R/Wp | 18 | 02 | 5 |
| 46149 | 74 | User screen6 | R/Wp | 18 | 04 | 6 |
| 46151 | 75 | User screen7 | R/Wp | 18 | 06 | 7 |
| 46153 | 76 | User screen8 | R/Wp | 18 | 08 | 8 |

## TABLE 3 : continued...

| Address (Register) | Param-eter No. | Parameter | Read/ Write | Modbus Start Addr. Hex | | Default Value |
|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | |
| 46155 | 77 | User screen9 | R/Wp | 18 | 0A | 9 |
| 46157 | 78 | User screen10 | R/Wp | 18 | 0C | 10 |
| 46177 | 88 | Serial Number Higher Digits | R | 18 | 20 | - |
| 46181 | 90 | Version no. | R | 18 | 24 | - |
| 46183 | 91 | Serial Number Lower Digits | R | 18 | 26 | - |
| 46185 | 92 | Event-based Datalog Select | R/Wp | 18 | 28 | 0 |
| 46187 | 93 | Time-based Datalog Select | R/Wp | 18 | 2A | 0 |
| 46189 | 94 | Time-based Datalog Interval Selection | R/Wp | 18 | 2C | 0 |
| 46191 | 95 | Logging Parameter Count | R/Wp | 18 | 2E | 1 |
| 46193 | 96 | Datalog Parameter 1 | R/Wp | 18 | 30 | 1 |
| 46195 | 97 | Datalog Parameter 2 | R/Wp | 18 | 32 | 0 |
| 46197 | 98 | Datalog Parameter 3 | R/Wp | 18 | 34 | 0 |
| 46199 | 99 | Datalog Parameter 4 | R/Wp | 18 | 36 | 0 |
| 46201 | 100 | Datalog Parameter 5 | R/Wp | 18 | 38 | 0 |
| 46203 | 101 | Datalog Parameter 6 | R/Wp | 18 | 3A | 0 |
| 46205 | 102 | Datalog Parameter 7 | R/Wp | 18 | 3C | 0 |
| 46207 | 103 | Datalog Parameter 8 | R/Wp | 18 | 3E | 0 |
| 46209 | 104 | Datalog Parameter 9 | R/Wp | 18 | 40 | 0 |
| 46211 | 105 | Datalog Parameter 10 | R/Wp | 18 | 42 | 0 |
| 46213 | 106 | Datalog Parameter 11 | R/Wp | 18 | 44 | 0 |
| 46215 | 107 | Datalog Parameter 12 | R/Wp | 18 | 46 | 0 |
| 46217 | 108 | Datalog Parameter 13 | R/Wp | 18 | 48 | 0 |
| 46219 | 109 | Datalog Parameter 14 | R/Wp | 18 | 4A | 0 |
| 46221 | 110 | Datalog Parameter 15 | R/Wp | 18 | 4C | 0 |
| 46223 | 111 | Datalog Parameter 16 | R/Wp | 18 | 4E | 0 |
| 46225 | 112 | Datalog Parameter 17 | R/Wp | 18 | 50 | 0 |
| 46227 | 113 | Datalog Parameter 18 | R/Wp | 18 | 52 | 0 |
| 46229 | 114 | Datalog Parameter 19 | R/Wp | 18 | 54 | 0 |
| 46231 | 115 | Datalog Parameter 20 | R/Wp | 18 | 56 | 0 |

## TABLE 3 : continued...

| Address (Register) | Parameter No. | Parameter | Read/ Write | Modbus Start Addr. Hex | | Default Value |
|---|---|---|---|---|---|---|
| | | | | High Byte | Low Byte | |
| 46233 | 116 | Datalog Parameter 21 | R/Wp | 18 | 58 | 0 |
| 46235 | 117 | Datalog Parameter 22 | R/Wp | 18 | 5A | 0 |
| 46237 | 118 | Datalog Parameter 23 | R/Wp | 18 | 5C | 0 |
| 46239 | 119 | Datalog Parameter 24 | R/Wp | 18 | 5E | 0 |
| 46241 | 120 | Datalog Parameter 25 | R/Wp | 18 | 60 | 0 |
| 46243 | 121 | Datalog Parameter 26 | R/Wp | 18 | 62 | 0 |
| 46245 | 122 | Datalog Parameter 27 | R/Wp | 18 | 64 | 0 |
| 46247 | 123 | Datalog Parameter 28 | R/Wp | 18 | 66 | 0 |
| 46249 | 124 | Datalog Parameter 29 | R/Wp | 18 | 68 | 0 |
| 46251 | 125 | Datalog Parameter 30 | R/Wp | 18 | 6A | 0 |
| 46253 | 126 | Load Profile Datalog Select | R/Wp | 18 | 6C | 0 |
| 46255 | 127 | Start Date of Load Profile Datalog | R | 18 | 6E | 0 |
| 46257 | 128 | IP address | R/Wp | 18 | 71 | |
| 46259 | 129 | Subnet Mask | R/Wp | 18 | 73 | |
| 46361 | 130 | Default gateway | R/Wp | 18 | 75 | |
| 46363 | 131 | Server port | R/Wp | 18 | 77 | |

**NOTE:** Wp - Write protected , R - Read only , R/Wp - Read & Write protected

## Explanation for 4 X register :

**NOTE:** Writing any invalid values (non-applicable values) to any of the following locations will result in modbus error.

| Address | Parameter | Description |
|---|---|---|
| 46003 | Demand Integration Time | Demand period represents demand time in minutes. The applicable values are 8,15,20 or 30. |
| 46005 | Energy Output | This address is used to set energy output in Wh,kWh & MWh.<br>Write one of the following value to this address.<br>**1:** Energy in Wh. **2:** Energy in KWh.<br>**3**: Energy in MWh. |
| 46011 | System Type | This address is used to set the System type.<br>Write one of the following value to this address.<br>**1**: 1 Phase 2 Wire<br>**2**: 3 Phase 3 Wire<br>**3**: 3 Phase 4 Wire**.** |

| Address | Parameter | Description |
|---|---|---|
| 46013 | Pulse Width of Relay | This address is used to set **pulse width** of the Pulse output.<br>Write one of the following values to this address:<br>**60** : 60 ms<br>**100** : 100 ms<br>**200** : 200 ms |
| 46015 | Reset Parameters | This address is used to reset different parameters. Write specific value to this register to reset the corresponding parameter. Following are the values to reset various data.<br>**1:** Energy Reset<br>**2:** Demand Reset<br>**3:** System Min Values Reset<br>**4:** System Max Values Reset<br>**5:** Run hour & On hour Reset<br>**6:** No of Interruptions Reset<br>**7:** Reset All data<br>**8**: Time Datalog<br>**9**: Load Profile Datalog |
| 46017 | Number of Poles | This address is used to set the no. of poles of generator of which RPM is to be measured. The value must be between 2 to 40 and a multiple of 2. |
| 46019 | Rs485 Set-up Code | This address is used to set the baud rate, Parity and Number of stop bits. Refer to **TABLE 4** for details. |
| 46021 | Node Address | This register address is used to set Device address between 1 and 247 . |
| 46023 | Pulse Divisor | This address is used to set **pulse divisor** of the Pulse output.<br>Write one of the following values to this address **for Wh**:<br>**1** : Divisor 1<br>**10** : Divisor 10<br>**100** : Divisor 100<br>**1000** : Divisor 1000 & In **kWh** or **MWh** divisor will be **1 default.** |
| 46033 | PT Primary | This address allows the user to set PT Primary value (in terms of VL-L). The settable range is 100 VL-L to 1200 kVL-L for all system types & also depends on the per phase 1800MVA Restriction of power combined with CT primary. |
| 46035 | CT Pimary | This address allows the user to set CT Primary value.<br>The settable range is 1 to 9999. It also depends on the per phase 1800 MVA Restriction of power combined with PT primary. |

| Address | Parameter | Description |
|---|---|---|
| 46039 | Energy Digit Reset Count | This address is used to set Energy Digit Reset Count value. Energy count can be configured to reset in between 7 to 9. |
| 46041 | Word Order | Word Order controls the order in which Multifunction Meter receives or sends floating - point numbers:- normal or reversed register order . In normal mode, the two registers that make up a floating point numbers are sent most significant bytes first. In reversed register mode , the two registers that make up a floating point numbers are sent least significant bytes first. To set the mode, write the value ' 2141.0' into this register-the instrument will detect the order used to send this value and set that order for all ModBus transaction involving floating point numbers. |
| 46043 | CT secondary | This address is used to read and write the CT secondary value. Write one of the following values to this address.<br>**1:** 1A CT secondary<br>**5:** 5A CT secondary<br>Note: For External CT model CT Secondary is not settable from modbus. |
| 46045 | PT secondary | This address is used to read and write the PT secondary value.<br>The settable range is 100-600VLL. |
| 46047 | Relay 1 output select | This address is used to select the Relay operation as Pulse/Timer/RTC Relay/Limit. Write one of the following values to this address.<br>**0:** Pulse output on Relay<br>**10** (Decimal): Timer mode for Relay<br>**40** (Decimal): RTC mode for Relay.<br>**128** (Decimal)**:** Limit output on Relay. |
| 46049 | Relay 1 Para select/ No. of Cycles/ Weekly repeat | This address is used to assign the Parameter to Relay.<br>Pulse relay: Refer **TABLE 5**<br>Timer relay: Refer **TABLE 6**<br>RTC relay: Refer **TABLE 7**<br>Limit relay: Refer **TABLE 8** |
| 46051 | Limit 1 Trip Point | This address is used to set the trip point in %. Any value between 10 to 100 for Lo- alarm & 10 to120 for Hi-alarm can be written to this address. For energy parameters, the valid range id 10-9999999. (refer **TABLE 8**). |
| 46053 | Limit 1 Hysteresis | This address is used to set the hysteresis between 0.5 to 50.0%. |
| 46055 | Relay 1 On (Energize) Delay/ On Time | This address is used to set the Energizing delay or On delay in seconds in range of 1 to 9999. For RTC Relay this range is 00.00 to 23.59. |

| Address | Parameter | Description |
|---|---|---|
| 46057 | Relay 1 Off (De-Energize) Delay/ Off Time | This address is used to set the De-energizing delay or Off delay in seconds in range of 1 to 9999. For RTC Relay this range is 00.00 to 23.59. |
| 46059 | Relay 2 output select | Same as Relay 1. |
| 46061 | Relay 2 Para select/ No. of Cycles/ Weekly repeat | |
| 46063 | Limit 2 Trip Point | |
| 46065 | Limit 2 Hysteresis | |
| 46067 | Relay 2 On (Energize) Delay/ On Time | |
| 46069 | Relay 2 Off (De-Energize) Delay/ Off Time | |
| 46071 | Password | This address is used to set & reset the password.<br>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**.<br>2) If Password lock is absent & if this location is read it will return **One**.<br>3) If password lock is present & to disable this lock first send valid password to this location then write “0000” to this location<br>4) If password lock is present & to modify 4X parameter first send valid password to this location so that 4X parameter will be accessible for modification.<br>5) If for in any of the above case invalid password is send then meter will return exceptional error 2. |
| 46073 | Relay 1 Configuration Select | This address is used to set the Configuration for Relay 1<br>Refer **TABLE 9**. |
| 46075 | Limit 2 Configuration Select | This address is used to set the Configuration for Relay 2<br>Refer **TABLE 9**. |

| Address | Parameter | Description |
|---|---|---|
| 46077 | Auto scroll | This address is used to activate or de-activate the auto scrolling.<br>Write **0:** Deactivate **1:** Activate |
| 46079 | 30mA Noise current Elimination | This address is used to activate or de-activate the 30 mA noise current elimination write<br>**0:** Deactivate **30** (Decimal)**:** Activate |
| 46081 | Energy Update Rate | This address is used to specify update rate of energy in corresponding 3X registers. The valid values for update rate are from 1 to 60 min. |
| 46083 | Factory Reset | This address allows the user to reset the instrument to factory settings. Refer the **Default Values** in **TABLE 3** for factory settings. Write **5555** at this address to reset the instrument. |
| 46087 | System Frequency Selection | This address is used to set the frequency of the input.<br>Write **50:** For 50 Hz input **60:** For 60Hz input |
| 46089 | Impulse Selection | This address is used to select the energy to which impulse is to be assigned. Writing any other value will return an error.<br>**0:** None **1:** Active Energy<br>**2:** Reactive Energy **3:** Apparent Energy |
| 46091 | Energy Parameter Selection | This address is used to select the parameter whose start count (initial value) is to be set. Refer **TABLE 10**. |
| 46093 | Energy Start Count | This address is used to set the start count of the parameter selected in address 46091. The start count of the parameter should be in the range specified in **TABLE 10**. |
| 46095 | Timer 1 Start/ Stop | This address is used to start/stop the timer for Relay 1 in timer mode with following options: **0**: Stop **1**: Start |
| 46097 | Timer 2 Start/ Stop | This address is used to start/stop the timer for Relay 2 in timer mode with following options: **0**: Stop **1**: Start |

| Address | Parameter | Description |
|---|---|---|
| 46127 | RTC Complete Date | This address is used to read and write full date in “ddmmyy” format from RTC. |
| 46129 | RTC Complete Time | This address is used to read and write complete time in “hh.mm.ss” format from RTC. |
| 46131 | RTC Day of week. | This address is used to read the day of the week for the present date with following values: **1**:Sunday **2**:Monday **3**:Tuesday **4**:Wednesday **5**:Thursday **6**:Friday **7**:Saturday |
| 46133 | Backlit ON/OFF | This address is used to turn On or turn Off the backlit.<br>**1:** Backlit On<br>**0:** Backlit Off |
| 46135 | Contrast | This address is used to change the contrast of the display. The options availabe are **1 to 4**, in increasing order of contrast. |
| 46137 | User Assignable Screen Enable | This address is used to activate or deactivate the User Assignable Screen feature.<br>**0:** Deactivate<br>**1 to 10**: Corresponding number of user assignable screens. |
| 46139 to 46157 | User Screens 1 to 10 | These addresses are used to assign the screen numbers to user screens 1 to 10 respectively. Refer to **TABLE 11 and 12** for screen numbers. |
| 46177 | Serial Number Higher Digits | This address is read only and displays the higher 4 digits (XXXX) of complete serial number (XXXXZZZZZZ) of the meter. |
| 46181 | Version Number | This address is read only and displays the version number of the meter. |
| 46183 | Serial Number Lower Digits | This address is read only and displays the lower 6 digits (ZZZZZZ) of complete serial number (XXXXZZZZZZ) of the meter.<br>e.g., if address 46177 reads 119 and address 46183 reads 20, then the serial number would be 0119000020. |
| 46185 | Event Based Datalog Select | This register is used to enable or disable event based datalogging.<br>0: Disabled<br>1: Enabled |
| 46187 | Time Based Datalog Select | This register is used to enable or disable time based datalogging.<br>0: Disabled<br>1: Enabled |

| Address | Parameter | Description |
|---|---|---|
| 46189 | Time Based Datalog Interval Selection | This address is used to read and write the interval between consecutive time log entries in minutes. Valid value range 1-60 |
| 46191 | Logging Parameter Count | This value decides the number of parameters to be logged in time based datalogging. The value ranges from **1 to 30**. |
| 46193-46251 | Datalog Parameter 1 to 30 | These addresses are used to read and write the parameters to be logged in time based logging. For valid values, refer **TABLE 13**. |
| 46253 | Load Profile Datalog Select | The address is used to start/stop Load Profile Datalogging.<br>**1**: Start Load Profile datalogging **0**: Stop Load Profile datalogging |
| 46255 | Start Date of Load Profile Datalog | This value show the starting date for Load Profile datalog.<br>This address are read only. |
| 46357 | IP Address | These address is used to set IP address for Ethernet . |
| 46359 | Subnet Mask | This address is used to Set subnet mask for Ethernet. |
| 46361 | Default gateway | This address is used to Set default gateway for Ethernet. |
| 46363 | Server Port | This address is used to set server port . |

**NOTE:**
**Changing system type, PT/CT ratio, Energy Output, Energy Digit Reset Count will reset the energy.**

## TABLE 4 : RS 485 Set-up Code

| Baud Rate | Parity | Stop Bit | Decimal value |
|---|---|---|---|
| 4800 | NONE | 01 | 0 |
| 4800 | NONE | 02 | 1 |
| 4800 | EVEN | 01 | 2 |
| 4800 | ODD | 01 | 3 |
| 9600 | NONE | 01 | 4 |
| 9600 | NONE | 02 | 5 |
| 9600 | EVEN | 01 | 6 |
| 9600 | ODD | 01 | 7 |
| 19200 | NONE | 01 | 8 |
| 19200 | NONE | 02 | 9 |
| 19200 | EVEN | 01 | 10 |
| 19200 | ODD | 01 | 11 |
| 38400 | NONE | 01 | 12 |
| 38400 | NONE | 02 | 13 |
| 38400 | EVEN | 01 | 14 |
| 38400 | ODD | 01 | 15 |
| 57600 | NONE | 01 | 16 |
| 57600 | NONE | 02 | 17 |
| 57600 | EVEN | 01 | 18 |
| 57600 | ODD | 01 | 19 |

**NOTE : Codes not listed in the table above may give rise to unpredictable results including loss of communication. Exercise caution when attempting to change mode via direct Modbus writes.**

## TABLE 5 : Pulse Configuration select

| Code | Configuration |
|---|---|
| 0 | Active Energy Import |
| 1 | Active Energy Export |
| 2 | Capacitive Reactive Energy |
| 3 | Inductive Reactive Energy |
| 4 | Apparent Energy |

## TABLE 6: Number of Cycles for Timer Relay

| Code | Description |
|---|---|
| 0 | Unlimited |
| 1 to 9999 | Fixed Cycles |

## TABLE 7: Weekly Repeat for RTC Relay

| Code | Description |
|---|---|
| 1XXXXXXX<br>E{1,2,3,4,5,6,7} | Eg 11010000 means relay will operate only on Sun & Tue.' E'bit indicate Enable/Disable |
| | 1 = Sunday, 7 = Saturday |

## TABLE 8 : Parameters for Limit output

| Parameter No. | Parameter | 3P 4W | 3P 3W | 1P 2W | Trip Point Set Range | 100% Value |
|---|---|---|---|---|---|---|
| 0 | None | ✓ | ✓ | ✓ | - | - |
| 1 | Volts 1 | ✓ | ✓ | ✓ | 10 - 120 % | Vnom (L-N) |
| 2 | Volts 2 | ✓ | ✓ | ✗ | 10 - 120 % | Vnom (L-N) |
| 3 | Volts 3 | ✓ | ✓ | ✗ | 10 - 120 % | Vnom (L-N) |
| 4 | IL1 | ✓ | ✓ | ✓ | 10 - 120 % | Inom |
| 5 | IL2 | ✓ | ✓ | ✗ | 10 - 120 % | Inom |
| 6 | IL3 | ✓ | ✓ | ✗ | 10 - 120 % | Inom |
| 7 | W1 | ✓ | ✗ | ✓ | 10 - 120 % | Nom (3) |
| 8 | W2 | ✓ | ✗ | ✗ | 10 - 120 % | Nom (3) |
| 9 | W3 | ✓ | ✗ | ✗ | 10 - 120 % | Nom (3) |
| 10 | Va1 | ✓ | ✗ | ✓ | 10 - 120 % | Nom (3) |
| 11 | Va2 | ✓ | ✗ | ✗ | 10 - 120 % | Nom (3) |
| 12 | Va3 | ✓ | ✗ | ✗ | 10 - 120 % | Nom (3) |
| 13 | Var1 | ✓ | ✗ | ✓ | 10 - 120 % | Nom (3) |
| 14 | Var2 | ✓ | ✗ | ✗ | 10 - 120 % | Nom (3) |
| 15 | VAr3 | ✓ | ✗ | ✗ | 10 - 120 % | Nom(3) |
| 16 | PF1 * | ✓ | ✗ | ✓ | 10 - 90 % | 90° |
| 17 | PF2 * | ✓ | ✗ | ✗ | 10 - 90 % | 90° |
| 18 | PF3 * | ✓ | ✗ | ✗ | 10 - 90 % | 90° |
| 19 | PA1 * | ✓ | ✗ | ✓ | 10 - 90 % | 360° |
| 20 | PA2 * | ✓ | ✗ | ✗ | 10 - 90 % | 360° |
| 21 | PA3 * | ✓ | ✗ | ✗ | 10 - 90 % | 360° |
| 22 | Volts Ave. | ✓ | ✓ | ✗ | 10 - 120 % | Vnom (2) |
| 24 | Current Ave. | ✓ | ✓ | ✗ | 10 - 120 % | Inom |
| 27 | Watts sum | ✓ | ✓ | ✗ | 10 - 120 % | Nom (3) |
| 29 | VA sum | ✓ | ✓ | ✗ | 10 - 120 % | Nom (3) |
| 31 | VAr sum | ✓ | ✓ | ✗ | 10 - 120 % | Nom (3) |
| 32 | PF Ave. | ✓ | ✓ | ✗ | 10 - 90 % | 90° |
| 34 | PA Ave. | ✓ | ✓ | ✗ | 10 - 90 % | 360° |
| 36 | Freq. | ✓ | ✓ | ✓ | 10 - 90 % | 66 Hz (1) |
| 37 | Wh Import | ✓ | ✓ | ✓ | 10 - 9999999 | - |

## TABLE 8: Continued...

| Parameter No. | Parameter | 3P 4W | 3P 3W | 1P 2W | Trip Point Set Range | 100% Value |
|---|---|---|---|---|---|---|
| 38 | Wh Export | ✓ | ✓ | ✓ | 10 - 9999999 | - |
| 39 | VAr Capacitive | ✓ | ✓ | ✓ | 10 - 9999999 | - |
| 40 | VAr Inductive | ✓ | ✓ | ✓ | 10 - 9999999 | - |
| 41 | VA | ✓ | ✓ | ✓ | 10 - 9999999 | - |
| 43 | Watt Demand Imp.* | ✓ | ✓ | ✓ | 10 - 120 % | Nom (3) |
| 44 | Watt Max Demand Imp.* | ✓ | ✓ | ✓ | 10 - 120 % | Nom (3) |
| 45 | Watt Demand Exp.* | ✓ | ✓ | ✓ | 10 - 120 % | Nom (3) |
| 46 | Watt Demand Max Exp.* | ✓ | ✓ | ✓ | 10 - 120 % | Nom (3) |
| 47 | VAr Demand Cap.* | ✓ | ✓ | ✓ | 10 - 120 % | Nom (3) |
| 48 | VAr Max Demand Cap.* | ✓ | ✓ | ✓ | 10 - 120 % | Nom (3) |
| 49 | VAr Demand Ind.* | ✓ | ✓ | ✓ | 10 - 120 % | Nom (3) |
| 50 | VAr Demand Max Ind.* | ✓ | ✓ | ✓ | 10 - 120 % | Nom (3) |
| 51 | VA Demand* | ✓ | ✓ | ✓ | 10 - 120 % | Nom (3) |
| 52 | VA Max Demand* | ✓ | ✓ | ✓ | 10 - 120 % | Nom (3) |
| 53 | Current Demand* | ✓ | ✓ | ✓ | 10 - 120 % | Inom |
| 54 | Current Max Demand* | ✓ | ✓ | ✓ | 10 - 120 % | Inom |
| 101 | VL1-L2 | ✓ | ✗ | ✗ | 10 - 120 % | Vnom (L-L) |
| 102 | VL2-L3 | ✓ | ✗ | ✗ | 10 - 120 % | Vnom (L-L) |
| 103 | VL3-L1 | ✓ | ✗ | ✗ | 10 - 120 % | Vnom (L-L) |
| 113 | I Neutral | ✓ | ✗ | ✗ | 10 - 120 % | Inom |
| 114 | Relay Manual OFF | ✓ | ✓ | ✓ | 1 | - |
| 115 | Relay Manual ON | ✓ | ✓ | ✓ | 1 | - |

**Note : Parameters 1,2,3 are L-N Voltage for 3P 4W & L-L Voltage for 3P 3W.**

***Note : Parameters marked are not applicable for the Lower Model.**

(1) For Frequency 0% corresponds to 45 Hz and 100% corresponds to 66 Hz.

(2) For 3P 4W and 1P2W the nominal value is VLN and that for 3P 3W is VLL.

(3) Nominal Value for power is calculated from Nominal Voltage and current values.

(4) Nominal Value is to be considered with set CT/ PT Primary values.

(5) For single phase L1 Phase values are to be considered as System values.

## TABLE 9: Relay Configuration

**For Limit Relay**

| Code | Configuration |
|---|---|
| 0 | Hi - alarm & energised Relay |
| 1 | Hi - alarm & De-energised Relay |
| 2 | Lo - alarm & Energised Relay |
| 3 | Lo - alarm & De-energised Relay |

**For Timer or RTC relay**

| Code | Configuration |
|---|---|
| 0 | Energize when triggered |
| 1 | De-energize when triggered |

## TABLE 10: Energy Parameter Selection and Start Count

| Parameter Number | Parameter | Range |
|---|---|---|
| 1 | Imp Active Energy Start Count | 1 to 999999999 |
| 2 | Exp Active Energy Start Count | 1 to 999999999 |
| 3 | Capacitive Reactive Energy Start Count | 1 to 999999999 |
| 4 | Inductive Reactive Energy Start Count | 1 to 999999999 |
| 5 | Apparent Energy Start Count | 1 to 999999999 |
| 7 | Imp Active Energy Overflow Start Count | 1 to 999999 |
| 8 | Exp Active Energy Overflow Start Count | 1 to 999999 |
| 9 | Capacitive Reactive Energy Overflow Start Count | 1 to 999999 |
| 10 | Inductive Reactive Energy Overflow Start Count | 1 to 999999 |
| 11 | Apparant Energy Overflow Start Count | 1 to 999999 |

# TABLE 11 : Measurement & Energy/Counter Screens for Higher Model

| Screen No. | Parameters | On Display | | | On Modbus | | |
|---|---|---|---|---|---|---|---|
| | | 3P 4W | 3P 3W | 1P 2W | 3P 4W | 3P 3W | 1P 2W |
| 1 | System Voltage/ Current/ Power/ Frequency | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | L-N Voltage | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 3 | L-L Voltage | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 4 | Current ,Neutral Current | ✓ | ✓* | ✗ | ✓ | ✓* | ✗ |
| 5 | Phase Voltage THD | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 6 | Phase Current THD | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 7 | L1 phase VA/VAr/W/PF | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 8 | L2 phase VA/VAr/W/PF | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 9 | L3 phase VA/VAr/W/PF | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 10 | Phase Angle | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 11 | VA/A demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 12 | Capacitive, Inductive VAr demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 13 | W IMP demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 14 | W EXP demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 15 | Max VA/A demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 16 | Max Capacitive, Inductive VAr demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 17 | Max W IMP demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 18 | Max W EXP demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 19 | Old Max VA/A demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 20 | Old Max Capacitive, Inductive VAr demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 21 | Old Max W IMP demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 22 | Old Max W EXP demand | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 23 | Sys RPM/Frequency | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 24 | Sys Active/Reactive/Apparent power | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 25 | Sys Apparent, Reactive (Power), Phase angle, PF | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 26 | Min Sys Voltage / Current | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 27 | Max Sys Voltage / Current | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 28 | Sys %THD Voltage /Current | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 29 | Current Reversal | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ |
| 30 | Phase rotation error | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 31 | Phase absent indication | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 32 | RTC | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

***Note: In 3P3W system, Neutral Current is not shown, only line currents are shown.**

## TABLE 11 : Continued...

| Screen No. | Parameters | On Display | | | On Modbus | | |
|---|---|---|---|---|---|---|---|
| | | 3P 4W | 3P 3W | 1P 2W | 3P 4W | 3P 3W | 1P 2W |
| 33 | Individual harmonics V | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 34 | Individual harmonics A | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 35 | Timer1 No. of Cycles, ON, OFF delay | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 36 | Timer2 No. of Cycles, ON, OFF delay | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 37 | Active Energy Import(Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 38 | Active Energy Import | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 39 | Active Energy Export(Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 40 | Active Energy Export | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 41 | Reactive Capacitive energy (Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 42 | Reactive Capacitive energy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 43 | Reactive Inductive energy (Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 44 | Reactive Inductive energy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 45 | Apparent energy(Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 46 | Apparent energy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 47 | Run hour | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 48 | On hour | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 49 | No. of interrupts | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 50 | Old Active energy Import(Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 51 | Old Active energy Import | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 52 | Old Active energy Export(Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 53 | Old Active energy Export | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 54 | Old Reactive Capacitive energy (Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 55 | Old Reactive Capacitive energy | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 56 | Old Reactive Inductive energy (Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 57 | Old Reactive Inductive energy | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 58 | Old Apparent energy(Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 59 | Old Apparent energy | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 60 | Old Run hour | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 61 | Old On hour | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 62 | Old no. of interrupts | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |

**Note: (1) Only screens (with screen number) 1 to 32 are available for selectable Userscreens.**

## TABLE 12 : Measurement & Energy/Counter Screens for Lower Model

| Screen No. | Parameters | On Display | | | On Modbus | | |
|---|---|---|---|---|---|---|---|
| | | 3P 4W | 3P 3W | 1P 2W | 3P 4W | 3P 3W | 1P 2W |
| 1 | System Voltage/ Current/ Power/ Frequency | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 2 | L-N Voltage | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 3 | L-L Voltage | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 4 | Current ,Neutral Current | ✓ | ✓* | ✗ | ✓ | ✓* | ✗ |
| 5 | Phase Voltage THD | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 6 | Phase Current THD | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 7 | L1 phase VA/VAr/W | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 8 | L2 phase VA/VAr/W | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 9 | L3 phase VA/VAr/W | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 10 | Phase Angle | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 11 | VA/A demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 12 | Capacitive, Inductive VAr demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 13 | W IMP demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 14 | W EXP demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 15 | Max VA/A demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 16 | Max Capacitive, Inductive VAr demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 17 | Max W IMP demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 18 | Max W EXP demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 19 | Old Max VA/A demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 20 | Old Max Capacitive, Inductive VAr demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 21 | Old Max W IMP demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 22 | Old Max W EXP demand | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 23 | Sys RPM/Frequency | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 24 | Sys Active/Reactive/Apparent power | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 25 | Sys Apparent, Reactive (Power), Phase angle, PF | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 26 | Min Sys Voltage / Current | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 27 | Max Sys Voltage / Current | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 28 | Sys %THD Voltage /Current | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 29 | Current Reversal | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ |
| 30 | Phase rotation error | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 31 | Phase absent indication | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 32 | RTC | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

***Note: In 3P3W system, Neutral Current is not shown, only line currents are shown.**

## TABLE 12 : Continued...

| Screen No. | Parameters | On Display | | | On Modbus | | |
|---|---|---|---|---|---|---|---|
| | | 3P 4W | 3P 3W | 1P 2W | 3P 4W | 3P 3W | 1P 2W |
| 33 | Individual harmonics V | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 34 | Individual harmonics A | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 35 | Timer1 No. of Cycles, ON, OFF delay | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 36 | Timer2 No. of Cycles, ON, OFF delay | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 37 | Active Energy Import(Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 38 | Active Energy Import | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 39 | Active Energy Export(Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 40 | Active Energy Export | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 41 | Reactive Capacitive energy (Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 42 | Reactive Capacitive energy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 43 | Reactive Inductive energy (Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 44 | Reactive Inductive energy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 45 | Apparent energy(Overflow) | ✗ | ✗ | ✗ | ✓ | ✓ | ✓ |
| 46 | Apparent energy | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 47 | Run hour | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 48 | On hour | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 49 | No. of interrupts | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 50 | Old Active energy Import(Overflow) | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 51 | Old Active energy Import | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 52 | Old Active energy Export(Overflow) | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 53 | Old Active energy Export | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 54 | Old Reactive Capacitive energy (Overflow) | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 55 | Old Reactive Capacitive energy | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 56 | Old Reactive Inductive energy (Overflow) | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 57 | Old Reactive Inductive energy | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 58 | Old Apparent energy(Overflow) | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 59 | Old Apparent energy | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 60 | Old Run hour | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 61 | Old On hour | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 62 | Old no. of interrupts | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |

**Note: (1) Only screens (with screen number) 1 to 32 are available for selectable Userscreens.**
**(2) For 'Overflow' energy screens, refer Section 3.2.1.12.**

## TABLE 13 : Datalogging Parameters List

| Para. No. | Parameter | Higher Model | | | Lower Model | | |
|---|---|---|---|---|---|---|---|
| | | 3P 4W | 3P 3W | 1P 2W | 3P 4W | 3P 3W | 1P 2W |
| 0 | V1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 1 | V2 | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 2 | V3 | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 3 | I1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 4 | I2 | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 5 | I3 | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 6 | W1 | ✓ | ✗ | ✓ | ✓ | ✗ | ✓ |
| 7 | W2 | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 8 | W3 | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 9 | VA1 | ✓ | ✗ | ✓ | ✓ | ✗ | ✓ |
| 10 | VA2 | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 11 | VA3 | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 12 | VAR1 | ✓ | ✗ | ✓ | ✓ | ✗ | ✓ |
| 13 | VAR2 | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 14 | VAR3 | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 15 | PF1 | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ |
| 16 | PF2 | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 17 | PF3 | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 18 | Angle1 | ✓ | ✗ | ✓ | ✗ | ✗ | ✗ |
| 19 | Angle2 | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 20 | Angle3 | ✓ | ✗ | ✗ | ✗ | ✗ | ✗ |
| 21 | Volt Avg | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 22 | Volt Sum | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 23 | Current Avg | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 24 | Current Sum | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 25 | Watt Avg | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 26 | Watt Sum | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 27 | VA Avg | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 28 | VA Sum | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |

## TABLE 13 : Continued...

| Para. No. | Parameter | Higher Model | | | Lower Model | | |
|---|---|---|---|---|---|---|---|
| | | 3P 4W | 3P 3W | 1P 2W | 3P 4W | 3P 3W | 1P 2W |
| 29 | VAR Avg | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 30 | VAR Sum | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 31 | PF Avg | ✓ | ✓ | ✗ | ✓ | ✓ | ✓ |
| 32 | PF Sum | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |
| 33 | Phase Angle Avg | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |
| 34 | Phase Angle Sum | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |
| 35 | Freq | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 36 | Wh import | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 37 | Wh export | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 38 | VARh Capacitive | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 39 | VARh Inductive | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 40 | VAh | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 42 | kw imp demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 43 | max kW imp demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 44 | kW exp demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 45 | max kW exp demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 46 | kVAr Cap. demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 47 | max kVAr Cap. demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 48 | kVAr Ind. demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 49 | max kVAr Ind. demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 50 | KVA demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 51 | max KVA demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 52 | current demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 53 | max current demand | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 54 | Import active energy overflow count | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 56 | Export active energy overflow count | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 58 | Capacitive reactive energy overflow count | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 60 | Inductive reactive energy overflow count | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 62 | Apparent energy overflow count | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## TABLE 13 : Continued...

| Para. No. | Parameter | Higher Model | | | Lower Model | | |
|---|---|---|---|---|---|---|---|
| | | 3P 4W | 3P 3W | 1P 2W | 3P 4W | 3P 3W | 1P 2W |
| 66 | system voltage max | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 67 | system voltage min | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 68 | RPM | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 70 | system current max | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 71 | system current min | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 100 | V12 | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 101 | V23 | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 102 | V31 | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 103 | V THD-L1 | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 104 | V THD-L2 | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |
| 105 | V THD-L3 | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |
| 106 | I THD-L1 | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| 107 | I THD-L2 | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |
| 108 | I THD-L3 | ✓ | ✓ | ✗ | ✗ | ✗ | ✗ |
| 109 | System V-THD | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 110 | System I-THD | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 112 | Neutral Current | ✓ | ✗ | ✗ | ✓ | ✗ | ✗ |
| 113 | Run hour | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 114 | On Hour | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 115 | No. of interrupts | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 166 | Phase indicate | ✓ | ✓ | ✗ | ✓ | ✓ | ✗ |

## 3.4 User Assignable Modbus Registers:

The Multifunction Instrument contains 20 user assignable registers in the address range of 0x400 (31025) to 0x426 (31065) for 3X registers (**see TABLE 14**) and address range of 0x400 (41025) to 0x426 (41065) for 4X registers (**see TABLE 14**).

Any of the parameter addresses (3X register addresses and 4X register addresses **TABLE 1**) accessible in the instrument can be mapped to these 20 user assignable registers.

Parameters (3X and 4X registers addresses) that reside in different locations may be accessed by the single request by re-mapping them to adjacent address in the user assignable registers area.

The actual address of the parameters (3X and 4X registers addresses) which are to be accessed via address 0x400 to 0x426 are specified in 4X Register 0x251C to 0x252F (**see TABLE 15**).

## TABLE 14 : User Assignable 3X Data Registers

| Address (3X) | Address (4X) | Assignable Register | Modbus Start Address (Hex) | |
|---|---|---|---|---|
| | | | High Byte | Low Byte |
| 31025 | 41025 | Assignable Reg 1 | 04 | 00 |
| 31027 | 41027 | Assignable Reg 2 | 04 | 02 |
| 31029 | 41029 | Assignable Reg 3 | 04 | 04 |
| 31031 | 41031 | Assignable Reg 4 | 04 | 06 |
| 31033 | 41033 | Assignable Reg 5 | 04 | 08 |
| 31035 | 41035 | Assignable Reg 6 | 04 | 0A |
| 31037 | 41037 | Assignable Reg 7 | 04 | 0C |
| 31039 | 41039 | Assignable Reg 8 | 04 | 0E |
| 31041 | 41041 | Assignable Reg 9 | 04 | 10 |
| 31043 | 41043 | Assignable Reg 10 | 04 | 12 |
| 31045 | 41045 | Assignable Reg 11 | 04 | 14 |
| 31047 | 41047 | Assignable Reg 12 | 04 | 16 |
| 31049 | 41049 | Assignable Reg 13 | 04 | 18 |
| 31051 | 41051 | Assignable Reg 14 | 04 | 1A |
| 31053 | 41053 | Assignable Reg 15 | 04 | 1C |
| 31055 | 41055 | Assignable Reg 16 | 04 | 1E |
| 31057 | 41057 | Assignable Reg 17 | 04 | 20 |
| 31059 | 41059 | Assignable Reg 18 | 04 | 22 |
| 31061 | 41061 | Assignable Reg 19 | 04 | 24 |
| 31063 | 41063 | Assignable Reg 20 | 04 | 26 |

## TABLE 15 : User Assignable mapping register ( 4X registers)

| Address (4X) | Assignable Register | Modbus Start Address (Hex) | |
|---|---|---|---|
| | | High Byte | Low Byte |
| 49501 | Mapped Add for register #0x0400 | 25 | 1C |
| 49502 | Mapped Add for register #0x0402 | 25 | 1D |
| 49503 | Mapped Add for register #0x0404 | 25 | 1E |
| 49504 | Mapped Add for register #0x0406 | 25 | 1F |
| 49505 | Mapped Add for register #0x0408 | 25 | 20 |
| 49506 | Mapped Add for register #0x040A | 25 | 21 |
| 49507 | Mapped Add for register #0x040C | 25 | 22 |
| 49508 | Mapped Add for register #0x040E | 25 | 23 |
| 49509 | Mapped Add for register #0x0410 | 25 | 24 |

## TABLE 15 : Continued...

| Address (4X) | Assignable Register | Modbus Start Address (Hex) | |
|---|---|---|---|
| | | High Byte | Low Byte |
| 49510 | Mapped Add for register #0x0412 | 25 | 25 |
| 49511 | Mapped Add for register #0x0414 | 25 | 26 |
| 49512 | Mapped Add for register #0x0416 | 25 | 27 |
| 49513 | Mapped Add for register #0x0418 | 25 | 28 |
| 49514 | Mapped Add for register #0x041A | 25 | 29 |
| 49515 | Mapped Add for register #0x041C | 25 | 2A |
| 49516 | Mapped Add for register #0x041E | 25 | 2B |
| 49517 | Mapped Add for register #0x0420 | 25 | 2C |
| 49518 | Mapped Add for register #0x0422 | 25 | 2D |
| 49519 | Mapped Add for register #0x0424 | 25 | 2E |
| 49520 | Mapped Add for register #0x0426 | 25 | 2F |

**Assigning parameter to User Assignable Registers:**

To access the Voltage2 (3X address 0x0002) and Power Factor1 (3X address 0x001E) through user assignable register assign these addresses to 4x register (**TABLE 15** ) 0x251C and 0x251D 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-1High Byte | 00 (Hex) |
| Data Register-1 Low Byte | 02 (Hex) |
| Data Register-2 High Byte | 00 (Hex) |
| Data Register-2 Low Byte | 1E (Hex) |
| CRC Low | CB (Hex) |
| CRC High | 07 (Hex) |

} Voltage 2 * (3X Address 0x0002)

} Power Factor 1 *(3X Address 0x001E)

**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 | 40 (Hex) |
| CRC High | 70 (Hex) |

* Note : Parameters should be assigned in Multiple of two i.e. 2,4,6,8.....20.

**Reading Parameter data through User Assignable Registers:**

In assigning query Voltage 2 & Power Factor 1 parameters were assigned to 0x251C & 0x251D (**TABLE 15**) which will point to user assignable 3x registers 0x400 and 0x402 (**TABLE 14**). So to read Voltage2 and Power Factor1 data reading query should be as below.

**Query**:

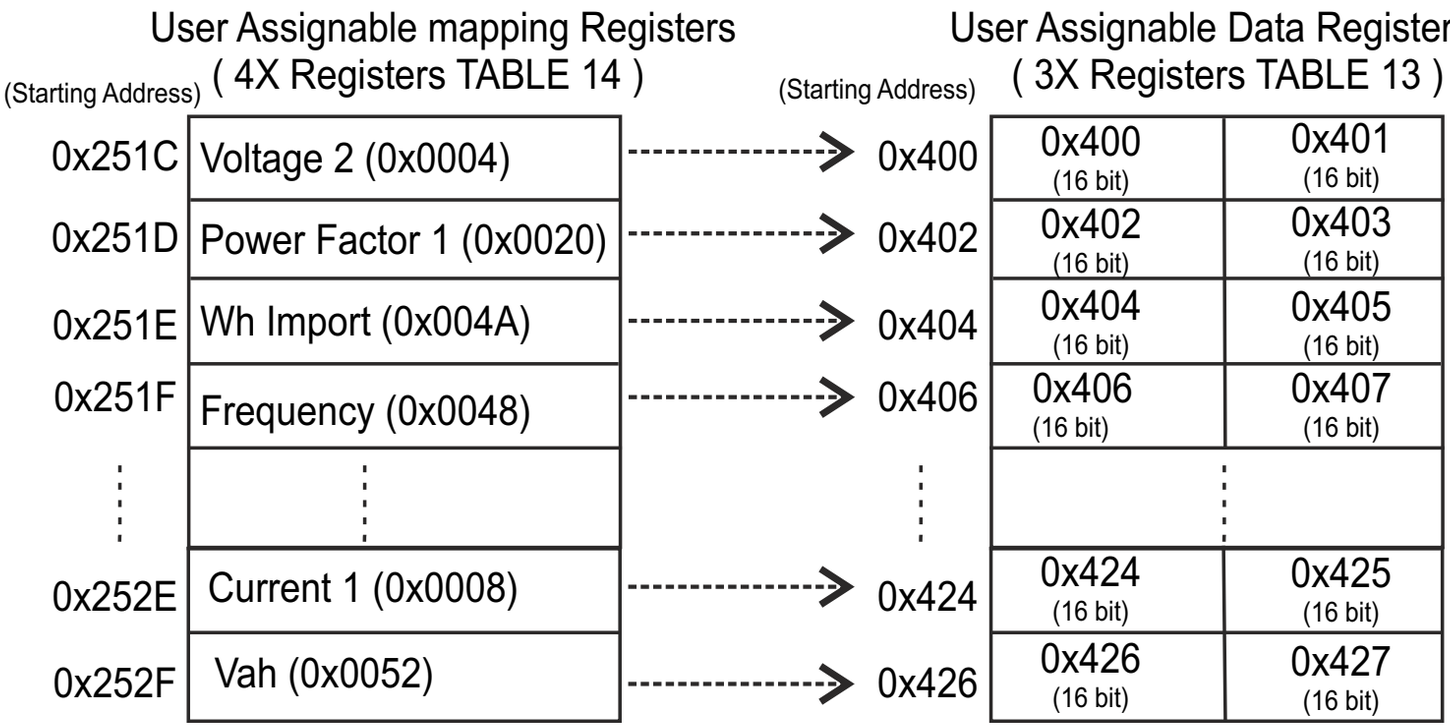
| | |
|---|---|
| Device Address | 01 (Hex) |
| Function Code | 04 (Hex) |
| Start Address High | 04(Hex) |
| Start Address Low | 00 (Hex) |
| Number of Registers Hi | 00 (Hex) |
| Number of Registers Lo | 04 (Hex)** |
| CRC Low | F0 (Hex) |
| CRC High | 71 (Hex) |

**Start Address High** : Most significant 8 bits of starting address of Userassignable 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 :** (Volt2 = 219.30 / Power Factor1 = 1.0)

| | | |
|---|---|---|
| Device Address | 01 (Hex) | |
| Function Code | 04 (Hex) | |
| Byte count | 08 (Hex) | |
| Data Register-1High Byte | 43 (Hex) | **Voltage 2 Data** |
| Data Register-1 Low Byte | 5B (Hex) | |
| Data Register-2 High Byte | 4E (Hex) | |
| Data Register-2 Low Byte | 04 (Hex) | |
| Data Register-3 High Byte | 3F (Hex) | **Power Factor 1 Data** |
| Data Register-3 Low Byte | 80 (Hex) | |
| Data Register-4 High Byte | 00 (Hex) | |
| Data Register-4 Low Byte | 00 (Hex) | |
| CRC Low | 79 (Hex) | |
| CRC High | 3F (Hex) | |




**To get the data through User Assignable Register go through the following steps:**

1) Assign starting addresses(**TABLE 1**) of parameters of interest to "User assignable mapping registers" in a sequence in which they are to be accessed (see Section "**Assigning Parameter to User Assignable Registers"** of Section 3.3).
2) Once the parameters are mapped, data can be acquired by using "User assignable data register" Starting address . i.e to access data of Voltage2, Power factor1,Wh import, Frequency send query with starting address 0x0400 with number of register 8 or individually parameters can be accessed. For example, if current1 is to be accessed use starting address 0x0424. (see Section **Reading Parameter data through User Assignable Registers** of Section 3.3**).**

# 4. Datalogging

Datalogging is a feature that allows the meter to store measured parameters based on time or on occurrence of a certain event. The user can retrieve the data later for further application.

This meter offers three types of datalogging

1) Event based 2) Time based 3) Load profile

## 4.1 Event Based Datalogging

This type of datalogging stores data when certain event is observed. This data is time stamped and last five occurrences of each type of event are stored based on first in first out queue. This meter offers event based logging for 10 parameters. This data can be observed on the modbus on the address table shown below. These registers can be accessed by the query explained in section 3.1 The user can turn this logging on and off through display as well as modbus by using address 46185.

Changing any setup parameter related to the logged parameters will reset the log.

Note: Below addresses are available for 3X and for 4X.

for example 312289 for 3X and 412289 for 4X.

**Table 16: Addresses for event based datalog**

| Address | Logged Parameter | Log Details | Mod Start Address Hex | |
|---|---|---|---|---|
| | | | High Byte | Low Byte |
| 312289 | Max Voltage | Date 1 | 30 | 00 |
| 312291 | | Time 1 | 30 | 02 |
| 312293 | | Value 1 | 30 | 04 |
| 312295 | | Date 2 | 30 | 06 |
| 312297 | | Time 2 | 30 | 08 |
| 312299 | | Value 2 | 30 | 0A |
| 312301 | | Date 3 | 30 | 0C |
| 312303 | | Time 3 | 30 | 0E |
| 312305 | | Value 3 | 30 | 10 |
| 312307 | | Date 4 | 30 | 12 |
| 312309 | | Time 4 | 30 | 14 |
| 312311 | | Value 4 | 30 | 16 |
| 312313 | | Date 5 | 30 | 18 |
| 312315 | | Time 5 | 30 | 1A |
| 312317 | | Value 5 | 30 | 1C |

| Address | Logged Parameter | Log Details | Mod Start Address Hex | |
|---|---|---|---|---|
| | | | High Byte | Low Byte |
| 312319 | Min Voltage | Date 1 | 30 | 1E |
| 312321 | | Time 1 | 30 | 20 |
| 312323 | | Value 1 | 30 | 22 |
| 312325 | | Date 2 | 30 | 24 |
| 312327 | | Time 2 | 30 | 26 |
| 312329 | | Value 2 | 30 | 28 |
| 312331 | | Date 3 | 30 | 2A |
| 312333 | | Time 3 | 30 | 2C |
| 312335 | | Value 3 | 30 | 2E |
| 312337 | | Date 4 | 30 | 30 |
| 312339 | | Time 4 | 30 | 32 |
| 312341 | | Value 4 | 30 | 34 |
| 312343 | | Date 5 | 30 | 36 |
| 312345 | | Time 5 | 30 | 38 |
| 312347 | | Value 5 | 30 | 3A |

## Table 16: Continued...

| | | | | |
|---|---|---|---|---|
| 312349 | Max Current | Date 1 | 30 | 3C |
| 312351 | | Time 1 | 30 | 3E |
| 312353 | | Value 1 | 30 | 40 |
| 312355 | | Date 2 | 30 | 42 |
| 312357 | | Time 2 | 30 | 44 |
| 312359 | | Value 2 | 30 | 46 |
| 312361 | | Date 3 | 30 | 48 |
| 312363 | | Time 3 | 30 | 4A |
| 312365 | | Value 3 | 30 | 4C |
| 312367 | | Date 4 | 30 | 4E |
| 312369 | | Time 4 | 30 | 50 |
| 312371 | | Value 4 | 30 | 52 |
| 312373 | | Date 5 | 30 | 54 |
| 312375 | | Time 5 | 30 | 56 |
| 312377 | | Value 5 | 30 | 58 |
| 312379 | Min Current | Date 1 | 30 | 5A |
| 312381 | | Time 1 | 30 | 5C |
| 312383 | | Value 1 | 30 | 5E |
| 312385 | | Date 2 | 30 | 60 |
| 312387 | | Time 2 | 30 | 62 |
| 312389 | | Value 2 | 30 | 64 |
| 312391 | | Date 3 | 30 | 66 |
| 312393 | | Time 3 | 30 | 68 |
| 312395 | | Value 3 | 30 | 6A |
| 312397 | | Date 4 | 30 | 6C |
| 312399 | | Time 4 | 30 | 6E |
| 312401 | | Value 4 | 30 | 70 |
| 312403 | | Date 5 | 30 | 72 |
| 312405 | | Time 5 | 30 | 74 |
| 312407 | | Value 5 | 30 | 76 |

| | | | | |
|---|---|---|---|---|
| 312409 | Max W Import Demand | Date 1 | 30 | 78 |
| 312411 | | Time 1 | 30 | 7A |
| 312413 | | Value 1 | 30 | 7C |
| 312415 | | Date 2 | 30 | 7E |
| 312417 | | Time 2 | 30 | 80 |
| 312419 | | Value 2 | 30 | 82 |
| 312421 | | Date 3 | 30 | 84 |
| 312423 | | Time 3 | 30 | 86 |
| 312425 | | Value 3 | 30 | 88 |
| 312427 | | Date 4 | 30 | 8A |
| 312429 | | Time 4 | 30 | 8C |
| 312431 | | Value 4 | 30 | 8E |
| 312433 | | Date 5 | 30 | 90 |
| 312435 | | Time 5 | 30 | 92 |
| 312437 | | Value 5 | 30 | 94 |
| 312439 | Max W Export Demand | Date 1 | 30 | 96 |
| 312441 | | Time 1 | 30 | 98 |
| 312443 | | Value 1 | 30 | 9A |
| 312445 | | Date 2 | 30 | 9C |
| 312447 | | Time 2 | 30 | 9E |
| 312449 | | Value 2 | 30 | A0 |
| 312451 | | Date 3 | 30 | A2 |
| 312453 | | Time 3 | 30 | A4 |
| 312455 | | Value 3 | 30 | A6 |
| 312457 | | Date 4 | 30 | A8 |
| 312459 | | Time 4 | 30 | AA |
| 312461 | | Value 4 | 30 | AC |
| 312463 | | Date 5 | 30 | AE |
| 312465 | | Time 5 | 30 | B0 |
| 312467 | | Value 5 | 30 | B2 |

## Table 16: Continued...

| | | | | |
|---|---|---|---|---|
| 312469 | Max VAr Capacitive Demand | Date 1 | 30 | B4 |
| 312471 | | Time 1 | 30 | B6 |
| 312473 | | Value 1 | 30 | B8 |
| 312475 | | Date 2 | 30 | BA |
| 312477 | | Time 2 | 30 | BC |
| 312479 | | Value 2 | 30 | BE |
| 312481 | | Date 3 | 30 | C0 |
| 312483 | | Time 3 | 30 | C2 |
| 312485 | | Value 3 | 30 | C4 |
| 312487 | | Date 4 | 30 | C6 |
| 312489 | | Time 4 | 30 | C8 |
| 312491 | | Value 4 | 30 | CA |
| 312493 | | Date 5 | 30 | CC |
| 312495 | | Time 5 | 30 | CE |
| 312497 | | Value 5 | 30 | D0 |
| 312499 | Max VAr Inductive Demand | Date 1 | 30 | D2 |
| 312501 | | Time 1 | 30 | D4 |
| 312503 | | Value 1 | 30 | D6 |
| 312505 | | Date 2 | 30 | D8 |
| 312507 | | Time 2 | 30 | DA |
| 312509 | | Value 2 | 30 | DC |
| 312511 | | Date 3 | 30 | DE |
| 312513 | | Time 3 | 30 | E0 |
| 312515 | | Value 3 | 30 | E2 |
| 312517 | | Date 4 | 30 | E4 |
| 312519 | | Time 4 | 30 | E6 |
| 312521 | | Value 4 | 30 | E8 |
| 312523 | | Date 5 | 30 | EA |
| 312525 | | Time 5 | 30 | EC |
| 312527 | | Value 5 | 30 | EE |

| | | | | |
|---|---|---|---|---|
| 312529 | Max VA Demand | Date 1 | 30 | F0 |
| 312531 | | Time 1 | 30 | F2 |
| 312533 | | Value 1 | 30 | F4 |
| 312535 | | Date 2 | 30 | F6 |
| 312537 | | Time 2 | 30 | F8 |
| 312539 | | Value 2 | 30 | FA |
| 312541 | | Date 3 | 30 | FC |
| 312543 | | Time 3 | 30 | FE |
| 312545 | | Value 3 | 31 | 0 |
| 312547 | | Date 4 | 31 | 2 |
| 312549 | | Time 4 | 31 | 4 |
| 312551 | | Value 4 | 31 | 6 |
| 312553 | | Date 5 | 31 | 8 |
| 312555 | | Time 5 | 31 | 0A |
| 312557 | | Value 5 | 31 | 0C |
| 312559 | Max A Demand | Date 1 | 31 | 0E |
| 312561 | | Time 1 | 31 | 10 |
| 312563 | | Value 1 | 31 | 12 |
| 312565 | | Date 2 | 31 | 14 |
| 312567 | | Time 2 | 31 | 16 |
| 312569 | | Value 2 | 31 | 18 |
| 312571 | | Date 3 | 31 | 1A |
| 312573 | | Time 3 | 31 | 1C |
| 312575 | | Value 3 | 31 | 1E |
| 312577 | | Date 4 | 31 | 20 |
| 312579 | | Time 4 | 31 | 22 |
| 312581 | | Value 4 | 31 | 24 |
| 312583 | | Date 5 | 31 | 26 |
| 312585 | | Time 5 | 31 | 28 |
| 312587 | | Value 5 | 31 | 2A |

## 4.2 Time Based Datalogging

This type of datalogging stores data with a timestamp at a preset time interval. This can be used to take a snapshot of the system at regular time intervals. This data can be used to do in-depth analysis of the system. The number of parameters to be logged and which parameters to store can also be configured by the user through display as well as modbus. Various configuration registers can be found on addresses 46187 to 46251.
The number of entries stored varies according to the number of parameters logged i.e. more entries can be stored if less number of parameters are being logged. User can configure the meter to store 1 to 30 parameters. And the time interval can vary from 1 to 60 minutes. Editing of these parameters is not allowed while the logging is on.

Each entry consists of number of parameters selected by the user in addition to date and time of the entry log.
Max Memory Locations = 273030
Actual parameter stored in Each log = Date +time+Number of parameter selected by user

for ex. Number of parameter selected by user = 1.

Actual parameter stored in Each log = 1(Date) +1(time)+ 1 = 3

Maximum log that can be stored = Max Memory Location/Actual parameter stored in Each log
=273030/3= 91010

Timelog Interval setting = 15 minutes

Log in one day = (60 /Timelog Interval setting) * 24
=(60/15)*24 = 96

Max Days = Maximum log that can be stored / log in one day
= 91010 / 96 = 948.20 days

After all memory allocated locations are filled with logging data, the meter will start shifting data by first in first out queue i.e. at any time after all the locations are used once, the user will have access to the latest logged maximum number of entries.

## Query Format for Downloading the Time based datalog

The query format for downloading an entry of a time datalog is given below. Maximum number of register the user can access in 1 query are limited by 64 and corresponding to it maximum byte count is 128. The byte count should be logging parameter count multiplied by 4 and added to 8, where 8 is the byte count for date and time (4 bytes x 2 parameters).

(logging parameter count x 4) + (2 x 4)
e.g.
if logging parameter count is 10

byte count = (10 x 4) + 8 = 48 (4 bytes per parameter)

number of registers = (10 x 2) + (2 x 2) = 24 (2 registers per parameter)

Starting address will be 01,CA for time datalog.
The entry number of the desired log need to be converted to IEEE format and sent as 4 bytes.

**Query example:**

| Description | Decimal Value | Hex Value |
|---|---|---|
| Dev Addr | 3 | 03 |
| Func Code | 16 | 10 |
| Start Addr Hi | | 01 |
| Start Addr Lo | | CA |
| No of Reg Hi | 00 | 00 |
| No of Reg Lo | 14 | 0E |
| Log Download Bytes | 28 | 1C |
| Entry No Reg 1 Hi | 25 | 41 |
| Entry No Reg 1 Lo | | C8 |
| Entry No Reg 2 Hi | | 00 |
| Entry No Reg 2 Lo | | 00 |
| CRC Lo | | CC |
| CRC Hi | | A4 |

If a user wants to download 5 parameters logged at entry number 25, the query will be as following (Assuming device address 3). All the data in query is represented in hexadecimal float.

**03,10, 01, CA,00,0E,1C,41,C8,00,00,CC,A4**

03 is device address;
10 is function code;
01 CA is the address that lets the user access the time datalog;
00 0E is number of registers to be accessed (actual parameter count x 2+4);
1C is number of bytes to be accessed;
41 C8 00 00 is entry number converted to hex;
CC A4 is CRC calculated on query.

**Response:**

| Description | Hex Value | Decimal Value |
|---|---|---|
| Dev Addr | 03 | 03 |
| Func Code | 10 | 16 |
| No of bytes | 1C | 28 |
| Date | 46,24,28,00 | 010506(May 1st 2006) |
| Time | 40,CC,CC,CD | 6.40 (06:40 am) |
| Parameter 1 | 41,78,1F,68 | 15.50 |
| Parameter 2 | 46,AB,5A,12 | 21933.0 |
| Parameter 3 | 46,AC,57,6A | 22059.7 |
| Parameter 4 | 46,AB,3C,58 | 21918.2 |
| Parameter 5 | 46,A9,AD,9D | 21718.8 |
| CRC | BE,7C | |

The response to time datalog query contains data in following structure.
First two bytes are device address and function code, followed by number of bytes data of 1 byte and then date and a time data of 4 bytes each.
Then requested parameters are received in order that is specified in timelog parameters settings, each of 4 bytes.
The response ends with 2 bytes of CRC.

## 4.3 Load Profile Datalogging

This type of datalogging stores data on each day at time 00:00. The parameters stored in this log include all energies and maximum demands. This log stores data daily as well as monthly interval. Hence, daily and monthly energy consumption can be logged. Furthermore, maximum power demand and maximum current demand during each day and each month is also logged . This data can be used to study load behaviour over a period of time.

The daily data available to the user is maximum of one year interval and the monthly data for 14 years interval assuming the log requested is after the starting date (requesting data before the starting date will result in modbus exception message). 1 year after the starting date, the oldest logs of daily data are constantly replaced with latest logs. 14 years after the starting date, all the load profile logs for that channel are cleared and logging is started again.

This log can be selected or de-selected using memory location 46253, if it is selected, then energy, maximum demand will be logged. The starting date of this datalog is stored in read only memory location 46255.

The user can access different parameters in this log by sending queries using following addresses.

**Note: Changing the meter date resets the load profile log.**

**TABLE 17: Addresses for Load Profile datalog access**

| Parameter | Modbus Start Address | |
|---|---|---|
| | High Byte | Low Byte |
| Daily Energy Datalog Download Addr | 01 | CC |
| Daily Maximum Demand Datalog Download Addr | 01 | CE |
| Monthly Energy Overflow count Datalog Download Addr | 01 | D0 |
| Monthly Energy Datalog Download Addr | 01 | D2 |
| Monthly Maximum Demand Datalog Download Addr | 01 | D4 |

**Note**: Total Monthly energy is combination of overflow count and main energy .

For Example: if overflow count = 2 and main energy is 345678 then total energyfor that month will be,

2x10^9 +345678= 2000345678.

**TABLE 18: Parameter number for Energy datalog Load Profile**

| Parameter number | Description |
|---|---|
| 01 | Imp watt energy |
| 02 | Exp watt energy |
| 03 | Capacitive VAr energy |
| 04 | Inductive VAr energy |
| 05 | Apparent energy |

**TABLE 19: Parameter number for max. Power Demand datalog Load Profile**

| Parameter number | Description |
|---|---|
| 01 | Imp watt Max demand |
| 02 | Exp watt Max demand |
| 03 | Capacitive VAr Max demand |
| 04 | Inductive VAr Max demand |
| 05 | Apparent Max demand |
| 06 | Current Max demand |

**TABLE 20 : Parameter number for Energy overflow datalog Load Profile**

| Parameter number | Description |
|---|---|
| 01 | Imp watt energy OF |
| 02 | Exp watt energy OF |
| 03 | Capacitive VAr energy OF |
| 04 | Inductive VAr energy OF |
| 05 | Apparent energy |

## Query Format for Downloading the Load Profile Datalog

The query format for downloading an entry of a daily load profile log is given below. Maximum number of register the user can access in 1 query are limited by 40.

**Query example:**

| Description | Decimal Value | Hex Value |
|---|---|---|
| Dev Addr | 03 | 03 |
| Func Code | 16 | 10 |
| Start Addr Hi | | 01 |
| Start Addr Lo | | CC |
| No of Reg Hi | 00 | 00 |
| No of Reg Lo | 20 | 14 |
| Log Download Bytes | 40 | 28 |
| Parameter no | 03 | 03 |
| Date | 04 | 04 |
| Month | 11 | 0B |
| Year | 17 | 11 |
| CRC Lo | | AD |
| CRC Hi | | C3 |

**Example:** If a user wants to access daily energy load profile log of Capacitive VAr Energy for 10 days from 4 November 2017 to 13 November 2017, the query for this will be as following.

**03,10,01,CC,00,14,28,03,04,0B,11,AD,C3**

**03** is device address;
**10** is function code;
**01 CC** is the starting address for accessing the daily energy load profile log. (refer **TABLE 17**)
**00 14** is the number of registers to be accessed. This value will be double of the number of parameters requested.
**28** is the number of bytes requested in this query. This value will be 4 times the number of parameters requested.
**03** is the parameter number for Capacitive VAr energy import data. (refer **TABLE 18**)
**04 0B 11** is the starting date of the log to be accessed.
**AD C3** is the CRC added at the end.
**Note**: **Energy is read in integer format.**

**Response:**

| Description | Hex | Decimal |
|---|---|---|
| Dev Addr | 03 | 03 |
| Func Code | 10 | 16 |
| Number of bytes | 28 | 40 |
| Value 1 (Nov 4) | 05,59,F1,C6 | 89780678 |
| Value 2 (Nov 5) | 05,59,F2,40 | 89780800 |
| Value 3 (Nov 6) | 05,59,F3,D0 | 89781200 |
| Value 4 (Nov 7) | 05,59,F4,98 | 89781400 |
| Value 5 (Nov 8) | 05,59,F5,60 | 89781600 |
| Value 6 (Nov 9) | 05,59,F6,28 | 89781800 |
| Value 7 (Nov 10) | 05,59,F6,F0 | 89782000 |
| Value 8 (Nov 11) | 05,59,F7,B8 | 89782200 |
| Value 9 (Nov 12) | 05,59,F8,80 | 89782400 |
| Value 10 (Nov 13) | 05,59,F9,48 | 89782600 |
| CRC | A9,2A | |

The response to the load profile query contains device address,  function code and number of bytes data each of 1 byte, and then the requested parameters of 4 bytes each. Each parameter represents data over a period of a day when daily log is accessed and represents data over a period of a month when monthly log is accessed.
The response ends with 2 byte CRC.
:

**Query example:**

| Description | Decimal Value | Hex Value |
|---|---|---|
| Dev Addr | 03 | 03 |
| Func Code | 16 | 10 |
| Start Addr Hi | | 01 |
| Start Addr Lo | | CE |
| No of Reg Hi | 00 | 00 |
| No of Reg Lo | 20 | 14 |
| Log Download Bytes | 40 | 28 |
| Parameter no | 03 | 03 |
| Date | 04 | 04 |
| Month | 11 | 0B |
| Year | 17 | 11 |
| CRC Lo | | AD |
| CRC Hi | | C3 |

**Example:** If a user wants to access daily energy load profile log of Capacitive VAr max demand for 10 days from 4 November 2017 to 13 November 2017, the query for this will be as following.

**03,10,01,CE,00,14,28,03,04,0B,11,AD,C3,00,14,28,03,04, 0B,11,AD,C3**

**03** is device address;
**10** is function code;
**01 CE** is the starting address for accessing the daily demand load profile log. (refer **TABLE 17**)
**00 14** is the number of registers to be accessed. This value will be double of the number of parameters requested.
**28** is the number of bytes requested in this query. This value will be 4 times the number of parameters requested.
**03** is the parameter number for Capacitive Var max demand data. (refer **TABLE 18**)
**04 0B 11** is the starting date of the log to be accessed.
**AD C3** is the CRC added at the end.

The load profile datalog access query consists of device address and function code followed by the starting address which is different for different parameters and mentioned in **TABLE 17**. Number of registers can vary in multiple of 2, but can not exceed 40 and corresponding to it, number of bytes can not exceed 80.
Parameter number decides the parameter within the log (eg. Capacitive VAr demand from the daily demand log.) Refer **TABLE 18** and **TABLE 19**.
Date, month and year decides the date from which the data is to be downloaded.
All data in the query is represented in hexadecimal format.
At the end 2 byte CRC is calculated.

**Note**: **demand is read in float format.**

**Response:**

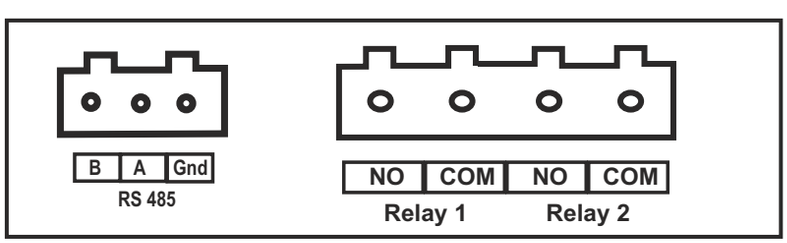
| Description | Hex | Decimal |
|---|---|---|
| Dev Addr | 03 | 03 |
| Func Code | 10 | 16 |
| Number of bytes | 28 | 40 |
| Value 1 (Nov 4) | 43,7A,99,99 | 250.6 |
| Value 2 (Nov 5) | 42,C9,66,66 | 100.7 |
| Value 3 (Nov 6) | 43,16,D4,7B | 150.38 |
| Value 4 (Nov 7) | 44,16,39,9A | 600.9 |
| Value 5 (Nov 8) | 42,97,CC,CD | 75.9 |
| Value 6 (Nov 9) | 43,1C,B3,33 | 156.7 |
| Value 7 (Nov 10) | 43,AF,19,9A | 350.2 |
| Value 8 (Nov 11) | 44,09,A6,66 | 550.6 |
| Value 9 (Nov 12) | 44,39,26,66 | 740.1 |
| Value 10 (Nov 13) | 44,07,6C,CC | 541.7 |
| CRC | A9,2A | |

The response to the load profile query contains device address, function code and number of bytes data each of 1 byte, and then the requested parameters of 4 bytes each. Each parameter represents data over a period of a day when daily log is accessed and represents data over a period of a month when monthly log is accessed.
The response ends with 2 byte CRC.
:

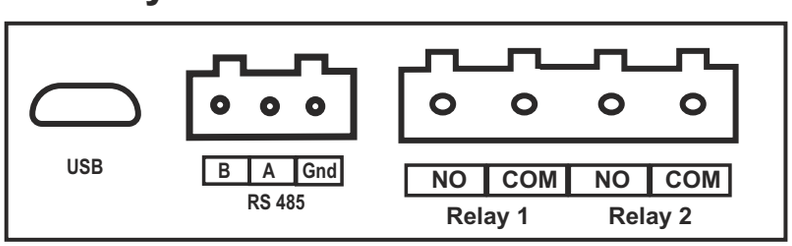
**Note: Modbus exception occurs in the following cases :**
**1. If user tries to access the data before the datalog starting date.**
**2. For daily log, if user tries to access data other than that of the previous 12 months (present month included).**
**3. For monthly log, if user tries to access data other than the 14 years (datalog start year included) after datalog starting year.**

## 5. Connection for Optional Pulse Output / RS 485 (rear view of Multifunction Meter):

### 1. RS 485 Output with Relay1 & Relay2




### 2. USB and RS 485 Output with Relay1 & Relay2



**NOTE**

The Information contained in these installation instructions is for use only by installers trained to make electrical power installations and is intended to describe the correct method of installation for this product. However, ‘manufacturer’ has no control over the field conditions which influence product installation.

It is the user’s responsibility to determine the suitability of the installation method in the user’s field conditions. ‘manufacturer’ only obligations are responsibility to determine the suitability of the installation method in the user’s field conditions. ‘manufacturer’ only obligations are those in ‘manufacturer’ standard Conditions of Sale for this product and in no case will ‘manufacturer’ be liable for any other incidental, indirect or consequential damages arising from the use or misuse of the products.